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Journal of Home Economics Research [JHER]

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In this Issue

Spatio-Temporal Patterns of Intimate Partner Violence Victimization and Preventive Measures among Married Persons in Imo State, South East Nigeria

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Abstract

The study investigated spatio-temporal patterns of intimate partner violence (IPV) victimization and preventive measures among married persons in Imo State, Nigeria. It adopted cross-sectional research design. The population consisted of 1,649,032 married persons in the study area. The sample size was 1,488 married persons drawn using multi-stage sampling procedure and purposive sampling technique. Questionnaire was used for data collection. Frequency, percentage, and binary logistic regression were used for data analyses. Findings reveal that married persons mostly experienced intimate partner violence in the home (23.4%), followed by public places (17.9%), and workplaces (15.4%). overall, married persons mostly experienced intimate partner violence in the morning (19.1%), followed by evening/night (14.9%), and afternoon (12.3%). Married persons indicated that all the proposed preventive measures for IPV were appropriate Gender, education level, place of residence, and length of marriage ($p \leq .05$) were significantly associated with the patterns of various forms of intimate partner violence among married persons.

Keywords: Spatial, Temporal, Pattern, Intimate Partner Violence, Victimization, Preventive Measures

Introduction

Intimate partner violence (IPV) is a major social and public health problem that affects men and women across the globe regardless of their culture, religion and other demographic characteristics. It remains a public health and human rights issue, disproportionately affecting women (Benebo et al., 2018; Gilchrist et al., 2022), and over a quarter of women aged 15-49 years who have been in a relationship have been subjected to physical and sexual violence by their intimate partner at least once in their lifetime (since age 15) (World Health Organization [WHO], 2021). Although, numerous studies report that the preponderance of IPV is perpetrated by men, a growing number of researchers and political activists claim that women and men are equally victimized (Archer, 2000). Traditional perspectives on IPV assumed that perpetrators were men trying to assert dominance.

Typology researchers refuted this perspective, stating that although some violence is male-on-female, the majority are gender mutual.

Intimate partner violence is a social menace that is common in Africa with Nigeria being no exception. Intimate partner violence involves any behaviour by a spouse causing physical, sexual, stalking, sexual coercion, psychological abuse, financial abuse, and controlling behaviours by a current or former intimate partner, whether or not the partner is a spouse (Centers for Disease Control and Prevention [CDC], 2017; WHO, 2022). Physical violence includes: hitting, slapping, punching, choking, pushing, burning, injuries; sexual violence includes: any act, attempt to obtain a sexual act, or advances or otherwise directed against a person's sexuality using coercion by any person regardless of their relationship to the victim; and emotional violence includes: humiliation, economic deprivation, intimidation, stalking, extreme controlling behaviour, isolation, verbal abuse, and threats (WHO, 2013). However, this study focused on victims of IPV, and the victims are usually married persons. Moreover, married persons are partners or men and women who live together, and share both good and bad moments within a legal union in Imo State.

Intimate partner violence can manifest in different patterns. Spivak and Shannon (2015) described pattern as the various forms something may take place. However, pattern refers to regular and various ways married persons are victimized or perpetrate IPV against their partners as it relates to spatial, temporal, and demographic variations. Also, Global Burden of Disease (GBD, 2021) differentiated pattern into three main forms of variations, namely: spatial, temporal, and demographic patterns. Spatial pattern refers to occurrence of IPV according to location, such as in the home, workplaces, and public places (streets etc) within Imo State. Temporal pattern refers to the time or period (morning, afternoon, evening, and night) when intimate partners (married persons) are victimized or are subjected to violence of all forms, while, demographic pattern refers to pattern of occurrence of IPV that could be attributed to environmental factors, such as gender, education level, place of residence, age, and length of marriage among others.

Intimate partner violence can be predicated by demographic (gender, education level, place of residence, age, and length of marriage etc) factors. A number of studies have focused on the possibility that the causes of violence are not the same for men and women. Perpetrators and victims of violence are however of both sexes. According to Oseni et al. (2022), IPV was significantly higher among women compared with men. Also, Ezenwoko et al. (2023) reported that men and women reciprocally reported experiencing IPV during the lockdown period. Age has been implicated to be associated with IPV perpetration and

victimization. Young age has consistently been found to be a risk factor for a man committing physical violence against a partner (Black et al., 2011). Individuals with greater education appear to less likely become victims or perpetrators of IPV. Abramsky et al. (2011) reported that completing secondary education has a protective effect on IPV risk, whereas primary education alone fails to confer similar benefits. Marital duration of more than 15 years seems to be a potential protective factor against male perpetration of IPV (Johnson & Das, 2009). Urban and rural residences are highly predictive of IPV (Antai & Antai, 2009; Jones & Ferguson, 2009).

Intimate partner violence victimization can erode families by reducing productivity and household property. The negative consequences of IPV extend beyond partner's physical, sexual, and emotional reproductive health to their overall health; the welfare of their children; and the economic and social development of the nation. Consequences of IPV can be reduced or prevented by adopting some preventive measures. In this study, preventive measures refer to all measures or activities designed to reduce and prevent the occurrence of IPV among married persons. Seeking shelter or counseling services, reporting to police, going for health services and seeking help from a health service provider are among the preventive measures advocated (WHO, 2005).

. While there have been global studies that documented the prevalence or magnitude of different forms of IPV, it has mainly been violence against women, and there has been little research on prevalence of exposure to different forms of IPV, patterns, and preventive measures to mitigate its menace. Little is known about reciprocal violence with regards to its context and spatio-temporal patterns of occurrence. IPV is underreported by its victims for fear of reactions from partners or family members, and is handled with levity and triviality (Ezenwoko et al., 2023; WHO, 2013). In Imo State Nigeria, often times, married persons are seen battering at various places and time resulting to frequent visitation of hospitals for treatment of injuries and psychological trauma emanating from IPV. However, spatial and temporal patterns and preventive measures of IPV have not been examined among married persons (men and women) in Imo State. To fill this gap in the knowledge base, this study examined the spatio-temporal patterns of IPV victimization and preventive measures in Imo State, Nigeria.

This study finding would provide valuable information for health care and public health professionals to implement effective IPV prevention. Married persons would find the results useful in making informed decision on matters of IPV patterns of occurrence that affect their healthy relationships with their partners and neighbours.

Objectives of the Study

The purpose of the study was to investigate the spatio-temporal patterns of intimate partner violence (IPV) victimization and preventive measures among married persons in Imo State, Nigeria Specifically, the study determined the:

1. spatial pattern of various forms of intimate partner violence among married persons;
2. temporal pattern of various forms of intimate partner violence among married persons; and
3. preventive measures for intimate partner violence among married persons.

Hypothesis

1. There is no significant association between the patterns of various forms of intimate partner violence and socio-demographic factors (gender, education level, place of residence, age, and length of marriage) among married persons in Imo State, South East Nigeria ($p \leq .05$).

Methodology

Design of the Study: The study adopted descriptive cross-sectional research design.

Area of the Study: The study was conducted in the three Senatorial Districts (Imo East [Owerri zone], Imo West [Orlu zone], and Imo North [Okigwe zone]) that make up Imo State, South East, Nigeria. In Imo State Nigeria, IPV is underreported by its victims for fear of reactions from partners or family members, and is handled with levity and triviality (Ezenwoko et al., 2023; WHO, 2013). Little is known about reciprocal violence with regards to its context and spatio-temporal patterns of occurrence.

Population for the Study: The study population comprised married persons in the study area. Married persons are men and women who are legally married. The projected population of married men and women is 1,649,032; comprising 830, 261 men and 818,771 women; which is 31.6% of the entire population in Imo State (National Population Commission, 2015). Only persons who were currently married were included in the study. Divorced, separated, cohabitating, and single parents were not involved in the study.

Sample for the Study: The sample size was 1,440 married persons. The sample size was determined using Cohen et al. (2011) Standardized Table for Random Samples, which states that when a population size is 1,000,000 or above at 95% confidence level (5% intervals), the sample size should be 384 or above.The multi-stage sampling procedure was employed. Four (2 urban & 2 rural) local government areas (LGAs) were randomly selected from each of the

four Senatorial Districts, to give it a total of 12 LGAs (6 urban & 6 rural). Two communities wererandomly drawn, each out of the 110 communities that made up the 12 drawn LGAs. This gave a total of 24 communities. Two villages were also randomly drawn from each of the communities. This gave a total of 48 villages. Finally, 30 married persons (15 men & 15 women) were drawn from each of the 48 villages, which gave a total of 1,440 respondents.

Instrument for Data Collection: Questionnaire was used for data collection. It consisted of 18 items classified into three parts. Part A sought information on demographic characteristics.Part B consisted six items (three items for spatial pattern and 3 items for temporal pattern) of various forms of IPV victimization. Part C consisted seven items on preventive measures of IPV.The questionnaire was validated by five experts from public health education, and was tested for internal consistency. Reliability indices of .82 and .77 were obtained for spatial pattern and temporal pattern scales respectively using Cronbach's alpha, while a reliability index of .79 was obtained for preventive measures scale using split half method (Spearman Brown Coefficent).

Data Collection Technique: A total number of 1,440 copies of the questionnaire were administered to the spouses. Only 1,433 copies were returned, which gave a return rate of 99.5 per cent. Only 1,427 copies were however properly completed and used for analysis.

Data Analysis Technique: Frequency and percentage were used for analyses of the research questions. Binary logistic regression was used to assess the association between socio-demographic covariates and IPV victimization at .05 level of significance. The criterion for deciding an appropriately indicated preventive measure of IPV was cut off point of 50 per cent. Therefore, a percentage score that had less than 50 per cent was deemed not appropriate, while those that had 50 per cent or above were deemed appropriate. The null hypothesis was tested using logistic regression at $p \leq 0.05$.

Results

Table 1: Spatial Pattern of Various Forms of Intimate Partner Violence among Married Persons

S/N	Intimate Partner Violence Experience	$F(\%)_h$	$F(\%)_w$	$F(\%)_p$	$F(\%)_n$
1	Physical violence (e.g., slapping, choking, kicking, beaten up, threatened with weapons etc)	330 (23.1)	307 (21.5)	204 (14.3)	586 (41.1)
2	Sexual violence (e.g., forceful engagement in sexual intercourse without your consent, rape, using physical violence and threats to lure you into sexual intercourse etc)	241 (16.9)	143 (10.0)	217 (15.2)	826 (57.9)
3	Emotional violence (e.g., assault, humiliation, intimidation, threatening, deprival of access to social amenities, family members and friends, deprivation of basic economic needs, prevention from resource acquisition, neglect, ignoring, treating you indifferently, calling you names, ridiculing and criticizing you always in the public places (street, health facilities, institutions, restaurants, public transport, meeting places etc)	433 (30.3)	208 (14.6)	345 (24.2)	441 (30.9)
	Overall percentage	23.4	15.4	17.9	43.3

$F(\%)_h$ = Home; $F(\%)_w$ = Workplace; F(%)p = Public Place; $F(\%)_n$ = None

Table 1 shows that overall, married persons mostly experiencedIPV in the home (23.4%), followed by public places (17.9%), and workplaces (15.4%). Also, the table shows that emotional violence (30.3%) and physical violence (23.1%) are mostly experienced in the home. Furthermore, physical violence (21.5%) is mostly experienced in the workplaces, while emotional violence (24.2%) is mostly experienced in the public places.

Table 2: Temporal Pattern of Various Forms of Intimate Partner Violence among Married Persons

S/N	Intimate Partner Violence Experience	$F(\%)_1$	$F(\%)_2$	$F(\%)_3$	$F(\%)_4$
1	Physical violence (e.g., slapping, choking, kicking, beaten up, threatened with weapons etc)	218 (15.3)	142 (10.0)	202 (14.2)	865 (60.6)
2	Sexual violence (e.g., forceful engagement in sexual intercourse without your consent, rape, using physical violence and threats to lure you into sexual intercourse etc)	174 (12.2)	137 (9.6)	157 (11.0)	959 (67.2)
3	Emotional violence (e.g., assault, humiliation, intimidation, threatening, deprival of access to social amenities, family members and friends, deprivation of basic economic needs, prevention from resource acquisition, neglect, ignoring, treating you indifferently, calling you names, ridiculing and criticizing you always in the public places (street, health facilities, institutions, restaurants, public transport, meeting places etc)	427 (29.9)	249 (17.4)	280 (19.6)	471 (33.0)
	Overall percentage	**19.1**	**12.3**	**14.9**	**53.6**

$F(\%)_1$ = Morning; $F(\%)_2$ = Afternoon; $F(\%)_3$ = Evening/Night; $F(\%)_4$ = None

Table 2 shows that overall, married persons mostly experienced IPVin the morning (19.1%), followed by evening/night (14.9%), and afternoon (12.3%). Also, the table shows that emotional violence is mostly experienced in the morning (29.9%); followed by evening/night (19.6%). Furthermore, physical violence is mostly experienced in the morning (15.3%); followed by evening/night (14.2%), while sexual violence is mostly experienced in the morning (12.2%); followed by evening/night (11.0%).

Table 3: Preventive Measures for Intimate Partner Violence among Married Persons (*n*=1,427)

S/N	Spousal Violence Indicators	F(%)
1	Preventive measures, such as providing shelter for the victims, reporting cases of abuse to the law enforcement agencies, holding abusers responsible for their actions etc.	1075 (75.3)
2	Providing guidance and counseling and support for victims at various sites	839 (58.8)
3	Education and enlightenment, such as training everyone in non-violent conflict resolution through family life education, reduction in the amount of imagery on TV and home videos, Campaigns to raise awareness about dangers of violence etc.	959 (67.2)
4	Developing good communication skills while relating with my partner, and avoiding verbal abuse such as name calling	987 (69.2)
5	Providing financial support for victims of violence, and allowing partner to acquire resources	753 (52.8)
6	Teaching conflict resolution and social skills at schools	723 (50.7)
7	Changing social and cultural gender norms through media awareness campaigns	871 (61.0)
	Overall percentage	62.1

Table 3 shows that overall, 62.1 per cent of the married persons indicated that all the proposed preventive measures for intimate partner violence were appropriate.

Table 4: Binary Logistic Regression of Patterns of Intimate Partner Violence and Socio-demographic Covariates

Variables	n(%)	COR	*p*	AOR	*p*
Gender					
Male	708 (49.6)	-	-	-	-
Female	719 (50.4)	8.568	.042	1.543*	.024
Education Level					
No Formal Education	116 (8.1)	-	-	-	-
Primary Education	177 (12.4)	.352	.000	.363***	.000
Secondary Education	408 (28.6)	.193	.000	.197***	.000
Tertiary Education	726 (50.9)	.058	.000	.056***	.000
Place of Residence					
Rural	735 (51.5)	-	-	-	-
Urban	692 (48.5)	.867	.198	1.283*	.047
Age					
18-43 years	753 (52.8)	-	-	-	-
44+ years	674 (47.2)	1.328	.010	.986	.930
Length of Marriage					
< 10 years	581 (40.7)	-	-	-	-
10-24 years	494 (34.6)	1.494	.002	1.408*	.025
25+ years	352 (24.7)	1.706	.000	1.361	.130

*COR = Crude Odds Ratio, AOR = Adjusted Odds Ratio; *p < 0.05; **p < 0.01; ***p < 0.001*
Reference Groups: Gender = Male; Education Level = No Formal Education; Place of Residence = Rural; Age = 18-43 years; Length of Marriage = < 10 years

Table 4 shows that gender, education level, place of residence, and length of marriage were significantly associated with the patterns of various forms of IPV among married persons in Imo State, South East Nigeria. In a multivariate analysis, female partners workers had 54.3%higher likelihood to be victimized in various patterns than the male partners (AOR = 1.543, p<.05). Partners with primary (AOR = .363, p<.001), secondary (AOR = .197, p<.001), and tertiary (AOR = .056, p<.001) education had 63.7%, 80.3%, and 94.4% respectively lesser likelihood to experience various forms of IPV than those with no formal education. Partners residing in the urban setting had 28.3% higher likelihood to experience various forms of IPV victimization than those residing in rural setting (AOR = 1.283, p<.05). Partners that have spent 10-24 years in marriage had 40.8% higher likelihood to experience various forms of IPV than those that have spent < 10 years in marriage (AOR = 1.408, p<.05).

Discussion

Married persons mostly experienced IPV in the home, followed by public places, and workplaces. Also, the table shows that emotional violence and physical violence are mostly experienced in the home. Furthermore, physical violence is mostly experienced in the workplaces, while emotional violence is mostly experienced in the public places (Table 1). These findings were expected and therefore not surprising, because various forms of IPV occur in diverse geographical settings. The finding that various forms of IPV mostly occurred at home was expected and therefore not surprising, because it was in line with Salari (2007) who reported that the most dangerous setting for IPV was the home or to be victimized repeatedly. The finding was consistent with the WHO (2005) who found that majority of IPV takes place in the privacy of the home; and Ediomo-Ubong and Iboro (2010) who reported that the family is the hot bed for IPV, and that most forms of IPV take place in the family space. The commonly held perception is that home is a place of safety or refuge for people other than a place for perpetration or experience of violence.

The finding that various forms of IPV occurred in the workplace was expected and therefore not surprising, because it was in line with Elserberg and Mcbohirter (1999) who reported that 75 per cent of battered partners are harassed in their work settings by their abusers. The findings could be attributed to the fact that intimate partners mostly stay together at home and regularly visit each other in the workplace. The report that sexual violence mostly occurred at home more than other places was expected and therefore not surprising. Violence at home or any geographical location may disrupt child development and

encourage perpetration of violence by those who witnessed it. The findings have implications in understanding the dynamics of IPV by trained clinicians, social workers and counselors.

Married persons mostly experienced IPV in the morning, followed by evening/night, and afternoon. Also, the table shows that emotional violence is mostly experienced in the morning; followed by evening/night. Furthermore, physical violence is mostly experienced in the morning; followed by evening/night, while sexual violence is mostly experienced in the morning; followed by evening/night (Table 2). These findings were expected and therefore not surprising, because various forms of IPV among married persons can take place during any time or period of the day. The findings were in line with Roger (2013) who found that in Uganda, most of the women had experienced IPV at least once in their lifetime, in the past year, with experiences of sexual IPV, physical IPV, and verbal IPV; and Porder et al. (2009) and Spivak and Shannon (2015) who reported that temporal pattern is used to answer questions about the state of information in the previous times or past years. The finding that temporal IPV only occur mostly in the morning was unexpected and surprising because the report of occurrence of the various form of IPV would have been mostly at night because it is the time partners are back home to relate with each other more than other times of the day.

Married persons indicated that all the proposed preventive measures for IPV were appropriate (Table 3). These findings were expected and therefore not surprising as prevention of public health problems is achieved through the application of certain measures as protective factors. These preventive measures were consistent with the intervention strategies against IPV designed by WHO (2005) and Harvey et al. (2007) which included seeking shelter or counseling services, reporting to police, going for health services, attending programmes that educate about family violence, supporting further research collaborations on causes of IPV, establishing, implementing, and monitoring action plans to address violence by intimate partners among others. A public health approach emphasizes the primary prevention of IPV, which is stopping them from occurring in the first place. This implies reducing the number of new instances of IPV or by intervening before any violence occurs.

Gender, education level, place of residence, and length of marriage except age were significantly associated with the patterns of various forms of IPV among married persons in Imo State (Table 4). Female partners had higher likelihood to be victimized in various patterns than the male partners. Partners with primary, secondary, and tertiary education had lesser likelihood to experience various forms of IPV victimization than those with no formal education. Partners residing in the urban setting had higher likelihood to experience various forms of IPV victimization than those residing in the rural setting. Partners that have spent

10-24 years in marriage had higher likelihood to experience various forms of IPV victimization than those that have spent < 10 years in marriage. The finding on gender was unexpected and therefore surprising as one would expect females to experience higher rates of IPV than their male counterparts conventionally. The finding was consistent with Hines and Douglas (2010) who found that men experienced more psychological, sexual, and physical violence including sustaining injuries than women, as female partners of men in the help seeking sample used more physical IPV, controlling behaviours, and severe psychological aggression than their male partners in the community sample. Also, the finding conforms to Machado et al. (2016), Oseni et al. (2022), and Ezenwoko et al. (2023) who found that a large body of research clearly indicates that men and women are victims of IPV. This finding is somewhat in line with the perspectives of the family violence theorists that men and women are violent at near equal rates. The finding on education level was expected and surprising. The finding is consistent with the findings of Jones and Ferguson (2009), Abramsky et al. (2011), and Black et al. (2011) that education level is associated with IPV occurrence in various forms and patterns. This finding may result in developing initiatives to improve access to higher education and in expanding educational opportunities for married persons.

The finding on place of residence are unexpected and therefore surprising as one would expect IPV to occur more in the urban areas due to overcrowding and influx of commercial activities. The finding is consistent with Jones and Ferguson (2009) who found that urban residence is highly predictive of IPV, and that rural residence decreases the odds of IPV. Furthermore, the finding was not consistent with Antai and Antai (2009) who found that rural residence was associated with higher risk of IPV among the women in the Niger Delta of Nigeria. The finding on age was unexpected and therefore surprising as age especially younger age is conventionally expected to contribute to IPV experience. The finding was not consistent with the findings of Black et al. (2011), Abramsky et al. (2011), and Trotman (2013) that age increased the risk of IPV. The finding on length of marriage was unexpected and therefore surprising as the researcher expected length of marriage, especially marriages that have lasted over 10 years to act as protective factor against IPV experience other than recent marriages. Also, the findings were consistent with Trotman (2013) who reported that length of relationship variable did not significantly predict experience of physical, emotional, and sexual violence. However, the findings supported the assertion of Johnson and Das (2009) that marital duration of more than 15 years seems to be a potential protective factor against male perpetration of IPV.

The findings of this study have important implications for health care and public health professionals. Public health awareness and prevention programmes would be used to mitigate the occurrence of IPV in various patterns, and emphasize the potential detrimental interpersonal effects of IPV occurrence. The findings have implication for making informed decision and policies on matters of IPV that affect relationship with people or partners.

There are some limitations that should be noted of this study. First, measures assessed using participant reports about their experiences of violence are thus subjected to recall bias and reporting bias. Second, there is the potential for unmeasured confounders that may influence the relationships between the key variables under study.

Conclusion

The findings of this study showed that married persons were victimized physically, sexually, and emotionally mostly in the home, public places and in the morning hours in Imo State, Nigeria. Gender, education level, place of residence, and length of marriage are very important factors considered in dealing with IPV victimization among married persons.

Recommendations

1. Government and religious bodies should organize public programmes to enlighten married persons on various forms of IPV, where and when they occur most, and its possible preventive measures.
2. Government at all levels should strengthen the implementation of legal sanctions and policy frameworks to mitigate high rate of bidirectional intimate partner violence.
3. Public awareness and education campaigns that address intimate partner violence should be gender inclusive.

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Effects of Processing Methods (Boiling, Soaking and Fermentation) on Nutrient and Anti-nutrient Composition of African Oil Bean (*Pentaclthra macrophylla)* Seeds.

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Abstract
This study investigated the nutrient and anti-nutrient compositions of African oil bean seed (*Pentaclthra macrophylla*) samples subjected to three processing methods (boiling, soaking and fermentation). It was an experimental study. The samples were subjected to different processing methods(soaking, boiling and fermentation). Association of Analytical Chemist (2010) and other analytical methods were used to determine the nutrient and anti –nutrient composition of the samples.Data were analyzed using means, standard deviation and ANOVA at 0.05 level of significance. Duncan's new multiple range test was used to separate the means. The result reveal that fermented sample had highest protein (16.26%) and fibre (5.24%), appreciable fat (20.66%), and ash (5.10%) with low carbohydrate (21.47%). For the minerals and vitamins, the soaked sample contained 289.73±2.16mg/100g of calcium, 3.25±0.02mg/100g of iron, and 37.80±0.00mg/100g of phosphorus and 377.38±0.52µg/100g for pro vitamin A. The result of the anti-nutrients showed that the tannin content of all the samples were within the acceptable limits of 0.201 to 0.296 mg/100g, while the boiled sample had the least value of oxalate (39.00±1.41mg/100g) and phytate (38.79±1.39mg/100g). This study showed that soaking and fermentation possessed superior nutritional benefits while boiling reduced the levels of anti-nutrients.

Keywords: Nutrients, Anti- nutrients, Processing, Boiling, Soaking, Fermentation, African Oil, Bean, Seeds

Introduction

The African oil bean tree (*Pentaclethra macrophylla)* is a large leguminous woody plant that belongs to the sub-family *Mimosoidae* (Enujiugha, 2003). It is popular in Nigeria where it is known by several names such as *Apara* in Yoruba, *Ukana* in Efik, and, the most prominent, *Ugba/Ukpaka* in Igbo. The seed pulp of *P. macrophylla* is consumed boiled or roasted, and more frequently undergo fermentation prior to their consumption (Ugbogu *et al.,* 2020). It is native to tropical Africa and holds significant potential as a versatile food source due to its rich nutrient composition. Traditionally, the seed is consumed in various forms across West Africa, this seed is valued for its high protein and fat content, contributing significantly to local diets (Oyeleke et al., 2014).The seed is a good source of minerals, vitamins, fibre and contain many phytochemicals. African oil bean seed is rich in essential amino acids as well as fatty acids and minerals. The seed contains more than 52 percent oil in its cotyledons, with polyunsaturated fatty acid especially linoleic and oleic acids constituting more than 82 percent of the fatty acids in the seed (Nwachukwu et al.,2018). Among the Igbos of Nigeria, its commonest folklore culinary application is the

fermented seed product popularly called *Ugba*. which has a meaty taste and is served both as a delicacy and a soup flavoring agent (Ugbogu *et al.*, 2020).

Recently, there has been a significant increase in research focused on tapping into the nutritional benefits of lesser-known legumes and oil seeds due to limited availability and high costs of animal protein sources and some plant protein sources (Hoehnel, et al., 2022). Nigeria as well as other countries in Africa depend on these foods to satisfy their nutritional needs. The growing population has put enormous pressure on the staple food availability of the people, and imported foods are relatively expensive and unaffordable to the majority of the populace due to poverty (Igbozuliki et al. 2020). Despite the nutritive value of the African oil bean seed, its high oil content, short shelf life and the presence of antinutrients are some of the reasons limiting its use as a food supplement.

Different food processing methods have various effects on nutrients present in the food including both positive and negative effects. Food processing techniques affects the food in various ways including taste augmentation, texture retention etc. (Singh et al. 2023). Treatment such as soaking, cooking, fermenting, roasting and malting have been found to increase the nutritive quality of African oil bean seed (Ajeigbe et al., 2012). However, there is no streamlined method, safety guideline or standards and so production practices and packaging are on individual/family basis. The non-standardized processing methods is a major concern that needs adequate research (Eluchie et al., 2021).

African oil bean goes through several primary processes before it is used in different food preparations. They are processed to detoxify the antinutritional factors, increase palatability and improve bioavailability of the nutrient (Oly-Alawuba & Anunukem, 2018).The methods of processing and also the length of fermentation vary from one producer to another with the final intended use resulting in non-uniform products (Nwokeleme & Obeta-Ugwuanyi, 2015). Over the years, fermentation has become part of the culture and traditions of most indigenous communities in developing countries especially in Africa (Okechukwu et al., 2015). Fermentation is a metabolic process which involves the conversion of carbohydrate by microorganism into an alcohol or an acid. It is a simultaneous process which involves several catabolic and anabolic reactions that depends on several conditions, including substrate, micro flora, and environmental factors (Nwachukwu et al., 2018). This metabolic conversion in food is owed greatly to microbial enzymic reactions (Okechukwu et al., 2015).

Soaking affects legumes either adversely or beneficially. Soaking reduces anti-nutritional factors such as trypsin inhibitors of legumes; water-soluble minerals, vitamins, amino acids, proteins and sugars are solubilized by the soaked water (Oly-Alawuba & Anunukem, 2018). Prolonged soaking causes enzyme driven changes in proteins, starch and cell wall materials, thereby inducing changes in physico-chemical and functional properties of foods (Sokari& Wachukwu, 2007). Understanding the balance between these nutrients and antinutrients is crucial to optimizing the bean's nutritional benefits and mitigating any adverse effects. This study aims to explore the nutrient and antinutrient composition of the African oil bean seed, highlighting its potential as a functional food.Therefore, there is need to evaluate the different methods of processing high grade of edible African oil beans seeds to minimize the loss of nutrients and also reducing the anti-nutritional factors.

Objectives of the study

The broad objective of this study is to investigate effects of processing methods (boiling, soaking and fermentation) on nutrient and anti-nutrient composition of African oil bean(*Pentaclthra macrophylla*) seeds.Specifically, the study determined:

1. proximate composition (crude protein, ash, fiber, fat, moisture and carbohydrate) of the boiled, soaked and fermented African oil bean (*Pentaclthra macrophylla*) seed samples,
2. mineral composition (iron, zinc, calcium, phosphorus) of the different samples,
3. vitamin composition (vitamin A, B_1, B_2) of the different samples,
4. anti-nutrient composition (phytate, oxalate, tannin) of the different samples.

Materials and methods

Study design: This study adopted an experimental design

Procurement of raw materials: African oil bean seed was purchased from Orie Orba main market in Udenu Local Government Area of Enugu State, Nigeria.

Sample preparation: This involved the following;

Processing of African Oil Bean Seed: Five kilogram of African oil bean seed was sorted to remove dirt and damaged ones. It was washed with portable water, boiled for six hours, dehulled, sliced into 2.0 mm thick with knife and re-washed. It was then divided into three portions and labeled as B, S and F. All samples were each boiled for two hours, drained and cooled.Sample Bwas dried for 12 hours and packaged in a well labeled air tight container. Sample S was soaked for 10hrs, drained, sun dried for 12 hours and packaged. Sample F was soaked and fermented for 72 hours, sun dried for 12 hours and packaged. All samples were labelled (B, S, F) appropriately. Each sample was thus divided into four portions for four sets

of analysis based on the four specific objectives of the study and taken to the laboratory for analysis.

Proximate analysis: Association of Analytical Chemist AOAC (2010) and Pearson (2005) method were used to determine the proximate composition of the samples.

Protein: The micro Kjeldahl method was used for the determination of protein. One milliliter of each sample was digested with concentrated sulphuric acid, distilled and titrated. The crude protein was obtained by multiplying N by the conversion factor of 6.25 (cP =TN x 6.25).

Fat: Two milliliters of each sample was extracted with acetone (BP 400C – 600C) using "Sohxlet extractor" for 1 hour. The solvent free samples were dried in an oven, cooled in a dissector and reweighed prior to calculation of crude fat content.

Ash: Two milliliters of each sample was weighed into already weighed crucibles, labelled and put into the furnace, heated gradually until the temperature was maintained or 550 - 6000C was reached for 6 hours. After ashing, the furnace was switched off; temperature was allowed to drop prior to removing the crucibles. Crucibles was put in desiccators and cooled, samples were reweighed and percentage ash calculated.

Crude Fiber: 100ml of 1.25% sulphuric acid (H2SO4) was added into the flask and made to boil over a heater for about 30minutes, filtered using a Buckner funnel and filter flask. The residue was put back into flask and diluted with 100ml of 1.25% NaOH and heated for another 30minutes and filtered using suction method. The residue was rinsed with 1% HCl, and added to neutralize the NaOH present, washed with methylated spirit to remove any trace of acid. The residue was put into a weighed crucible, dried in an oven set at 100 C for 30minutes, cooled in a desiccator and reweighed. The residue was put into a muffled furnace set at 550 C for 2hours for complete ashing. The ash was weighed and the percentage fiber in the sample calculated.

Moisture: The Petri dishes were washed, dried in hot air oven at 1000C for about 25 minutes, and cooled in desiccators for 10minutes. The dishes were reweighed. Two milliliters of sample was added to each dish in hot air oven, dried for two hours, removed, cooled in desiccators, reweighed and dried until a constant weight was obtained. The percentage moisture was calculated.

Carbohydrate: This was determined by Difference that is, subtracting the sum of the percent of protein, fat, moisture, and ash from 100 percent. Carbohydrate percentage was calculated.

Mineral Analysis: Association of Analytical Chemist AOAC (2010) was used to determine the mineral composition of the samples

Iron: Five milliliters of Phenanthroline solution and two milliliters of concentrated HCl were added in the test-tube. One milliliter of hydroxylamine solution was added and left to boil for 2mins. Nine milliliters of ammonium acetate buffer solution was added and diluted with 50ml of water. The absorbance was read at 510nm wavelength.

Calcium: Previously ashed sample was dissolved in 5ml of 30% HCl and 45ml of distilled water. The diluted samples were filtered and the filtrates were used to analyze for calcium using atomic absorption spectrophotometer.

Zinc was separated from other metals by extraction with dithizone and then determined by measuring the colour of the zinc dithizone in carbon tetrachoric. Two grams of the digested sample was pipette into test tube and 5ml of acetic buffer was added. 1ml of sodium thiosulphate solution was added and mixed after which 10ml of dithizone solution was added. The mixture was shaken for 40 minutes, and the reading taken at 535nm, the standard was prepared and zinc concentration of the sample was calculated.

Phosphorus: Two grams of each sample was pipette into 50ml of graduated flask. Ten milliliters of molybdate mixture were added and diluted to the mark with water. It was allowed to stand for 15minutes for colour development. The absorbance at 400nm was measured against the blank. A standard graph was plotted relating absorbance to phosphorus concentration. Concentration of phosphorus (mg/ml) was extrapolated from the graph.

Vitamin Analysis: Pro Vitamin A was determined using Pearson (2005) method while Vitamin B_1 and Vitamin B_2 were determined using Association of Analytical Chemist AOAC (2010).

Pro Vitamin: Two (2) milliliters of each sample was put into a film container and 20ml of petroleum ether was added. The solution was filtered through Whatman filter paper No 42. The filtrate was evaporated to dryness, later dissolved with 0.2mls of chloroform acetic anhydride, 2mls of TCA chloroform was added and read at 620nm using a spectrophotometer.

Vitamin B_1: Five (5) grams of samples are homogenized with 50ml of ethanoic sodium hydroxide solution. This will be filtered into a 100ml flask. A 10ml of the filtrate was pipetted into a beaker and color developed by the addition of 10ml potassium dichromate. The absorbance was read at 360nm. A blank sample was prepared and read at same wavelength. The values were extrapolated from a standard curve.

Vitamin B_2: Five (5) grams of each of the samples was extracted with 100ml of 50% ethanol solution shaken for 1 hour. This was filtered into a 100ml of 30% hydrogen peroxide (H_2O_2)

and allowed to stand over hot water bath for 30mins. 2ml of 40% sodium sulphate was added to make up the 50ml mark and absorbance read at 510nm in a spectrometer.

Anti-nutrient Composition: This was determined by using the method described by Association of Analytical Chemist AOAC (2010)

Phytate: About 0.5gram of the sample was weighed into 500ml of 2.4% HCl for 1hour at room temperature, poured out and filtered. From the filtrate, 5 milliliters were pipette and diluted to 25ml of water. From the diluted sample, 10ml was pipetted into a test-tube through amber liters in grade 200 – 400 mesh to elude inorganic phosphate and added 15mililiter of 0.7m sodium chloride. The absorbance was taken at 520nm.

Tannin: Five grammes of the sample was extracted with 300ml diethyl ether for 20 hours at room temperature. The residue was boiled for 2 hours with 100ml distilled water, cooled and filtered and the extract was adjusted to a volume of 100ml in a volumetric flask. Then, calorimetrically using Folin- Denis reagent, the tannins content was determined by measuring the absorbance of the solution at wavelength of 760nm.

Oxalate: One gram of the sample was weighed into 100mL conical flask. Then, 75mL of 3M H2SO4 was added and the solution stirred intermittently with a magnetic stirrer for about one hour. It was filtered and the filtered collected and titrated hot O.1N potassium permanganate (KMnO4) solution t temperature of (80-90 c) until a faint pink color appeared and persisted for at least 30 seconds.

Data Analysis: Data generated from the study were analyzed with means and standard deviation.

Results

Table 1: Proximate composition of the samples of cooked, soaked and fermented African oil bean samples

Samples	Protein (%)	Ash (%)	Crude fibre (%)	Fat (%)	Moisture (%)	Carbohydrate (%)
Boiled AOB	13.16^{b}±0.164	1.92^{c}±0.120	3.82^{b}±0.028	20.66^{a}±0.148	38.99^{c}±0.021	21.47^{a}±0.482
Soaked AOB	12.27^{c}±0.325	5.10^{a}±0.141	2.56^{c}±0.021	17.74^{c}±0.064	46.30^{b}±0.092	16.05^{b}±0.516
Fermented AOB	16.26^{a}±0.215	3.85^{b}±0.212	5.54^{a}±0.014	18.54^{b}±0.170	47.27^{a}±0.021	8.55^{c}±0.174

Keys: AOB- African oil bean. Values are mean ± Standard deviation; values with different superscripts across the rows are significantly different.

Table 1 shows the result of proximate composition of cooked, soaked and fermented African oil bean samples. The protein content of the samples ranged from 12.27- 16.16%. The ash content of the sample ranged from 1.92 - 5.10%. The moisture content of the samples varied from 38.99 -47.27%. The fat contents varied from 17.74 - 20.66%. The crude fibre content of

the samples oscillated between from 2.56 to 5.54%. The carbohydrate content of the samples ranged from 8.55 to 21.47%.

Table 2: Mineral Composition of the Samplesof Cooked, Soaked and Fermented African Oil Bean Samples

Samples	Calcium (mg/100g)	Iron (mg/100g)	Zinc (mg/100g)	Phosphorus (mg/100g)
Boiled AOB	230.00^{b}±14.142	2.25^{b}±0.021	1.37^{a}±0.099	20.92^{b}±0.021
Soaked AOB	289.73^{a}±2.164	3.25^{a}±0.021	1.32^{a}±0.141	37.80^{a}±0.000
Fermented AOB	203.11^{b}±3.684	2.14^{c}±0.042	0.44^{b}±0.085	14.74^{c}±1.251

Keys: AOB- African oil bean. Values are mean ± Standard deviation; values with different superscripts across the rows are significantly different.

Table 2 shows the mineral composition of the samples. Soaked AOB sample contained the highest calcium content while fermented AOB sample had the lowest calcium mean value. The iron content of the samples ranged from 2.14 to 3.25 mg/100g. The zinc content of the samples ranged from 0.44 to 1.37 mg/100g. The phosphorus content of the samples ranged from 14.74 to 20.92 mg/100g.

Table 3: Vitamin Composition of the Cooked, Soaked and Fermented African Oil Bean Samples

Samples	Pro Vitamin A (µg/100g)	Vitamin B_1 (mg/100g)	Vitamin B_2 (mg/100g)
Boiled AOB	162.99^{c}±0.84	0.50^{a}±0.01	0.43^{b}±0.01
Soaked AOB	377.38^{a}±0.52	0.29^{c}±0.02	0.24^{c}±0.00
Fermented AOB	302.72^{b}±0.73	0.34^{b}±0.02	0.57^{a}±0.01

Keys: AOB- African oil bean. Values are mean ± Standard deviation; values with different superscripts across the rows are significantly different.

Table 3 shows the vitamin composition of the samples. The pro vitamin A content of the samples analyzed ranged from 162.99 to 377.38µg/100g. The vitamin B_1 content of the samples ranged from 0.29 to 0.50 mg/100g. The vitamin B_2 content of the samples ranged from 0.24 to 0.57 mg/100g.

Table 4: Anti-nutrient Composition of Cooked, Soaked and Fermented African Oil Bean Samples

Samples	Tannin (mg/100g)	Oxalate (mg/100g)	Phytate (mg/100g)
Boiled AOB	0.243^{a}±0.04	39.00^{c}±1.41	38.79^{c}±1.39
Soaked AOB	0.201^{a}±0.04	67.00^{b}±2.82	188.15^{a}±0.02
Fermented AOB	0.296^{a}±0.04	58.00^{a}±2.82	49.41^{b}±0.00

Keys: AOB- African oil bean. Values are mean ± Standard deviation; values with different superscripts across the rows are significantly different.

Table 4 shows the anti-nutrient composition of the samples. Tannin content of the samples ranged from 0.201 to 0.296 mg/100g. The oxalate content of the samples oscillated from 39.00 to 67.00 mg/100g. The phytate content of the samples ranged from 38.79 to 188.15 mg/100g.

Discussion

The result of the proximate analysis shows that the protein content of the fermented African oil bean sample was higher when compared to the boiled and soaked samples. This is in line with the values (15.46%) reported by Nwachukwu et al. (2018) on fermented African oil bean. The high protein content in the fermented sample may confer nutritional advantage on the fermented oil bean. This could be attributed to net synthesis of protein by fermenting seeds which might have resulted in the production of some amino acids during the fermentation process (Adebowale & Maliki 2011). The percentage value of protein will definitely meet the daily protein requirement of individuals (Igwenyi et al. 2015).

Soaking increased the ash content when compared to the boiled and fermented samples. The value gives an indication of the level of macro and micro nutrients in the seeds. The values obtained in this study were in line with the findings (6.12%) reported by Eze et al (2014) and slightly higher than the values 3.47% reported by Ikhuoria *et al.* (2008) for raw African oil bean seed.

The result of the moisture content is within the range reported by Ikhuoria *et al.* (2008) who recorded 39.05% moisture and slightly lower than the values reported by Nwachukwu (2018) on the effect of fermentation time on the proximate and mineral composition of fermented African oil bean seed. Moisture has been reported to increase during fermentation. The moisture content of the boiled and soaked samples was lower than that of fermented sample, which might be due to its low dry matter content.

The crude fibre values reported in this work were in agreement with 3.66% reported by Balogun (2013) in processed African oil bean. Fiber has a physiological effect on the gastrointestinal function by promoting the reduction of traclonic pressure which is beneficial in diverticular disease such as cancer of the colon and hemorrhoids (Okwu &Morah 2004).

The fat values reported in this study was highest in the boiled samples when compared to soaked and fermented samples. The values were similar to the findings of Eze *et al.* (2014) that reported 19.72% on the proximate composition, biochemical and microbiological changes associated with fermenting African oil bean. However, it was a bit higher when compared to the reports of Okorie et al (2013) on controlled fermentation and preservation of African oil bean seed. The carbohydrate content of the samples ranged from 8.55 to 21.47%. The carbohydrate content of the samples was in line with 12.15% reported by Nwachukwu *et al.* (2018) in fermented African oil bean. The lowest carbohydrate content in fermented sample could be attributed to the conversion of complex starch to disaccharide by amylase enzyme and breaking down of complex starch into alcohol and carbon dioxide by the activities of micro-

organisms. These values were similar to the report of Enujiugha and Akanbi (2005) on oil bean seed with 28.25% carbohydrate.

The calcium content in this study was higher when compared to the value 89.58 mg/100g reported by Nwachukwu *et al.* (2018). Calcium is essential for many metabolic processes including nerve function, muscle contraction and blood clothing, De et al., (2019). The iron content of the samples ranged from 2.14 to 3.25 mg/100g. The iron content in this study was slightly lower than the findings of Enujiugha and Akanbi, (2005) who reported 4.23mg/100g in fermented oil bean seed. The variation could be due to the age of the crop and location. This mico-nutrient is known to be important in human body because it is a component of haemoglobin (Asoegwu *et al.*, 2006).

The zinc content of oil bean seed samples was in line with the findings of Ikhuoria *et al.* (2008) who worked on oil bean with value 1.31mg/100g. The zinc content could mean that the seeds can play a valuable role in the management of diabetes, which results from insulin malfunctioning (Okaka, 2001). The phosphorus content of the samples ranged from 14.74 to 20.92 mg/100g. The result showed that boiling of oil bean increases the phosphorus content. The value reported in this study was higher than the research work of Okwu and Aluwo (2008) that reported 1.51 and 0.77mg/100g for raw and fermented samples respectively. It was however; lower than 102.48 mg/100g reported by Nwachukwu *et al.* (2018) in African oil bean.

Pro vitamin A value obtained in this study were lower than 50 percent reported by Devi (2015) in oil bean seed. Vitamin A is valuable for the promotion of growth of cells and tissues, resistance to diseases and for delaying the ageing process. The RDA requirement for vitamin A for a normal healthy, active adult man and non-pregnant woman is 0.3mg/day and 0.27mg/day respectively (FAO 2001). The values obtained for vitamin B_1 are slightly lower than 0.62 – 2.10 mg/100g reported Akinlabu *et al.* (2019) in fermented African oil bean. They are also in line with the recommended minimum daily intake of 0.2 to 1.0mg for vitamin B_1. The value of vitamin B_2 content in this research is comparable to the value 0.09 – 0.18 mg/100g recorded by Akinlabu *et al.* (2019) in African oil bean. Again, the values obtained were within the recommended daily intake of 0.3 to 1.6mg (Belitz *et al.*, 2009). Vitamin B1 aids in the prevention of Alzheimer's Disease, and boost body immunityGibson et al., (2016). Vitamin B2 is also beneficial for eye health, migraines, energy production, decreasing cardiovascular risk, and boosting antioxidant status (Mahabadi et al., 2022).

The levels of tannin obtained in this study were slightly higher than the value 0.042mg/100g obtained by Balogun (2013) in oil bean seed. The presence of tannins in the seeds serves as nutritional inhibitor because they combine with proteins and this makes them indigestible and unavailable to the body. Adequate processing (cooking, soaking and fermentation) reduces tannins to trace amounts. The reduction of oxalate in the boiled and fermented samples could be as a result of leaching of the anti-nutrients into water. The value of reported in this study was higher than the findings of Oly-Alawuba *et al.* (2018). The mean phytate values among the samples were higher than 0.04 mg/100g reported by Balogun (2013) in fermented oil bean seed. The variation could be due to difference in the nature soil, processing method, and age of the seeds. Phytate in food renders minerals unavailable for absorption. It has been reported that calcium absorption increases with low phytate (3.01mg/g) (Onuekwe, 2012).

Conclusion

Based on the results of this study, fermentation improved the nutrients composition of African oil bean seed (*Pentaclethra macrophylla*). The fermented sample had the highest protein and fibre, moderate fat and ash with low carbohydrate values and appreciable amounts of vitamins. The protein level in the fermented sample will go a long way in alleviating protein deficiency among the poor with the aim of meeting up with the FAO protein requirement recommended levels. The fermented sample had appreciable levels of minerals. However, the soaked sample contained the highest calcium, iron and phosphorus with all samples having minimal anti-nutrient levels within the acceptable limit. All processed samples proved satisfactory in both nutritional requirements and anti-nutritional reduction. However, fermentation proved to be the best processing method for African oil bean.

Recommendations

1. Individuals and families should adopt fermentation as the only method for the processing of African oil bean as it conserved more nutrient.
2. Fermented African oil bean should be used for the production of food supplements or nutrient concentrates.
3. It should be incorporated into local dishes to enrich their nutritional quality.

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Nutritional Composition and Acceptability of Pearl Millet (*Pennisetum glaucum)*Snacks Enriched with Moringa (*Moringa oleifera*) Seeds

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Abstract

This studyevaluated nutritional composition and acceptability of snacks made from pearl millet (*Pennisetum glaucum)* and moringa seeds (*Moringa oleifera)* flour blend. It was an experimental research. The flour samples were formulated at the ratios of 9:1, 4: 2 and 7:3 moringa and pearl millet flour blends; and 100 percent wheat flour. Proximate and mineral compositions were determined using AOAC standard methods. Sensory evaluation involved standard procedures. Data were analyzed using means and standard deviation. Results show that meat pie 100 percent wheat flour had highest moisture content (34.30%), protein (9.63%), ash (2.05%) and lowest carbohydrate (29.39%). Fat varied significantly with sample with 7: 3 millet and moringa seed meat pie (MPC) having highest content (29.31%). Sample with 9: 1 millet and moringa seed meat pie (MPA) had highest fiber content (3.61%). There was no significant difference ($P \geq 0.05$)in the iron and zinc content of the composite snack samples. Potassium (70.40%), sodium (65.82%) and magnesium (18.63%) were significantly higher in meat pie with 90% millet and 10% moringa seed, while calcium was significantly higher (13.28%) in 100 percent wheat flour. Meat pie samples varied significantly in their color, texture, taste and overall acceptability. Wheat flour was most preferred having higher mean scores (8.00% and 8.35%) respectively for the sensory attributes.

Keywords: Nutritional, Acceptability, Snacks, Moringa, Pearl Millet,Enriched, Flour

Introduction

Snacks are small portable meals eaten in between meals to satisfy hunger and offer immediate energy (Hess *et al*., 2016).Snacks play a significant role in Nigerian cuisine, showcasing the nation's vast ethnic diversity and local delicacies.Snack foods are popular and frequently consumed, and they are regarded as vital means of providing consumers with nutrition. They can be produced by baking, frying, or extrusion. (Nawaz, Xiong, Li, Xiong, Irshad, Chen, Wang, Zhang, Hina, & Regenstein, 2019). Plantain chips, puff-puff (deep-fried dough balls), cake, meat pie, suya (spicy grilled meat), and boli (roasted plantains) are examples of snacks that are frequently eaten in Nigeria. Although snacks can provide people with an increase of energy swiftly and relieve hunger, there is cause for concern over the role that unhealthy snacking habits such as consuming high-calorie and low-nutrient snacksplay in the development of chronic illnesses like obesity, diabetes, cancers and cardiovascular disease among others.

The creation of wholesome and sustainable food items has received more attention in recent years as a means of addressing issues related to global health. Adding nutrient-dense plant components to food formulations is one promising strategy for improving food's nutritional profile and fostering well-being (Ravindran, 2019).Plant-based diets have become increasingly common in recent years due to growing concerns about personal health. Consequently, there has been a substantial rise in the demand for plant-based snacks as consumers desire tasty, nourishing, and accessible substitutes for conventional animal-based products. . More focus has been placed on enhancing cereal-based diets with protein sources like oil seeds, plant vegetables, and legumes (Feyera, 2020).Exploring alternate snack components is becoming more popular as dietary demands and preferences change. One such ingredient is millet, a versatile and nutrient-rich grain.

Pearl millet (*Pennistum glaucum*), Millets are resilient, rainfed plants that grow in arid places and even in less fertile, low moisture soil. African countries produced around 55 percent of the world's millet, accounting for 59 percent of global millet production (Singh, Khan, Chauhan, Singh, Jaglan & Yadav 2019). People in the northern region of Nigeria produce pearl millet and use it to prepare beverages like *kunu* and *fura de nunu*, while the eastern region often uses it to prepare infant porridges like pap, and turn brown. According to Tarlor and Kruger (2016), pearl millet grains have a nutritional content of 8–9% dietary fiber, 9–20% protein, 2%–7% fat, and 63–78% carbohydrates.(Obinwa , Mbah, & Umeh-idika, 2023), noted that adding *moringa oleifera* seed flour to pearl millet flour enhances the nutritional content of the composite flour. The protein content of pearl millet ranges between 9.4 to 11.8g/ 100g with an amino acid profile predominantly comprising the essential leucine, isoleucine, valine and phenylanine, but lacking in lysine and methionine (Hassan, Sebola, Mabelebele, 2021). The grain also contains substantial phenolic compounds making it a potent source of antioxidants for populations that consume the cereal in porridge or beverage formats (Anitha, Govindaras & Kane- potaka, 2020). Millet-based snacks can be further enhanced by fortifying them with moringa seed (Moringa oleifera).

Moringa oleifera is gaining popularity on a global scale, particularly for its rich nutritional profilewhich includes high levels of antioxidants, protein, vitamins, and minerals and ability to help tackle the issue of malnutrition. It is found in many other tropical and dry nations and contains 13 species of shrubs and trees that are native to India and Africa (Kashyap, Kumar, Rilar, Jindal, Baniwal, Guine, Coneia, Mehra, & Kumar, 2022).The plant's antibacterial, antidiabetic, anti-inflammatory, antioxidant, and hepatoprotective characteristics make it

possible to use practically every part of it, including the seeds, leaves, flowers, bark, roots, fruit, and immature pods (Islam, Islam, Hossen, Mahtab, Islam, Hasan, .& Karim, R 2021).

Cake are widely enjoyed bakery items across all social levels because they are easy to eat, come in varieties and are affordable for most people , it can be made with flour, sugar, eggs and butter. In addition to other micronutrients, it is an excellent source of calories, protein, lipids, iron, calcium, and vitamins A and D (Lenka, Kumari , Pradhan , Biswal & Misra 2020). Similarly, meat pies are delicious pastries filled with cooked meat usually lamb, chicken, or pork and additional ingredients including seasonings, sauce, and vegetables. Meat pies may provide vital nutrients like protein, iron, and various vitamins and minerals (Smith & Jones, 2021). The incorporation of pearl millet-enriched moringa snacks into this setting creates opportunities to experiment with new flavor profiles to enhance the dietary value of these popular snacks, cake and meat pie.The assessment takes into account the nutritional composition, sensory characteristics, and general acceptability by consumers with the goal of establishing Pearl millet, and moringa fortified cakes and meat pie as a means of achieving sustainable economic development. From a broader viewpoint, the production of composite snacks can fulfill nutritional demands, provide food security, and contribute to economic growth.

Objectives of the study

The study was to evaluated nutritional composition and acceptability of snacks (queen cake and meat-pie) made from pearl millet (*Pennisetum glaucum)* and moringa seeds (*Moringa oleifera)* flour blend.Specifically, the study determined:

1. proximate composition of snacks made from millet fortified with moringa.
2. mineral composition of snacks made from millet fortified with moringa.
3. sensory properties of queen cake and meat pie

Materials and Methods

Design of the Study: The study employed a laboratory-based experimental design.

Procurement of Materials: Moringa seeds were collected from a mature moringa tree in a backyard garden in Umudike, Abia State. Pearl millet, wheat flour (used as a control), and other ingredients like sugar, shortening, eggs, salt, nutmeg, baking powder, milk, and flavorings were bought from a neighborhood market (Orie ugba) in the Abia state.

Preparation of Materials: Moringa seeds were washed and dehusked, thoroughly cleaned, boiled for 15 minutes, allowed to cool down, then manually dehulled to remove the shell, rinsed thoroughly, and dried in an oven at 60°C for 5 hours and milled into flour. The milled

flour was sieved and then stored in air tight plastic containers with the right labels on them for analysis and formulation.

Pearl millet grains were cleaned, washed in tap water, dried in an oven at 60°C for duration of 5 hours, and ground using a commercial grain mill machine. The flour was collected, sieved using a 0.4mm sieve, and stored at room temperature in an airtight bag for further research.

Sample Formulation: Composite flour was formulated with moringa seed and pearl millet flours using the different ratios. QCA to QCD represent queen cake sample A to sample D while MPA to MPD represent meat pie sample A to D respectively.

100 percent (100%) Wheat flour was used as the control: QCD and MPD

90 percent (90%) Moringa seed and 10percent (10%) Pearl millet: 9:1 QCA and MPA

80 percent (80%)Moringa seed and 20percent (20%)Pearl millet: 4:1 QCB and MPB

70percent (70%) Moringa seed and 30percent (30%)Pearl millet: 7:3 QCC and MPC

Snacks (Millet – Moringa)Production: Queen Cake and meat pie were produced.

Queen Cake Samples

Ingredients	**Quantity**
Flour	200g
Sugar	50g
Margarine	150g
Baking powder	1 teaspoon
Nutmeg	1/4 teaspoon
Eggs	3
Vanilla essence	½ teaspoon
Salt	a pinch

Meat Pie Samples

Ingredients	**Quantity**
Flour	200g
Margarine	100g
Baking powder	1/4 teaspoon
Salt	a pinch
Water	75ml
Vegetable oil	2 tablespoon
Minced beef	200g
Onion	1 medium sized
Irish potatoes	2 medium sized

Preparation of queen cake samples: Eggs were washed, cracked and whisked for three minutes; they were gradually mixed in with the whipped mixture. Separately sieved flour, baking powder, and salt were added to the mixture and mixed until soft consistency dough was formed. After being moved to a baking pan that had been greased, the cake was baked and then allowed to cool for two hours before being examined.

Preparation of meat pie samples: Flour was sieved into a bowl and combined with baking powder. Margarine was added and mixed until crumb-like. Then, water was added and kneaded vigorously. In a vegetable oil, minced beef, chopped onion, and chopped Irish potatoes were fried with spices. The dough was flattened, cut, and filled with the ingredients. The edges were sealed with egg white. Baked for 30 minutes at 70°C until golden brown

Proximate Analysis procedure

Proximate composition of the snack products were analyzed using the Association of Official Analytical Chemists (AOAC) (2016) method to determinemoisture, ash, protein, fat, and fiber contents.

Moisture content was determined via thermogravimetric in muffle furnace (Sanyo Gallenkamp, Weiss Technik, West Midlands,UK) at 500C for 24hrs. Ash content wasdetermined by heating two grams in a ceramic crucible at 550°C for three hours, The samples were then weighed and the formula, ash (%) = (w2 - w1) / (weight of sample) x 100, was applied. Protein was determined by Kjeldahl method. After distillation and titration, nitrogen was corrected using a factor of 5.25. Fat was determined by exhaustive extraction of 0.5g of sample with petroleum ether in a microsoxhlet extraction unit (Gerhardt, Bonn, Germany).Fiber content was determined by digesting two grams of each treatment in a conical flask with 200ml of 1.25% H_2so4 solution and boiled for 30 minutes. The solution and content were poured in a Buchner funnel, filtered and dried. The dry residue was heated in a muffle furnace until it turned to ash, then cooled in desiccators and weighed.These analyses were done in the food science laboratory from the department of home economics Michael Okpara University of agriculture Umudike.

Determination of Mineral Composition: Mineral composition of the flour samples were analyzed according to the method of AOAC (2006) for the following minerals:

Iron:A 100 ml micro-Kjeldahl flask was digested with 10 ml of HNO2 in order to measure iron using Atomic Absorption Spectrometry (AAS). After that, the sample was diluted to volume using 0.1 ml of HCl solution in a 25 ml volumetric flask.

Potassium: By measuring the amount of light that potassium ions release in a flame using flame photometry, with KCl serving as the standard, the potassium concentration was ascertained.

Sodium: By atomizing the sample in a flame and measuring the light that is released at the distinctive wavelength of sodium using Nacl as a standard, sodium levels were determined using Flame Photometry.

Zinc: By measuring light absorption at a wavelength specific to zinc, the Atomic Absorption Spectroscopy (AAS) approach was used to determine the zinc level.

Calcium: The calcium content was ascertained using the Atomic Absorption Spectroscopy (AAS) approach, which involves dissolving the sample and detecting the absorption of light at a wavelength specific to calcium.

.**Magnesium:**Atomic Absorption Spectroscopy (AAS) is a procedure that detects light absorption at a certain wavelength to determine magnesium. It was used to determine the amounts of magnesium.

Sensory Evaluation: A sensory evaluation was conducted using a 9 point hedonic scale as described by Iwe (2010).Twentypanelists consisting of students from Home Science department Michael Okpara University of agriculture Umudike who are familiar with the products were used.A 9- point hedonic scale was used for data collection. The scale ranged from (9) representing "liked extremely" (1) representing "disliked extremely". The samples were presented with coded plates that are identical. Each sample was evaluated for color, texture, taste, flavor, and over all acceptability. The panelists were instructed to rinse their mouths with water at intervals to avoid bias and samples were rated together with the control samples (100% queen cake and meat pie). They recorded their responses in the 9-point hedonic scale.

Data Analysis: Mean and standard deviation were used for data analysis. Duncan's multiple range test and Analysis of Variance were also used.

Results

Table 1: Proximate Compositions of Queen Cake and Meat-pie Samples (%)

	Moisture (%)	Protein (%)	Ash (%)	Fat (%)	Fiber (%)	Carbohydrate (%)
Queens Cake						
QCA	$24.27^{b} \pm 0.09$	$6.50^{b} \pm 0.30$	$1.42^{a} \pm 0.02$	$17.11^{b} \pm 1.03$	$1.05^{b} \pm 0.12$	$49.65^{a} \pm 0.68$
QCB	$24.01^{b} \pm 0.14$	$6.80^{b} \pm 0.16$	$1.33^{b} \pm 0.02$	$21.34^{a} \pm 0.14$	$1.50^{b} \pm 0.69$	$45.02^{b} \pm 0.55$
QCC	$24.74^{a} \pm 0.04$	$6.93^{b} \pm 0.68$	$1.21^{c} \pm 0.01$	$22.79^{a} \pm 0.05$	$2.77^{a} \pm 0.33$	$41.56^{c} \pm 0.90$
QCD	$23.63^{c} \pm 0.16$	$7.58^{a} \pm 0.35$	$1.36^{b} \pm 0.02$	$17.49^{b} \pm 0.28$	ND	$49.94^{a} \pm 0.11$
Meat Pie						
MPA	$24.23^{b} \pm 0.40$	$5.59^{c} \pm 0.06$	$1.96^{a} \pm 0.04$	$24.67^{b} \pm 0.41$	$3.61^{a} \pm 0.04$	$39.94^{a} \pm 0.07$
MPB	$20.95^{c} \pm 0.29$	$6.09^{c} \pm 0.03$	$1.63^{b} \pm 0.12$	$28.40^{a} \pm 0.83$	$2.18^{b} \pm 0.13$	$40.75^{a} \pm 0.33$
MPC	$25.48^{b} \pm 0.70$	$6.80^{b} \pm 0.39$	$1.89^{a} \pm 0.04$	$29.31^{a} \pm 0.45$	$1.60^{b} \pm 0.11$	$34.92^{b} \pm 0.71$
MPD	$34.30^{a} \pm 0.52$	$9.63^{a} \pm 0.73$	$2.05^{a} \pm 0.04$	$22.81^{b} \pm 1.24$	$1.82^{b} \pm 0.53$	$29.39^{c} \pm 3.05$

QCA = Queen Cake A (9:1 pearl millet flour and Moringa seed flour), QCB= Queen Cake B (4:2 pearl millet flour and Moringa seed flour), QCC = Queen Cake C (7:3 pearl millet flour and Moringa seed flour), QCD= Queen Cake D Wheat flour 100 percent. MPA = Meat Pie A (9:1 pearl millet flour and Moringa seed flour), MPB = Meat Pie B (4:2 pearl millet flour and Moringa seed flour), MPC = Meat Pie C (7:3 pearl millet flour and Moringa seed flour), MPD = Meat Pie D Wheat flour 100 percent.

Table 1 shows the proximate composition of the snack products. Moisture content ranged from 23.63percent to 24.74percent in queen cake samples and from 20.95percent to 34.30percent in meat pie samples. Protein content varied from 6.50percent to 7.58percent in

queen cake samples and from 5.59percent to 9.63percent in meat pie samples. Ash content ranged from 1.21percent to 1.42percent in queen cake samples and from 1.63percent to 2.05percent in meat pie samples. Fat content ranged from 17.11percent to 22.79percent in queen cake samples and from 22.81% to 29.31% in meat pie samples. Fiber content varied from 1.05percent to 2.71percent in queen cake samples and from 1.60percent to 3.61percent in meat pie samples. Carbohydrate content ranged from 41.56percent to 49.94percent in queen cake samples and from 29.39percent to 40.75percent in meat pie samples.

Table 2: Mineral Compositions of Queen Cake and Meat-pie Samples (mg/100g)

	Iron	Potassium	Sodium	Zinc	Calcium	Magnesium
Queens Cake						
QCA	1.17^{b}±0.01	54.75^{a} ± 0.04	38.51^{b}± 0.13	0.84^{a}±0.01	9.84^{d} ± 0.02	18.61^{b}± 0.01
QCB	1.20± 0.01	32.49^{d} ± 0.01	39.27^{a} ± 0.04	0.72^{c}±0.00	15.47^{a}± 0.01	20.61^{a}± 0.01
QCC	1.34^{a}±0.02	35.63^{c} ± 0.04	35.69^{d}± 0.01	0.84^{a}±0.02	10.73^{c}± 0.01	20.54^{a}± 0.08
QCD	1.37^{a}±0.01	45.28^{b} ± 0.03	36.41^{c} ± 0.01	0.80^{b}±0.00	12.87^{b}± 0.04	11.87^{c}± 0.04
Meat Pie						
MPA	1.43^{a} ± 0.01	70.40^{a} ± 0.11	65.82^{a} ± 0.03	1.05^{a} ± 0.01	10.71^{b} ± 0.13	18.63^{a}± 0.01
MPB	1.30^{b} ± 0.00	33.82^{c} ± 0.03	40.32^{d} ± 0.05	0.54^{d} ± 0.00	9.67^{c} ± 0.04	15.65^{b}± 0.06
MPC	1.03^{d} ± 0.00	54.79^{b} ± 0.08	48.56 ± 0.06	0.68^{c} ± 0.00	9.71^{c} ± 0.13	15.38^{c}± 0.03
MPD	1.05^{c} ± 0.00	30.57^{d} ± 0.04	46.57^{a} ± 0.38	0.73^{b} ± 0.01	13.28^{a} ± 0.02	15.71^{b}± 0.02

QCA = Queen Cake A (9:1% pearl millet flour and Moringa seed flour), QCB= Queen Cake B (4:2 pearl millet flour and Moringa seed flour), QCC = Queen Cake C (7:3pearl millet flour and Moringa seed flour), QCD= Queen Cake D Wheat flour 100 percent. MPA = Meat Pie A (9:1pearl millet flour and Moringa seed flour), MPB = Meat Pie B (4:2 pearl millet flour and Moringa seed flour), MPC = Meat Pie C (7:1pearl millet flour and Moringa seed flour), MPD = Meat Pie D Wheat flour 100 percent.

Table 2 shows the mineral composition of the snacks. Iron content in queen cake samples ranged from 1.17mg to 1.37mg. Potassium varied significantly ($P > 0.05$), with values ranging from 32.49mg to 54.75mg. Sodium content ranged from 35.69mg to 39.27mg. Zinc content ranged from 0.72mg to 0.84mg. Calcium content varied from 9.84mg to 15.47mg, while magnesium ranged from 11.87mg to 20.61mg.

In meat pie samples, iron content ranged from 1.03mg to 1.43mg. Potassium content ranged from 30.57mg to 70.40mg. Sodium content varied from 40.32mg to 65.82mg. Zinc content rangedfrom 0.54mg to 1.05mg. Calcium content varied from 9.67mg to 13.28mg, while magnesium ranged from 15.38mg to 18.63mg.

Table 3: Sensory Evaluation of Queen Cake and Meat pie Samples

Samples	Color	Texture	Taste	Overall acceptability
Queens Cake				
QCA	$6.90^{b} \pm 1.74$	$6.00^{b} \pm 1.30$	$6.30^{b} \pm 1.53$	$6.40^{b} \pm 1.19$
QCB	$6.35^{b} \pm 1.84$	$6.80^{b} \pm 1.74$	$6.45^{b} \pm 1.57$	$6.53^{b} \pm 1.36$
QCC	$6.60^{b} \pm 2.06$	$6.55^{b} \pm 1.82$	$5.90^{b} \pm 2.51$	$6.35^{b} \pm 1.79$
QCD	$7.90^{a} \pm 1.17$	$8.10^{a} \pm 0.85$	$8.00^{a} \pm 1.30$	$8.00^{a} \pm 0.84$
Meat Pie				
MPA	$5.45^{b} \pm 2.19$	$5.05^{b} \pm 2.31$	$4.10^{b} \pm 1.94$	$4.87^{b} \pm 1.80$
MPB	$4.10^{c} \pm 2.02$	$4.00^{b} \pm 2.22$	$3.05^{b} \pm 1.50$	$3.72^{c} \pm 1.69$
MPC	$4.45^{bc} \pm 2.44$	$4.35^{b} \pm 2.58$	$3.10^{b} \pm 2.07$	$3.97^{bc} \pm 1.80$
MPD	$8.70^{a} \pm 0.57$	$8.20^{a} \pm 1.15$	$8.15^{a} \pm 1.66$	$8.35^{a} \pm 0.98$

Means with the same superscript in the same column are not significantly different ($P \geq 0.05$) Key: QCA = Queen Cake A (9:1 pearl millet flour and Moringa seed flour), QCB= Queen Cake B (4:2pearl millet flour and Moringa seed flour), QCC = Queen Cake C (7:3pearl millet flour and Moringa seed flour), QCD= Queen Cake D Wheat flour 100 percent. MPA = Meat Pie A (9:1pearl millet flour and Moringa seed flour), MPB = Meat Pie B (4:2pearl millet flour and Moringa seed flour), MPC = Meat Pie C (7:3pearl millet flour and Moringa seed flour), MPD= Meat Pie D Wheat flour 100 percent.

Table 3 shows the sensory properties of the snack products. In queen cake samples, color values ranged from 6.35 percent to 7.90 percent, texture from 6.00 percentto 8.10 percent, and taste from 5.90percent to 8.00percent. Overall acceptability was highest in the control sample and lowest in the 70:30percent pearl millet and moringa seed sample.

For meat pie samples, color values ranged from 4.10 percent to 8.70percent, texture from 4.00percentto 8.20percent, and taste from 3.05percent to 8.15percent. Overall acceptability was lowest in the 80:20percent pearl millet and moringa seed sample and highest in the control sample.

Discussion of Findings

Queen cakes had the lowest moisture content in the sample, ranging from (23.63% to 24.74%), while meat pies showed a wider range, from (20.95% to 34.30%). The observed increased variability in meat pies as opposed to queen cakes may result from variations in the composition and components used.Contrarily, Adekunle & Abiodun, (2018) reported a moisture content (8.79 - 8.60%) of Acha-Moringa seed flour blend biscuits. Opeifa,et al (2015) stated that 10percent of moisture content is generally specified for flour and related products. The higher moisture content for the composite snack may reduce the shelf life and lower their keeping quality.The protein content of the developed products in this study (6.50% - 7.58%)were significantly different ($P < 0.05$) for queen cake samples while the meat pie samples had protein content (5.59- 9.60%). Chinma, et al(2014) reported higher protein content (13.14 – 23.10%) in cakes made with defatted moringa and wheat cake. The ash content of queen cake (1.21% – 1.42%) was significantly different ($P < 0.05$) among the cakes. Samplesprepared with 90 percent pearl millet, 10 percent moringa seed hadthe highest

value. Meat pie ash content ranged from 1.63 – 2.05percent. The control sample had the highest ash content The ash content reported in this study was higher than the ash content (0.53% – 0.91%) from white maize ogi flour and moringa seed (Oladeji *et al*., 2017). Ash content indicates a rough estimation of the mineral content of product the may be beneficial for nutritional quality.The fat content value of queen cake ranged from (17.11% - 22.29%) while meat pie value ranged from (22.81%- 29.31%). Fat content of the samples increased with an increase in moringa seed. The fat content obtained from this study was higher than the fat content (4.00 – 5.95%) for cake made from wheat and moringa leaf (Kolawole, et al, 2013). The higher fat content of the samples could impact their energy density and sensory attributes.The fiber content in this study is higher than the fiber content (0.08% – 0.62%) ofbread fortifiedwith Moringa seed powder (Bolarinwa,et al, 2017).The carbohydrate content (41.56% - 49.94%) reported in this study was lower than the carbohydrate content (54.71 – 63.92%) of dakuwa snacks from finger millet, groundnut and moringa seed flour reported by (Yelmi, et al, 2022).Meat pie carbohydrate content (29.39% - 40.75%) varied significantly. This suggests that formulation changes can significantly impact carbohydrate levels in these products.

Abundance of the necessary elements found in the queen cake and meat pie including magnesium, potassium, calcium, sodium, and zinc, implies that a moringa seed and pearl millet snack could aid in reducing micronutrient deficiencies.Sodium content (39.27 mg/100g to 35.69 mg/100g) and (40.32 to 65.82 mg/100g) for queen cake and meat pie recorded in this studywas higher than the sodium content (7.69 mg/100g to 10.64 mg/100g) of cookies prepared with Rice, Unripe banana and sprouted soybean (Inyang, et al,2018). Calcium and magnesium content of queen cake and meat pie differed significantly. The calcium content is lower than the calcium content (76.95 mg/100g to 98.20 mg/100g) of biscuits made with Bambara groundnut, ground bean seed and moringa seed (Talabi, et al2019).Yelmi *et al*., (2022) reported that the iron content of dakuwa snack produce from finger millet, groundnut, and moringa seed (100.5 to 128.0 mg/100g) was much higher compared to the iron content observed in this study (1.17 to 1.37 mg/100g) and (1.03 to 1.43 mg/100g) respectively.Furthermore, the zinc content (0.72 to 0.84 mg/100g) and (0/54 to 1.05mg/100g) in this study were notably lower (2.45 to 4.77 mg/100g).compared to those reported by Gwer, et al(2020) for weaning food made from millet, soya beans, and moringa leaf flour.

The findings on sensory properties showed that the control samples consistently scored higher in the attributes measured (color, texture, taste and overall acceptability). This preference for the control samples may be attributed to the panelist's familiarity with the

control sample. However, queen cake prepared from composite flour were equally preferred and accepted. The low score for color, texture, and taste in meat pies made with composite flours suggest that adjustments in formulation could improve sensory appeal.

Conclusion

Based on the results of this study, it can be concluded that enrichment of pearl millet with moringa seed significantly enhanced its nutritional properties as shown in the proximate and mineral content results obtained. Enrichment of pearl millet with moringa seed also had significant effect on the sensory properties of the snack samples which affected its acceptability, especially the meat pie samples that scored below 5 on the 9-point hedonic scale this could be attributed to the stringent taste of moringa seed which affected its acceptability.

Recommendation

Base on the results, the following recommendations are made**:**

1. Nutrient-dense plant products like pearl millet, and moringa seeds, should be used to produce snacks like meat pies and queen cakes.
2. More studies could be carried out on various combinations of nutrients and processing methods for developing nutrient-dense snacks.

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Proximate And Phytochemical Analysis of Tiger Nuts (*Cyperus esculentus*) Oil

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Abstract
The major purpose of this study was to analyse proximate and phytochemical composition of tiger nut (Cyperus esculentus) oil. The study adopted experimental research design. Dehydrated tiger nut was purchased from Nigerian market and processed into oil using fermentation method. The oil was subjected to proximate and phytochmical analysis using standard methods. Result obtained showed that the crude protein (0.40%), ash (0.00%), crude fibre (0.00%), fat (98.94%), moisture content (0.49%), carbohydrate (0.47%) and metabolizable energy (8114.01kca./kg). These proximate compositions show that tiger nut oil is high in metabolizable energy. Phytochemical analysis showed that tiger nut oil is rich in bio-active components; tannin (20.00mg/100g), phytate (24.19mg/100g), flavonoids (9.22mg/100g), glycoside (7.81mg/100g) and alkaloids (18.68mg/100g).These results confirmed the fact that tiger nut oil can be utilized medicinally and therapeutically for improving health of Nigerians. Recommendations include among others that the state and federal government in Nigeria should synergize to establish tiger nut research institute who will work out modalities on how tiger nut can be cultivated in large quantities processed into various useful and healthful products

Keywords*:* Proximate, Phytochemical, Tiger Nut, Oil, Quantitative Tests, , Analysis

Introduction

Tiger nut **(***Cyperus esculentus**)* also known as chufa, yellow nut sedge, earth almond, or ground almond are not actually nuts, but rather tubers because its edible part usually sits beneath the surface of the soil. The tuber has characteristic sweet, almond-like flavor and taste. Tiger nut is one of the unexploited rich food sourceswith inherent nutritional and medicinal values. Bando, Tutuwa, Ogu, Nuhu, and Mbaragbog, (2020) described tiger nut as an edible perennial grass-like plant of the sedge family. Tiger nuts according to Bazine & Arslanoglu (2020) originated from Africa and tropical Asia. The plant produces rhizomes and spherical tubers which are rich in variety of nutrients and have been linked to several health benefits ranging from better digestion to a reduced risk of heart diseases (Bamishaiye and Bamishaiye, 2011). Tiger nut plant is usually a fast growing plant which can grow up to 20 to 70 cm tall. It lives in a moderate climate with a temperature between 20 °C and 30 °C and can thrive well in all types of soil types except saline soil (Bazine & Arslanoglu .2020).

Tiger Nuts can be utilized for food in varieties of ways. According to Alina (2022) and Berlinda (2021) tiger nuts can be eaten as snacks in fresh, dried, baked or roasted forms. In dried form, they are better enjoyed when soaked in water especially overnight to soften the outer part. The flour of roasted tiger nuts are a good addition in biscuits and other bakery products. The flour has also been utilized in the production of meal (tiger nut fufu) which is eaten and enjoyed with different soup of choice.The tubers can be processed into a milk-like product called Tiger nuts milk. Tiger nuts milk with or without the addition of cow milk have been utilized in the production of Yoghurt drink. In the Northern part of Nigeria, tiger nuts have been utilized in the production of a popular non-alcoholic drink (beverage) called "*Kunu Aya*"Tiger nuts is commonly called and recognised by different names in different parts of the world. In Nigeria, it is called "*aya*" (Hausa), "*aki-Hausa*" (Igbo) and "*ofio*" (Yoruba). Tiger nut is popularly known as "*atadwe*" (Ghana), "*chufa*" (Spain), "*mandorla*" (Italy), "*souchet*" (France), "*junca*" (Portugal) etc.

Tiger nut is said to be very good for its nutritional, therapeutic and medicinal values. Berlinda (2021); Rida (2022) and Alina (2022) argued that regular consumption of tiger nuts can help to boost libido and sperm production and erectile dysfunction as the high amount of Arginine and Omega 3 in tiger nuts help in better flow of blood from the heart through the arteries down to the penis. Berlinda (2021) also maintained that the high content of Vitamin E in tiger nut helps prevent against skin wrinkles and premature aging which helps in keeping the skin healthy and strong. Chukwuma, et. al (2010) asserts that consuming tiger nut can help to improve cardiovascular health by lowering the bad cholesterol in the blood stream. Its good content of potassium and other related minerals allows better flow of blood which reduces the risk of blockage that can lead to heart attack. It has antioxidant effect over fat which are responsible for coronary heart disease

Tiger nuts oil has a characteristic nutty taste and flavour. It is golden brown in colour and has high content of oleic acid with low acidity that makes it useful to maintain skin health. The oil is loaded with important nutrients essential for the body. Tiger nut oil has a number of applications ranging from culinary purposes, cosmetics, pharmaceuticals, bio-fuel, traditional medicine, food preservation, skin care, hair care etc. For instance, Kumar et al. (2017) assert that due to its high smoke point, tiger nut oil is suitable for frying and sautéing while according to Ijaritimi et al.(2018) tiger nut oil has been studied for its potential use in the treatment of various diseases, including cancer, diabetes, and cardiovascular disease. Some of

the health benefits of tiger nut oils as reported by Rida (2022) are that it lowers bad cholesterol level and increases level of good cholesterol, it lowers the chances of formation of blood clots and prevents arteriosclerosis, it stimulates the calcium absorption in bones and produces new bony materials, it provides relief from fatigue and soothes the nervous system as well as eliminates free radicals. Kurek (2019) and Tong et al. (2021) have established that the presence of phytochemicals (bio-active components) such as tannin, phytate, flavonoids, glycoside. alkaloids etc, in some plants like tiger nuts are added medicinal advantage of utilizing such plants.

Processing of tiger nuts into edible oil is not entirely a new practice, however, its utilization for culinary and health purposes still largely remained unexploited especially in Nigeria, Hence, this study tends to close this gap by generating research results that could contribute to popularizing tiger nuts oil among individuals and families as alternative oil for improving healthy living.

Purpose of the Study

The major purpose of the study was to analyse proximate and phytochemical composition of tiger nut **(***Cyperus esculentus**)* oil. Specifically, the study determined:

1. proximate composition of tiger nut oil
2. phytochemical composition of tiger nut oil as a measure of its bio-activeness

Materials and Methods (For production of Tiger nut oil)

Design of the Study: Experimentaldesign was adopted for the research.

Materials and Methods

Procurement of Material: Dehydrated tiger nut was purchased from Mile 12 Market, Lagos, attrition mill (grinding machine) for wet-milling, muslin cloth, non-stick cookware and packaging plastic bottles. Materials for proximate analysis include; analytical balance, oven (105^0C), desiccators, Soxhlet apparatus, fat extraction solvent (hexane), Kjeldahl apparatus, protein analysis reagents (sodium hydroxide), ash crucibles, Muffle furnace and tiger nut oil sample while for phytochemical analysis are; tiger nut oil sample, solvents (hexane, ethanol, methanol), phytochemical standards High performance liquid chromatography (HPLC)

Sample Preparation: Dried tiger nuts were sorted (removal of bad tubers) and soaked in clean water for 24 hours to soften the nuts for better recovery during milling. Soaked nuts were later washed with detergent to remove adhering plant materials. They were then washed thoroughly with clean water to remove traces of detergent and wet-milled using attrition mill. The slurry obtained after milling was sieved with the aid of muslin cloth to separate the milk

from the shaft. The milk was then allowed to stand for 5 hours during which the oily cream floats at the top while the starch settle at the bottom. The oily cream was later carefully removed into another container where it was allowed to ferment for three days. Fermented cream was placed in a non-sticky pot and allowed to burn out gradually over a low heat. When the cream was completely burnt out, oil with a nutty flavor was then recovered. Recovered oil was doubled- filtered and allowed to cool before packaged in a plastic bottle

Proximate Analysis: For the proximate analysis, sample was analyzed for crude protein, ash, crude fibre, fat, moisture content, carbohydrate (CHO) and metabolizable energy (ME) according to the official methods of analysis described by the Association of Official Analytical Chemist (A.O.A.C., 18th Edition, 2005).

Crude Protein: 5g of tiger nut oil was weighed into a Kjeldahl flask and protein analysis reagents were added. This was digested, distilled and titrated with sodium hydroxide. The crude protein was calculated as percentage (%)

Ash Content: Tiger nut oil was weighed into an ash crucible and later heated in muffle furnace at 550^{0}C for about 2 hours. This was cooled and weighed to calculate ash content as percentage (%)

Fibre: Tiger nut was weighed into a crucible. Sulphuric acid and sodium hydroxide were then added. This was later digested and filtered so that the residue was calculated as percentage (%) of crude fibre

Crude Fat: For crude fat, tiger nut oil was weighed into Soxhlet apparatus and extracted with hexane for 6 hours. The solvent was evaporated and the residue weighed as percentage (%) of crude fat

Moisture Content: Tiger nut oil was measured into a crucible. This was dried in the oven at 105^{0}C for 2 hours. It was then cooled in desiccators and calculated as percent moisture content.

Carbohydrate: This was determined by subtracting the sum of moisture, crude protein, crude fat, crude fibre, and ash from 100%.

Phytochemical analysis: Quantitative tests were conducted for tannin, phytate, flavonoids, glycoside and alkaloids using the quantitative methods for phytochemical analysis described by Bando et al (2020). All analysis was carried out in duplicate. Flavonoids, tannin, alkaloids, phytate and glycoside were analyzed using HPLC to detect and for quantification.The quantitative methods for phytochemical analysis described by Bando et al (2020) were used.

Results

Table 1: Proximate Composition of Tiger nut Oil

	Composition of Tiger nut Oil/100g		
Proximate Parameters	**Test A***	**Test B***	**Average ****
Crude Protein	0.39	0.41	**0.40**
Ash	0.00	0.00	**0.00**
Crude Fibre	0.00	0.00	**0.00**
Fat	98.95	98.92	**98.94**
Moisture Content	0.50	0.49	**0.49**
Carbohydrate (CHO)	0.16	0.18	**0.17**
Metabolizable Energy ME (Kcal/Kg.)	8114.22	8113.80	**8114.01**

**** Results calculated in Duplicates Test A is first test, Test B is second test**

Table 1 shows result of proximate composition of tiger nut. It show that metabolizable energy (8114.01 kcal/kg). Metabolizable energy is the energy available to cells in the body for metabolism which enable the cells of the body to stay alive and to function effectively. The result also showed that the percentage of ash content in 100g of oil sample is zero. This implies that the level of the pureness of the oil is very high. The presence of high ash content could signify the presence of toxic materials such as mercury. Other composition as obtained from the table are; crude protein (0.40%), crude fibre (0.00%), fat (98.94%), moisture content (0.49%), carbohydrate (0.47%). The high fat content (98.94%) indicates that tiger nut oil is a rich source of lipids, making it suitable for culinary and industrial applications.

Table 2: Phytochemical Composition of Tiger nut Oil

	Composition of Tiger nut Oil (mg/100g)		
Pytochemical Parameters	**Test A***	**Test B***	**Average ****
Tannin (mg/100g)	20.05	19.96	**20.00**
Phytate (mg/100g)	24.21	24.18	**24.19**
Flavonoids (mg/100g)	9.19	9.24	**9.22**
Glycoside (mg/100g)	7.83	7.78	**7.81**
Alkaloids (mg/100g)	18.40	18.96	**18.68**

**** Results calculated in Duplicates**

Table 2 shows that tiger nut oil is rich in bio-active components, tannin (20mg), phytate (24.19mg), flavonoids (9.22mg), glycoside (7.81mg), and alkaloids (18.69mg). This confirmed the fact that tiger nut oil can be utilized medicinally and therapeutically for improving health of Nigerians.

Discussion of Findings

This study explored the health potentials of tiger nut oil as prognosis for healthy consumption in Nigeria. Tiger nuts when eaten as snack (fresh, dried, baked or roasted) or processed it into edible oil have potentials for helping to improve the health status of individuals. Gambo & Da'U (2014); Elom & Ming (2017) and Mohammed & Mua 'Zu (2019) have established the fact that tiger nuts are beneficial in digestion, cardiovascular health, diabetes, central nervous system, sex and libido tonic, cancer etc. The result of proximate composition in this study shows that tiger nut oil is high in metabolizable energy (8114.01kcal/kg). Metabolizable energy is the energy available to cells in the body for metabolism which enable the cells of the body to stay alive and to function effectively. This implies that including tiger nut oil in human diet could significantly help to boost general wellness. The result also showed that the percentage of ash content in 100g of oil sample is zero (an indication that the oil produce from tiger nut using fermentation method is very pure free from toxic materials such as mercury). The result also revealed that tiger nut oil is an excellent source of monounsaturated fats. Alina (2022) have earlier argued that the high fat profile of tiger nut oil is similar to that of heart-healthy olive oil. Hence, utilizing tiger nut oil for culinary purposes could help individuals and families maintain a healthy heart. Tiger nut oil has number of applications ranging from culinary purposes, cosmetics, pharmaceuticals, bio-fuel, traditional medicine, food preservation, skin care, hair care etc. The findings of the present study are consistent with those of Kumar et al. (2017) who reported that due to its high smoke point, tiger nut oil is suitable for frying and sautéing. They are also consistent with findings of Ijaritimi et al.(2018) who reported that tiger nut oil has the potential for use in the treatment of various diseases, including cancer, diabetes, and cardiovascular disease.

The phytochemical composition of tiger nut oil in Table 2 showed that tiger nut oil is rich in bio-active components such as tannin (20.00mg/10g), phytate (24.19mg/100g), flavonoids (9.22mg/100g). glycoside (7.81mg/100g) and alkaloids (18.69mg/100g) with tannin, phytate and alkaloids present in higher quantities. This result corroborates that of Bando et al (2020) who in a similar study confirmed that tiger nut is an excellent source of polyphenol, alkaloids and glycoside. The presence of bio-actives such as tannin, phytate, flavonoids, glycoside and alkaloids in plant materials make such plants exhibit diverse pharmacological and biochemical actions when ingested or utilized by humans. Tong et al (2021) observed that tannin for instance help in accelerating blood clothing, reducing blood pressure and decreases

the serum lipid level. Kurek (2019) asserts that alkaloids have diverse physiological effects ranging from antibacterial, anti-inflammatory, analgesic and antitumor activity while Gemede (2014) in a study of potential health benefits and adverse effects associated with phytate in foods found that phytate have beneficial health effect such as antioxidant and anticancer properties. Roy et al (2022) observed that flavonoid is a biologically active phytochemical that is very popular in the plant kingdom for its medicinal applications.

Conclusion

This study investigated the proximate and phytochemical composition of tiger nut oil. He proximate and phytochemical analysis of tiger nuts oil revealed its exceptional nutritional and bioactive profile. The findings demonstrated that tiger nuts oil is an excellent source of metabolizable energy, dietary fibre, crude protein, and healthy fats. Furthermore, the phytochemical analysis identified a rich presence of bioactive compounds, including tannins, flavonoids, glycosides, and alkaloids. These findings suggest that tiger nuts oil has immense potential a nutraceutical, providing essential nutrients and energy; functional food ingredient, enhancing dietary fibre and protein contents, and as pharmaceutical agent utilizing its bioactive compounds for therapeutic purposes. The study thus concludes that tiger nut oil is a nutritious and phytochemucally rich oil with potential health benefits, including antioxidants, anti-inflammatory and antimicrobial activities. .Hence, apart from consuming tigernuts routinely as snack (fresh, dried, baked or roasted), acceptable edible oil can be extracted from its tubers which can be utilized for culinary, medicinal and therapeutic purposes by humans. The presence of bio active chemicals such as tannin, phytate, flavonoids, glycoside and alkaloids in tiger nut oil will no doubt help individuals and families in Nigerian develop and maintain all-round wellness for better productivity if allowed to be part of their daily diets

Recommendations

Based on the findings, the following recommendations are made:

1. Tiger nut research institutes should be created and funded for comprehensive biochemical analysis of tiger nut oil to foster healthy consumption.
2. Investigation of the stability and shelf-life of tiger nut oil should be conducted under different conditions
3. Inclusion of tiger nut in human diets will not only help to create varieties but also help to solve the problems of malnutrition and food insecurity in Nigeria.

4. Further investigation is needed on the effects of processing conditions on the proximate and phytochemical composition of tiger nut oil
5. Further research on the optimal extraction methods of tiger nuts oil to enhance bioactive compound recovery should be explored.

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Prostate Cancer Media Messages Issues among Male Secondary School Staff in Southeast Nigeria

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Abstract
The study focused on prostate cancer in media messages and male secondary school staff in Southeast Nigeria. Specifically, it determined regularity of exposure of men to media messages on prostate cancer; level of awareness of the men to media messages on prostate cancer media messages; knowledge of prostate cancer gained from media messages; attitude of men towards prostate cancer media messages. The study adopted a survey research design.. Population was 759 male teaching and non-teaching staff of Federal Government College (30 years and above) in Southeast Nigeria. Data were collected using questionnaire. Findings show various exposure regularity to masses, including on a daily basis ($\overline{X}$=2.97), once a week ($\overline{X}$=2.97), and once a month ($\overline{X}$=2.84). Also the respondents have a high level of awareness of the six awareness indicators, which include campaigns that help provide information about early detection and prevention ($\overline{X}$=3.01), among others. Furthermore, respondents have high knowledge for each of the seven knowledge indicators,including that prostate cancer is a disease that affects men alone ($\overline{X}$=3.12), among others. Also respondents have a high level of attitude for each of the five attitude indicators, including that prostate cancer can be averted ($\overline{X}$=3.26), among others. There is a significant relationship at 0.05 level of significant between regular exposure to media messages about prostate cancer and attitude of male secondary school staff in Southeast towards prostate cancer.

Key words: Awareness,Cancer, Prostate, Knowledge, Attitude, Media Messages, Campaign.

Introduction

Cancer is the unchecked growth of malignant cells in any organ system (Selvakumar et al., 2012; Abbott & Ustoyev, 2019; Kumari, 2020). These abnormal cells or growth are known as cancer cells, malignant cells, or tumour cells. These cells have the ability to enter normal human tissues (Fadaka, et al., 2017; Didiugwu, et al., 2018; Kumari, 2020; Alothman et al., 2022). Cancer cells, according to Kumari (2020) and Vasantharajan et al. (2021), can break free from the initial mass of cells, travel through the blood and lymph systems, and lodge in other organs in order to restart the unrestrained growth phase.

Cancer-related mortality rates in Asia and Africa are much higher than their incident incidence rates (57.3% and 7.3%, respectively). Although the condition can afflict men of various racial origins, research suggests that black men have a greater susceptibility to contracting the disease (Alexis et al., 2024). This is because many nations lack the resources to detect and treat cancer early, and those who are diagnosed often have a far lower chance of survival World Health Organisation (WHO), 2018). Prostate cancer (PCa), the most frequent cancer in males, is diagnosed in about 2000 men every day around the world, with one man

dying from the disease every two minutes (Fitzpatrick et al., 2009; Gebru et al., 2023). It happens when a tumour develops in the prostate gland of the male reproductive system.

Previous prostate cancer studies in Nigeria and Africa found that men in Africa have the highest incidence and mortality rates (Enemugwem et al., 2019;Ugochukwu et al., 2019; Riviere et al., 2020; Aladuwaka et al., 2022). An earlier study by St-Hilaire (2019) andDozie et al. (2022) found that this disease had a significant morbidity and mortality rate, with a 20,000 annual death rate and a hospital incidence of 127 per 100,000. This rise can be attributed to the nonexistence of in-depth awareness of prostate cancer risk factors, symptoms, and treatment, as well as a negative attitude towards prostate cancer screening (Agbugui, et al., 2014; Liss et al., 2020).

In Nigeria, prostate cancer is the most common male cancer, accounting for 28 percent of all new occurrences of male cancer. Media campaigns are one technique to educate the public about the hazards of prostate cancer. The media have a vital role in raising public awareness about health issues. The media acquaint individuals with alternative lifestyles and provide them with knowledge on certain diseases, including their risk factors and strategies for maintaining a life free from such illnesses (Acha et al., 2023). The most proximal endpoint is awareness, which may be an important step towards campaign effectiveness on behavioural outcomes (Bauman & Chau, 2009; den Braver et al., 2022). There is no doubt that the best way to raise awareness is through the media, through which helpful information can be disseminated to thousands of individuals in a specific area from a credible source.

Citizens are taught how to make appropriate health decisions, such as the need for early prostate cancer screening. The media, as an effective means of disseminating information, must be well-equipped to educate and advise men on how to prevent and detect prostate cancer early (Oranusi, et al., 2012; Alexander et al., 2021; Ndung & Kahura, 2022). Men will have a greater understanding of prostate cancer and its significance, as well as routine prostate checks, as a result of the widespread media messages on the disease.

Scholarly studies on postrate cancer have revealed a lack of awareness (Ajape, et al., 2010; Okeibunor's 2011;Adibe et al., 2017; Schliemann et al., 2019; Sofija et al., 2023), a lack of knowledge about prostate cancer (Enemugwem et al., 2019; Sakala et al., 2020), and a negative attitude towards postrate cancer (Adibe et al., 2017; Sakala et al., 2020). However, there is evidence to suggest that issues with men's prostate cancer media messages among male secondary school teachers in Southeast Nigeria may impact their decision to seek screening and treatment. Despite the increasing use of media campaigns to promote prostate cancer awareness, little is known about the effectiveness of such messages and their impact

on MSSS regularity of exposure, level of awareness of, knowledge on prostate cancer gained from media messages and attitudes towards the diseases.

In spite of prostate cancer awareness campaigns, death rates continue to rise. Prostate cancer is a key factor in mortality in developing countries such as Nigeria, with men aged 50 and up accounting for the majority of deaths. This high death ratecould be attributed to absence of public awareness and information, late confirmation of illness and diagnosis, as well as men's attitudes towards the disease. Some experts believe that efforts to combat prostate cancer must prioritize raising awareness, changing attitudes, and improving the use of screening measures among all groups of men generally. Male secondary school staff (both non-teaching and teaching), constitute a group that needs to be targeted. This because when they are appropriate impacted by awareness programmes, they can impact other men, hence the need for this study.

Objectives of the Study

The major objective of this study was to examine prostate cancer media messages issues among male secondary school staff in Southeast Nigeria. Specifically, the study determined:

1. regularity of exposure of men secondary school staff (MSSS) to media messages on prostate cancer in Southeast Nigeria,
2. level of awareness of MSSS to media messages on prostate cancer in Southeast Nigeria
3. level of knowledge of prostate cancer among MSSS gained from media messages in Southeast Nigeria
4. attitude of MSSS towards prostate cancer media messages in southeast Nigeria

Hypotheses (HOs):

The following hypotheses were tested at a significance level of 0.05.

There is no significant relationship between regular exposure of MSSS to media messages about prostate cancer and:

$H0_1$: attitudes of MMSS in southeast towards prostate cancer.

$H0_2$: level of knowledge about prostate cancer gained from media messages in Southeast Nigeria

Methodology

Design of the Study: The study adopted a survey research design.

Area of the Study: The study was conducted in the five states that make up Southeast Nigeria. The area comprised of Abia, Anambra, Ebonyi, Enugu, and Imo. The study focused on the Federal government colleges (unity secondary schools) in the area of the study. At the time of the study there were 12 such schools in the area (National Education Management Information System (NEMIS) & Federal Ministry of Education (2021) https://nemiserp.com/reports/fucs.pdf.).

Population for the Study: The population was made up of 426 teaching and 323 non-teaching male staff of 12 Federal government colleges (FGC) in southeast Nigeria. The FGC involved male secondary school staff from Abia State (80 teaching staff and 92 non-teaching staff), Anambra State (131 teaching staff and 61 non-teaching staff), Ebonyi State (61 teaching staff and 39 non-teaching staff), Enugu State (98 teaching staff and 73 non-teaching staff), and Imo State (66 teaching staff and 58 non-teaching staff). The male teaching and non-teaching staff, who were all 30 years old or older. The teaching staff predominantly hold advanced academic qualifications (such as bachelor's, master's, or higher degrees) and typically boast substantial teaching expertise, spanning from five to 20 years or beyond. This experience involves direct classroom instruction and educational engagements. On the other hand, the non-teaching staff possess diverse educational backgrounds, which may include diplomas and related qualifications. They also have three to 15 years of experience in administrative, maintenance, and support duties.

Sample for the study: A total of 385 participants were randomly selected from the population of 759 male secondary school staff in Southeast Nigeria's Federal Government Colleges. The sample was made up of 221 teaching staff and 164 non-teaching staff.

Instrument for data collection: Structured questionnaire was used for data collection. The instrument was developed through literature review based on specific objectives of the study. Three experts in the fields of mass communication and media studies validated the instrument. The instrument had a four point strongly disagree (0.50-1.49); disagree (1.50-2.49); agree (2.50-3.49); strongly agree (3.50-4.00). The reliability of the instrument was tested using Pearson's formula, which yielded 0.91 from the instrument, which suggests a strong positive correlation, which may indicate high reliability for the instrument being tested.

Method of data collection:A total of 385 copies of the questionnaire were administered as follows, 221 for the teaching staff and 164 for the non-teaching staff. Over the course of six weeks all, the 385 copies retrieved giving a 100 percent return rate.

Method of data Analysis: The data was analysed using mean scores and standard deviation. Means were used to answer research questions, and the standard deviation measures how dispersed the data is relative to the mean. A criterion score of 2.50 was adopted for decision-making. Any mean of 2.50 and above ($\bar{X} \geq 2.50$) was regarded as high regularity/ awareness/ knowledge/ attitude. Any item with mean less than 2.50 **(**$\bar{X} \leq 2.50$) were considered low on the four parameters. Simple linear regression analysis was used to test hypotheses. The hypotheses were tested at the 0.05 level of significance.

Results

Table 1: Mean Responses and Standard Deviation on How Regularly are MSSS Exposed to Media Messages about Prostate Cancer in South East, Nigeria

SN	Regularity exposureIndicators	$\bar{X}_1$	SD_1	$\bar{X}_1$	SD_2	$\bar{X}_g$	SD_g	R
1	Am exposed to prostate cancer campaigns daily	2.55	1.50	2.45	1.45	2.97	0.97	HR
2	Am exposed to prostate cancer campaigns once a week	2.60	1.55	2.40	1.50	2.97	0.91	HR
3	Am exposed to prostate cancer campaigns once a month	2.50	1.60	2.50	1.50	2.84	0.96	HR
	Cluster Mean					**2.92**	**0.83**	**HR**

N_1= Number of Teaching staff (221), N_2= Number of Non-teaching staff (164), $\bar{X}_1$= Mean of Teaching staff, SD_1=Standard deviation of teaching staff; $\bar{X}_2$= Mean of Non-teaching staff, SD_2 =Standard deviation of Non-teaching staff; $\bar{X}_g$ =Grand mean; SD_g= Standard deviation of grand mean; Remark=HR= High Regularity

Table 1 presents the grand mean ratings and standard deviations of respondents' exposure to media messages about prostate cancer in Southeast Nigeria. The findings indicate that the respondents agree on three items: daily, weekly, and monthly exposure to media messages about prostate cancer, with mean values ranging from 2.84 to 2.97, all exceeding the mean of 2.50 and above ($\bar{X} \geq 2.50$) overall mean of 2.92 and a standard deviation of 0.83. These all show that regularity of exposure of MSSS to media messages on prostate cancer is high regularity.

Table 2: Mean Responses and Standard Deviation on the Level of Awareness among MSSS Regarding Media Messages on Prostate Cancer in South East, Nigeria

SN	Awareness Indicators	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	R
1	The campaign helps to provide information about early detection and prevention	2.60	1.50	2.42	1.45	3.01	0.95	HA
2	The media campaigns detailed the lifestyles that predispose men to prostate cancer	2.55	1.55	2.33	1.50	2.94	0.92	HA
3	The media campaign showcased the genetic factors that predispose men to prostate cancer	2.60	1.60	2.28	1.55	2.94	0.94	HA
4	The preventive measures were also incorporated in the media messages	2.52	1.55	2.30	1.50	2.91	0.91	HA
5	The media messages explained the treatment options available in the hospitals	2.48	1.50	2.22	1.45	2.85	0.93	HA
6	The Media messages educated men on the different kind of screening regarding prostate cancer	2.50	1.55	2.20	1.50	2.85	0.94	HA
	Cluster Mean					**2.91**	**0.78**	**HA**

N_1= Number of Teaching staff (221), N_2= Number of Non-teaching staff (16) 4$\bar{X}_1$= Mean of Teaching staff, SD_1=Standard deviation of teaching staff; $\bar{X}_2$ = Mean of Non-teaching staff, SD_2 =Standard deviation of Non-teaching staff; $\bar{X}_g$=Grand mean; SD_g= Standard deviation of grand mean; Remark =HA= High Awareness

Table 2 presents the mean ratings and standard deviation of respondents on six (6) identified items related to respondent's level of awareness regarding media messages on prostate cancer. The grand mean values ranged from 2.85 to 3.01, all of which exceeded the acceptable mean limit of 2.50. The overall mean is 2.91, with a standard deviation of 0.78. This indicates that respondents agreed that items 1, 2, 3, 4,5, and 6 have a high level of awareness regarding media messages concerning prostate cancer. This implies that the respondents have high awareness of the six awareness indicators.

Table 3: Mean Responses and Standard Deviation on Knowledge about Prostate Cancer Gained from Media Messages among MMSS in South East, Nigeria

SN	Knowledge Indicators	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	R
1	Prostate cancer is a disease that affect men alone	3.15	1.10	3.09	1.05	3.12	0.86	HK
2	Painful ejaculation is attributable to prostate cancer	2.95	1.00	2.89	0.95	2.92	0.85	HK
3	Prostate cancer is a growth of tumour in prostate gland	2.98	1.05	2.92	1.00	2.95	0.88	HK
4	Most prostate cancer cases affect men from 40 years and above	2.90	1.10	2.84	1.05	2.87	0.92	HK
5	Genetic factors also predispose men to prostate cancer	2.87	1.10	2.81	1.05	2.84	0.91	HK
6	Blood in the urine or ejaculation is one of the symptoms of prostate cancer	2.92	1.10	2.86	1.05	2.89	0.92	HK
7	Prostate Specific Antigen (PSA) is test that helps to detect prostate cancer	2.85	1.15	2.77	1.10	2.81	1.01	HK
	Cluster Mean					**2.91**	**0.72**	**HK**

N_1= Number of Teaching staff (221), N_2= Number of Non-teaching staff (164), $\bar{X}_1$= Mean of Teaching staff, SD_1=Standard deviation of teaching staff; $\bar{X}_2$ = Mean of Non-teaching staff, SD_2 =Standard deviation of Non-teaching staff; $\bar{X}_g$ = Grand mean; SD_g= Standard deviation of grand mean; Remark= HK= High knowledge

Table 3 shows the mean ratings and standard deviation of respondents on the seven (7) identified items pertaining to the level of knowledge about prostate cancer gained from media messages. The grand mean values ranged from 2.81 to 3.12, all of which exceeded the acceptable mean limit of 2.5. This indicates that respondents agreed that items 1, 2, 3, 4, 5, 6, and 7 have an overall mean of 2.91 with a standard deviation of 0.72, which means the respondents have high knowledge for each of the seven knowledge indicators.

Table 4: Mean Responses and Standard Deviation on the Attitudes of MSSS towards Prostate Cancer Media Messages in South East, Nigeria

SN	Attitude Indicators	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_2$	SD_g	R
1	Prostate cancer can be averted	3.30	1.10	3.22	1.05	3.26	0.84	HAT
2	Prostate cancer can be treated	3.15	1.05	3.11	1.00	3.13	0.77	HAT
3	The disease is treatable in its earliest stages.	3.25	1.10	3.17	1.05	3.21	0.79	HAT
4	I am willing to undergo any treatment recommended by my doctor to manage prostate cancer, regardless of any potential adverse effects.	2.90	1.15	2.76	1.10	2.83	1.00	HAT
5	I will promote and advocate for the screening and treatment of prostate cancer among my friends and family.	3.10	1.20	3.02	0.15	3.06	0.98	HAT
	Cluster Mean					**3.10**	**0.64**	**HAT**

N_1= Number of Teaching staff (221), N^2= Number of Non-teaching staff (164); $\bar{X}_1$= Mean of Teaching staff, SD_1=Standard deviation of teaching staff; $\bar{X}_2$ = Mean of Non-teaching staff, SD_1=Standard deviation of Non-teaching staff; $\bar{X}_g$ =Grand mean; SD_g= Standard deviation of grand mean; Remark=HAT=High Attitude

Table 4 presents the mean ratings and standard deviation of respondents on the five (5) identified items related to MSSS attitudes towards prostate cancer media messages in Southeast Nigeria. The grand mean values of these items ranged from 2.83 to 3.26, all of which exceeded the acceptable mean limit of 2.50. This shows that the respondents have high level of attitude for each of the five attitude indicators.

Table 5: Regression Analysis of the Relationship between Exposure to Media Messages about Prostate Cancer and the Attitudes of MSSS Towards Prostate Cancer

Model		Sum of Squares	Df	Mean Square	F	Sig.	Dec.
1	Regression	37.193	1	37.193	114.567	0.00	S
	Residual	124.337	383	.325			
	Total	161.530	384				

Note: S = Significant, α = 0.05

Table 5 presents a linear regression analysis examining the relationship between regular exposure to media messages about prostate cancer and MSSS attitudes toward the disease. The results indicate a significant relationship, with an F-ratio of ($F(1, 383) = 114.567$, $p = 0.00$). Since the p-value is less than the 0.05 significance level, the null

hypothesis is rejected. This confirms that regular exposure to media messages significantly predicts MSSS high attitudes towards prostate cancer in Southeast Nigeria.

Table 6: Regression Analysis of the Relationship between Exposure to Media Messages about Prostate Cancer and Level of Knowledge of MSSS about Prostate Cancer Gained from Media Messages

Model		Sum of Squares	Df	Mean Square	F	Sig.	Dec.
1	Regression	73.586	1	73.586	223.284	0.00	S
	Residual	126.222	383	.330			
	Total	199.807	384				

Note: S = Significant, α = 0.05

Table 6 presents a linear regression analysis that examines the relationship between exposure to media messages about prostate cancer and the level of knowledge MSSS gained from these messages. The analysis yielded an F-ratio of ($F(1, 383) = 223.284$, $p = 0.00$). Since the p-value is below the 0.05 significance level, the null hypothesis is rejected. This indicates a statistically significant relationship, suggesting that the level of knowledge MSSS in Southeast Nigeria gains about prostate cancer is significantly influenced by media messages.

Discussion of Findings

The findings indicate that the respondents, with an overall mean of 2.92 and a standard deviation of 0.83, show that MSSS in southeast Nigeria are regularly exposed to media messages about prostate cancer. This implies that prostate cancer messages are broadcast to men in the Southeast through campaigns and other forms of media. The study's findings align with Okeibunor's (2011) study on the assessment of breast cancer media campaigns in Edo State, which showed high exposure and awareness among women. This indicates that similar public health campaigns have been effective in both regions in increasing breast cancer awareness and promoting early detection. The findings are in line with Julin et al. (2012), who found evidence that dietary cadmium exposure might have played a significant role in prostate cancer development.This implies that there is a need for regulatory measures to limit cadmium levels in food and increase public awareness about the risks associated with cadmium consumption.

The study's findings revealed that MSSS have a high level of awareness about prostate cancer media messages, with a mean of 2.91 and a standard deviation of 0.78. This means that respondents were taught about the various types of prostate cancer preventive care through media messages. The study's findings contrast with Ajape et al. (2010) and Gebru et al. (2023), which reported limited awareness of prostate cancer among urban Nigerians and male patients, respectively. However, they align with Oranusi and Nwofor (2012), Wogu et

al., (2019) and Assefa et al. (2022), showing high awareness and symptom recognition among surveyed individuals, underscoring the need for further efforts to enhance prostate cancer understanding.

The study's findings indicate that the respondents that the knowledge of prostate cancer gained from media messages in Southeast Nigeria is high, with 2.91 as the overall mean and a standard deviation of 0.72. This means that males in the Southeast have a high level of knowledge about prostate cancer, which is a positive indicator of public health initiatives in the states and could lead to early detection and treatment. The findings support Adibe et al. (2017), showing useful knowledge and a positive attitude towards prostate cancer among University of Nigeria staff, but differ from Enemugwem et al. (2019) and Sakala et al. (2020), who found lower awareness and screening willingness. They also contrast with Acha et al. (2023), indicating limited pre-campaign knowledge, but align with Alexis et al. (2024), suggesting that awareness campaigns effectively enhance knowledge of prostate cancer risk factors among black men and can improve prevention and early detection.

The findings of the study show that the respondent's attitude towards prostate cancer media messages is high, with a cluster mean of 3.10 and a standard deviation of 0.64. This indicates that the attitude of men in the Southeast towards prostate cancer media messages can aid in encouraging friends and family to embrace prostate cancer screening and treatment. This finding aligns with the findings of Ugochukwu et al. (2019), who found that fear of a positive result, ignorance, and financial constraints hindered men in Lagos, Nigeria from screening for prostate cancer, despite their willingness to do so. The results are in opposition to the findings of Adibe et al.'s (2017) research, which showed a notable number of employees had inadequate understanding and unfavourable attitudes and perceptions towards prostate cancer screening and treatment. The study aligns with the health belief model, which suggests that individual perceptions of susceptibility and severity influence health behaviours, such as attitudes towards prostate cancer. However, it contrasts with Alothman et al. (2022), who found a lack of information and negative attitudes toward screening in Saudi Arabia, and Didiugwu et al. (2018), highlighting the need for clear communication of risks to address negative attitudes and improve awareness and engagement.

Conclusion

The media significantly influences public awareness and attitudes toward prostate cancer, frequently acting as a principal information source for the public. Evidence suggests

that increased exposure to media campaigns improves understanding of prostate cancer by helping individuals recognize the significance of early detection and treatment alternatives. Respondents from MSSS in Southeast Nigeria exhibited a particularly favourable reaction to prostate cancer messages in the media, indicating elevated levels of engagement with the information provided. The respondents express feeling well informed about the disease, crediting their knowledge to the accessible and thorough information disseminated through numerous media platforms. These findings highlight the importance of targeted media campaigns for public health education and have considerable implications for developing effective outreach tactics to promote proactive and preventive health behaviors among diverse populations.

Recommendation

This study aims to provide recommendations for improving knowledge, attitudes, and practices towards prostate cancer media messages among MSSS in Southeast Nigeria.

1. The public health sector should make more efforts to increase prostate cancer awareness and education in Southeast Nigeria through inclusive campaigns utilizing television, radio, and social media.
2. Community leaders should use local languages and culturally tailored media messages to ensure relevance, engagement, and understanding of the importance of prostate cancer screening.
3. Men should be encouraged to visit hospitals on routine visits for regular prostate cancer screening, including prostate-specific antigen (PSA) blood tests and digital rectal exams (DREs).
4. The Healthcare providers should use the media to clear factual information that addresses misconceptions and increase knowledge about prostate cancer screening and treatment.

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Strategies for Empowering Rural Women through Enhanced Agricultural Productivity in Okene, Kogi State

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Abstract

The study focused on strategies for empowering rural women through enhanced agricultural productivity in Okene, Kogi State. Specifically, it determined ways of: enhancing the rural women's agricultural input, marketing their farm produce; and their general welfare; as well as factors hindering empowerment and ways of removingthe hinderances. It was a survey research design. Population included 2,512 registered rural women farmers and 30 registered extension agents. Questionnairewasutilized for data collection. Data was analyzed using mean and standard deviation. Findings include 10ways ($\overline{X} \geq 2.50$) for enhancing the women's agricultural input, including providing access to improved agricultural inputs including high-quality seeds ($\overline{X} = 3.48$); and others. 12ways rural women could improve the marketing of their farm produce including establishing women-led cooperatives to enhance bargaining power and access to markets($\overline{X} = 3.70$), and others. 8waysof improving the rural women's general welfare, including expand access to affordable financial services and credit for investing in agricultural inputs ($\overline{X} = 3.40$) and others. 10 factors hindering empowerment of rural women through enhanced agricultural productivity such as heavy burden of unpaid care work, including household chores and childcare services($\overline{X} = 3.75$) and nine waysof mitigating factors hindering the women's empowerment such as promoting financial inclusion with microcredit and savings for agricultural investments($\overline{X} = 3.86$).appropriate recommendations were made based on the findings.

Keywords: Empowerment, Rural, Women, Agriculture, Productivity, Gender, Equality, Training.

Introduction

Agriculture plays a vital role in global economies, especially in developing nations, where it significantly impacts livelihoods (United Nations (UN), 2023). In Nigeria, agriculture is central to the economy, contributing to rural development and employment (Ajani, 2019). It encompasses various activities, including crop cultivation, animal husbandry, and the marketing of produce (Nwakile et al., 2020). Nigeria's diverse agricultural landscape reflects its rich ecological and cultural heritage (Fapohunda & Bolarinwa, 2020). The sector holds potential for inclusive growth and poverty reduction, particularly through rural development (Smith et al., 2023). Investments in agriculture promote economic diversification and resilience to external shocks, furthering socioeconomic development (Achike, 2017). Gender equality and women's empowerment are increasingly recognized as essential to agricultural development, with recent research and global

frameworks underscoring their importance (United Nations Development Programme Women (UNDP), 2023; Amadi & Eke, 2024).

In rural Nigeria, agriculture forms the backbone of local economies, particularly in communities dependent on crop cultivation and livestock rearing (Onah et al., 2023). While agriculture provides income and nutrition, it also shapes cultural identity in rural areas (Onyeneke, 2020). However, rural women, who are integral to agricultural production, face significant challenges that hinder their empowerment and productivity (Awosanya & Oluwakemi, 2022). These women are crucial in all stages of agricultural production, yet they encounter barriers in accessing resources like quality seeds, fertilizers, and modern equipment, which limits their productivity and income (Dauda & Lawal, 2022). Moreover, inadequate training in modern farming techniques and poor market access exacerbate their economic vulnerability (Eze & Agwu, 2023). Addressing these issues requires a multifaceted approach to improve access to resources, enhance training, and strengthen market linkages, thereby empowering rural women and fostering inclusive development (UNDP, 2023; Okonkwo & Afolami, 2023).

In Nigeria, there is a pronounced gender division of labor in agriculture, with women playing a critical role in crop cultivation, animal husbandry, and food processing (Onyeneke, 2019). Despite their contributions, rural women face gender-based inequalities that limit their access to resources and decision-making power (Onyeneke, 2020). Factors such as patriarchal norms, limited education, and restricted land tenure rights contribute to these disparities (Adewole, 2016). Access to land, credit, and modern technologies remains a significant challenge for many rural women, impacting their ability to improve agricultural productivity and economic status (Kumar & Singh, 2022). Additionally, climate change exacerbates these challenges, as rural women often lack the resources and knowledge to adopt climate-resilient practices (UNDP, 2023). Enhancing rural women's access to markets and value chain opportunities is crucial for increasing their income and reducing economic vulnerability (Mudege, 2016).

In Okene, Kogi State, agriculture is a primary livelihood, with rural women forming a significant part of the workforce. However, these women face substantial barriers, including limited access to land, credit, and modern agricultural technologies (Ogundeji, 2019). Customary land tenure systems, which favor male heirs, leave women with insecure land rights and difficulties in securing land for cultivation (Ajani, 2019). The lack of financial resources further hinders their ability to invest in necessary agricultural inputs, perpetuating a cycle of economic vulnerability and dependence on subsistence farming (UN Women, 2022).

To empower rural women in Okene, it is essential to implement strategies that enhance their agricultural productivity, tailored to the specific socio-economic and cultural context of the region (UNDP, 2023).

Purpose of the Study

The study evolved strategies for empowering rural women through enhanced agricultural productivity in Okene, Kogi State. Specifically, the study determined:

1. ways of enhancing rural women's agricultural input.
2. ways the rural women could improve marketing of their farm produce.
3. ways of improving rural women's general welfare.
4. factors that hinder empowerment of rural women through enhanced agricultural productivity.
5. ways of mitigating factors hindering empowerment of rural women through enhanced agricultural productivity.

Methodology

Design of the Study: The study adopted a survey research design.

Area of the Study: The study was conducted in Okene, Kogi State, Nigeria, where the Ebira people predominantly reside. Agriculture, the main economic activity, involves rural women in crop farming, livestock rearing, and small-scale agro-processing. Common crops include maize, yam, and cassava, while livestock like goats and poultry support household income. However, traditional farming methods prevail, with limited access to modern techniques, inputs, and equipment, leading to low productivity. The area lacks adequate agricultural facilities and services, and local markets, with poor infrastructure, offer limited opportunities, underscoring the need for strategies to boost productivity and empower rural women.

Population for the Study: The study involved 2,542 respondents, including 2,512 rural women farmers and 30 extension agents.All the women were registered with the Kogi State Ministry of Agriculture and Rural Development as of July 2023. These women, officially recognized, are actively engaged in crop cultivation, livestock rearing, and post-harvest processing. The selection of these registered farmers ensures their active participation in agriculture and access to government programs. Including extension agents, also from the Ministry, provides insights into the support and challenges faced by these women, enabling a comprehensive understanding of the factors influencing their productivity and empowerment. This targeted population allows for effective strategies to enhance agricultural productivity and empower rural women in Okene.

Sample for the Study: The study sample consisted of 282 respondents: 252 registered female farmers and 30 registered extension agents. The selection of 252 farmers followed Nwanna's rule of thumb (1981), which suggests using 10-20% of a population under 4,000 for sampling. A simple random sampling technique was employed to select 252 farmers. All 30 registered extension agents were included due to their manageable size.

Instrument for Data Collection. The study used a structured questionnaire with 49 items derived from a literature review in line with the research purposes. Five expertsin Agricultural extension validated the instrument.The internal consistency of the instrument, determined using Cronbach Alpha, yielded a coefficient of 0.78. The questionnaire was divided into five clusters (I – V), each based on the specific purposes used a 4-point of **very important way**(VIH);**important way** (IW); **less important way**(LIW); and **not important wayat all** (NIWA)with weights of 4, 3, 2, and 1 respectively.

Method of Data Collection:A total of 282 copies of questionnaires were distributed. Only 264 valid responses (240 from rural women farmers, 24 from extension agents) copies were retrieved. This give 93.6 percent return rate.

Method of Data Analysis: Data were analyzed using mean and standard deviation, with a mean cutoff of 2.50. Items with a mean of 2.50 or higher were deemed an important way (IW), while those below 2.50 were regarded as not an important way (NIW)

Results

Table 1: Mean Responses and Standard Deviations on the Ways of Enhancing the Rural Women Agricultural Input

S/N	Ways Enhancing Women's Agricultural Input	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	R
1	Providing access to improved agricultural inputs, such as high-quality seeds	3.50	0.80	3.40	0.60	3.48	0.77	IW
2	Offering affordable land or leasing options for farming activities	3.55	0.70	3.40	0.65	3.48	0.67	IW
3	Implementing training programs on sustainable farming practices.	3.10	1.00	3.20	1.10	3.15	1.03	IW
4	Providing financial support for agricultural startup ventures.	3.50	0.55	3.60	0.60	3.54	0.57	IW
5	Enhancing extension services.	3.60	0.50	3.50	0.60	3.56	0.56	IW
6	Implementing measures to prevent contamination of soil and water sources.	3.40	0.60	3.45	0.55	3.42	0.58	IW
7	Establishing measures to prevent transmission of zoonotic diseases.	3.35	0.75	3.25	0.65	3.30	0.70	IW
8	Enforcing environmental pollution control measures.	3.20	0.70	3.30	0.65	3.25	0.68	IW
9	Ensuring adequate security measures.	3.35	0.60	3.25	0.68	3.31	0.64	IW
10	Prioritizing government policies on land use to support and empower rural women in their agricultural activities	3.30	0.75	3.25	0.73	3.29	0.74	IW

$\bar{X}_1$ = Mean score of female famers; SD_1 = Standard deviation of female farmers; $\bar{X}_2$ = mean of extension agent/worker; SD_2 = Standard deviation of extension agents/workers; $\bar{X}_g$ = grand mean; R = Remark

Table 1 reveals that all the 10 items had grand mean values ranged 3.15 – 3.56. The values are all above 2.50 indicating that the items were important ways for enhancing the women's agricultural input in Okene, Kogi State. The standard deviation of all the 10 items range from 0.56 – 1.03. Each of the values are below 1.96 indicating that the respondents were near to the mean and to each other in their responses.

Table 2: Mean Responses and Standard Deviations on Ways the Rural Women Could Improve the Marketing of their Farm Produce

S/N	Ways Rural Women Improve Marketing of their Farm Produce	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	R
1	Establishing women-led cooperatives to enhance bargaining power and access to markets.	3.70	0.90	3.70	0.86	3.70	0.88	IW
2	Providing training programs on post-harvest handling and packaging.	3.40	0.65	3.48	0.55	3.44	0.60	IW
3	Facilitating access to market information through digital platforms	3.30	0.70	3.24	0.66	3.27	0.68	IW
4	Supporting the establishment of local processing facilities for value addition of agricultural products	3.20	0.85	3.10	0.79	3.15	0.82	IW
5	Promoting women's participation in agricultural trade fairs.	2.80	1.10	2.66	1.08	2.73	1.09	IW
6	Developing marketing strategies tailored to rural women's agricultural products t.	3.00	1.00	3.12	0.94	3.06	0.97	IW
7	Strengthening women's capacity in negotiation skills and market-oriented business management practices.	3.40	0.80	3.28	0.86	3.34	0.83	IW
8	Facilitating access to transportation facilities to reduce post-harvest losses and ensure timely delivery of agricultural produce to markets.	3.44	0.75	3.40	0.69	3.42	0.72	IW
9	Advocating for gender-inclusive policies that address barriers to women's participation in agricultural markets	3.55	0.70	3.45	0.68	3.50	0.69	IW
10	Providing financial support or credit facilities to invest in market infrastructure.	3.50	0.70	3.54	0.64	3.52	0.67	IW
11	Offering training on quality control to meet market requirements and improve product acceptance.	3.40	0.75	3.44	0.69	3.42	0.72	IW
12	Promoting the use of technology, such as mobile applications to facilitate access to market information	3.60	0.65	3.56	0.55	3.58	0.60	IW

$\bar{X}_1$ = Mean score of female famers; SD_1 = Standard deviation of female farmers; $\bar{X}_2$ = mean of extension agent/worker; SD_2 = Standard deviation of extension agents/workers; $\bar{X}_g$ = grand mean; R = Remark

Table 2 reveals that all 12 items had mean values ranged from 2.73 – 3.70. The values of the 12 items are above 2.50 indicating that the items were important ways the rural women could improve the marketing of their farm produce in Okene. The standard deviation of all the 12 items ranges from 0.60 – 1.09. Each of the values are below 1.96 indicating that the respondents were near to the mean and to each other in their responses.

Table 3: Mean Responses and Standard Deviations on Ways of Improving Rural Women's General Welfare

S/N	Ways of Improving Rural Women's General Welfare	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	R
1	Improve access to healthcare services.	3.54	0.79	3.20	0.98	3.42	0.88	IW
2	Enhance educational programs related to agriculture to increase skills.	3.56	0.60	3.35	0.85	3.48	0.70	IW
3	Provide better basic amenities, like clean water and sanitation.	3.68	0.60	3.59	0.70	3.64	0.64	IW
4	Expand access to affordable financial services and credit.	3.42	0.72	3.35	0.69	3.40	0.71	IW
5	Offer tailored agricultural training and extension services to boost productivity.	3.51	0.65	3.68	0.64	3.57	0.65	IW
6	Establish support networks and cooperatives focused on farmers collaboration.	3.19	0.71	3.09	1.02	3.15	0.83	IW
7	Invest in rural infrastructure, such as roads, to facilitate the transport of agricultural produce.	2.97	0.87	2.88	0.95	3.00	0.90	IW
8	Implement social protection programs that support agricultural livelihoods and reduce economic vulnerability.	3.36	0.74	3.30	0.76	3.33	0.74	IW

$\bar{X}_1$ = Mean score of female famers; SD_1 = Standard deviation of female farmers; $\bar{X}_2$ = mean of extension agent/worker; SD_2 = Standard deviation of extension agents/workers; $\bar{X}_g$ = grand mean; R = Remark

Table 3 reveals that all eight items had mean values ranges3.00- 3.64. The values arehigher than 2.50 indicating that the items are ways of improving the rural women's general welfare. The standard deviation of all the eight items ranged from 0.64-0.90. Each of the values is below 1.96 indicating that the respondents were near to the mean and to each other in their responses.

Table 4:Mean Responses and Standard Deviations on Factors Hindering Empowerment of Rural Women through Enhanced Agricultural Productivity in Okene, Kogi State

S/N	Factors Hindering Empowerment of Rural Women	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	R
1	Inadequate access to land due to traditional land tenure systems.	3.90	0.20	3.94	0.22	3.92	0.21	IW
2	Deeply ingrained gender biases limit women's decision-making.	3.20	0.85	3.24	0.87	3.22	0.86	IW
3	Limited access to financial services, credit options and appropriate technologies.	3.35	0.65	3.41	0.69	3.38	0.67	IW
4	Limited access to gender-sensitive agricultural training.	3.40	0.75	3.46	0.81	3.43	0.78	IW
5	Heavy burden of unpaid care work, including household chores and childcare services.	3.70	0.60	3.80	0.62	3.75	0.61	IW
6	Difficulty in accessing market information by womes.	3.55	0.60	3.57	0.70	3.56	0.65	IW
7	Climate change-related challenges, such as droughts	3.80	0.50	3.88	0.54	3.84	0.52	IW
8	Inadequate healthcare hampers rural women's health and agricultural engagement.	3.50	1.10	3.58	1.12	3.54	1.11	IW

9	Low representation in cooperatives limits women's influence on agricultural policies.	3.90	0.25	3.92	0.31	3.91	0.28	IW
10	Lack of education restricts girls' and women's access to agricultural information and opportunities	3.78	0.50	3.82	0.56	3.80	0.53	IW

$\bar{X}_1$ = Mean score of female famers; SD_1 = Standard deviation of female farmers; $\bar{X}_2$ = mean of extension agent/worker; SD_2 = Standard deviation of extension agents/workers; $\bar{X}_g$ = grand mean; R = Remark

Table 4shows that all the 10 items had mean values ranges from 3.22 - 3.96. The values were above 2.50 indicating that the important ways of hindering empowerment of rural women through enhanced agricultural productivity in Okene, Kogi State. The standard deviation of all the 10 items ranges from 0.21 – 1.11. Each of the values was below 1.96 indicating that the respondents were near to the mean and to each other in their responses.

Table 5:Mean Responses and Standard Deviations on Ways of Mitigating Factors Hindering Empowerment of Rural Women through Enhanced Agricultural Productivity

S/N	Ways of Mitigating Factors Hindering Empowerment	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	R
1	Securing women's land rights through land tenure reforms.	3.90	0.30	3.88	0.32	3.15	1.00	IW
2	Developing gender-sensitive agricultural training.	3.70	0.50	3.72	0.48	3.45	1.08	IW
3	Promoting financial inclusion with microcredit and savings for agricultural investments.	3.65	0.60	3.67	0.58	3.86	0.35	IW
4	Integrating gender considerations into agricultural policies to address discrimination	3.80	0.40	3.78	0.42	3.47	1.14	IW
5	Introducing time-saving and energy saving technologies like ease.	3.75	0.55	3.77	0.53	3.79	0.52	IW
6	Implement initiatives to share household and caregiving responsibilities.	3.60	0.70	3.62	0.68	3.81	0.46	IW
7	Improving infrastructure and transportation to enhance market access.	3.55	0.65	3.57	0.63	3.81	0.62	IW
8	Promoting climate change-resilient practices and technologies to help women adapt to climate change.	3.85	0.45	3.83	0.47	3.64	0.81	IW
9	Increasing access to quality healthcare.	3.50	0.75	3.52	0.73	3.88	0.39	IW

$\bar{X}_1$ = Mean score of female famers; SD_1 = Standard deviation of female farmers; $\bar{X}_2$ = mean of extension agent/worker; SD_2 = Standard deviation of extension agents/workers; $\bar{X}_g$ = grand mean; R = Remark

Table 5shows that all the nine items had mean values ranging from 3.15 - 3.88. The values are above 2.50 indicating that the items were important ways of mitigating factors hindering the empowerment of rural women through enhanced agricultural productivity. The standard deviation of all the nine items range from 0.35 – 1.14. Each of the values was below 1.96 indicating that the respondents are near to the mean and to each other in their responses.

Discussion of the Findings

The study identified several strategies to enhance women's agricultural input, including access to improved seeds, affordable land, and training in water conservation for

sustainable farming. Financial support for agricultural startups and measures to prevent zoonotic diseases were also emphasized. Additionally, environmental pollution control is crucial for maintaining a healthy agricultural environment. These strategies align with Smith et al. (2023), who emphasized the importance of access to quality seeds and technologies for boosting women's productivity. Amadi and Eke (2024) also support offering affordable land to ensure long-term investment and food security. The findings are consistent with the Food and Agriculture Organization (2023), which stresses the need for training in climate-smart techniques.

The study also revealed ways rural women can improve the marketing of their farm produce. Establishing cooperatives, providing training on post-harvest handling, and facilitating access to market information through digital platforms were highlighted. Supporting local processing facilities and promoting participation in agricultural trade fairs were also found to be important. These findings support Achike (2017), who highlighted women's critical role in food production. Adewole (2016) underscores the need for tailored strategies to address gender disparities, while Agwu and Eboh (2015) emphasize recognizing rural women's contributions and challenges in accessing resources.

The study highlighted strategies for improving rural women's general welfare, including better access to healthcare, educational programs, basic amenities, and financial services. These strategies aim to enhance health, skills, and economic security, thereby supporting better agricultural outcomes. The findings are aligned with Achike (2017), who emphasized women's roles in agriculture and rural development. Adewole (2016) and Agwu and Eboh (2015) also stressed the importance of addressing gender disparities and recognizing rural women's contributions.

The study also identified barriers to empowering rural women in Okene, Kogi State, such as inadequate access to land, gender biases, limited financial services, and insufficient agricultural training. The heavy burden of unpaid care work and limited access to education further restrict women's opportunities. These findings align with Mbilinyi (2018), who identified the lack of gender-sensitive training as a barrier, and Mekonen and Gebremedhin (2016), who documented the impact of unpaid care work on women's agricultural activities.

Finally, the study proposed strategies to mitigate these hindering factors. Implementing land tenure reforms, developing gender-sensitive training, promoting financial inclusion, and integrating gender considerations into policies were recommended. The introduction of time-saving technologies and improving access to healthcare were also highlighted. These strategies are supported by Njuki and Sanginga (2013), who emphasized

reducing women's unpaid care work, and Quisumbing (2015), who highlighted the importance of infrastructure and climate-resilient practices for empowering women.

Conclusion

The study identified key strategies for empowering rural women, including access to improved agricultural inputs, better marketing of produce, and enhancing general welfare. It also highlighted barriers to empowerment, such as limited land access, financial constraints, gender discrimination, and inadequate healthcare and education. These findings underscore the need for comprehensive approaches that address structural barriers and promote gender equality within the agricultural sector.By implementing the strategies and mitigating factors identified in this study, policymakers, stakeholders, and development practitioners can contribute to creating enabling environments where rural women can thrive, contribute meaningfully to agricultural development, and improve their livelihoods.

Recommendations

Based on the findings of the study, the following recommendations were made.

1. Okene LGA authorities should provide access to improved agricultural inputs, to rural women farmers.
2. Agricultural extension services should offer targeted training programs for rural women on various area of agriculture.
3. Okene LGA authorities should invest in healthcare facilities and services in rural areas to improve the health and productivity of women.
4. Financial institutions should develop affordable microcredit programs specifically for rural women farmers.
5. Policymakers should implement land tenure reforms to secure women's land rights.

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Determinants of Customer Satisfaction AmongHotels in Ebonyi

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Abstract

This study investigated determinants of customer satisfactionamong hotels in Ebonyi State. Specifically,it determined ways interior decoration, product quality, service quality, environmental aesthetics and staff welfare influence customer satisfaction in the hotels. Descriptive survey design was used for the study. Population was made up of 100 registered hotel businesses in Ebonyi State. Questionnaire was used for data collection. Data were analysed using mean and standard deviation. Findings reveal 10 ways interior decoration influences customer satisfaction.These include,enhances customers' value for quality ($\overline{X}$=3.31) and fanciful curtains ($\overline{X}$=3.31) and others. Other findings are 10 waysproduct qualityinfluenced customer satisfaction. These include among others, serving nutritious foods ($\overline{X}$=3.10) and availability of products ($\overline{X}$=3.50). Also, 10 way service quality influenced customer satisfaction such as prompt attendance to customers ($\overline{X}$=3.40) and friendly customer service ($\overline{X}$=3.20). Furthermore, 10 waysenvironmental aestheticsinfluenced customer satisfaction. These include among others, paintings and decorations ($\overline{X}$=3.12) and quality of architectural structures ($\overline{X}$=3.51). More findings also reveal10 waysstaff welfare influenced customer satisfactionsuch as regular payment of staff salaries ($\overline{X}$=3.21) and adequate salaries ($\overline{X}$=3.30).

Keywords: Hospitality, Industry, Influence, Hotels, Factors, Customers, Determinants, Satisfaction.

Introduction

Hospitality is the relationship of a host towards a guest. It means extending welcome to guests or offering a home away from home (Ofobruku 2012). Hospitality connotes friendly reception. It is a business that provides foods, drinks and accommodation for customers. Hospitality industry has been one of the most competitive industries especially in the 21st century. In the recent times, there has been a surge in the business in Nigeria and other nations (Nwokorie&Obiora, 2018). Hospitality industry covers many activities such as tourism services, restaurants, fast food centres, event management, transportation, hotels etc. Hotels host guests, they provide foods, drinks, recreational facilities etc. Hotels play an important role in the socio-economic growth of emerging societies. It is well-positioned as a major provider of variety of services including paid accommodation, restaurant services, relaxation centres, etc. Hotels offer hospitality services to guests and tourists (Batnic 2016). Hotels are classified into one to five stars based on their amenities, room numbers, furnishings, staff strength etc (Yuvraj 2022). Hotel industry is an important driver of

economic development. Due to the linkages it has with numerous sectors of the economy, it has the potential to create an array of jobs for its international and local populace (Otu, Itam, Emeka, Eja, 2013). It also offers natural and cultural attractions and historical monuments to guest as well as various entertainment facilities (Yadav 2014).

Over the years, hotels seem to have been experiencing difficulty providing sustainable customer satisfaction (Abdullah & Othman, 2019). Customer satisfaction measures how happy customers are with a company's product, services, capabilities, etc (American Society for Quality 2024). To succeed or simply to survive in the now, the industry is definitely interested in the perception of the services to be in line with expectations (Anwar& Abdullah, 2021). Hotel industries are very essential, because they are considered a source of income for individuals and the country at large. As such, they strive to catch the attention of guests and tourists to their establishment (Ali, et al, 2021).

Owing to the strategic role of the hotels, owners have been concerned about appropriate factors that will influence customer satisfaction. Zeleke & Kumar (2020) argued that hotels have launched different initiatives to demonstrate their willingness and determination to promote customer satisfaction including the adoption of relevant conduct and implementation of a viable management system. It is argued that the performance of the industry is dependent on variety of factors that connect with the sustenance of product and service quality aimed at enhancing customer satisfaction and loyalty. Anwar & Abdullah, (2021) affirmed that customers prefer and value establishments that provide high service quality. Customers judge service quality about what they want by comparing their perceptions of service experiences with their expectations of what the service performance should be. For this reason, enhancing customer loyalty is one of the key aspects of competitiveness in the industry as well as ensuring business continuity. In the event that customers are satisfied with products or brand, they most likely become loyal customers and keep spreading good word of the hotel (Prentice, et al, 2020). In that same manner, in the event that they are disappointed, they will probably switch off brand and talk bad of it to different customers. Satisfaction occurs when a service or product is superior or equal to the expectations of a customer (Nikou&Khiabani, 2020). With the high increase of hotel businesses and the need to provide distinct services for customers, there have been accompanying demands for the business owners to adopt appropriate service management factors for sustainable customer satisfaction (Nwokorie, 2017).

Customer satisfaction is a term that portrays a customer's perception of the value of the products and services they have received compared to the amount they have spent on the products and services. A customer who receives what he or she expected in a hotel is most likely to be satisfied (Flores, Saldanha, &Vong, 2020). Customer satisfaction with the hotels can be triggered by many elements, such as the ambience of the hotel, the exterior designs and arrangement to enhance more aesthetically pleasing environment for consumers using the space and the services. Customer satisfaction is a critical success factor in hotels. Satisfied customers repurchase the service, recommend and encourage others to use the service, while a dissatisfied customer responds differently. Customer's discernment may depend on the nature of the services, products, aesthetics and staff welfare that can trigger performance. A loyal customer is a customer who keeps consuming the services of an organization and keeps recommending the services to other people. Consumer's loyalty is a good measure of the quality of service offered to customers. Hotel businesses can create strategies to improve the quality of their services and products by measuring the level of their customer's loyalty.

In Ebonyi State, hotels have increasingly assumed a crucial role in the economic growth and development of the state. They offer varied services however, in some cases qualities of services and products remain questionable. There are cases of customers not repeating visits to the organizations especially in Abakaliki. In such situation, customers may visit once and owing to the nature of the products and services they received and also due to the decline in the quality of the environment and interiors may decide not to come again, they go all out to seek for better options and alternatives which usually may not be readily available as occurrences are similar in other hotels. They start good but as time passes, a lot of complaints begin to manifest. Customers complain about products, choky and unfriendly environment, foul smell etc. They also identify lapses and inconsistency on the part of the services and products provided. The establishment consistently looses their initial statuesque. This seems to make owners and management alike not to enjoy prolonged patronage translating to a great loss in their business investments. It is common that when a customer is not satisfied with service quality, environment both in and out, product quality, etc, such customer may not continue to patronize them. It seems that managers face the problems of trying to satisfy their customers and end up experiencing high levels of customers' dissatisfaction. It thus becomes necessary to evolve ways of enhancing customer satisfaction in hotels in Ebonyi state.

Purpose of the Study

The main purpose of the study was to investigate determinants of customer satisfaction in hotels in Ebonyi State. Specifically, the study determined ways the following could influence customer satisfaction in the hotels:

1. interior decoration
2. product quality
3. service quality
4. environmental aesthetics
5. staff welfare.

Methodology

Design of the Study: A descriptive survey design was employed for the study.

Area of Study: The area of study was Ebonyi State in South-east geopolitical zone of Nigeria.There are three senatorial zones in the state. The hotels in thearea are mostly one-star to three-star hotels. There are no five-star hotels in the state presently. The hotels used for the study were registered with the Ministry of Culture and Tourism and also registered with the Corporate Affairs Commission.

Population of the Study: The population was made up of all the customers who patronize the hotels in Ebonyi State. The state has 45 one - star hotels, 34 two - star hotels and 21 three - star hotels registered under Ebonyi State Ministry of Culture and Tourism (EBMCT Registration Data, 2022).

Sample for the Study: Abakaliki senatorial zone was purposively selected because it has more hotels (70) than the other zones. Stochastic sampling approach was employed to draw 180 respondents, comprising of 181 males and 49 females, who were customers seen on site at the selected hotels at the time of data collection. They were all adults of different socico-economic, educational and age levels.

Instrument for Data Collection: Questionnaire was used for the study. It was developed based on extensive literature review and in line with the objectives. The instrument was face validated by three experts in Hospitality management. A pilot study was conducted using 20 respondents who were not part of the study and from another zone. Data obtained were analyzed to determine the internal consistency of the instrument using Cron back Alpha. A reliability co-efficient of 0.786 was obtained.

Data Collection Method: A total of 180 copies of questionnaire were distributed by hand to respondents.All the 180 copies were completed and retrieved. This gave 100 percent return rate.

Data Analysis: Mean and standard deviation were used for data analysis. The decision rule was 2.50.Mean score of 2.50 and above was considered a "way" while customer satisfaction could be influenced. Mean score below 2.50 was considered as "not a way"

Findings

Table 1: Mean Responses and Standard Deviation on Ways Interior Decoration could Influence Customer Satisfaction in Hotels in Ebonyi State

S/N	Ways Interior Decoration could Influence Customer Satisfaction	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	R
1	Beautiful paintings enhance comfort of guests.	3.20	0.15	3.22	0.18	3.20	W
2	Interior decoration enhances customers' value for quality.	3.30	0.18	3.31	0.17	3.31	W
3	Beautiful lightings attracts customers patronage	3.48	0.32	3.48	0.35	3.48	W
4	Appropriate colour mix promotes customer's appeal.	3.33	0.17	3.36	0.18	3.34	W
5	Beautiful ornamental fixtures give customers beautiful serenity.	3.32	0.12	3.30	0.19	3.31	W
6	Televisions make customers feed relaxed for picture tourism.	3.21	0.12	3.18	0.18	3.20	W
7	Having quality cameras increases customers' engagement when they visit.	3.31	0.18	3.28	0.17	3.30	W
8	Decorative flowers in rooms and receptions enhance closeness to nature.	3.53	0.35	3.51	0.35	3.52	W
9	Quality beds and soft sofas enhance customers comfort	3.27	0.19	3.32	0.18	3.29	W
10	Fanciful and clean curtains and beddings improve room comfort and appeal	3.32	0.17	3.27	0.19	3.31	W

$\bar{X}_1$ = Mean of Male Customers; SD_1 = Standard Deviation of Male Customers; $\bar{X}_2$ = Mean of Female Customers; SD_2 = Standard Deviation of Female Customer; $\bar{X}^g$ = Grand Mean; R = Remark; W = Way customer satisfaction is influenced.

Table 1 shows mean ($\bar{X}$)responses on ways interior decoration influence customer satisfaction in hotels in Ebonyi State. The Table shows that all the 10 interior decoration items have mean scores of $\geq$ 2.50. This means that they are all ways interior decoration influence customer satisfaction in the hotels.

Table 2: Mean Responses and Standard Deviation on Ways Product Quality could Influence Customer Satisfaction in Hotels in Ebonyi State

S/N	Ways Product Quality Influence Customers Satisfaction	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	R
1	Serving nutritious foods	3.10	0.16	3.09	0.16	3.10	W
2	Serving chilled drinks of different varieties	3.40	0.28	3.33	0.29	3.38	W
3	Serving healthy and rich snacks	3.29	0.18	3.27	0.18	3.28	W
4	Food varieties encourages customers unending choices	3.23	0.18	3.20	0.15	3.22	W
5	Serving indigenous cuisines	3.50	0.36	3.52	0.37	3.50	W
6	*Ala carte* is of great value to customers food choices	3.10	0.17	3.12	0.18	3.11	W
7	Improve appearance and colour mix of foods	3.39	0.29	3.41	0.29	3.39	W
8	Good taste and texture of food products	3.29	0.17	3.32	0.18	3.30	W
9	Eye catching products display style	3.19	0.17	3.20	0.19	3.20	W
10	Steady availability of products	3.49	0.34	3.52	0.35	3.50	W

$\bar{X}_1$= Mean of Male Customers; SD_1 = Standard Deviation of Male Customers; $\bar{X}_2$ = Mean of Female Customers; SD_2 = Standard Deviation of Female Customer; $\bar{X}_g$ = Grand Mean; R = Remark; W = Way customer satisfaction is influenced.

Table 2 shows that all the 10 items have mean scores above 2.50 ($\bar{X} \geq 2.50$). This implies that each of the 10 items is a way product quality could influence customer satisfaction.

Table 3: Mean Responses and Standard Deviation on Ways Service Quality Influence Customer Satisfaction in Hotels in Ebonyi State

S/N	Ways Service Quality Influence Customer Satisfaction	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	R
1	Attending to guests quickly	3.40	0.30	3.38	0.29	3.40	W
2	Resolving the complaints of guests promptly	3.31	0.18	3.28	0.17	3.30	W
3	Attending friendly to customers	3.18	0.18	3.23	0.16	3.20	W
4	Conducting regular surveys on the opinions of customers and acting on them promptly	3.48	0.27	3.50	0.29	3.48	W
5	Offering regular promotional and motivational packages for customers	3.21	0.18	3.22	0.17	3.21	W
6	Availability of smart workers	3.49	0.31	3.39	0.29	3.46	W
7	Availability of workers with good knowledge of products	3.28	0.16	3.30	0.18	3.28	W
8	Availability of attendants with clear and polite communication skills	3.19	0.17	3.22	0.19	3.20	W
9	Availability of attendants who have respect for customer's needs and choices	3.34	0.28	3.40	0.30	3.36	W
10	Creating a community with customers	3.21	0.18	3.22	0.17	3.21	W

$\bar{X}_1$ = Mean of Male Customers; SD_1 = Standard Deviation of Male Customers; $\bar{X}_2$ = Mean of Female Customers; SD_2 = Standard Deviation of Female Customer; $\bar{X}_g$ = Grand Mean; R = Remark; W = Way customer satisfaction is influenced.

Table 3 shows that all the 10 items have mean scores of 2.50 and above 50 ($\bar{X} \geq 2.50$). It follows that the 10 items are ways service quality influence customers satisfaction.

Table 4: Mean Responses and Standard Deviation on Ways Environmental Aesthetics could Influence Customer Satisfaction in Hotels in Ebonyi State

S/N	Ways Environmental Aesthetics could Influence Customer Satisfaction	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	R
1	Paintings and decorations attrack customers	3.13	0.17	3.11	0.17	3.12	W
2	Spacious seating arrangements allow customers free movement	3.40	0.30	3.42	0.29	3.41	W
3	Beautiful flowers and ornamental trees in the surrounding	3.32	0.17	3.33	0.19	3.32	W
4	Surrounding need to be nature.	3.20	0.16	3.14	0.19	3.18	W
5	Quality of architectural structures influences retention of customers	3.54	0.37	3.43	0.36	3.51	W
6	Covered gutters within environment boost environmental appeal	3.11	0.19	3.06	0.18	3.10	W
7	Prevention of pollution around premises promotes healthy environment	3.39	0.30	3.37	0.26	3.38	W
8	Spacious and organized car park portrays orderliness	3.30	0.17	3.31	0.18	3.30	W
9	Spacious and designed sit-outs enhances environmental appeal	3.21	0.18	3.22	0.17	3.21	W
10	Beautiful and serene walk ways present homely presence	3.55	0.35	3.54	0.37	3.55	W

$\bar{X}_1$ = Mean of Male Customers; SD_1 = Standard Deviation of Male Customers; $\bar{X}_2$ = Mean of Female Customers; SD_2 = Standard Deviation of Female Customer; $\bar{X}_g$ = Grand Mean; R = Remark; W = Way customer satisfaction is influenced.

Table 4 shows that all the 10 items in the Table obtained mean scores of 2.50 and above. The items are therefore ways environmental aesthetics could influence customer satisfaction.

Table 5: Mean Responses and Standard Deviation on Ways Staff Welfare could Influence Customer Satisfaction in Hotels in Ebonyi State

S/N	Ways Staff Welfare Influence Customer Satisfaction	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	R
1	Payment of staff salaries regularly	3.20	0.18	3.23	0.19	3.21	W
2	Payment of adequate salaries to workers	3.29	0.18	3.31	0.17	3.30	W
3	Regular promotion of workers increases productivity	3.50	0.36	3.53	0.32	3.51	W
4	Paying workers bonuses for overtime	3.32	0.17	3.33	0.20	3.33	W
5	Retraining of workers to promote professionalism	3.32	0.18	3.33	0.18	3.32	W
6	Leave allowance promotes staff commitment to service	3.22	0.19	3.23	0.20	3.22	W
7	Sponsored vacations for staff	3.30	0.16	3.29	0.17	3.30	W
8	Organizing end of the year parties for staff	3.51	0.35	3.44	0.37	3.49	W
9	Giving awards for excellence to deserving staff	3.29	0.19	3.34	0.17	3.30	W
10	Provision of pension plan for staff	3.32	0.18	3.30	0.17	3.31	W

$\bar{X}_1$ = Mean of Male Customers; SD_1 = Standard Deviation of Male Customers; $\bar{X}_2$ = Mean of Female Customers; SD_2 = Standard Deviation of Female Customer; $\bar{X}_g$ = Grand Mean; R = Remark; W = Way

Table 5 shows that the all the 10 items obtained mean scores of 2.50 and above. This implies that each of the items is a way staff welfare could influence customer satisfaction.

Discussion of Findings

Findings of the study reveal that interior decoration is a determinant of customer satisfaction in hotels in Ebonyi State. Beautiful paintings, lightings, ornamental fixtures etc. enhance the comfort of guests. These findings are consistent with those of Chattergee (2022)that effectiveness and efficiency of hotel is dependent on the packaging of the interior decoration. The interior decoration of hotels is essential part of the marketing strategy since the looks of the organisation is crucial to branding. The findings are also in line with those of Obinwanne &Alozie (2019) who reported that interior decoration of a hotel is the first thing that customers will notice as they walk through the door. This first impression will dictate how they perceive the brand, what level of service they expect, what kind of time they anticipate and if they want to come back again. Thus, the importance of interior design cannot be underplayed. Dzremedo et al (2019) also agreed that interior decoration is crucial for branding. The way the organization looks impacts how the customers perceive their concept and if they consider it a good enough place to eat in or sleep over.

Product quality describes the quality of foods, drinks, product varieties on display aimed at eliciting customer's desire. According to Jana & Chandra (2016) the quality of food, drinks and associated products determines whether customers would continue to patronize the business or not. Aroma has always been associated with food and its ability to simulate appetite. It is one of the sensations that are debated as being highly psychological and also varying from person to person. The anticipation of taste depends on perceived aroma. Aroma is a strong driver of food choice and desire (Majeed et al 2017). Rajah & Metin (2016) affirmed that the value for money paid on products continues to play a crucial role in customer's overall satisfaction because consumers wants a balance between product and cost. The result of the findings agrees with Rua et al (2020) who affirmed that product quality is a major determinant of customer's level of satisfaction.

Service quality influences on customer satisfaction in hotels. Services include attending to guests promptly, resolving the complaints of guests quickly etc. Siti (2022) in his study confirms that consumers prefer where they are offered varied and complete products and also regarding the depth, breadth and quality of service. He said that service is key and has the capacity to give a company a high turnover. Attending to customers with friendliness is satisfying to customers and promotes customer's responsiveness in patronage. In hotels, conducting regular surveys on the opinion of customers is a pathway to offering quality service. This finding is in line with that of Adiza (2020) who found a notable

correlation between customer's satisfaction and the quality of service. Direct personnel services, room quality were also found as key determinants influencing customer's patronage in the hotels than the outside environment. Nwokorie (2021) also revealed a significant relationship between sufficient service management and guest satisfaction. Ali et al (2021) corroborated that hotel managers can investigate reasons for negative factors that lead to dissatisfied guest and improve their current service to meet guest needs and expectations.

Findings on environmental aesthetics and influence on customer satisfaction in hotels are consistent with those of Olabode (2020). Olabode (2020) observed that "servicescape" which is the physical environment of a firm could have a direct effect on customer's perception of service delivery. Serene physical environment is most of the time created or developed in order to leave a positive impression on guests. (Dewi 2020) also report that servicescape provides positive encounter and interactions between customers and service providers.

Staff welfare has significant influence on customer satisfaction in hotels in Ebonyi State. Payment of staff salaries regularly, payment of adequate salary, regular promotion, payment of bonuses for over time etc triggers quality service. It makes them more dedicated to their duties thereby promoting customer satisfaction. The study of Wapande et al (2020) affirmed that there is a significant relationship between workers attitude and customers satisfaction. Regular training and retraining of workers promotes professionalism among them thereby enhancing a positive customer – staff relationship. The result also agrees with that of Sanders (2020) who affirmed that staff welfare stimulates employees' level of performance and effectiveness. He established a significant relationship between staff welfare package and their commitment to work. Adeyemi (2014) revealed that customers and workers relationship is a predator of customers' satisfaction. The development of positive attitude of workers towards their job is a significant influence to customer satisfaction in hotels in the study area.

Conclusion

The findings have shown that interior decorations, products quality, service quality, environmental aesthetics and staff welfare are determinants of customer satisfaction. The reduction in the level of customer's loyalty might be due to compromises in quality. Ensuring high quality products and services is essential for maintaining customer satisfaction. This also advances customer's positive brand reputation, increased revenue and overall boosting of

employee and employer's morale. Staff welfare enhances the employers' loyalty towards the organization which translates to their attendance to guest.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Hotelsshould continue to improve their interior decoration, product quality, service quality, staff welfare and environmental aesthetics for maximum customer satisfaction.
2. Condition of service for staff of the hotels should be improved.
3. Staff service should be improved through in-service training..

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Effect of Textured Vegetable Protein Blends from African Yam Bean (*Sphenostylis stenocarpa*) and Soybean (*Glycine max*) on Nutrient Composition of Beef Patties and Sensory Attributes of Hamburgers

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Abstract
Effect of textured vegetable protein blends from African yam bean (AYB), soybean (SYB) on the nutrient composition of beef patties and sensory attributes of hamburgers was studied. Patties were produced using beef and textured vegetable protein (curd) from AYB and SYB blends with AYB and SYB and various substitution levels. Proximate and mineral compositions of the patties were determined using standard methods. Data were analysed using meansand analysis of variance (ANOVA). Hamburgers were also prepared using the formulated patties and evaluated for their sensory attributes. Proximate analysis of the samples ranged from 21.20-29.80% for moisture, ash (2.61-5.50%), fat (6.08-13.50%), crude protein (23.60-36.80%), crude fibre (0.04-8.33%) and carbohydrate (19.80-25.11%). Supplementation with AYB and SYB curds resulted in a significant ($p<0.05$) increase in the moisture, ash, crude fibre with a decrease in crude protein. Similarly, phosphorus (20.23-100.21 mg/100g), calcium (7.01-16.41 mg/100g) and magnesium (63.70-121.09 mg/100g) content increased significantly ($p<0.05$) as the supplementation with AYB and SYB curds increased. Sensory analysis showed that the control hamburger was generally acceptable.

Keywords: Hamburger, Textured Vegetable Protein, Beef Patties, African Yam Bean, Soybean

Introduction

Hamburger is a popular food items. It normally consists of a cooked patty of ground meat, usually beef, served on a bun or bread roll with different kinds of toppings and condiments. A conventional hamburger generally comprises 70-80 percent beef and 20-30 percent fat (Wordu and Eke-Ejiofor, 2020). This meat product traditionally holds a salt content of approximately 2.2 – 2.4 percent. Additional components beyond beef and fat might be incorporated to enhance the nutritional value and sensory attributes of hamburgers (Adebowale *et al* 2011). The growing demand among consumers for healthier beef sausages has compelled hamburger producers to continuously innovate, creating new and higher-quality products while keeping costs low. This involves minimizing fat content and

incorporating health-enhancing ingredients that offer improved functional characteristics, tastiness, and nutritional value. Plant-based proteins are becoming increasingly popular in the production of hamburgers, primarily due to their elevated protein content. These plant proteins are sometimes referred to as meat extenders or substitutes because they effectively rival beef in terms of flavour and texture (Amadi, 2020). They are commonly used as binders in meat products to enhance emulsion stability and serve as a cost-effective alternative to meat (Omwamba*et al* 2014).

Textured plant-based proteins are 'edible plant protein food items. They are distinguished by their structural integrity and recognizable consistency, ensuring that each element withstands hydration during cooking and other food preparation processes (China *et al* 2021). The creation of textured plant-based proteins, particularly from legumes, has been documented by Omohimi*et al*(2013) as a promising solution to address protein malnutrition issues. They serve as excellent substitutes for animal protein in food products. They are also often referred to as meat analogs because they compete effectively with beef in terms of both flavor and chewiness. The production process involves transforming a flour-like substance into one with a meat-like texture (Adedokun *et al* 2017). The resulting protein is known as textured plant-based protein, which contributes to chewiness and fibrous qualities. Soybean flour is the typical primary ingredient utilized for the production of textured plant-based proteins. Nevertheless, the utilization of soybean may be constrained in rural areas due to its scarcity or high cost (China *et al* 2021), necessitating the exploration of other legumes like African yam bean as a substitute for soybean.

African yam bean, scientifically known as *Sphenostylisstenocarpa*, is a tropical climbing legume typically found in lowland regions (Raji *et al* 2014). This legume is considered a minor and underutilized crop but holds significant importance in Western Africa, particularly in Nigeria's Southern, Eastern, and Western regions, where it is a staple food. The seeds of African yam bean boast a high protein content ranging from 21 to 29 percent, accompanied by a carbohydrate content of approximately 50% (Okoye and Onyekwelu, 2018). According to Raji *et al* (2014), the lysine and methionine content of African yam bean seeds is on par with, if not superior to, that of soybeans. However, its widespread utilization has been hindered by the presence of anti-nutritional elements such as phytic acid, oxalate, trypsin inhibitor and tannin, to mention but a few. These compounds can be reduced or eliminated through various processing methods like boiling, soaking, fermentation, and germination.African yam bean tubers and seeds are often prepared and consumed either independently or in combination with vegetables or other dishes (Nwosu *et*

al 2014). They are used to create sauces, wrapped in plantain leaves and boiled to make dishes like *okpa*, a delicacy made from bambara nut. Milk can be extracted from its seeds, and the flour derived from its tubers can be used to make moi-moi (Akinyele and Oloruntoba, 2013).

Recently, there is a growing interest in using local, underutilized seeds as alternatives to traditional ones. This approach, particularly in industrialized nations, aims to tap into local resources to meet a growing population's needs. Numerous studies have explored sausage production with various meat extenders like cowpea flour, full-fat soy flour, mung bean powder, and texturized soy protein (Kenawi*et al* 2009; Teye *et al* 2012; Omwamba*et al* 2014; Amadi, 2020). African yam bean, similar to soybean, is a protein-rich seed with untapped potential in sausage production. High meat product costs limit accessibility, and there is a rising demand to reduce costs by using meat extenders without compromising nutrition. Soybean is common due to its cost-effective, high-quality protein, but alternatives like underutilized legumes need exploration. African yam bean is one such option. Efforts are underway to use it as an extender in hamburgers, making this popular food more budget-friendly for all.

Objective of the Study

The study investigatedeffect of textured vegetable protein (curd) blends from African yam bean (AYB) and soybean (SYB) on the proximate composition, mineral content and sensory attributes of hamburgers.

Specifically, the study determined:

1. proximate composition of the beef patties;
2. mineral composition of the beef patties;
3. sensory properties of beef patties supplemented with AYB and SYB curds

Materials and Methods

Design of the Study: A quasi-experimental design was employed in the study.

Procurement of Materials: African yam bean seed was obtained from Ogbete market in Enugu State, Nigeria. While soybean, hamburgers and other vegetables were purchased from Mile one market and Wilson Bakery at Rivers State University, Port Harcourt. Chemicals and reagents were obtained from the Department of Food Science and Technology Laboratory, Rivers State University,Port Harcourt.

Preparation of Soybean and African Yam Bean Curds: African yam bean and soybean curds were prepared using the method of China *et al* (2021). African yam bean and soybean

seeds were sorted, washed and soaked overnight. Thereafter, it was dehulled and wet milled using a milling machine and sieved using chiffon cloth to obtain milk that was used for preparation of curd. 1000 ml of soybean milk was mixed with 1000 ml of African yam bean milk and boiled for 1 hr followed by the addition of 50 ml of lemon juice as coagulant. The coagulant formed was drained using a cheese cloth and it was sliced into square shaped, and thereafter transferred to salted water to eliminate the lemon.

Formulation of Recipe for Hamburger Preparation

Ingredients	Samples				
	A	B	C	D	E
Minced meat (g)	500	-	150	200	250
AYB and SYB curd (g)	-	500	350	300	250
Burger bread (pcs)	2	2	2	2	2
Sliced Lettuce (g)	50	50	50	50	50
Sliced Cucumber (g)	20	20	20	20	20
Mayonnaise (g)	50	50	50	50	50
Egg (pcs)	5	5	5	5	5
Vegetable oil (ml)	20	20	20	20	20
Salt (g)	1	1	1	1	1
Bouillon cube (tbsp)	¼	¼	¼	¼	¼
Dried Pepper (tbsp)	½	½	½	½	½
Onion (g)	50	50	50	50	50

Preparation of Hamburger

- **AYB, SYB, Meat Preparation:** Minced or ground AYB, SYB and meat are mixed, then seasoned with salt, pepper, bouillon cubes and eggs.
- **Patty Formation:** Seasoned minced/ground AYB-SYB-meat mix is shaped into round patties.
- **Cooking:** Patties are fried in vegetable oil on medium – to low heat until golden brown, usually 4-5 minutes per side.
- **Assembling the Burger:** Slather mayonnaise on burger bread. Place cooked patties on the burger bread. Top with sliced lettuce, cucumber and onions.

A total of 26 patties were produced. Six patties were used for proximate and mineral analysis, while 20 were used for preparation of hamburgers which were subjected to evaluation.

Proximate Analysis: The moisture, crude protein, crude fibre, crude fat and total ash contents of samples were analysed using the method described by Association of Official Analytical Chemists (AOAC, 2019). Moisture content determined was obtained gravimetrically after drying to a constant weight at 70^{o}C in a hot air oven (DHG 9140A). Fat was determined using soxhlet extraction method with ethyl ether. Kjeldahl method and a nitrogen conversion factor of 6.25 were used for crude protein determination. Ash content

was determined gravimetrically after the incineration of the samples in a muffle Furnace (Model SXL) at 550^{o}C for 2 h. Enzymatic gravimetric method was utilized in the determination of crude fibre. Carbohydrate was calculated by difference {100 - (Crude protein + crude fibre + ash + fat)}.

Mineral Analysis: As described by Gbadamosi *et al*(2021), 1 g of each sample was digested with 10% HNO_3 after ashing. The sample was filtered after digestion and the filtrate was made up to 100 mL of distilled deionized water. Atomic Absorption Spectrometer (Buck Scientific 210 VGP, USA) was used to determine the concentration of Iron, calcium, magnesium and phosphorous.

Sensory Evaluation: A twenty-member semi-trained panellist consisting of students of the Rivers State University, Port Harcourt, Nigeria was used for the sensory evaluation of the samples. Criteria for selection were that panellists are above 18 years of age and regular consumers of burgers. The samples were evaluated for colour, taste, aroma, texture and flavour while overall acceptability was obtained as a mean value of all the other sensory attributes accessed. Each attribute was rated on a 9-point hedonic scale with 1 = disliked extremely while 9 = liked extremely (Iwe, 2010). The panellists were given sensory evaluation forms to rate the samples. The hamburger were served with plates to the panellist while portable water was provided to rinse the mouth between evaluations.

Statistical Analysis: Data were analysed using means, standard deviation and analysis of variance (ANOVA).

Result of the Study

Result of Proximate Composition

Table 1 Proximate Composition (%) of AYB-SYB and Beef Patties

Samples	Moisture (%)	Ash (%)	Fat (%)	Protein (%)	Crude Fibre (%)	CHO (%)
A	29.80^{a}±4.27	3.07^{ab}±0.88	6.08^{c}±1.01	36.80^{a}±0.62	0.04^{d}±0.10	24.21^{b}±0.82
B	27.60^{b}±1.16	3.52^{ab}±0.80	11.84^{b}±0.65	23.60^{e}±2.12	8.33^{a}±2.12	25.11^{a}±0.53
C	21.20^{c}±1.18	2.61^{b}±1.00	13.50^{a}±3.72	35.50^{b}±0.00	6.20^{c}±0.34	20.99^{c}±0.14
D	24.80^{bc}±1.85	3.81^{ab}±1.01	13.00^{a}±5.20	31.70^{c}±0.00	6.50^{c}±0.70	20.19^{c}±0.79
E	26.10^{b}±1.15	5.50^{a}±0.40	12.00^{b}±1.01	28.80^{d}±0.00	7.80^{b}± 0.42	19.80^{d}±0.50

A = 100 % beef patties B = 100% AYB and SYB patties C = 70% beef: 30% AYB and SYB patties D= 60% beef: 40% AYB and SYB patties E= 50% beef: 50% AYB and SYB patties.Mean values are of duplicate determinations. Mean values within a column with different superscripts are significantly different at (p <0.05).

Table 1 shows proximate composition of AYB, SYB and beff patties. Moisture content of the patties ranged from 21.20-29.80 percent with sample B (100% AYB and SYB patties) recording the lowest value (21.20%) while sample A (100% minced meat) had the highest (29.80%). Moisture content of sample A was significantly ($p<0.05$) different from all other

samples. Ash content ranged from 3.07 percent in sample A to 5.50% in sample E (70% beef: 30% AYB and SYB patties). Ash content of sample E (50% beef: 50% AYB and SYB patties) was significantly ($p<0.05$) different from that of sample C (70% beef: 30% AYB and SYB patties). Fat content of the samples ranged from 6.08 percent in sample A to 13.50 percent in sample C. Protein content ranged from 23.60-36.80% with sample B recording the lowest value (23.60%) while sample A had the highest (36.80%). There was a significant ($p<0.05$) difference in the crude content of all the samples. Crude fibre content of the samples ranged from 0.04% in sample A to 8.33% in sample B. Crude fibre content of sample B was significantly ($p<0.05$) different from other samples. Carbohydrate content of the samples ranged from 19.80% in sample E (50% beef: 50% AYB and SYB patties) to 25.11% in sample B.

Table 2 Mineral Composition (mg/100g) of Beef, AYB and SYB Patties

Samples	Iron	Phosphorus	Calcium	Magnesium
A	$3.43^{a}\pm0.30$	$65.00^{b}\pm1.32$	$10.32^{c}\pm0.55$	$63.70^{d}\pm1.21$
B	$4.60^{a}\pm0.21$	$20.23^{c}\pm0.87$	$16.41^{a}\pm0.66$	$76.40^{c}\pm2.32$
C	$4.70^{a}\pm0.04$	$52.55^{b}\pm2.93$	$7.01^{d}\pm0.24$	$72.42^{c}\pm1.43$
D	$5.15^{a}\pm0.09$	$92.65^{a}\pm3.12$	$12.23^{b}\pm0.62$	$110.12^{b}\pm3.65$
E	$4.59^{a}\pm0.13$	$100.21^{a}\pm2.54$	$15.41^{a}\pm0.88$	$121.09^{a}\pm5.22$

A = 100 % beef patties B = 100% AYB and SYB patties C = 70% beef: 30% AYB and SYB patties D= 60% beef: 40% AYB and SYB patties E= 50% beef: 50% AYB and SYB patties.Mean values are of duplicate determinations. Mean values within a column with different superscripts are significantly different at (p <0.05).

Table 2 shows the mineral composition of AYB-SYB and beef patties. Iron content of the patties ranged from 3.43 mg/100g in sample A (100% beef patties) to 5.15 mg/100g in sample D (60% beef: 40% AYB and SYB patties). There was no significant ($p>0.05$) difference in the iron content of the samples. Phosphorus content ranged from 20.23 mg/100g to 100.21 mg/100g with the lowest value found in sample B (100% AYB and SYB patties) while sample E (50% beef: 50% AYB and SYB patties) had the highest value. Calcium content of the samples ranged from 7.01 mg/100g in sample C (70% beef: 30% AYB and SYB patties) to 16.41 mg/100g in sample B. Magnesium content ranged from 63.70 mg/100g in sample A to 121.09 mg/100g in sample E.

Table 3 Mean Sensory Scores of Hamburgers Produced with African Yam Bean, Soya Bean and Beef Patties

Samples	Colour	Texture	Aroma	Taste	Flavour	Overall Acceptability
A	$7.70^{a}\pm1.03$	$7.65^{a}\pm1.03$	$7.00^{a}\pm0.85$	$7.90^{a}\pm1.29$	$7.25^{a}\pm1.44$	$7.50^{a}\pm0.78$
B	$6.60^{a}\pm1.50$	$6.05^{b}\pm1.50$	$6.20^{a}\pm1.70$	$5.60^{b}\pm1.72$	$5.50^{b}\pm1.57$	$5.99^{b}\pm0.70$
C	$6.70^{a}\pm1.17$	$6.45^{ab}\pm1.14$	$6.15^{a}\pm1.30$	$6.20^{b}\pm1.67$	$6.30^{ab}\pm1.52$	$6.36^{ab}\pm0.87$
D	$6.70^{a}\pm1.38$	$6.20^{b}\pm1.43$	$6.30^{a}\pm1.21$	$5.80^{b}\pm1.47$	$5.80^{b}\pm1.10$	$6.16^{b}\pm0.69$
E	$6.60^{a}\pm1.60$	$5.85^{b}\pm1.69$	$6.00^{a}\pm1.52$	$6.15^{b}\pm1.84$	$5.90^{b}\pm1.33$	$6.10^{b}\pm0.93$

A = 100 % beef patties B = 100% AYB and SYB patties C = 70% beef: 30% AYB and SYB patties D= 60% beef: 40% AYB and SYB patties E= 50% beef: 50% AYB and SYB patties.Mean values are of duplicate determinations. Mean values within a column with different superscripts are significantly different at (p <0.05).

Table 3 shows the mean sensory scores of hamburgers produced with beef, African yam bean and soybean patties. Colour of the hamburgers ranged from 6.60 in samples B (100% AYB and SYB patties) and E (50% beef: 50% AYB and SYB patties) to 7.70 in sample A (100% beef patties). There was no significant ($p>0.05$) difference in the colour of the hamburgers. Texture of the samples ranged from 6.05-7.65 with sample B as the least preferred while sample A was most liked. Aroma ranged from 6.00-7.00 with sample E as the least preferred while sample A was most preferred. There was no significant ($p>0.05$) difference in the aroma scores of the hamburgers. Taste and flavour of the samples ranged from 5.60-7.90 and 5.50-7.25, respectively with sample B as the least preferred while sample A was most liked. The taste score of sample A was significantly ($p<0.05$) different from other samples. Overall acceptability scores ranged from 5.99 in sample B to 7.50 in sample A.

Discussion

Table 1 shows that replacement of beef with AYB and SYB curds for the preparation of hamburger had varying effects on the crude protein, fat, ash, crude fibre and carbohydrate contents of the patties. Supplementation of beef with AYB and SYB curds led to the reduction in the moisture content of the patties. This can be linked to the increase in the fat content of the samples, and agrees with Eke-Ejiofor *et al* (2023) who reported reduction in the moisture contents of seafood preserved with spice oleoresin, as a result of increase in their fat contents. This trend was also reported by Behailu and Abebe (2020) for beef meat sausage partially substituted with soybean protein and finger millet flours. The moisture content in food is a crucial parameter as it can affect the texture, juiciness, and overall palatability of the product. Moisture content of the patties was lower when compared to 63.77-65.59 percent reported by Amadi (2020) for meat sausages. The low moisture content of the patties from this study indicates a good shelf life for the product, since moisture content affects its stability and overall quality (Folake and Bolanle, 2006).

The ash content of the beef and AYB-SYB patties increased with increase in substitution level of AYB and SYB patties. This increase might be attributed to a concentration effect, as the 100 percent AYB/SYB patties exhibited higher ash content compared to the 100 percent beef patties. This uptick in ash content in AYB/SYB curd formulations indicates their potential as essential mineral sources in hamburger production, as ash content reflects mineral presence (Orisa *et al* 2023). The observed values were consistent with those reported

by Amadi (2020), who noted percentages of 3.10-4.24 percent of ash in beef sausage enriched with full-fat soy flour. The ash content of the 100% beef patties (Sample A) obtained in this study (3.07%) aligns with Dharmaveer *et al* (2007) findings for chevon sausage (3.00%).

The fat content of the beef and AYB-SYB patties reduced as AYB and SYB curds were included. The highfat content in patties with AYB and SYB curds when compared with 100 percent beef patties might be attributed to soy flour's strong fat-binding properties (Odiase *et al* 2013), which can be advantageous in meat applications. This increase in fat content was also noted by Omojola et al (2013) in breakfast sausages containing legume flours as binders. The high fat content in patties with AYB and SYB curds suggests their potential as significant energy sources for consumers when used in hamburger production.Conversely, there was a significant ($p<0.05$) decline in the crude protein content of the patties as the substitution with AYB/SYB curds increased. However, the protein content of the patties remained relatively high compared to that reported by Behailu and Abebe (2020) for beef partially substituted with soybean protein and finger millet flours (21.57-25.10%).

On the other hand, there was a significant ($p<0.05$) increase in the crude fibre content of the patties as the substitution with AYB/SYB curds increased. The increase in fibre content may be attributed to the fact that soybean and African yam bean contain vegetable-based fibres, which are a mixture of amylopectins and cellulosic (Odiase e*t al* 2013). This increase in fibre content indicates lower cooking loss, as dietary fibre additions augment bulk and reduce cooking loss in meat products, often without significant changes in textural properties, due to improved water-binding capabilities. This has economic advantages for both consumers and producers (Brewer, 2012). Dietary fibre in meat products also provides health benefits and serves as excellent meat substitutes, owing to their inherent functional and nutritional effects (Biswas *et al* 2011).The inclusion of AYB and SYB curds to the beef patties resulted ina significant ($p<0.05$) reduction in the carbohydrate content of the samples. Sample B (100% AYB and SYB curds) recorded the highest carbohydrate content (25.11%). These curds are sourced from legumes, which are renowned for their carbohydrate-rich composition, including starches and dietary fibres (Obinna-Echem *et al* 2024).

Table 2 shows that the patties supplemented with AYB/SYB curds are a rich source of mineral elements. The results showed an increase in the calcium, phosphorus, iron and magnesium content as the substitution with AYB and SYB curds increased. Similar findings were also reported by Amadi (2020) for beef sausage supplemented with soybean flour. Magnesium content of the patties obtained from this study were higher than that of Schmid *et*

al(2009) who recorded that the magnesium content of cooked sausage averaged between 11 and 18 mg/100 g for Swiss sausages. Magnesium helps in the proper functioning of the muscles. It also serves as an activator in many enzymes systems (Okoye and Egbujie, 2018).Calcium content of the beef patties from this study was similar to the values of 11.67-18.74 mg/100g reported by Amadi (2020).Calcium, in conjunction with other minerals and protein, plays a crucial role in facilitating proper bone formation, with calcium serving as the primary contributor. Furthermore, it is vital for essential bodily functions such as blood clotting, muscle contraction, and various metabolic processes (Abulude*et al* 2006). Inclusion AYB and SYB curds to the beef patties increased the iron content as well as the phosphorous content of the samples. The iron content of the patties was similar to iron content of different varieties of *Irvinga gabonesis* reported by Orisa *et al* (2023). The result for phosphorous content were comparable to Amadi (2020) who reported phosphorous content of 83.82-95.77 mg/100g.

Table 3 shows that hamburger produced from 100 percentbeef was more acceptable for all sensory parameters studied. Increase in the substitution of beef with AYB and SYB curds resulted in a decrease in the colour, texture, aroma, taste, flavour and overall acceptability of the hamburgers. Substitution with AYB and SYB curds had no significant effect on the colour and aroma of the hamburgers. The result showed that the hamburger containing 100 percent beef did not differ significantly ($p<0.05$) from hamburger containing 30 percent AYB/SYB curds. This suggests that a certain level of substitution (70% AYB/SYB curd: 30% beef) might be acceptable to consumers without a significant loss in sensory quality.

Conclusion

This study observed significant changes in the nutritional composition of hamburger patties when beef was substituted with AYB and SYB curds. Ash content increased, suggesting AYB and SYB curds could serve as a valuable source of minerals. Fat content also increased, which might be attributed to fat-binding properties of AYB and SYB, making it a good energy source. Crude fibre content increased with AYB/SYB curd substitution. The result also showed an increase in the calcium, phosphorus, iron and magnesium content of the beef patties as the supplementation with AYB and SYB curds increased. However, despite these nutritional benefits, sensory evaluations revealed that hamburgers containing 100 percent beef patties were liked best but did not differ significantly ($p<0.05$) from the hamburgers supplemented with 30 percent AYB and SYB curds.

Recommendations

(1) Further research should be conducted with different formulations and processing methods to further optimize the sensory acceptability of hamburgers containing AYB/SYB curds.

(2) Use of plant-base proteins in hamburger production should encouraged.

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Proximate Analysis, Vitamin and Mineral Composition of Instant Melon (*Citulluscolocynthis)* and *Dikanut*(*Irvingiawombolu)* Soup Powders

By

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Abstract

The study determined the vitamin and mineral composition of instant melon (*Citrullu colocynthis*) and dikanut (*Irvingia wombolu*) soup powders. The study adopted experimental research design. Data were analyzed using mean and standard deviation. Findings revealamong others, proximate compositions of (15.80%) moisture content for dikanut soup powder1(DSP1) and (9.41%) for melon soup powder1(MSP1); for ash content, DSP1 (7.71%) while MSP1 (7.41%); the crude fibre content of both samples had (2.10%)and (2.09%) for DSP1 and MSP1; fat composition of DSP1 had (39.99%) and MSP1 (14.20%); crude protein composition, MSP1 (42.28%) while DSP1 (4.64%); carbohydrate composition, DSP1 (29.76%),and MSP1 (24.61%). Vitamin compositions include: Vit A, MSP1 3.6 ug while DSP1 2.4 ug, Vit B_1, MSP1 4.2 mg while DSP1 3.0 mg; and others. Findings on mineral compositions indicate that Phosphorus for MSP1 986mg while DSP1 628mg; Iron content, MSP1 4.27 mg while DSP1 had 2.81 mg; for Manganese, MSP1 had 0.35mg while DSP1 had 0.25mg; for Magnesium, MSP1 had 11.84 mg while DSP1 had 12.49mg; for Potassium content, MSP had 1.85mg while DSP1 had 5.72 mg and for Selenium, MSP1 contained 0.37mg while DSP1 contained 0.33mg.

Keywords: Instant, Soup, Melon, Dikanut, Minerals, Vitamins, Proximate Analysis,

Introduction

Soup is a dish made by combining liquids such as water or stock with other ingredients such as meat, fish, vegetables and thickening agents.Wu, et al (2012) described soup as a liquid food usually served warm or hot (but may be hot or cold), made by combining various ingredients, such as meat, vegetables with stock or water. Chandramouli, et al (2012) noted that hot soups are additionally characterized by boiling solid ingredients in liquids in a pot until the flavors are extracted, forming a broth while cold soups are usually prepared using fruits, raw, blended vegetables, cream and liquid such as stock, juice or water. Some soups are neither thin nor thickand sometimes certain soups are classified into a category called international soups. Essentially international soups are soups from different countries. These soups represent the region or origin of such soups. This is where Nigerian soups because they are garnished, thickened or other ingredients are added to the soup. Nigerian soup is a viscous liquid food that is cooked to be eaten with stiff porridge such as pounded yam, semovita, maize or cereal, cassava, potatoe and rice porridge. Kayode, et al (2010).. Kayode, et al (2010) reported that the ingredients used to thicken Nigerian soup

ranges from starchy roots/tubers, legumes, oil seeds and nuts.Olayemi, & Rahman (2013) reiterated that Nigerian soup is of two kinds; drinking and eating soup. Eating soups are soups such as melon and dikanut that are often chewed before swallowing while drinking soups are soups like pepper soups that are usually swallowed without chewing.

Nigerian soups have watery or thick consistencies depending on their composition. Ingredients used for thickening soups in Nigeria are usually based on the available staple foods in the cultural setting. Nigeria is multi-cultural society with different traditional soups which are indigenous to the different ethnic and cultural settings. There are different types of soups in the different culture and tribes in Nigeria and these include; *gbegiri, afang, ewedu, edikaikong, ogbono, editan,* melon, *ofe-nsala,* (white soup) among others. Olayemi & Rahman (2013) noted that Nigerian soup can be thickened with *melon (Citrullus colocynthis*)*,offor (Detarium microcarpum),* Dikanut (*Irvingia wombolu),(Brachystegia eurycoma),* cocoyam (*Colacasia esculenta)* among others. Nigeria, melon soup is likely the most populous Nigerian soup going by its rate of acceptability, distinctive aroma and flavor

Melon (*Citrullus colocynthis*) soup on the other hand is thickened with melon seeds in Nigeria and it is prepared by most tribes in Nigeria in different ways (Akusu & Kiin-kabari, 2015). It is called *Miyan Gushi* in Hausa, *Ofeegwusi* in Igbo and *Obeegusi* in Yoruba language and is best cherished for its thickening ability(Ogbuonye, 2017). Another soup that is generally accepted by majority of households in Nigeria is dikanut soup also known as*(Ogbono)*. Dika tree is a plant that is either planted or grows freely in the tropical rain forests of Eastern, Western and some Southern part of Nigeria. It is a native forest tree belonging to the group of plants classified as Non-Timber Forest Products (NTP) (**Don-Lawson, 2018).**

There are different varieties of dikanuts but the highly and extensively utilized ones are *Irvingia wombolu.* The fruitsof *Irvingia wombolu* are usually purchased for itskernels, which is used in its fresh or dried form to add flavour and consistency to soups (Amal, et al 2014). The thick edible draw soup made from the ground dikanut powder is known as "*apon*" in Yoruba or "*ogbono*" in Igbo. According to Kiin-Kabari & Akusu (2017) some people like dikanutsoup plain while others would add vegetables to it. Dikanut soup is mostly highly cherished for its drawability. Importantly, adoption of proper storage method is required for preserving ground dikanut powder so as to promote its shelf life (Beatrice, et al 2017).

The shelf life of this instant melon (*citrullus colocynthis)* and dikanut (*irvingia wombolu)* soup powders is already determined byOgbonna, et al (2023) in their study. They

noted in their study that the shelf life determinants included free fatty acid (FFA), moisture content and total viable count measured over a period of 22 weeks. From their analysis, FFA content slightly appreciated over the weeks; from 0.60 at the start to 0.7 5 at 4weeks; 0.86 at 8weeks; 0.95 at 12 weeks; 1.70 at 16 weeks and 4.06 at 22 weeks. The analysis also showed that the moisture content of the developed instant melon soup powder slightly decreased over the weeks; from 9.41 at the start to 9.30 at 4 weeks; 9.00 at 8 weeks; 8.82 at 12 weeks; 8.60 at 16 weeks and 8.30 at 22 weeks. The total viable count (TVC) of the developed instant melon soup powder increased over the weeks. At the start of the experiment, the TVC of the developed instant dikanut soup powder was 8; TVC increased to 10 at 4 weeks; 14 at 8 weeks; 15 at 12 weeks; 18 at 16 weeks and 29 at 22 weeks. Hence, the findings of Ogbonna, Onyeka,& Attah (2023) revealed that the developed instant melon and dikanut soup powders can comfortably last for six months and still remain safe for human consumption. Having determined the shelf life of the instant soups, it became imperative to also determine the proximate, vitamin and mineral composition of the instant melon and dikanut soup powders. This is the gap this which this study intends to fill.

Proximate analysis is used for estimation of the quantitative of food substances while mineral and vitamin analyses are used for estimation of the quantitative of minerals in food. Aunyachulee and Suksaard (2020). Determination of the major food nutrients in instant melon and dikanut soup powders are of great importance since that can help in the identification of nutritional content, chemical composition and qualities of the instant soup powders. Therefore there is a great need for comprehensive documentation of the proximate, mineral and vitamin composition of these instant soup powders in order to scientifically validate their usage by homemakers and the general public. Hence, the need for this study that analyzed the proximate, vitamin and mineral composition of instant melon (*citullus colocynthis)* and dikanut (*irvingia wombolu)* soup powders that would be useful in commercial processing.

Objective of the Study

The major objective of this study was to investigate nutritional properties of instant melon (*Citullus colocynthis)* and dikanut (*Irvingia wombolu)* Soup Powders. Specifically, the study determined:

(1) proximate (moisture, ash, lipid, protein, crude fibre, carbohydrate) composition of the instant melon (*Citrullus colocynthis)*) and dikanut (*Irvingiawombolu*) soup powders

(2) vitamin (A, B_1 B_2, B_3, B_6, B_{12}, and E) composition of the instant melon (*Citrullus colocynthis)* and dikanut (*Irvingiawombolu*) soup powders

(3) mineral (calcium, iron, magganese, magnesium, potassium, selenium, phosphorus and zinc) compositions of the instant melon (*Citrullus colocynthis)* and dikanut (*Irvingia wombolu*) soup powders

Materials and Methods

Design of the study: The study adopted an experimental research design.

Procurement of Materials: melon seeds and dikanut seeds were procured from ogigie market in Nsukka

Preparation of Materials *(ingredients for instant melon and dikanut soup powders)*

Melon seeds: 5kg of melon seeds which was dehulled and selected and after dehuling the measurement was 4kg of melon. The selected melon was cleaned, picked from impurities and dried. The dried melon seeds were milled, dried and moisture extracted, and afterwards it was packaged so as to keep it safe and protect it from moisture, moulds and also to sustain the shelf life. One kilogram of biter leaf was picked, washed and dried under room temperature to conserve the nutrient. 5kg medium sized dried cat fish and 3kg crayfish were ground, separately packed and included amongst the ingredients for instant soup powder to provide protein. The instant soup powder contained 100g melon soup powder, 50g dried bitter leaf, 10g of ground cray fish and 25g of ground dried cat fish. All the materials were purchased from Oyingbo market, Ebute-metta, Lagos.

Dikanut: 10kg of dikanut (Irvingia *wombolu*) seeds were cut, dehulled and selected. The selected dikanutwere cleaned, picked from impurities and dried. The dried dikanutseeds were milled and moisture was extracted using oil extraction machine by cold press method before being taken to the laboratory for analysis and afterwards it was packaged in a retort bag and sealed so as to keep it safe from moisture and to sustain the shelf life. 1kg of okro was also purchased, washed, cut and dried with an air dryer under room temperature to conserve the nutrient. Dried 5kg of cat fishes and 3kg of crayfish were oven dried and ground separately. They were separately sealed and were added to the pack of the *instant* dikanut soup powder to provide protein. The ingredients were all purchased from Oyingbo market in Ebute-metta, Lagos. The instant soup powder pack contained 100g dikanutsoup powder, 50g okro, 10g ground cray fish and 25g ground dried cat fish.

Coding of the food products (Instant Soups): The melon and dikanut soup products were coded as follows.

1. Sample A MSP 1 = Melon 50%, cray fish 10%, cat fish 15%, dried okro 25% (5:1:3:25)
2. Sample B DSP1=. Dikanut 50%, cray fish 10%, cat fish 15%, dried bitter leaf 25% (5:1:3:25)

Chemical/Proximate Analysis: Proximate analysis for the instant melon and dikanut soup powders were carried out using Association of Official Analytical Chemist (2010) method. This method was used to determine the nutrient composition, including moisture, ash, lipid, protein, crude fibre, carbohydrate, calcium, iron, magganese, magnesium, potassium, selenium, phosphorus and zinc. While compositions of Vitamin A, B_1 B_2, B_3, B_6, B_{12}, and E composition was done Association of Official Analytical Chemist (2005) method.

Data Analysis: Data were analyzed using means, t-test were used to compare means between the pre and post treatment, mean, standard deviation standard error of the mean (SEM). P value (0.5) was an indicative of significance and Duncans Multiple Range Test (DMRT) and was used tocompare and contrast means.

Findings

Results of Chemical Analysis

Table 1: Proximate Composition of Instant Melon and Dikanut Soup Powders

Sample	Moisture (%)	Ash (%)	Crude Fibre (%)	Fats (%)	Protein (%)	Carbohydrate (%)
MPS1	9.41	7.41	2.09	14.20	42.28	24.61
DSP1	15.80	7.71	2.10	39.99	4.64	29.76

Key: MSP1: Melon Soup Powder, DSP1: Dikanut Soup Powder,

Table 1 contains the proximate compositions of the soup powders. The results indicated that the DSP1 with 15.80% had more moisture content than MSP1 which had 9.41%; for ash content, DSP1 had 7.71% while MSP1 had 7.41%; the crude fibre content of both samples are almost the same with DSP1 having 2.10% and MSP1 with 2.09%; Fat composition, DSP1 had high content of 39.99% and MSP1 had 14.20%; for crude protein composition, MSP1 had high content of 42.28% while DSP1 had 4.64%. Carbohydrate composition, DSP1 contain 29.76% while MSP1 had 24.61%.

Table 2: Vitamin Compositions of Instant Melon (*Citullus colocynthis)* and Dikanut (*Irvingia wombolu)* Soup Powders

Sample	Vit A (ug)	Vit B_1 (mg)	Vit B_2(mg)	Vit B_3 (mg)	Vit B_6 (mg)	Vit B_{12} (mg)	Vit E (mg)
MSP1	3.6	4.2	11.8	0.22	0.18	0.26	0.70
SP1		2.4	3.0	9.2	0.16	0.12	0.20

Key: MSP1: Melon Soup Powder, DSP1: Dikanut Soup Powder,

Table 2 contains the vitamin compositions of the developed soup powders. The results indicated that the vitamin compositions of the soup powders had Vit A:-3.6 ug for MSP1 and 2.4 ug for DSP1; Vit B_1:- MSP1 contain 4.2 mg while DSP1 contain 3.0 mg; Vit $B_{2:-}$ MSP1 contain 11.8 mg while OSP1 contain 9.2 mg; Vit B_3:- MSP1 contain 0.22 mg while DSP1 contain 0.16 mg; Vit B_6:- MSP1 contain 0.18 mg while DSP1 contain 0.12 mg; Vit B_{12}:- MSP1 contain 0.26 mg while DSP1 contain 0.20 mg; Vit E composition:- MSP1 contain 0.70 mg while DSP1 contain 0.60 mg.

Table 3: Mineral Compositions of Instant Melon (*Citullus colocynthis)* and Dikanut (*Irvingia wombolu)* Soup Powders

Sample	Phosphorus (mg)	Iron (mg)	Manganese (mg)	Magnessium (mg)	Potassium (mg	Selenium
MSP1	986	4.27	0.35	11.84	1.85	0.37
OSP1	628	2.81	0.25	12.49	5.72	0.33

Key: MSP1: Melon Soup Powder, DSP1: Dikanut Soup Powder,

Table 3 contains the mineral compositions of the developed soup powders. The results indicated that the mineral compositions of the soup powders had Phosphorus:- 986 mg for MSP1 and 628 mg for DSP1; Iron content:- MSP1 had 4.27 mg while DSP1 had 2.81 mg. Manganese:-MSP1 had 0.35 mg while DSP1 had 0.25 mg; Magnesium:- MSP1 had 11.84 mg while DSP1 had 12.49 mg, Potassium content:- MSP had 1.85 mg while DSP1 had 5.72 mg. The Selenium composition of the soup powders, MSP1 contain 0.37 mg while DSP1 contain 0.33 mg.

Discussion of Findings

Table 1 shows the proximate compositions of the instant soup powders. The results indicated that the DSP1 with (15.80%) had more moisture content than MSP1 which had (9.41%) for ash content, DSP1 had (7.71%) while MSP1 had (7.41%); the crude fibre content of both samples are almost the same with DSP1 having (2.10 %) and MSP1 with (2.09 %); For fat composition, DSP1 had high content of (39.99 %) and MSP1 had (14.20 %); for crude protein composition, MSP1 had high content of (42.28%)

while OSP1 had (4.64 %). For carbohydrate composition, DSP1 contain (29.76 %) while MSP1 had (24.61%). This supports the findings of Omah , Ajayi and Nwankwo (2015) who stated in a study on proximate analysis of varieties of egusi soup reported similar findings on proximate analysis of (10.89 %) moisture, (15.19 %) fat and (23.30 %) carbohydrate. However, Omah and Okafor (2015) reported lesser value of (19.73%) crude protein. The increase in protein content of the developed melon soup powder may be attributed to the addition of their ingredients.

Also in support of the findings, Bamidele, Ojodokun and Fasogbon (2015) in a study on physio-chemical properties of different varieties of soup prepared from instant ogbono mix powders, reported similar value of sensory evaluation of moisture which ranged from value ranged from (9.60-14.36 %); crude fat values ranged from (20.13-%) 34.62 ash content ranged from (6.98 - 8.23 %). The crude fat content of ogbono may be because dikant seed has been classified as an oil seed (Idowu, Omoniyi, Henshaw and Olayiwola, 2013). The developed dikanut soup sample recorded higher value of carbohydrate based on the carbohydrate content of the ingredients added.

Table 2 shows the vitamin compositions of the developed soup powders. The results indicated that the vitamin compositions of the soup powders had for Vit A, 3.6 ug for MSP1 and 2.4 ug for DSP1; for Vit B_1, MSP1 contain 4.2 mg while DSP1 contain 3.0 mg; for Vit B_2, MSP1 contain 11.8 mg while DSP1 contain 9.2 mg; for Vit B_3, MSP1 contain 0.22 mg while DSP1 contain 0.16 mg; for Vit B_6, MSP1 contain 0.18 mg while DSP1 contain 0.12 mg; for Vit B_{12}, MSP1 contain 0.26 mg while DSP1 contain 0.20 mg; for Vit E composition, MSP1 contain 0.70 mg while DSP1 contain 0.60 mg. This supports the findings of Bamidele, Ojodokun and Fasogbon (2015) in a study on physio-chemical properties of different varieties of soup prepared from instant ogbono mix powders, reported similar values of Vitamin A content from 0.01 mg/100 g for control to 3.15 mg/100g for ogbono mix powder as well as Vitamin B3 with value of 0.16 0.01 mg/100 g.

However, Bamidele, et. al. (2015) reported a higher Vit B_2 content which ranged from 12.25 to 30.25 mg/100g. The increase in Vitamin B_2 content of all the samples may be due to addition of fluted pumpkin (Ugwu) leaf which is believed to be rich in vitamins (Adumanya, Obi-Adumanya and Chukwu, 2012). This supports the finding, Prerna and Sharma (2020) in a study on development of Mung Dal (Mung beans) based instant soup mix fortified with moringa which reported similar value of 2.64 mg/100g for Vitamin B_1.

Table 3 shows the mineral compositions of the developed soup powders. The results indicated that the mineral compositions of the soup powders had for Phosphorus,

986 mg for MSP1 and 628 mg for DSP1; for Iron content, MSP had 4.27 mg while DSP1 had 2.81 mg; for Manganese, MSP1 had 0.35 mg while DSP1 had 0.25 mg; for Magnesium, MSP1 had 11.84 mg while DSP1 had 12.49 mg; for Potassium content, MSP had 1.85 mg while DSP1 had 5.72 mg. For the Selenium composition of the soup powders, MSP1 contain 0.37 mg while DSP1 contain 0.33 mg. In line with the findings of Olubi, Felix-Minnaar and Jideani, (2021)in a study on physio-chemical, mineral and sensory characteristics of instant egusi soup reported similar values for phosphorus which ranged from 822.2-905.3 mg/100g. This supports the findings of Kayode, et al (2010) that reported 3.0mg/100g for magnesium which is similar to the report of the present study.

Conclusion

On the basis of the findings, it was concluded that proximate compositions of the instant melon and dikanut soup powders indicated that instant dikanut soup had more moisture content than instant melon soup powder with (15.80%) and (9.41%) respectively. Dikanut soup powder had (7.71%) ash while melon soup power had (7.41%). The developed instant dikanut soup sample recorded higher value of carbohydrate based on the carbohydrate content of the ingredints added. The vitamin compositions of the developed instant soup powders indicated that instant melon soup powder had 3.6 ug of vit A, while dikanut soup powder had 2.4 ug. On the other hand, instant melon soup powder contained 4.2 mg for Vit B_1 and 4.2 mg for dikanut soup powder. The results also indicated that the mineral compositions of the instant melon soup powders had higher level of Phosphorus; 986 mg while instant dikanut soup powder had 628 mg; for Iron content, instant melon soup powder had 4.27 mg while dikanut soup had 2.81 mg;

Recommendation

Based on the findings of the study, the following recommendations were made:

1. Awareness should be carried out to encourage home makers, working class mothers, chefs and cooks in different communities, market places, churches and mosques on the availability and nutritional content of instant melon and dikanut soup powders.
2. Cooking demonstrations on how to prepare instant melon and dikanut soup powders should be carried out by home economist and nutritionist during various conferences and workshops so as to sensitize the public.

3. Instant melon and dikanut soup powders should be popularized by packaging into different sizes so as to encourage wide patronage from many Nigerians.

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Influence of Marketing Strategies on Managing Service Breakdown among Small and Medium Enterprises (SMEs) in Anambra State

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Abstract
The study investigated ways marketing strategies could influence managing service breakdown among small and medium enterprises (SMEs) in Anambra State. Specifically,it determined ways:advertisement, packaging design; and sales promotion could influence managing service breakdownamong the SMEs. Research design was descriptive survey. Population was made up of all registered SMEs in Anambra state. Questionnaire was used to collect data. Data were analysed using mean, standard deviation and t-test at 0.05 level of significance. Findings indicate 10ways advertisement could influence the managementof service breakdown in SMEs. These includebuilds brand awareness more quickly, ($\overline{X}$= 3.62)and others. Other findings reveal 7ways packaging design influences management of service breakdown in SMEs. These include packaging serves as a tool for differentiation ($\overline{X}$= 3.22) among others.Also 9 ways sales promotion influences management service breakdown in SMEs. These include empowers product acceptance ($\overline{X}$= 3.72) and others.

Keywords: Marketing Strategies, Advertising, Packaging Design, Sales Promotion, SMEs, Marketing

Introduction

Marketing can be considered to be a management activity that emphasizes on the effort to satisfy the needs and desires of target customers, profit-making and sales of product. Gupta et al. (2024) observed that marketing is an activity, set of instructions, and processes for creating, communicating, delivering, and exchanging offerings that customers, clients, partners, and society at large consider valuable. Marketing offers better value for money, causes responses and immediately motivates clients, customers or buyers (Kotler & Keller, 2016). This requires strategy to achieve.

Marketing strategy has become an important tool globally for any organization to remain in a competitive market environment and to be strong. Thus, marketing strategy, for the purposes of this work is a way of providing quality product that satisfies customer needs, offering affordable prices and engaging in wider product distribution backed up with effective advertising, packaging and promotion (Pankajkumar & Deepak, 2022). Marketing strategy is a vital prerequisite that influences organizations, vendors and business' ability to

strengthen their market share and minimize the effects of competition and sales of goods and services, for maximum profit.

Furthermore, Sudirjo (2023) asserted that marketing strategy is a way of providing quality product that satisfies customer needs, offering affordable price and engaging in wider distribution, and back it up with effective promotion strategy. Babalola et al. (2022) examined the impact of marketing strategies (6Ps) on commercial banks performance in Ogun-State, Nigeria. This study concludes that customer satisfaction significantly promotes the performance of commercial banks. Chigbata et al. (2020) also assessed the association that exists between marketing strategy and performance of SMEsin Anambra State. The correlation result study revealed that product and promotion marketing strategies have a positive and significant relationship which could prevent service breakdown of SMEs in Anambra State.

Service breakdowns could occur daily in all organizations. Woodside and Calhoun, (2020) opined that service breakdown occurs when a service fails to meet the expectations or needs of the customer. They happen whenever the product or service delivered fails to meet customer needs, wants and expectations. Managing service breakdown is service recovery (Wu, & Monfort, 2023). In this study, service breakdown is referred to as arising issues that prevent the business from delivering on their promise. When dealing with customer service breakdowns, it is important to investigate the **root cause** of the issues so that your organization can work to proactively fix it (Park et al. 2022). Common causes of customer services breakdowns include: poor goal setting, lack of training, lack of resources and low commitment on the part of employees. Similarly, Babalola et al (2022) postulate that, to effectively overcome service breakdowns, advertising packaging and sales promotion are the major strategies to adopt to rebuild customer trust, and prevent future occurrences. Eniola and Olorunleke (2020) opined that advertising message is to establish a basic awareness of the product or service in the mind of the potential consumer and to build up knowledge about it. Advertising is a non-personal and paid form where ideas, concepts, products or services and information are promoted through media by an identified sponsor. Products need to be kept safe, informed, and convenient through packaging.

Packaging is the container for a product – encompassing the physical appearance of the container and including the design, colour, shape, labeling and materials used (Bintu, 2017). In a similar view, Ishar and Mubarak (2017), define packaging as all the activities of designing and producing the container for a product. In the context of this work, packaging can be defined as the wrapping material around a consumer item that serves to contain,

identify, describe, protect, display, promote and otherwise make the product marketable. Zhao et al. (2021) stipulate that customers expect their goods and services to be packaged and presented conveniently. Attractive packaging, before purchase, is an aid to selling. However, after purchasing a product, the packaging becomes an aspect of service. The customer needs packaging that is suitable for transporting and storage and that is easy to remove. Marketers also use sales promotion to boost sales, and generate interest in a product or service.

Sales promotion is the business of communicating with customers which could validate products quality, and empower product acceptance, thereby possibly influencing managing service breakdown among SMEs (Guerola-Navarro et al., 2022). Sales promotion, in this work is "marketing devices and techniques employed by SMEs which are used to make goods and services more attractive, by providing some additional benefit, whether in cash or in kind, or the expectation of such a benefit".

In Nigerian context, government has historically supported the growth of SMEs, especially growth-oriented businesses through various policy interventions. The government, for instance, formulated Small and Medium Industries Equity Investment Scheme (SMIEIS, 2000/2001) to create an enabling environment for the sector. SMEs in this work are enterprises that have between five and one hundred staff with an annual turnover of about four hundred thousand naira (₦400,000) (Osamwonyi, 2010). The Government of Nigeria identified growth-oriented SMEs based on their potential for job creation, poverty reduction, local raw material utilization and ease of transformation to medium and large scale businesses in a short period of time.

It has been observed that so many SMEs in Anambra State are victims of mismanagement, closure and bankruptcy (Gamage, et al. 2020). Obvious upon this, many of such SMEs lack patronage from customers which result to accumulation of outdated products in stock. This has made them suffer severely in the midst of a competitive marketing economy. Adam and Alarifi (2021) posited that advertisement, packaging design, sales promotion, management competence among others can influence and prevent SMEs management and services from breaking down when effectively put in place, for the benefit of SMEs management and consumers.

Objectives of the Study

The general objective of the study was to investigate ways **marketing strategies could influence managing service breakdown among SMEs in Anambra State. S**pecifically, the study determined ways each of the following marketing strategies could influence managing service breakdown:

(1) advertising
(2) packaging design
(3) sales promotion

Methodology

Design of the Study: The design of this study was descriptive survey research design.

Area of the Study: The study area was Anambra State. The state consists of three Senatorial Zones and 21 Local Government Areas (LGAs). There are very many SMEs both in the rural and urban areas of the state, many of which are prome to service breakdowns (Anugwu et al. 2021).

Population for the Study: The population of the study was made up of all the SMEs in Anambra state that were registered by the Corporate Affairs Commission (CAC) at the time of the study. The estimated number of the SMEs was 1020. Mangers, accountants and sales representatives in the SMEs were the respondents. The respondents were both males and female. The minimium educational qualification was Higher National Diploma/National Certificate of Education.

Sample for the Study: A sample of 75 SMEs was purposively selcetd for the study. These SMEs showed evidence of their registration and indicated willness to participate in the study. Three respondents were from each SME, including a manager, an accountant and a sales representative. These gave a total of 223 respondents.

Instrument for Data Collection: Instrument used for data collection was structured questionnaire. It developed based on literature review and research objectives. The instrument was validated by three university experts, in Business Education. It was scaled on Likert five-point scale: Very High Extent (VHE) = 5-points, high extent (HE) = 4 points, moderate extent (ME) = 3 points, low extent (LE) = 2 points, and very low extent (VLE) = 1 point.

Data Collection Method: A total of 223 copies of questionnaire were distributed to the respondents by hand with the help of of trained research assistants. All the 223 copies were retrieved and found useable.

Data Analysis Technique: The research questions were answered using mean and standard deviations. The mean value of 3.00 was used as a bench mark for decision making. A mean value below 3.00 is regarded as low extent (LE) while a mean value of 3.00 and above is regarded as high extent (HE).

Findings

Table 1: Mean Responses and Standard Deviation on Possible Ways Advertising InfluenceManaging Service Breakdown among SMEs in Anambra State

S/N	Possible WaysAdvertisement Influence	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	R
	Advertising:						
1	internet advertising provides media to reach out to customers worldwide	3.45	0.94	2.56	0.23	3.01	WI
2	builds brand awareness more quickly	4.35	0.65	2.88	0.83	3.62	WI
3	helps to breathe life into a failing handicraft brand.	3.62	0.95	2.47	0.50	3.05	WI
4	helps to tailor advertisement message to the location of the prospective customers.	2.81	1.01	3.27	1.11	3.04	WI
5	promotes management competence of SMEs.	3.28	0.67	2.85	0.48	3.07	WI
6	eradicates management breakdown among SMEs.	2.98	0.67	3.11	0.92	3.05	WI
7	enhances productivity and efficiency of SMEs.	4.15	1.51	2.65	0.52	3.40	WI
8	creates awareness and minimizes breakdown among SMEs.	4.07	1.43	2.21	0.59	3.14	WI
9	Advertising enlarges sales distribution among SMEs.	3.84	1.53	3.61	0.54	3.73	WI
10	promotes costumers awareness of SMEs business products and services.	3.52	1.35	4.08	0.50	3.80	WI

N_1 = Number of males (98); N_2 = Number of females (125); $\bar{X}_1$= Mean of male staff; SD_1 = Standard deviation of male staff; $\bar{X}_2$= Mean of female staff; SD_2 =Standard deviation of female staff; $\bar{X}_g$= Grand mean; R = Remark; WI = Ways of influence.

Table 1 shows the mean and standard deviations of respondents on possible waysadvertisement influencemanaging service breakdown among SMEs in Anambra State. The 10 items obtain grand means of 3.00 and above ($\bar{X} \geq 3.00$). This implies that each item influences managing service breakdown to a high extent.

Table 2: Mean Responses and Standard Deviation on Possible WaysPackaging Design Influence Managing Service Breakdown among SMEs in Anambra State

S/N	Possible WaysPackaging Design Influence	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	R
	Packaging:						
1	item relates the product to cleanliness and freshness	3.45	0.94	1.06	0.23	2.26	NWI
2	serves as a tool for differentiation	4.35	0.65	2.08	0.83	3.22	WI
3	enhances product image.	3.62	0.95	2.47	0.50	3.05	WI
4	drives impulse for purchases.	3.38	1.82	2.87	1.11	3.13	WI
5	helps promote customers satisfaction over a product.	2.56	1.73	3.65	0.48	3.11	WI
6	brings customers dissatisfaction over products or services.	1.26	1.73	3.11	0.92	2.19	NWI
7	enhances recognition of products.	3.15	1.11	3.05	0.52	3.13	WI
8	promotes SMEs product appearance.	3.07	1.05	3.01	0.59	3.04	WI
9	reduces quality and quantity of products.	2.84	1.53	2.61	0.54	2.73	NWI
10	promotes new design of products.	3.02	1.35	3.04	064	3.03	WI

N_1 = Number of males (98); N_2 = Number of females (125); $\bar{X}_1$= Mean of male staff; SD_1 = Standard deviation of male staff; $\bar{X}_2$= Mean of female staff; SD_2 =Standard deviation of female staff; $\bar{X}_g$= Grand mean; R = Remark; WI = Ways of influence; NWI = Not ways of influence.

Table 2 shows the mean and standard deviations of respondents on the possible way **o**f packaging design **I**nfluencemanaging service breakdown among SMEs in

AnambraState.Seven items out of the 10 items obtained a mean score of 3.000 and above($\bar{X}\geq$ 3.00).This implies that packaging design influence management service breakdown in 7 ways.

Table 3: Mean Responses and Standard Deviation on Possible Ways Sales Promotion InfluenceM**anaging Service Breakdown among SMEs in Anambra State**

S/N	Possible Way Sales Promotion Influence	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	R
	Sales Promotion:						
1	targeted at the right audience.	3.45	0.94	3.06	0.23	2.26	WI
2	increases qualified customers traffic.	3.01	1.25	3.08	0.83	3.05	WI
3	shows differentiation product.	3.02	0.95	3.07	0.50	3.05	WI
4	creates interactive customer relationship.	3.01	1.82	3.07	1.11	3.04	WI
5	advances awareness of products to customers.	3.08	1.73	3.06	1.04	3.07	WI
6	does not manage service breakdown of SMEs.	2.28	1.73	2.48	1.36	2.38	NWI
7	empowers product acceptance.	4015	1011	3.28	1.49	3.72	WI
8	validates products quality.	4.07	1.05	3.57	1.21	3.68	WI
9	enhances productivity of SMEs.	3.04	1.53	3.01	0.54	3.03	WI
10	promotion builds up effectiveness of SMEs.	3.02	1.35	3.08	0.64	3.05	WI

N_1 = Number of males (98); N_2 = Number of females (125); $\bar{X}_1$= Mean of male staff; SD_1 = Standard deviation of male staff; $\bar{X}_2$= Mean of female staff; SD_2 =Standard deviation of female staff; $\bar{X}_g$= Grand mean; R = Remark; WI = Ways of influence; NWI = Not ways of influence.

Table 3 shows the mean responses and standard deviation on possible ways sales promotion influence managing service breakdown among SMEs in Anambra State. The Table shows that each of the sales promotion nine items obtained mean scores of 3.00 and above ($\bar{X}\geq$ 3.00). This implies that the nine items are ways sales promotion influences the management of ervice breadown.

Discussion

1 reveals the possible influence of advertisement on managing service breakdown among SMEs in Anambra State. The respondents rated high extent in all the ten items. This is an indication of possible significant influence of advertising on managing service breakdown among SMEs. This finding agrees with Chukwudi et al. (2023) who stated that social media adverting is an essential tool for businesses trying to capitalize on the opportunities presented by digitalization, increased online presence, and widespread mobile phone usage. Advertising also encourages people to buy products and services of SMEs; builds awareness of their business and brand; gain advantage over their competitors; and improves profitability (Etuk, & Emenyi, 2022). The finding also agrees with Gora et al. (2020) who found out that marketing strategies adopted by periodical street vendors influence the sale of periodicals.

Table 2 reveals the possible influence of packaging design on managingservice breakdown among SMEs in Anambra State.Seven items were rated high extent and threeitems low extent by the respondents. This suggests possible significant influence of packaging design on managing service breakdown among SMEs in Anambra State**.** The finding agrees with that of Akanji and Olowe (2022) who stated that customers expect their goods and services to be packaged and presented conveniently and that attractive packaging, before purchase, is an aid to selling. This also supports the view of Asri et al. (2020) that the most influential elements on food packaging are the font style and the packaging materials. When products of SMEs have a distinct look, it sticks in people's minds. Consistent packaging elements like logos, colours, and fonts make brands easier to remember. The more customers see SMEs packaging, the more they recognize and trust their brands. This recognition could lead to more sales and loyal customers (Saad et al. 2020).

Table 3 reveals the possible influence of sales promotion on managing service breakdown among SMEs in Anambra State. Nine items were rated high extent.This suggests that sales promotion could be instrumental in managing service breakdown among SMEs. The finding is in consonance with that of Akanji and Olowe (2022) who stated that sales promotion is the business of communicating with customers and providing them with information that will assist them in making a decision to purchase a product or service. The finding also agrees with Segun (2022) who stated that publicity and sales promotion are veritable tools for actualizing organizational marketing goals in a competitive marketing environment. Sales promotion also enables SMEs to introduce a new product; increase sales; attract more customers; create brand awareness; encourage brand presence; create differentiation; and create word of mouth (Mauligita & Windasari, 2021).

Conclusion

The study attempted to determine Influence of Marketing Strategies on Managing Service Breakdown among Small and Medium Enterprises (SMEs) in Anambra State. This Study has indicated that advertisement, packaging design, and sales promotion have respective significantly influence on managing service breakdown among SMEs in Anambra State. It is therefore concluded that a good marketing strategy such as a good advertisement, good packaging design, and quality sales promotion are inevitable marketing strategies for efficient managing of service breakdowns, not only among SMEs in Anambra Statebut also beyond, thereby improving customer satisfaction and patronage. It is also concluded that the above mentioned marketing strategies are instrumental to sustaining all SMEs businesses

consequent upon efficient services. Good customer service enables SMEs to ensure customer loyalty, customer retention, competitive advantage, positive reputation, increased sales, profitability, brand loyalty, business development, enhanced public image, higher productivity, and referrals.

Recommendations

The following recommendations were made from the findings of the study:

4. Management of SMEs should develop new methods in the aspect of promotion.
5. Management of SMEs should tailor promotion by using social media, word of mouth, visual, audio, face-to-face channels.
6. Management of SMEs should devise better packaging designs to forestall service breakdown,
7. Policy makers should take into account the way enterprises apply specific marketing mix strategies when formulating enterprise policies.
8. Service management education should be enshrined in the Business Education curriculum.

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Vitamins and Phytochemical Compositions of African Velvet Tamarind (*Dialium guineense)* Fruit Pulp

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Abstract
This study determined the vitamin C, niacin, carotenoids, saponins, flavonoids tannins, phenolic acids, and alkaloids compositions of African velvet tamarind *(Dialium guineense*). African velvet tamarind (AVT)was purchased from Watt Market, Calabar. After sorting, the seeds were manually separated from the pulp. The pulp was blended into a homogeneous powder and stored for chemical analysis. Chemical analysis was carried out using standard analytical procedures. Means and standard deviations were used for data analysis. Results show that niacin content of the fruit was 3.6 mg/100g ± 0.03. The Vitamin C content was 26.4 mg/100g ±0.02. The Vitamin A (RAE) contents was 109 ug/100g ±0.21. Among the carotenoids, Lutein (1163±021 µg/100g) was more abundant, while Phenolic acids (12.8±0.07 mg/100g) were the most abundant phytochemical. Leveraging on this data, consumers and health workers can make more informed food choices. Food processors should consider processing this fruit pulp into food powder, which can be used for nutrient enrichment.

Keywords: Dialium Guineense, Vitamin Compositions, Phytochemicals Compositions, Fruit Pulp.

Introduction

Fruits and vegetables are edible parts of plants like seed-bearing structures, flowers, buds, leaves, stems, shoots, and roots cultivated or harvested wild and eaten in their raw form or with minimal processing (Food and Agriculture Organization (FAO), 2021). Fruit consumption, like vegetables, has been widely recommended by researchers and was reemphasized during the International Year of Fruits and Vegetables in 2021 as one of the important steps in improving health. Inadequate consumption of fruits and vegetables was implicated in about 1 percent of Disability-Adjusted Life Years (DALYs) and also the cause of about 2.8 percent of deaths worldwide (World Health Organization (WHO), 2023). Studies have associated inadequate fruit and vegetable consumption to chronic lung diseases, poor management of diabetes mellitus, gut health, and some sensory organ malfunction (Smith *et al.,* 2022; Mirza *et al*., 2024). Nigeria is blessed with variable fruits with diverse nutritional and health benefits, some of these fruits like the Black velvet tamarind among others are underutilized and may go extinct (Obiefuna *et al.,* 2016).

Black velvet tamarind (BVT)/ African velvet tamarind (AVT) *(Dialium guineense*) is a tropical tree that belongs to the fabaceae family, AVT is commonly found in dense savanna

forests and gallery forests, its fruiting time is from October to January. It has an orthodox kind of seed. The tree of AVT is shrubby with a densely leafy crown. It is usually average in height of about 30 meters. It has a short bole (80cm) without buttresses with narrow, thin, butt flares (The Green Institute, 2024; International Institute of Tropical Agriculture, (IITA), 2017). Among the three major languages in Nigeria, it is called *icheku* in Igbo, *awin* by the Yorubas and the Hausas call it *tsamiya-kurm*. Generally, it is fondly referred to as *licky-licky* in pidgin English. It has small edible fruits with a black velvety inedible circular and flattened pod that may contain one or two smooth, stony shiny-black seeds surrounded by dry, orange to brown coloured edible pulp. The fruit pulp has a sweet-sour, astringent flavour (International Institute for Tropical Agriculture, 2017). The fruit when ripe, usually falls off its parent tree and can picked from the ground. The fruit can easily be licked after minimal processing like breaking the velvety pod with the fingers. The pulp can also be washed off from the seeds (International Institute of Tropical Agriculture, 2017) and used for local juices and drinks. Since AVT has an orthodox seed, it is likely to havethe ability to endure extreme freezing and drying conditions and can survive outside its natural habitats. AVT could be dried to an internal moisture of less than 12% and can be stored in a conventional freezer at a temperature of –18°C + 3°C (Walters and Maschinski, 2020). Storage in conventional freezers is generally inexpensive.

Their use varies as they are used for the production of beverages, probiotics, and prebiotics. AVT is eaten fresh or dried as an on-the-go snack. The fruits are consumed out of hand, discarding the exterior brittle shell, and the flesh is sucked from the seeds. It is used in beverage industries as a sweetener (Abiodun *et al.,* 2017) or infused and consumed hot or chilled as a drink. AVT has very low-fat contents, high carbohydrates, and appreciable protein contents for a fruit (Airaodion *et al.,* 2021). The high ash content of *AVT* pulp is an indication of the mineral contents. The fruit pulp is also rich in vitamins and minerals, as well as carbohydrates. The moisture content of AVT fruit pulp is low, it falls within the safe levels of moisture reported for most fruits (Afolabi, 2014), and as such could make it less perishable than most fruits. AVT can increase gastric mucus secretion which may confer an anti-ulcer effect (Balogun *et al.,* 2013). The sweet-tart, subtly acidic, and sour flavour makes it ideal for raw or cooked food preparations. It is essentially a good source of nutrients for humans (Airaodion *et al.,* 2021) and animals because it contains several nutrients and antioxidants (Akinpelu *et al,* 2011). Generally, fruits are vitamin and mineral-dense, and they also have phytochemicals., as a result, has therapeutic potential. *The* pulp of AVT is abundant in iron, calcium, magnesium, and potassium (Ogbuewu *et al.,* 2023). AVT is called vitamin C plant

probably because of the high content of this vitamin. Vitamin C is an antioxidant vitamin thus, might be the reason for some of the health benefits of the plant. A lot of research has been conducted to determine the nutrient compositions of the seeds, fruit coats, barks, and other parts of the tree (Ofosu *et al*., 2013), therefore, the relatively high ascorbic acid content indicates that it could be used as a source of dietary antioxidant.

AVT has been listed among underutilized fruits. It could go extinct as the trees are barely available due to urbanization, economic and environmental reasons among others (Obiefuna *et al.,* 2016). The fruits are now imported (Akinfenwa, 2022). Enhanced production, processing, preservation, and storage of underutilized fruits like the AVT growing in wild bushes and the scientific evaluation of their chemical contents may contribute to mitigating the situation. The literature on the chemical compositions of AVT fruit pulp is scanty as it is mostly considered lesser known and underutilized. Knowing the chemical composition of food makes the consumers aware of the nutritional and health value of such foods, their toxicological effects, safety, and stability to microbiological, chemical, or physical changes (FAO/WHO, 2004; Aletan and Kwazo, 2019).

The inadequate nutrient compositional information on the fruit pulp of AVT has encouraged the population to ascribe some of their nutritional benefits to superstition. Until recently, most research on the health benefits of AVT has focused on other parts of the AVT plant including the leaves and, seeds among others. Some researchers have also concentrated their research on major nutrients, yet, the available data are not sufficient, and the drive to identify other bioactive components present in the fruit pulp of AVT that may reduce the risk of chronic diseases is on the rise. To enrich the food composition database of this plant, this study seeks to determine some of its chemical compositions. This will contribute to enriching the database on AVT.

Purpose of the study

The major purpose of this study was to investigate the selected chemical composition of African velvet tamarind.Specifically, the study determined:

(1) vitamin (vitamin C, Niacin, and Retinol Activity equivalent) composition of AVT.
(2) phytochemical composition of AVT.
(3) Carotenoids profile AVT

Materials and Method: Procurement of Material

Fruits of AVT were purchased from Watt Market, Calabar, Cross River State, Nigeria in March. The purchased fruit was wrapped in paper and inserted in Woven Polypropylene Bags to ensure it was kept. It was transported to the Human Nutrition and Dietetics laboratory, Faculty of Basic Medical Sciences, University of Calabar, Cross River State for preparation for analysis.

Sample Preparation: The fruits were selected to remove dirt and unwanted particles, they were washed with tap water to free them from dust and any other debris. The fruit pulp was shelled and deseeded and then blended (Binatone BLG-620) electric blender) to a homogeneous powder for chemical analysis. The sample was packed in an airtight sample bottle and stored in a refrigerator before analysis.

Chemical Analysis: The method as described by Ward and Trenerry, (1997) was used for the determination of Niacin, with this method, niacin is liberated from the food matrix through alkaline digestion using aqueous calcium hydroxide and the extract purified and concentrated. Vitamin C was determined using the method as described by the Association of Official Analytical Chemists (1988). With this method, Acid extracts (Metaphosphoric) of AVT was prepared and the pH of the fruit were adjusted and the extract's reducing capacity was measured by titration.

Alkaloids, Flavonoids, and phenolic acid contents of the samples were determined using the method described by AOAC (2010). Saponins determination was carried out by Fenwick and Oakenfull, (1983) procedure. The reagents used were reagent grade acetone, methanol, solution of concentrated e*n*-buthanol-methanol-ammonia (3.5:1:2.5), Standard solution of saponins purified in methanol, Solution of sulphuric acid in methanol (100 ml per litre). The tannin contents of the samples were determined using the methods described by Harbone (1973).

The carotenoid contents of the samples were determined using the method described by Rodriguez-Amaya and Kimura (2004). Three grams (3g) of the sample was weighed into a beaker. Sufficient water (10ml) was added to the sample. It was allowed to stand for 30 mins. Cold acetone (20 ml) was added to the mixture and filtered with suction through a sintered glass funnel. Some 50ml acetone was added and ground again with the pestle to extract the carotenoids.

Data Analysis: All tests were in replicates and data obtained were statistically analyzed means and standard deviations. Retinol Activity Equivalent (RAE) was calculated according to the following formula as described by Vincent *et al*., (2020). Beta-carotene equivalents

(µg/100 g EP) = beta-carotene (µg/100 g EP) + alpha-carotene (µg/100 g EP) / 2 + beta-cryptoxanthin (µg/100 g EP) / 2.

RAE (µg/100 g EP) = beta-carotene equivalents (µg/100 g EP) / 12)

Results of the study

The findings from this study were presented as follows:

Table 1: Vitamin (Vitamin C, Niacin, and Retinol Activity Equivalent) Composition of AVT (mg/ug/100g as Consumed)

Vitamin	Contents
B3 (Niacin) Mg/100g	3.6±0.03
Vitamin C Mg /100g	26.4±0.02
Vitamin A (RAE)	109 ug/100g ±0.21

Data were mean of two determinations (n=2). Data are presented as Mean ± SEM.

Table 1 shows the vitamin composition of the AVT, vitamin C content was (26.4±0.02 mg/100g), vitamin B3 was (3.6±0.03mg/100g) and Vitamin A(RAE) was 109 µg/100 g ±0.21.

Table 2: Phytochemicals composition (mg/100g) of AVT pulp as consumed

Parameters	Values
Saponins	0.45±0.00
Tannins	1.29±0.01
Phenolic acids	12.83±0.07
Alkaloids	3.88±0.02
Flavonoids	5.36±0.04

Data were mean of two determinations (n=2). Data are presented as Mean ± SEM

Table 2 shows the phytochemical composition (mg/100g) of AVT. It is as follows: Saponin (0.45±0.00 mg/100g), Tannin (1.29 ± 0.01 mg/100g), Phenolic acid (12.83 ± 0.07 mg/100g), Alkaloid (3.88 ±0.02 mg/100g) and Flavonoid (5.36 ± 0.04 mg/100g).

Table 3: Carotenoids profile (µg/100 g /EP) of AVT as consumed

Parameters	Values
Beta carotene	885 ± 0.01 µg/100 g
Alpha carotene	366 ± 0.04 µg/100 g
Lutein	1163±021 µg/100 g
Cryptoxanthin	483±0.02 µg/100 g
Zexanthin	542±0.00 µg/100 g
Beta-carotene equivalents	1309 µg/100 g

Data were means of two determinations (n=2). Data are presented as Mean ± SEM

Table 3 shows the carotenoid profile of African velvet tamarind (µg/100 g). They are as follows: beta carotenoid (885 ± 0.01 µg/100 g), alpha (366 ± 0.04 µg/100 g), lutein

(1163±021 µg/100 g), cryptoxanthin (483±0.02 µg/100 g) and zeaxanthin (542±0.00 µg/100 g). The value of the Beta-carotene equivalent is 1309 µg/100 g.

Discussion

Findings on the vitamin compositions of AVTin niacin is appreciable. The content of niacin in AVT is higher than the contents found in 28 fruits as studied by Catak and Yaman (2019). Niacin functions as a reductive biosynthesis in steroid and fatty acid synthesis, it is also important in the oxidation of carbohydrates. Its deficiency results in pellagra, a wasting disease that manifests as bilateral and also symmetrical erythematous dermatitis. In a state of deficiency of Niacin, Pellagra is most likely as an individual might manifest symptoms of dementia after having episodes of insomnia and apathy displaying variable character changes, loss of memory, confusion, and in severe state, coma or death (Redzic, Hashmi, and Gupta, 2023; Morris *et al*., 2004). Niacin deficiency is also associated with severe diarrhea because of the inflammation of the intestinal mucous surfaces and adequate intake may improve growth performance in humans given the result of a study using pigs (Liu *et al.,* 2021). Vitamin C contents of AVT observed in this study may provide over 50 percent of the recommended nutrient intake (FAO/WHO, 2004). As such it is a cheap and good source of vitamin C. Vitamin C deficiency will promote anemia because of its role in iron absorption, and stabilization of folate in food and also in the plasma (Loganathan *et al*., 2023; Golding, 2018).

Saponin levels observed in AVT were low and within safe levels. A study on the lethal dose of saponin was observed to be 200 mg/kg (Diwan, Abdel-Hassan, and Mohammed, 2000). Saponin contents above safe levels are known to exact negative effects like haemorrhage and erosion of the mucosa of the small intestine or necrosis of liver cells and renal (Diwan *et al.,* 2000).

The level of tannin observed from this study is not surprising as the fruit tastes nice aside from being sour as products with high tannin levels are known to have a bitter taste thus reducing consumer choice for such foods (Pandey and Rizvi, 2009; Kyraleou *et al.,* 2017). Tannin levels in the range of 0.02mg/g - 0.05mg/g are regarded as low (Trugo and Baer, 2004) foods high in tannin aside from their bitter taste, are known to form complexes with protein, starch, cellulose or minerals (Aldred, 2009).

The safe level for a wide range of phenolic compounds is 5mg/kg (European Food Safety Authority, 2012). The phenolic acid content of AVT is quite high as observed from this

study. Generally, foods rich in phenolic acids are known to protect against chronic diseases, including cardiovascular disease, neurodegenerative disease, and cancer (Rio, 2013). Particularly, Flavonoids have a wide range of applications in the food, pharmaceutical, and cosmetic industries. Their importance is attributable to their anti-oxidative, anti-inflammatory, anti-mutagenic, and anti-carcinogenic properties (Kopustinskiene *et al*., 2020; Al-Khayri, 2022).

They are different alkaloids that occur naturally in foods, alkaloids have medicinal properties when consumed the high level of alkaloid present in AVT potentiates it with the ability to exert the health benefits attributable to foods rich in alkaloids which include but are not limited to the anticancer properties of alkaloid rich foods (Dhyani *et al.,* 2022*).*

Tannins observed from this study are within the safe levels of less than 22mg/kg, as such, may not antagonize protein absorption (Gilani, Cockell, and Sepehr, 2005). Lawrence *et al.,* (2017) reported that the tannins component possesses excellent cardio-protective qualities in addition to the antioxidant action. It precipitates lipoprotein which carries cholesterol and thus reduces the level of in-take cholesterol. Mensah *et al.* (2019) also reported the usefulness of tannins in fruit aid in the management of hypertension.

The carotenoids present in AVT are among the major carotenoids important to human nutrition (Rodriguez-Amaya, 2017; Johnson, 2002). The β-carotene which happens to be the most abundant carotenoid that exhibits provitamin A activity is found in high concentration in AVT aside that, other provitamin A carotenoids like the α-carotene and β-cryptoxanthin were also identified. Their contributions to the RNI/day of vitamin A is 36 to 40 percent in adults (male and female respectively) is appreciable (FAO/WHO, 2004). Lutein and zeaxanthin are also known to be important in human nutrition. The amount of carotenoids found in this study is not surprising as carotenoids are found naturally in many coloured plants (fruits and vegetables) and AVT is not an exception (Gropper, *et al.*, 2009)

Conclusion

AVT is a lesser-known fruit, although it is not a citrus fruit,it has abundant vitamin C and Niacin levels. It also has high levels of phytochemicals like phenolic acids and flavonoids. Beta-carotene equivalents (Retinol activity equivalents) were appreciable. Zeaxanthin and lutein were also found present.

Recommendation:

1. Researchers should isolate and categorize the specific phenolic acids and alkaloids in AVT
2. Consumers should leverage on the information on the chemical compositions in making food choices
3. Food processors should consider processing the fruit pulp of AVT into powder to enhance food use.

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COVID-19 Pandemic and Arable Crop Farmers' Production Activities in Odeda Local Government Area of Ogun State, Nigeria

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Abstract

The study investigated COVID-19 pandemic and arable crop farmers' production activities in Odeda local government area of Ogun State, Nigeria.Specifically,it determined perception of other issues relating to COVID-19 pandemic, perceived effects of COVID-19 pandemic on their production and sales of farm produce and coping strategies to Covid-19 pandemic.Survey design was adopted for the study.The study population was the arable crop farmers in Odeda local government area thatwas made up of people of different ages. Data were collected with the aids of questionnaire which also served as interview guide. Multi-stage sampling procedure was used to select (120) respondents. Frequency distribution, percentage and mean were used for data analysis. The results indicated that all (100%) the respondents had full knowledge of the COVID-19 pandemic. The study showed that all (100%) the respondents were severely affected by the skyrocketing of farm input prices and inadequate supply of relief package as well as the pandemic had highly increased cost of production (93.3%). Majority (87.5%) of the respondents reduced the employment of hired labour in other to cope during lockdown. Majority (80.8%) also reduced the land sizes they would have normally cultivated because of the pandemic.

Keywords: Activities, Arable, Coping Strategies, COVID-19, Crop Farmers, Perception.

Introduction

COVID-19 pandemic was the second major pandemic the world has encountered in the 21st century. Predating it was the influenza A H1N1 of 2009 (Badejo *et al.,* 2020; Miranda *et al.,* 2022). To Vellingiri *et al.* (2020), however, COVID-19 was the most dangerous global pandemic threat since its outbreak in December 2019. As of April 18, 2020, more than 200 countries/regions had reported confirmed COVID-19 cases. Some of the countries included China, Italy, Iran, South Korea, India, Switzerland, Taiwan, United states of America U.S.A., Sweden, Singapore, Sri Lanka, France, Australia, Malaysia, etc. (Tang *et al.,* 2022).

On February 27, 2020, the Federal Ministry of Health confirmed the first COVID-19 case in Ogun State, Nigeria, making the country the third country in Africa to recognize an imported COVID-19 case after Egypt and Algeria (Dan-Nwafor *et al.,* 2020). Nigeria recorded the subcontinent's first confirmed case, after which it began to spread throughout Lagos, Ogun State, and the Federal Capital Territory (FCT) area of Abuja. The arrival of the

pandemic set off a chain of policy actions, including public health and education campaigns, fiscal and monetary measures, restrictions on large sections of the economy, and compensating measures in the form of social protection for poor and vulnerable people (Andam, 2020). In addition to posing a major health challenge for developing countries, COVID-19 was having severe socio-economic impacts. For Nigeria's economy, an immediate concern was the sharp drop in oil prices, which threatened to undo years of moderate economic growth in Nigeria and many other oil-dependent African countries (Kanupriya, 2020).

The Nigeria agricultural sector holds the key to country's drive for economic diversification. The sector has grown consistently at an average of 2.6 percent over the last three years. As at first quarter of year 2020, agriculture accounted for more than 22 percent of the Nigerian gross domestic product compared to oil and gas (9.5%), manufacturing (9.7%), financial services (3.8%) and trade (16.1%) (Azubuike and Ebere, 2020).

In addition, the agricultural sector remains the highest employer of labour (Yeboah and Jayne, 2018). However, Nigeria still faces many challenges; some of these include adverse weather conditions associated with climate change, herder-farmer clashes, terrorism in the north-east, and low level of mechanization, poor research and development activities. With COVID-19, the challenges hampering the attainment of food security in Nigeria could deepen. The impact was been felt in form of rising food crises. By April 2020, inflation had risen to 15 percent from 14.7 percent in December 2019 (Azubuike and Ebere, 2020). After spreading through East Asia, Europe, and North America in early 2020, the COVID-19 global pandemic started affecting countries in Africa and Latin America. With the largest population in Sub-Saharan Africa, and long-standing travel and trade links within Africa and to the rest of the world, it seemed inevitable that the pandemic would eventually reach Nigeria.

Arable farming is a type of crop production that produces a wide range of annual crops (Hajdu and Mamonova, 2020). This means that the crop life cycle, from germination to seed production, is complete within one year. Depending on the type of use, there are a few different types of arable crops. These include: Grain crops, Pulse crops, Oil seed crops, Forage crops, Fiber crops and Tuber crops. Gonzalez-Sanchez, *et al.* (2015) opined that arable crop production refers to the systematic use of land to grow crops. Farmers check how fertile their land is and undertake a process of preparation following the previous year's harvest to ensure a steady supply of their valued produce. The state's farmers, particularly the poorer ones, were subjected to a systematic lockdown.

The government lockdown in Nigeria, especially in Lagos State, Ogun State, and Abuja Federal Capital Territory, which began at the end of March 2020, came as a shock to Nigerian arable crop farmers.As security officers imposed mobility restrictions everywhere across the country, many farmers were unable to access their fields. Farmers' access to markets was severely hampered as well. Since most arable crop farmers lack storage facilities, they were forced to either watch their fruits and vegetables perish or sell them to opportunistic middlemen for a low price. Hence, many company owners were caught off guard when enterprises and social activities were shut down. As a result, income losses were incurred, and because many were in the informal sector, many had to deplete their meager savings. The shutdown had a particularly negative impact on farmers. (Phillipson *et al.,* 2020).

In addition, since the outbreak of coronavirus (COVID-19) Pandemic disease, many countries had shut down their economic activities and ordered their citizens to stay at home and observed precautionary measures as advised by World Health Organization to curtail the spread of the pandemic disease. It therefore becomes imperative to assess the impact of lockdown in Odeda local government which is home to most arable crop farmers in Ogun state.

In sub-Saharan Africa, almost six out of ten people reside in rural areas, according to the World Bank (2020). Similar to the Odede local government area, the population is made up of people of different ages, including those who are at high risk of contracting COVID-19, such as the elderly.Lack of access to quality healthcare and coverage, as well as a shortage of medical personnel, has been the primary issues affecting the study area's health services. Odeda zones are also seen in clusters, suggesting that regular human contact is unavoidable.In Odeda regions, it has been demonstrated that family and community clustering influences COVID-19 responses.Amidst the pandemic's attack, people in Odeda areas sought to cling to their cultural and customs because it would be difficult to adapt socioculturally. This presented a threat to the government and health authorities of Nigeria's implementation of stay-at-home directives, physical distancing, and other preventative measures (Olajide & Ladigbolu, 2020).

However, arable crop farmers, whose farm produce were susceptible to rotting due to their perishable natures, were particularly hard hit, particularly in Odeda local government area, which shares a border with Abeokuta's main town (the state capital of Ogun State). Notwithstanding the interventions made by the Nigerian government, such as palliative care, the Nigeria Centre for Disease Control (NCDC), which is tasked with fighting pandemics like

the Novel Coronavirus in Nigeria and providing information on prevention, control, and mode of transmission through a variety of media and sources, including the NCDC website, radio and television jingles, newspaper columns, social media platforms, and other online sources (NCDC, 2020). Additionally, policies and stimulus packages were called for by the players in the agricultural supply chain, who were also at the forefront of the COVID-19 pandemic in assuring food security by providing crop growers with free seeds, seedlings, agrochemicals, and inorganic fertilizers (Akinhanmi*et al.,* 2023).

Most of the aforementioned interventions were designed particularly to the poorest families, the programme's planning and implementation were flawed. Many targeted families in urban regions, let alone those in Odeda rural areas, were not reached in many cases. It is critical to understand how arable crop producers were affected by the government's varied tactics for minimizing the virus's spread in order to guide the future rationally and knowledgeably in situations like these.

The study region has not seen any noteworthy correlation between arable crop farmers' production activities and measures federal and state governments have put in place to combat the negative effects of CIVID-19 pandemic on arable crop farmers. Therefore, this called for investigation of COVID-19 pandemic and arable crop farmers' production activities in Odeda Local Government Area of Ogun State, Nigeria.

Purpose of the Study

The major objective of this study was to investigate the effects of COVID-19 pandemic on arable crop farmers' production activities in Odeda local government area of Ogun State, Nigeria. Specifically, the study determined the arable farmers':

(1) perception of other issues relating to COVID-19 pandemic,
(2) perceived effects of COVID-19 pandemic on their production and sales of farm produce,
(3) coping strategies to Covid-19 pandemic.

Methodology

Design of the Study: The research design used in the study was survey.

Area of the Study: The research was conducted in the Odeda local government area of Ogun state, which is 20 kilometers from Abeokuta. The LGA is a wide stretch of territory in Ogun State's Northwestern region, covering 1263.45km3 and home to roughly 217,000 people who mostly speak Yoruba dialect "*Egba*". Numerous food crops, including rice, maize, cassava, yam, cocoyam, oil palm, vegetables, and fruit trees, are grown in the area.The majority of the

population is made up of farmers and traders, with a small number of government employees working for the state hospital, local government secretariat, and primary and secondary schools.

Population for the Study: The study population was the arable crop farmers in Odeda local government area there was no comprehensive list of arable crop farmers in Odeda LGA of Ogun State, Nigeria. At Odede local government area, the population is made up of people of different ages, including those who are at high risk of contracting COVID-19, such as the elderly.Lack of access to quality healthcare and coverage, as well as a shortage of medical personnel, has been the primary issues affecting the study area's health services.

Sample for the Study: A Multistage sampling technique was used which involved three stages: First stage: Five wards were randomly selected out of the 10 wards in Odeda Local Government Area. Second Stage: Two communities were randomly selected each from the 5 wards (Orile Ilugun ,Olodo, Odeda, Kila and Olugbo) to make a total of 10 communities. Third Stage: Eligible (12) arable crop farmers that had the knowledge of COVID-19 pandemic were randomly selected and interviewed. Altogether, 120 arable crop farmers were used for the study.

Instrument for Data Collection: Data were collected with questionnaire which also served as interview guide for illiterate farmers. Socio-economic characteristics of the respondents were measured at a nominal level, ordinal level and interval level. The perceived effects of COVID-19 pandemic on the respondents were measured at three points Likert response type as: Severe effect (3), Minor effect (2), No effect (1) on fifteen (15) statements. The grand mean was 2.43; mean value ≥ grand mean was classified "high effect," and mean value < grand mean was classified "low effect". The arable crop farmers' perceptions of the pandemicwas measured at five Likert response type as: Strongly agreed (5), Agreed (4), Undecided (3), Disagreed (2) and Strongly disagreed (1) on 10 statements. The grand mean was 3.80; as a result, mean value ≥ grand mean was classified "high perception statement," and mean value < grand mean was classified "low perception statement". And crop farmers' coping strategies to COVID-19 pandemicwas measured at nominal level using dichotomous scale as: Yes (2), No (1) on twelve (10) statements.Reliability of the instrument was established using test re-test method. This was conducted on 20 arable farmers outside Odeda LGA. Cronbach's alpha value of 0.76 was obtained, indicating that the instrument was reliable.

Data Collection Method: The participants were given a thorough description of the primary goal of the research. Those who were illiterate were assisted because the questionnaire functioned as a schedule for their interviews. The respondents were given one hundred and twenty (120) copies of the questionnaire by hand. All 120 copies were correctly completed and returned. This suggests a return of 100 percent.

Data Analysis Technique: Frequency distribution, percentage and mean were used for data analysis.

Results

Socio-economic characteristics of the respondents

Data analysis indicates that some (44.2%) of the arable crop farmers were between 31 and 40 years old with mean age of 33 years, followed by 35.0 % that were within 41 to 50 years. Also, many (57.5%) of them were male and majority (95.0%) were married. The results show that many (63.3%) of the respondents had farming experience of between 11 to 20 years in arable crop farming. The results show that more than half (61.7%) of the respondents had household size of 3 to 6 persons, followed by 30.8% that had 7 to 9 persons. It was noted that some (42.5%) of the arable crop farmers earned between one hundred and fifty thousand Naira to three hundred thousand naira (₦150,000- ₦300,000) as monthly income. Also, more than half (65.8%) of them employ hired labour for farming, followed by 23.3 percent who used family labour and most (69.2%) cultivated arable crops on about 11 to 20 acres (which is about 4 to 8 hectares) of farm land.

Table 1: Mean Responses on Perceived Effects of COVID-19 Pandemic on Arable Crop Farmers (n=120)

S/N	Perceived Effect Indicators	Mean	Rank
1	Skyrocketing farm input prices.	3.00	1st
2	Inadequate supply of relief package.	3.00	1st
3	High cost of production.	2.97	3rd
4	High cost of transportation.	2.88	4th
5	Covid-19 is dangerous to elderly and people with base ill health.	2.86	5th
6	Accessibility to regular market days.	2.82	6th
7	Blocking of extension service delivery.	2.80	7th
8	Fear of contracting the disease.	2.73	8th
9	Scarcity of farm labourers.	2.34	9th
10	Low patronage for farm produce.	2.16	10th
11	Restricted movement on farm activities.	2.14	11th
12	Unfavorable government policy.	2.01	12th
13	Government tax on farm produce.	1.78	13th
14	Low product price.	1.77	14th
15	Lack of close substitute for farm inputs.	1.13	15th

Source: Computed from a field survey, 2022. Note: SE = Severe effect, ME = Minor effect, NE = No effect, F = Frequency, %= Percentage. Grand Mean 2.43

Table 1 shows that all the respondents were severely affected by the skyrocketing of farm input prices ($\overline{X}$= 3.00) and inadequate supply of relief package ($\overline{X}$= 3.00). The result also

reveals that the pandemic had severe effect on the cost of production ($\bar{X}$= 2.97) and transportation for majority of the respondents ($\bar{X}$= 2.88).

Table 2: Mean Responses of Arable Crop Farmers' Perception of Other Issues Relating to COVID-19 pandemic (n=120)

S/N	Perception Indicators	Mean	Rank
1	Pandemic increase encourages the high cost of production.	4.93	1st
2	Pandemic lockdown encourages spoilage of farm produce.	4.80	2nd
3	Pandemic has reduced my income.	4.75	3rd
4	Pandemic caused incessant increase in my expenditure	4.50	4th
5	It demoralized majority's participation in farming.	4.45	5th
6	Pandemic scare away extension service providers (extension Agents).	4.43	6th
7	It discourages international agricultural donors.	4.35	7th
8	Covid-19 reorganized the farming system.	4.24	8th
9	Covid-19 was orchestrated by set of people and government to scoop public funds.	3.37	9th
10	Covid-19 pandemic has nothing negative to do with arable crop farmers activities.	2.34	10th
11	Covid-19 is one of the oldest diseases in the world.	2.23	11th
12	Pandemic has increased my income.	1.22	12th

Source: Computed from a field survey, 2022. Where: F = Frequency, %= Percentage, SA= Strongly agreed, A= Agreed, U= Undecided, D= Disagreed, SD= Strongly disagreed. Grand Mean 3.80

Table 2 reveals that majority of the respondents strongly agreed that the pandemic increase encouraged the high cost of production ($\bar{X}$= 4.93). The result also shows that majority of the respondents strongly agreed that the pandemic lockdown encouraged spoilage of farm produce ($\bar{X}$= 4.80). The result further reveals that the pandemic had reduced the income of the respondents ($\bar{X}$= 4.75). Other high perception statements of effect(s) of COVID 19 pandemic on arable crop farmers' production activities were: pandemic caused incessant increase in their expenditure ($\bar{X}$= 4.50), it demoralized majority's participation in farming ($\bar{X}$= 4.45), pandemic scared away extension service providers ($\bar{X}$= 4.43), it discouraged international agricultural donors ($\bar{X}$= 4.35) and COVID-19 reorganized the farming system ($\bar{X}$= 4.2).

Table 3: Frequency and Percentage Responses on Arable Crop Farmers' Coping Strategies to COVID-19 Pandemic (n=120)

S/N	Coping Strategy Indicators	F (%)Yes	F (%) No
1.	Reducing the land size cultivated	97 (80.8)	23 (19.2)
2.	Contingency fund for farming activities	0 (0.0)	120 (100.0)
3.	Diversification of farming	57 (47.5)	63 (52.5)
4.	Pure organic farm practices	76 (63.3)	44 (36.7)
5.	Substitution for inorganic/synthetic chemical	69 (57.5)	51 (42.5)
6.	Personal savings before lockdown	102 (85.0)	18 (15.0)
7.	Employed family labour for farming	77 (64.2)	43 (35.8)
8.	Loan from cooperative	11 (9.2)	109 (90.8)
9.	Selling of farm produce at farm gate	46 (38.3)	74 (61.7)
10.	Reducing of hired labour engagement	105 (87.5)	15 (12.5)

Source: Computed from a field survey, 2022. Where: F = Frequency, %= Percentage.

Table 2 reveals the coping strategies that the respondents engaged in other to cope with the COVID-19 pandemic. The result shows that majority (87.5%) of the respondents reduced the employment of hired labour and majority (85.0%) also had personal savings before the lockdown which was of good usefulness to them during the period that they had to be at home. The result also reveals that majority (80.8%) of the respondents reduced the land size they would normally cultivate because of the pandemic. The result further shows that more than half (64.2%) of the respondents employed family labour for farming activities during the pandemic.

Discussion

The findings indicated that the arable crop farmers were within the mean age of 33 years. This implies that they could still withstand the pandemic because it affected the health of older people than the younger people. This corroborates the findings of Lebrasseur *et al.*, 2021 and Adedeji-Adenola *et al.* (2022) that asserted thatCOVID-19 affected older people than the younger people. Young farmers are more likely to implement preventative measures against the COVID-19 epidemic. Five people made up the average household size of arable farmers in the study, indicating that they were squeezed by the COVID-19 pandemic and paid more for food and inputs while getting less for their crops. TechnoServe (2021) found that 70% of households struggled to provide for their families because of high food costs and low earnings. It was noted that some of the arable crop farmers earn between one hundred and fifty thousand Naira to three hundred thousand naira (₦150,000- ₦300,000) as monthly income. This signifies that the respondents might have saved enough money, all things are equal, before the emergence of COVID-19, and this may serve as a coping strategy. Contrary, the COVID-19 pandemic's effects on commerce and supply chains made it harder for farmers to make a living and provide for their family. Poor rural households, in particular, sometimes lack the funds to purchase foods that are adequate in calories and essential nutrients. Disruptions to both agricultural and non-agricultural activity resulted in farmers losing income. Comparably, in the first three months following the start of COVID-19, roughly 64% of agricultural households had an income loss of more than 40% relative to their pre-COVID income level, according to Balana *et al*. (2020).

The findings reflected that all the respondents were severely affected by the skyrocketing of farm input prices and inadequate supply of relief package. Most farmers were unable to purchase inputs for their production process amid COVID-19. Similarly, studies by Haque *et al.* (2022) and Alam *et al.* (2023) revealed that farmers had contend with rising costs for agricultural inputs because the lockout also hampered the import and transit of commodities

including seedlings, fertilizers, and pesticides. Other authors also stated that since the majority of agricultural inputs were imported, the volatility of foreign exchange was driving up the cost of these inputs. Farmers who were having a hard time getting by were frustrated by the high cost of agricultural supplies across the nation (Serpil and Mehmet, 2024).

The result also reveals that the pandemic had severe effect on the cost of production and transportation for majority of the respondents. The findings revealed that majority of the respondents strongly agreed that the pandemic resulted to high cost of production. According to Thomas and Gilbert (2014), Olukunle (2016), the cost of production involves labour, raw materials, consumable manufacturing, land and capital. To these during COVID-19 pandemic, across the country, because there are no mechanized farming tools available, agricultural labour was performed manually on a daily basis. There was a high demand for labour during times of peak agricultural activity, particularly harvesting, but access to farmlands was restricted by lockdowns and movement restrictions for both arable crop farmers and labourers. The findings of Menon and Schmidt-Vogt (2022);Oyetoro (2023) asserted that most of the arable crop farmers were unable to get necessary production input resources during COVID-19 pandemic which was attributed to the sudden rise of high cost of labour, poor access to farm credit and no-COVID-19 pandemic palliative by the government were factors contributed to high cost of crop production.

Furthermore, findings showed that majority of the respondents strongly agree that the pandemic lockdown encouraged spoilage of farm produce. This implies that because of the pandemic, the farmers were not able to transport, sell and store their produce properly which therefore increased the spoilage of the farm produce, this finding is corroborated with Ilesanmi*et at.* (2023) who affirmed that COVID-19 pandemic lockdown resulted to spoilage of some arable crop produce that could not get to consumers on time. The study further revealed that the pandemic has reduced the income of the respondents. Also, Adebayo and Milu, (2020) in Agricultural Policy and Research in Africa (APRA) supported that the COVID-19 period is associated with a reduction in labour availability and increased labour costs.

The findings revealed the coping strategies that the respondents engaged in other to cope with the COVID-19 pandemic. It was indicated that majority of the respondents reduced the employment of hired labour and majority also had personal savings before the lockdown which advantage to them during the period that they had to be at home, Adebayo and Milu, (2020) OECD, (2020) and Ilesanmi*et at.* (2023) were of the same view that COVID-19 pandemic exert a significant effect on labour force, savings and marketing of farm produce.

The findings indicated that majority of the respondents reduced the land size they would normally cultivate because of the pandemic. This supports the work of Balana *et al.* (2020) who stated that because of the movement restrictions during the pandemic, some farmers had to reduce their farm sizes in order to be efficient in their production. This, however, affected total productivity.This implies that the arable crop farmers started producing less produce than usual because they were not selling as much as before in other to reduce spoilage of the farm produce. The result further shows that more than half of the respondents employed family labour for farming activities during the pandemic.

Conclusion

Based on the findings of this study, the following conclusions were drawn that the effects of COVID-19 pandemic was well pronounced on arable crop farmers activities. Thus, it was concluded that the COVID-19 pandemic affected the arable crop farmers in Odeda local government. Covid-19 pandemic was responsible for incessant increase of farm inputs' prices and coping strategies that were adopted by the respondents might be helpful to subside the effects of the pandemic in future occurrence.

Recommendations

Based on the conclusions, the study recommends the following:

1. All efforts should be on top gear by the farmers to see the pandemic as a better way to unveil new face of farming and take every chance to improve the livelihood activities in case of future occurrence.
2. Agricultural stakeholders (Farmers, Extension and the government) should ensure that favourable policy are implemented to turn the effects of pandemic to the nation's favour in term of food security.
3. Government should ensure farm input price are in check to avoid depriving the core rural farmers chances to contribute their quota to the nation's food security.
4. Effort should be made by the Extension and NGOs to initiate capacity building among farmers for optimum utilization of available coping strategies against COVID-19 pandemic in case of future occurrence.

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Utilization of E-Commerce Platforms by Small and Medium Scale Business Operators in Ebonyi South Senatorial Zone of Ebonyi State

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Abstract

This study focused on utilization of e-commerce platforms by small and medium scale business operators in Ebonyi South Senatorial Zone of Ebonyi State. The specific purpose was to determine Web intelligence platforms and social networking platforms utilized by small and medium scale Operators in Ebonyi South Senatorial zone of Ebonyi State. The study was carried out in Ebonyi South zone of Ebonyi State. Population for the study comprised 103Small and medium scale business operators in Ebonyi South zone of Ebonyi state. No sample was taken in view of the manageable size of the population. The study adopted a survey research design. Questionnaires were used for data collection. The overall Reliability coefficient of the instrument was 0.94. Mean, standard deviation and t-test statistic were used to analyze the data.The result of the study revealed thatthe 12web platforms such as Google marketing analytics, Similarweb, Ahrefs, SEMrush, Moz, Hoot-suite insight, Sprout Social, Brandwatch, Crimson Hexagon, NetBase, Qlik and Oracle Analytics Cloud are utilized at low extent by small and medium scale Operators and social networking platforms such as Facebook, Pinterest, YouTube, Crunchbase, Instagram, Twitterare utilizedat low extent by small and medium scale in Ebonyi South zone of Ebonyi state. The result of t-test results shows that there was no significant difference in the mean ratings of male and female SMEs operators on the extent of utilizing web intelligence platforms. Based on the findings of the study, it was recommended that Managers of small and medium scale businesses should utilizeseveral web intelligence and networking platforms to promote SMEs growth and performance. Furthermore, SMEs should also ensure that all online transactions are done with trusted persons whose identities are not anonymous and should use secured websites as well as document receipts of every online commercial activity.

Keywords: Utilization, E-commerce Platforms, Small, Medium Scale Business

Introduction

Electronic Commerce (E-commerce) refers to the buying and selling of goods and services over the Internet with the aid of modern communication equipment such as computer, telephone, fax, e-payment, money transfer systems, e-data interchange among others. It encompasses various types of transaction, including (1) B2B (Business-to Business), companies trading with each other, (2) B2C (Business-to-Consumer)-companies selling directly to individuals, (3) C2C(Consumer-to Consumer)-individual trading with each other (4) Social commerce-buying and selling through social media platforms and (5) M-Commerce (Mobile Consumer)- a transactions conducted through mobile device. Accordingto Attamah (2019), it is the way of carrying out business transactions using Internet

services. It is also mean the production, distribution, marketing, sales, or delivery of goods and services through electronic means. Okolie and Ojomo in Akanibo and Abbiyesuku (2021) defined e-commerce as the means of using Internet and web for business transactions or commercial transactions, which typically involves the exchange of value (e.g. money) across business organization or individuals boundaries in returns for products and services. E-commerce according to Chevalier (2022) is the buying and selling of goods, products, or services using the Internet as a medium whereby the buyer gets to see the product online, order it and make payment through the mode accepted by the seller. The seller then delivers these products to the consumer via available and accepted means. E-commerce is also known Internet commerce. To participate in ecommerce, a customer needs to have access to the Internet as well as a means of error free payment in order to make use of ecommerce services successfully.

E-commerce activities in Nigeria are rapidly growing as results of vast improvement in Telecommunication services. Chevalier (2021) stated that the evolution of e-commerce is highly influenced by developments in Communication and computer technologies. The benefits of ecommerce according to Shettima (2021), include customer loyalty, the speed of access, reduced costs of operation, transformation of traditional market chain, acquisition of a niche market, business efficiency, increased automation of process, retrained and expanded customer base, enhancing well being and education of customers about the products. The growth of e-commerce in Nigeria is affected by accessibility privacy, and confidentiality, establishing cost, data security, network reliability, credit card threat, citizens' income and education, authenticity, cyber crime, poor technological infrastructure and fear of inadequate security in online business environment (Ayo, 2022).

E-commerce platforms are the online infrastructures that enable the conduct of business transactions via the Internet. According to Akanbo et al (2021), ecommerce platforms is the content management system (CMS) and commerce engine websites use to manage a users relationships with an online retailer. It doesn't matter if your business is large or small, B2B or B2C, selling tangible goods or providing remote services. Ikemelu (2022) revealed that ecommerce platforms have the potential of transforming the nature of retail merchandising and shopping in Nigeria. E-commerce platforms, therefore, involves the use of electronic communication and digital information processing technology skill, aptitude and knowledge in marketing business (Timmer, 2017). E-commerce platforms include web based platforms and social networking platforms.

Web Intelligence platform refers to the process of gathering, analyzing and utilization of data from the web to support informed decision making. It involves gathering data from various online sources, applying techniques to identify patterns, trends and insights; presenting findings in a clear, actionable format. It is a software solution, its function is to collect, analyze and interpret data from the web to provide actionable insights for businesses, organizations, or individuals. Examples of WIP includes Google marketing analytics, Similarweb, Ahrefs, SEMrush, Moz, Hoot-suite insight, Sprout Social, Brandwatch, Crimson Hexagon, NetBase, Qlik and Oracle Analytics Cloudaccording to Akanibo and Abbiyesuku (2021)have emerged as credible outlets where merchandisers canvass patronage for their products from their target markets. Utilization of Web Intelligence platforms in business organizations involves leveraging web data and analytics to inform strategic decisions, drive growth, and stay competitive. Chen, Singh and Wang (2020) noted that leveraging web intelligence platforms, small and medium scale enterprises can enhance data driven insights, drive growth, and stay ahead of the competition. Web intelligence (WI) platforms according to Kim Kim, Huang and Kumar (2019), offer a solution, empowering SMES to leverage web data and analytics for informed decision making. Web Intelligence platforms provide real-time monitoring, predictive analytics and data visualization, enabling businesses to optimize operations, enhance customer experiences and drive growth. Okeke, Ezeaghaego amd Oboreh (2016) opined that the Web Intelligence Platforms when utilized has its influence over many aspects of the world market either directly or indirectly. According to them, it help toremove the limitations of the accessibility of information and ensure that it can be reached anywhere by anyone accessing the Internet.

Social networking platforms are the internet based software application or websites that enables users to create and share contents, connect with others, and participate in online communities. It is the online websites that allow people to network with friends as well make new friends to build network. Okoye and Obi (2022) posits that social networking platforms consist of any online platforms or channel for user generated content. The common examples of social Networking platforms includes: Facebook, twitter, Crunchbase, YouTube, WordPress, Sharepoint, Lithum among others. Tito (2023) explained that social networking platforms have relevance not only for regular Internet users, but business as well. In business, social networking platforms is used to market products, promote brands, and connect to current customers and foster new business (Sarah, 2021).Social networking platforms such as Facebook, Instagram, Twitter and LinkedIn are deployed as avenues for businesses to engage

customers and sell their products and services online. Akujo (2019) posits that platforms like, Facebook, Twitter, and LinkedIn have created online communities where people can share as much or little personal information as they desire with other members. Social network platform is a very powerful business tool. Through social network platforms, SMEs Operators can follow conversations about their product for real-time market data and feedback. Example, establish Facebook, Twitter page allows someone who like your product and the way you conduct business to your page, which creates a venue for communication, marketing and network. Beckers, Weekx and Verhetsel, (2021) opined that web and social networking platform allows small and medium scale business (SMEs) Operators to connect individuals who share similar business interest or activities.

Small and medium scale business according to Bank of Industry (BOI) in Attamah (2019) is defined as business industries with project cost (investment and working capital) not exceeding ₦3 million ($18,750). According to Oyelaran-Oyeyinka (2020), small and medium scale businesses are businesses with turnover of less than N100 MM per annum and/ or less than 300 employees. According to him, in a study by the IFC show that approximately 96% of Nigerian businesses are small and medium scale business compared to 53% in the US and 65% in Europe. It was further stated that small and medium scale businesses represent about 90% of the manufacturing/ industrial sector in terms of number of enterprises. The importance of having an online presence especially for small and medium scale business operators cannot be overstressed. It helps business operators to showcase their products to much broader audience and attracts more patronage. Schawbel (2019) posits that for any business operator to excel, he/she should at least be involved in the largest social networks, belong to forums and have at least one blog; set a Google Alert for his name and company's name and have profit page on a social network. MacKillop (2020) stated that business can be promoted through e-commerce platforms. Small and medium scale enterprises (SMEs) in particular can benefit significantly from e-commerce platforms, enabling them to reach global markets, enhance customer's engagement and increase revenue. In addition, SMEs can benefit significantly from e-commerce platforms, expanding their market reach, improving efficiency and reducing cost.

In Ebonyi State, the small and medium scale enterprises have continued to thrive even before the creation of the state in 1996. About 80% of all the economic activities in Ebonyi State are purely small and medium scale enterprises (Nwusulor, 2016). This accounts for their (SMEs) huge contributions to the greater outputs of the Ebonyi State economy. According to

SMEDAN (2022) collaborative National Survey of Micro, Small & Medium Enterprises (MSMEs), Ebonyi State has 2,433 small and medium scale enterprises. They bring employment generation, poverty reduction and diversification of the economy among others, these small and medium scale enterprises are located in different strategic positions of the State (Ebonyi) especially in the capital territory (Abakaliki). They operate in different dimensions as water production, cassava processing, rice milling, provision stores, hair dressing, fruit juice making, computer centers, shoe making, palm oil production, vehicle repairs and maintenance, laundry and dry cleaning services, bookshops, transport service/companies, carpentry, electronics repairs and accessories, poultry farms, restaurants and fast food centers, saloons (haircuts/plaiting), fruits and vegetable vendors, cosmetics shops, among others. These enterprises have been struggling resiliently to survive on their own even when the State Government has not shown enough interest to promote them. To a reasonable extent they have contributed immensely to the economic growth of the State. Small and Medium scale enterprises account for 90% of businesses worldwide, contributing significantly to economic development. However, they often lack resources and infrastructure for advanced data analysis. Web Intelligence Platforms bridge this gap, providing accessible and affordable solutions.

The utilization of e-commerce platforms is important to the small and medium scale businesses in the developing countries, including, Nigeria, as this would enhance the needed impact of the small and medium scale businesses in the economic development of the country. Utilization connotes the use of item, idea or object to solve an existing problem or to achieve an objective. According to Hawkins (2022) to utilize is to find a use for something. Cassia and Magno (2021) noted that with e-commerce platforms many small and medium scale sales market directly to the consumer rather than going through a conventional retail sales channel. Akanbi and Akintunde (2018) stated that e-commerce has potentials to improve the performance of SMEs operators and bring about expansion in business outlook if factors limiting the adoption of e-commerce like security issues, under developed infrastructures, poor delivery logistics and poor courier systems, infrastructure facilities, incompatibility of business with e-commerce among others., were eliminated

In today's digital landscape, e-commerce platforms is fast rising one, gaining steady popularity in Ebonyi State as there is increased accessibility and availability of Internet access which is making many small and medium operators and even large-scale businesses to be considering e-commerce as a valid and more profitable sales channel. Chevalier (2022)

noted that since the emergence of e-commerce platforms, sales of SMEs Operators have skyrocketed every year in Ebonyi State. Chevalier further revealed that from 2014 to 2022, sales has multiplied almost fivefold across states in Nigeria including Ebonyi State. Besides that, the global Covid-19 pandemic forced many business organizations across States in Nigeria including Ebonyi State to shift their business focus to an online environment because restrictions and rules prevented them from practicing their usual business activities. Even though restrictions are lifted now, many small and medium seem to bear the fruits of their online activities and continue conducting business activities through e-commerce platforms (Chevalier, 2021).

In Ebonyi South Senatorial zone of Ebonyi State, however, it seems that SMEs are not yet appropriately adopt electronic platforms which facilitate business transactions with high level of speed. This situation has been of great concern to the government, customers, Operators, practitioners and the organized private sector groups. The adoption of e-commerce by Small and medium scale enterprises in Nigeria is crucial because it has the potential to increase the revenue of the economy, create new markets for both small and larger businesses and open up channels to serve and interact with consumers. Okeke, Ezeaghaego and Oboreh (2016) noted that the cause of low performance of small and scale business operators is non utilization of e-commerce platforms in the world market either directly or indirectly. A study Ucha (2021) revealed that small and medium scale businesses are fast losing their customers to businesses with longer exposure. This could be attributed to lack of utilization or poor utilization of e-commerce platformsby small and medium scale business operators in Ebonyi South Senatorial zone of Ebonyi State. Based on this problem, the study sought to investigate the extent of utilization of e-commerce platforms by small and medium scale business Operators in Ebonyi South Senatorial Zone of Ebonyi State.

Purpose of the Study

The major purpose of the study was to investigate theutilization of e-commerce platforms by small and medium scale (SMEs) business operators in Ebonyi South Senatorial Zone of Ebonyi State. Specifically, the study was undertaken to determine the extent of:

4. Web intelligence platforms utilization by SMEs business operators in Ebonyi South Senatorial zone of Ebonyi State.
5. Social networking platforms utilization by SMEs operators for in Ebonyi South Senatorial zone of Ebonyi State.

Research Questions

The following research questions were answered by the study:

1. To what extent do SMEs businesses operators utilized web Intelligence platforms in Ebonyi South Senatorial zone of Ebonyi State?
2. To what extent do SMEs business operators utilized social networking platforms utilized by small and medium scale operators in Ebonyi South Senatorial zone of Ebonyi State?

Research Hypotheses (HOs)

The following null hypotheses were tested at 0.05 level of significance

HO_1: There is no significant difference in the mean responses of SMEs business operators in Ebonyi South Senatorial zone on utilization of web intelligence platforms based on gender (Male & Female).

HO_2: There is no significant difference in the mean response of SMEs business operators in Ebonyi South Senatorial zone on utilization of social networking platforms based on years of experience (1-10 years & 11 years above)

Methodology

Design of the Study: The study adopted a survey research design.

Area of the Study: The study was carried out in Ebonyi South zone of Ebonyi State. Ebonyi South zone is made up five Local Government Areas (LGAs) Afikpo North, Afikpo South, Ohaozara, Onicha and Ivo Local Government areas. Ebonyi South zone is also situated at the southern part of Ebonyi state. According to Small & Medium Enterprises Development Agency of Nigeria (SMEDAN) collaborative National, Ebonyi State has 2,433 small and medium scale enterprise which include: wholesale and retail trade; food and beverages stores; hotel and restaurant; repairs of motor vehicles and motor cycles; accommodation and food service Activities; Transport and Storage; administrative and support services Activities; art entertainment and recreation; land Transportation and Other Services Activities. The use of this area for the study is justified by the fact that this area has a lot of small and medium scale business operators, which perfectly suits the research plan.

Population of the Study: The population for the study comprised 103Small and medium scale business operatorsin Ebonyi South zone of Ebonyi state whose businesses are registered with the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN), Ebonyi State branch.

Sample of the Study: No sample was taken in view of the manageable size of the population.

Instrument for Data Collection: Questionnaire was used for data collection using four point scales of Very High Extent (VHE), High Extent (HE), Low Extent (LE) and Very Low Extent (VLE). The instrument was validated by three experts, all from Ebonyi State

University, Abakaliki. To determine the reliability, the instrument was trial tested by administering the questionnaire to 20 smalland medium scale business operators in Aba, Abia State that has close proximity and a common boundary with Ebonyi State. Reliability was tested using Cronbach Alpha at 5%level of significant. The overall reliability coefficient of the instrument was 0.94. Mean and standard deviation were used to answer the research questions.

Data Collection Method: A total of 103 copies of questionnaire were administered to the respondents by hand with the help of three research assistants. The respondents were properly instructed on questionnaire items and how to respond to the instrument. All the 103 copies of questionnaire were retrieved. There was 100 percent return rate.

Data Analysis Techniques: Data were analyzed using mean ($\bar{x}$) to answer research questions while t-test statistic was used to test the hypotheses at 0.05 level of significance. A mean of 2.50 was used as basis for decision making. The null hypothesis was accepted when the t-calculated value (t-cal) was less than the t-critical (t-tab) value of 1.96. On the other hand, an hypothesis was rejected when the t-calculated value (t-cal) was greater than the t-critical (t-tab) value of 1.96 at 0.05 degree of freedom.

Result

Extent of utilization of web intelligence platforms by SMEs in Ebonyi South Senatorial zone of Ebonyi State.

Table 1: Mean Responses and t-test Analysis on the Extent SMEs Business Operators Utilization of Web Intelligence Platforms based on gender. Where N=103

S/N	Web Platforms	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	t.cal	Remark
1	Google marketing analytics	2.35	1.38	1.36	0.76	1.85	1.07	0.80	NS
2	Similar web	2.35	1.39	2.50	1.35	2.42	1.37	1.80	NS
3	Ahrefs	2.46	1.38	2.50	1.35	2.48	1.36	1.80	NS
4	SEMrush	2.46	1.38	2.38	1.35	2.42	1.36	1.70	NS
5	Moz	2.46	1.38	2.47	1.28	2.46	1.33	0.80	NS
6	Hoot-suite insight	2.48	1.38	2.43	1.45	2.45	1.41	0.80	NS
7	Sprout Social	2.41	1.07	2.11	1.06	2.26	1.06	0.80	NS
8	Brandwatch	2.43	1.12	2.33	1.16	2.38	1.14	1.70	NS
9	Crimson Hexagon	2.48	1.18	2.56	0.85	2.52	1.02	1.80	NS
10	NetBase	2.34	1.10	2.50	1.15	2.42	1.12	1.70	NS
11	Qlik	2.50	1.39	3.65	0.47	3.08	0.93	1.80	NS
12	Oracle Analytics Cloud	2.54	1.39	3.79	0.68	3.16	1.02	1.80	NS
	Cluster Summary	2.45	1.39	2.54	1.07	2.49	1.18	1.01	NS

N_1 = number of males, N_2 = Number of females; $\bar{X}_1$= mean of male; $\bar{X}_2$ = mean of female; $\bar{X}_g$ = grand mean; SD_1= standard deviation of male; SD_2 = standard deviation of female; t.cal = caculated t-test result, $_g$=Grand Mean

Table 1 shows that the grand mean ratings of the responses of small and medium scale business operatorson 10 items (1-10) in range from 1.85 to 2.42 which are in each case less

than the cut-off point value of 2.50 on 4-point rating scale. This indicated that majority of the respondents indicated that items in the cluster were utilized at low extent. The mean ($\overline{X}$)for items 11 and 12 were 3.08, and 3.16 respectively which are in each case greater than the agreed cut-off point mean ($\overline{X}$)of 2.50 on 4-point rating scale hence were adjudged as highly utilized. The overall mean of male SMEs business operators was 2.45 which was less than that of female business operators which was 2.54.

Table 3 further shows that the t-calculated (t-cal) values of eight out of 12 items range from 1.97 to 3.79 which are in each case is less the t-table (t-tab) value of 1.96. This implies that there is no significant differences existed in the mean ratings of the responses of male and female SMEs business operators on the twelve identified web intelligence platforms by SMEs in Ebonyi South Senatorial zone of Ebonyi State. Therefore, the null hypothesis was not rejected.

Extent of utilization of social networking platforms by SMEs in Ebonyi south zone of Ebonyi state.

Table 2: MeanResponses and t-test Analysis on the extent SMEs business operators utilize social networking platforms based on years of experiences, where N=103

S/N	Social Networking platforms	$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}_g$	SD_g	t.cal	Remark
1	Facebook	2.43	1.45	1.41	0.84	1.92	1.15	2.80	Sig
2	Instagram	2.36	1.38	1.37	0.80	1.86	1.09	2.91	Sig
3	Twitter	2.49	1.41	1.45	0.82	1.97	1.12	2.22	Sig
4	Linkedin	2.50	1.35	1.45	0.36	1.96	0.85	2.32	Sig
5	YouTube	2.50	1.35	1.44	0.78	1.97	1.07	3.30	Sig
6	Tiktok	2.38	1.35	1.40	0.79	1.89	1.09	2.31	Sig
7	Snapchat	2.47	1.28	1.41	0.83	1.94	1.05	3.32	Sig
8	Redidit	2.43	1.45	2.43	1.45	2.43	1.45	2.72	Sig
9	Pinterest	2.41	1.36	2.21	1.06	2.31	1.21	3.31	Sig
10	MySpace	2.33	1.36	2.13	1.16	2.23	1.26	3.01	Sig
11	WhatsApp	2.56	0.85	2.26	0.95	2.41	0.90	2.01	Sig
12	Crunchbase	2.48	1.35	2.10	1.15	2.29	1.25	3.32	Sig
13	Xing	2.89	0.70	3.65	0.47	3.27	0.58	2.41	Sig
14	Telegram	2.46	1.46	2.09	0.68	2.27	1.06	2.92	Sig
15	WeChat	2.37	1.29	2.43	1.45	2.40	1.37	3.30	Sig
	Cluster Summary	2.45	1.39	1.80	0.91	2.21	1.03	2.01	Sig.

N_1 = number of 1-10years, N_2 = Number of 11 and above; $\bar{X}_1$= 1-10years; $\bar{X}_2$ = mean of 11 and above; X_g = grand mean; SD_1= standard deviation of male; SD_2 = standard deviation of female; t.cal = caculated t-test result, $\bar{X}_g$=Grand Mean

Table 2 shows that the grand mean ratings of the responses of small and medium scale business operatorson 14 items (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, and 15) range from 1.92 to 2.43 which are in each case less than the cut-off point value of 2.50 on 4-point rating scale.

This indicated that majority of the respondents indicated that items in the cluster were utilized at low extent. The mean ($\bar{X}$)for items 13 were 3.27 which are in each case greater than the agreed cut-off point mean ($\bar{X}$)of 2.50 on 4-point rating scale hence were adjudged as highly utilized. The overall mean of male students was 2.45 which were greater than that of female which was 1.80.

Table 2 further shows that the t-calculated (t-cal) values of fifteen (15) items range from 2.72 to 3.31 which are in each case greater than the t-table (t-tab) value of 1.96. This implies that significant differences existed in the mean ratings of the responses of business operators of 1-10 years and those of them with experiences of 11 and above on the fifteen identified networking platforms. Therefore, the null hypothesis was rejected.

Discussionof Findings

The study revealed thatsmall and medium scale businesses utilized web intelligence platforms at low extent in Ebonyi South Senatorial zone of Ebonyi State. The study revealed that web intelligence platforms such as Google marketing analytics, Similarweb, Ahrefs, SEMrush, Moz, Hoot-suite insight, Sprout Social, Brandwatch, Crimson Hexagon, NetBase, Qlik and Oracle Analytics Cloud are utilized at low extent by small and medium scale businesses in Ebonyi South Senatorial zone of Ebonyi State of Nigeria. The test of hypothesis revealed that the mean responses of small and medium scale business operators did not differ on their extent of utilizing web intelligence platforms based on Gender. This portends a great danger for small and medium scale businesses in Ebonyi South Senatorial zone of Ebonyi State of Nigeria. In contemporary marketing, Web intelligence is a necessary adjunct to any marketing effort. This finding agrees with Okeke, Ezeaghaego and Oboreh (2016) who noted that the cause of low performance of small and scale business operators is non utilization of web intelligence platforms in the world market either directly or indirectly. The finding also collaborates with the view of Akanbi and Akintunde (2018) who stated that e-commerce has potentials to improve the performance of SMEs operators and bring about expansion in business outlook if factors limiting the adoption of e-commerce like security issues, under developed infrastructures, poor delivery logistics and poor courier systems, infrastructure facilities, incompatibility of business with e-commerce among others., were eliminated.

The analyses of the second research question in Tables 2revealed that there is low utilization of social networking platforms such as Facebook, Instagram, Twitter, LinkedIn, YouTube, Tiktok, Snapchat, Redidit, Pinterest, MySpace, WhatsApp, Crunchbase, Xing, Telegram and WeChat by small and medium scale businesses in Ebonyi South Senatorial zone of Ebonyi

State. The test of hypothesis revealed that the mean responses of small and medium scale business operators differed significantly on their extent of utilizing Networking platforms based on their years of experience. The low utilization of networking platforms by small and medium scale business operators in Ebonyi South also suggests that they are not excelling in their marketing effort. This finding agrees with Schawbel (2019) who posits that for any business operator to excel, he should at least be involved in the largest social networks, belong to forums and have at least one blog; set a Google Alert for his name and company's name and have profit page on a social network. This finding is in consonance with Bevan MacKillop (2020) also noted that business can be promoted through social networking. Nwabufo (2017) noted that companies like Amazon, Alibaba and Walmart have become large corporations due to the integration of ecommerce such as web intelligent and networking platforms into their business models.

Conclusions

This study focused on utilization of e-commerce platforms by small and medium scale business operators in Ebonyi South Senatorial Zone of Ebonyi State. The study found that 12 identified web intelligence platforms Google marketing analytics, Similarweb, Ahrefs, SEMrush, Moz, Hoot-suite insight, Sprout Social, Brandwatch, Crimson Hexagon, NetBase, Qlik and Oracle Analytics Cloud among others and 15 identified social networking platforms Facebook, Instagram, Twitter, LinkedIn, YouTube, Tiktok, Snapchat, Redidit, Pinterest, MySpace, WhatsApp, Crunchbase, Xing, Telegram and WeChat utilized at low extent by small and medium scale businesses in Ebonyi South zone of Ebonyi state. The result of the tested null hypothesis proved that there was no significant difference in the mean ratings of male and female business operators on their extent of utilizing web intelligence platform and significant differences existed in the mean responses of small and medium business operators of 1-10 years and those of them with experiences of 11 and above on the fifteen identified networking platforms. Based on the findings, it was concluded thatthe advent of e-commerce offers considerable opportunities for SMEs to expand their customer base, enter new product markets, and rationalize their businesses and as such, the benefits of e-commerce outweigh the costs of investment. Therefore, SMEs that invest in e-commerce may continue to grow whether the investment costs are high or low

Recommendations

Based on the findings and conclusions drawn from the study, the following are recommended

1. Managers of small and medium scale businesses should utilize several web intelligence platforms to promote SMEs growth and performance

2. Managers of small and medium scale businesses should continuously research and utilize several networking platforms and its components to significantly promote SMEs growth and performance
3. SMEs should also ensure that all online transactions are done with trusted persons whose identities are not anonymous and should use secured websites as well as document receipts of every online commercial activity
4. That all the tertiary institutions that offer marketing education courses need to be provided with e-learning facilities and platforms in order to ensure the facilitation of electronic commerce competencies

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Influence of Social Media Messages on Adult Internet Users and Issues Relating to Domestic Violence against Cohabiting and Married Women in Southeast Nigeria

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Abstract
The study focused on influence of social media messages on adult internet users and issues relationg to domestic violence against cohabiting and married women (DVACMW) in Southeast Nigeria. Specifically, the study determined: level of awareness of social media messages on DVACMW among internet user; knowledge gained from the messages on DVACMW by the internet users; and their attitude towards DVACMW based on the messages. Survey research design was adopted. Population was 14,684,504, comprising adult internet users in Southeast Nigeria. Questionnaire was used for data collection. Data were analysed using percentages, mean and standard deviation. Findings reveal that 100 percent of respondents were aware of DVACMW. Awareness was mainly through Facebbok (75.3%); Instagram (14.0%); Twitter (8.5%); and Tik-Tok (0.8%). Regularity of reading social media messages on DVACMW ranges from daily (22.0%); weekly (30.50%); biweekly (8.8%); monthly (9.5%) to rarely (29.3%). Furthermore, findings show high knowledge level ($\overline{X}$ =3.65 to 2.84) for up to 90 percent of the knowledge indicators studied. The messages also have high influence ($\overline{X}$ = 3.43 to 2.66) on the respondents for up to 90 percent of the attitude indicators. The recommendations were made based on the findings.

Keywords: Domestic, Violence, Knowledge, Attitude, Social, Media, Internet, Users, Women.

Introduction

Domestic violence may include any abusive treatment against a person sharing the same house with an abuser. It could be verbal, physical, financial, religious, digital, psychological, or sexual (Odenigbo et al., 2023). According to the World Health Organisation (WHO) (2021), 641 million ever-married/partnered women aged 15 years and older have been subjected to physical and sexual intimate partner violence at least once. Two-hundred and forty-five million ever-married/partnered women aged 15 years and older had been subjected to recent physical and sexual intimate partner violence.Globally, the victims of domestic violence are principally women. Many African and Asian countries justify domestic violence based on infidelity, cooking flaws, lack of respect, or disobedience to husband and his people (Odenigbo et al., 2023). A study by the National Population Commission (NPC) (2014) reports that one in three surveyed women agree that a man is justified in beating his wife in

some cases, including if she burns the food while cooking, argues with him, goes out without telling him, neglects the children, or refuses to have sexual intercourse with him. Another study on Nigeria Demographic and Health Survey 2018 by NPC and ICF (2019) reportsthat 31 percent of women aged 15-49 have experienced physical violence, and nine per cent have experienced sexual violence, and six per cent of women have experienced physical violence during pregnancy. Furthermore, 36 per cent of ever-married women have experienced spousal physical, sexual, or emotional violence. The prevalence of one or more of these forms of spousal violence was higher in 2018 than in 2008 (31%) and 2013 (25%). Astonishingly, the victims' current husbands (58.0%) orchestrate most physical abuse against women.

Women's safety and psychological stability have been exploited for decades. Various women die yearly in Nigeria because of emotional torture and battering, with others battling depression, anxiety and suicidal thoughts (Odenigbo and Anyakoha, 2021). Liu et al. (2021) also reported that domestic violence has a short-term detrimental impact on people's mental health, as shown in victim and non-victim groups on Sina Weibo, the aftermath of domestic violence includes an increase in depressive symptoms, a higher risk of suicide, and a worse level of life satisfaction.

Similarly, the health effects of intimate partner abuse on the psychological well-being of a victim include mental health problems, post-traumatic stress disorder (PTSD), anxiety, depression, eating disorders, suicidality, and alcohol and substance use (tobacco, and other drugs) (WHO, 2013).

The fight against domestic violence against married and cohabiting women would not be effectively mitigated by international organisations and governments without the intervention of the media as the watchdog and agenda setter for the people. The media owe it to the masses to enlighten and educate them on the issue of domestic violence against married and cohabiting women, enumerating the psychological, social, and health disasters that it poses to society.

The traditional media, especially the newspaper, have been criticized for low coverage and poor analysis of domestic violence stories (Owusu-Addo et al., 2018; Mwai, 2016; Onyebuchi et al., 2021; Odenigbo et al., 2023). Digital technologies are significantly multifaceted, advancing rapidly daily and can promote domestic violence stories. It therefore becomes imperative to utilize these tools in exposing and campaigning against the dehumanizing treatment women suffer in marriages and cohabitations. Social interaction platforms, such as Facebook, WhatsApp, Instagram, Twitter, YouTube, and TikTok, are

becoming more popular among Nigerians of all ages and ethno-social backgrounds. It has become a fundamental part of their social life, providing opportunities and connections. It is no surprise that these platforms have received a torrent of intimate partner abuse stories from around the country.

Several studies highlight the prevalence of domestic abuse against women and the importance of social media in raising awareness. According to Abdulgaffar et al. (2017), 74.9 percent of Nigerians have come across information regarding violence against women on social media, emphasising its significance in campaigning and empowering survivors. Arisukwu et al. (2021) discovered that 97 percent of respondents were aware of domestic abuse, with 43.8 percent attributing it to early marriage. The amount of education has a major impact on their understanding of abuse.

Ikushika et al. (2017) analysed Facebook postings concerning violence against women and discovered that they comprised physical violence (26%), sexual assault (52%), and emotional abuse (6%). Carlyle et al. (2019) discovered that 53.4 percent of Instagram postings regarding intimate partner violence (IPV) exhibited physical assault, with 43 percent blaming victims. Ebrahimi and Mohamadlou (2019) discovered themes such as psychological trauma and children's concerns among mistreated mothers. Liu et al. (2021) linked domestic violence to an increased risk of depression and suicide, while Cirici et al. (2022) found that 87 percent of IPV victims had state anxiety and post-traumatic stress disorder. Furthermore, Rosser-Limiñana et al. (2020) and LoCascio et al. (2021) observed that children exposed to IPV exhibited behavioural issues, with 37 percent showing attention problems and 15.2 percent engaging in rule-breaking behaviour.

Theoretically, ancient theorists like George Armitage Miller (1956) emphasized the impact of exposure to persuasive messages on attitudes. Anaeto et al. (2008) noted that exposure raises awareness, and a comprehended message guarantees knowledge, which, if accepted, reforms beliefs and attitudes. Odenigbo (2023) argued that new media could effectively influence public perceptions and behaviours regarding domestic abuse through social media campaigns.

Objectives of the study

The study investigated influence of social media messages on adult internet users and issues relating to domestic violence against cohabiting and married women in Southeast Nigeria. Specifically, the study determined:

1. level of awareness of social media messages among adult internet users on domestic violence against cohabiting and married women (DVACMW).
2. level of knowledge gained from social media messages on DVACMW among adult internet users.
3. attitude of adult internet users towards social media messages on DVACMW.

Methodology

Design of the Study: The study adopted online survey research design (Bhattacherjee, 2012; Regmi et al., 2016).

Area of Study: The area of study was Southeast Nigeria, one of the six geopolitical zones in the country. This study targeted adult internet users in the five Southeastern states (Abia, Anambra, Ebonyi, Enugu and Imo) of Nigeria. The choice of southeast geopolitical zone is because similar social media studies have been conducted on the other regions especially, Southwest and North Central. Hence, it becomes imperative to evaluate social media user's opinions on this topic in Southeast Nigeria.

Population of the Study: The population of the study is 14,684,504; comprising adult internet users in the Southeast geopolitical zone (National Bureau of Statistics, 2021). This category includes males and females aged 18 years and above who reside in Southeast Nigeria and have internet access.

Sample for the Study: The study used a sample size of 400 from a research population of 14,684,504. The sample size was calculated statistically using the Cochran (1979) Formula for sample size determination. The researchers were more interested in the quality of the replies than in the gender of the respondents. As a result,the e-questionnaire was shared to WhatsApp and Telegram groups populated by experts in the topic.

Instrument for Data Collection: The instrument for data collection was an e-survey questionnaire. The items covered the specific objectives of the study. The instrument was divided into two categories: demographic section (section A) requested information, such as age, gender, educational qualifications, religious affiliation, and marital status. Section B focused on items related to the objectives of the study. The instrument was validated by three research experts. Reliability of the instrument was analysed using Cronbach's Alpha coefficient method in SPSS. The result showed that the instrument had a Cronbach's Alpha coefficient of 0.809 indicating it is 80% reliable.

Data Collection Method: Four hundred copies of the e-survey questionnaire were administered to 400 respondents via WhatsApp and Telegram platforms. The e-questionnaire

was programmed to be disabled after four hundred respondents from Southeast Nigeria had completed it. To ensure that only residents of Southeast Nigeria participated, the questionnaire began with the prompt, "Do you reside in Southeast Nigeria?" Once 400 responses were submitted, the Google Form link was set to expire.

Data Analysis Techniques: Data were analysed using frequencies (F), percentages (%), means and standard deviations. A Mean ($\overline{X}$) of 3.50 and above was considered a very high level of knowledge, awareness or attitude, 3.00-2.50 is considered a high level and 2.49 and below is considered a low level.

Findings

Table 1: Percentage Responses on Level of Audiences' Awareness of Social Media Messages on Domestic Violence against Cohabiting and Married Women (DVACMW) among Adult Internet Users in Southeast Nigeria

S/N	Awareness Indicators	F (%)	F (%)	F (%)	F (%)	F (%)
1.	I am aware of DVACMW	Yes	No			
		400(100)	0(0)	-	-	-
2.	My awareness of DVACMW on social media was mainly through	Facebook	Instagram	Twitter	TikTok	Others
		301(75.3)	56(14.0)	34(8.5)	3(0.8)	6(1.5)
3.	I read about these messages on DVACMW on social media	Daily	Weekly	Biweekly	Monthly	Rarely
		88(22.0)	122(30.5)	35(8.8)	38(9.5)	117(29.3)

Note: *% = percentage: F = Frequency*

Table 1 shows the frequencies and percentages of respondents' awareness of social media messages on DVACMW in Southeast Nigeria. The Table shows that 400 (100%) respondents are aware DVACMW.

The Table also shows social media platforms where awareness of DVACMW came mainly frommajority of respondents (75.3%) chose Facebook, while (14.0%) are through Instagram, (8.5%) favoured Twitter, (0.8%) selected TikTok, and (1.5%) through other means the ones stated in the Table.

Data analysis on how often these messages on DVACMW are seen on social media shows that 88 (22.0%) respondents selected daily, 122 (30.5%) favoured weekly, 35 (8.8%) chose biweekly, 38 (9.5%) indicated monthly, and 117 (29.3%) said they rarely notice these stories on DVACMW.

Table 2: Mean Responses and Standard Deviation on Audiences' Knowledge Level on Domestic Violence against Cohabiting and Married Women (DVACME) Gained through Social Media Messages

S/N	Knowledge Indicators	$\bar{X}$	SD	Decision
1	Social media provide informative messages on DVACMW	3.31	0.56	HL
2	Continuous dissemination of stories of abused women on social media might increase DVACMW	2.25	0.90	LL
3	Health issues associated with DVACMW portrayed on social media: Depression	3.65	0.53	VHL
4	Post-traumatic stress disorder	3.30	0.76	HL
5	Anxiety disorder	3.21	0.75	HL
6	Alcohol and drug misuse	2.84	0.91	HL
7	Pregnancy complication/miscarriage	3.28	0.80	HL
8	Unintended pregnancy	2.88	0.95	HL
9	Sexually transmitted diseases	2.93	1.00	HL
10	Suicidal thoughts/ suicide	2.89	1.10	HL

$\bar{X}$ = Mean: SD =Standard deviation; N = 400; HL = High level; LL = Low-level; VHL = Very high level

Table 2 shows the mean and standard deviation of respondents' knowledge level on DVACMW gained through social media messages. The Table shows that one of the 10 knowledge indicators (No. 3) namely, "Health issues associated with DVACMW portrayed on social media: Depression" ($\bar{X}$= 3.65) has the highest knowledge level mean while eight indicators each obtained mean score ($\bar{X}$) ranging from 3.31-2.84 which indicatoe high knowledge levels. Only one indicator obtained low knoeldge level of $\bar{X}$= 2.25.

Table 3: Mean Responses and Standard Deviation Attitude of Respondents towards Social Media Messages on DVACMW

S/N	Attitude Indicators	$\bar{X}$	SD	Decision
1	Witnessing DV during childhood increases the tendency to violate others	2.95	0.823	HAI
2	Witnessing DV during childhood increases the tendency to accept abuse as a norm	2.66	0.83	HAI
3	Social media education on DVACMW could result in attitudinal change	3.13	0.75	HAI
4	Alcohol/drug misuse could trigger DVACMW	3.64	0.55	VHAI
5	Infidelity could trigger DVACMW	3.15	0.81	HAL
6	Social influence could trigger DVACMW	2.82	0.80	HAI
7	Mental disorder could trigger DVACMW	3.29	0.78	HAI
8	Family orientation could trigger DVACMW	2.92	0.77	HAI
9	Anger could trigger DVACMW	3.43	0.73	HAI
10	Bad cooking could trigger DVACMW	2.34	1.00	LAI
11	Jealousy could trigger DVACMW	3.02	0.93	HAI
12	A lack of respect could trigger DVACMW	3.00	0.98	HAI

$\bar{X}$= Mean: SD =Standard deviation; N = 400; HAI = High attitude influence; VHAI = Very high attitude influence; LAI = Low attitude influence.

Table 3 shows mean ($\overline{X}$) responses and standard deviation (SD) pn 12 indicators that could influence respondents' attitude toward social media messages on DVACMW. The Table shows that item No 4 has very high mean score of $\overline{X}$ = 3.64 while No 10 has low score of $\overline{X}$ = 2.34. The remaing 10 items obtained high attitude influence mean scores of $\overline{X}$ =3.43 - $\overline{X}$ = 2.66.

Discussion

The results indicate that all respondents are aware of domestic violence against cohabiting and married women. This awareness was through social media, especially Facebook. Respondents reported seeing stories of domestic violence weekly on social media. These findings align with findings of Arisukwu et al. (2021), who reported that respondents were highly aware of domestic violence, and findings of Abdulgaffar et al. (2017), who indicated frequent exposure to violence on social media. The findings of this study are alsoconsistent with those of Ikushika et al. (2017) which revealed that most domestic violence uploads came from Facebook groups. Similarly, Carlyle et al. (2019) found that Instagram messages increased engagement in intimate partner violence.

The findings on knowledge show high mean scores for knowledge indicators ($\overline{X}$ =3.65 - 2.84. These implies that respondents agree that social media messages about DVACMW are informative and that these messages can help curb the issue. Most respondents also recognised depression, PTSD, anxiety, substance misuse, pregnancy complications, unintended pregnancy, STDs, and suicidal thoughts as health challenges associated with DVACMW. These findings align with Abdulgaffar et al. (2017) study, where respondents attested that social media helps in campaigns against violence against women. Ebrahimi and Mohamadlou (2019) discovered that psychological consequences like depression and anxiety were the most prevalent themes in their study on domestic violence. Similarly, Liu et al. (2021) affirmed that domestic violence victims face increased depression, higher suicide risks, and diminished life satisfaction. Cirici et al. (2022) also reported significant psychological symptoms among IPV victims, including depression and PTSD.

However, most respondents disagreed that continuous dissemination of stories on DVACMW could increase abuse, aligning with Carlyle et al.'s (2019) conclusion that Instagram messages enhanced engagement and provided insights for better IPV prevention efforts. Overall, research question three indicates respondents have substantial knowledge of social media messages on DVACMW.

The findings on attitude indicate that respondents believe witnessing domestic violence during childhood increases the tendency to both accept abuse as normal and to perpetrate violence. This concurs with Rosser-Limiñana et al. (2020), who assert that children exposed to intimate partner violence (IPV) exhibit more externalizing behaviour problems and face psychosocial imbalances due to the need to adapt to and overcome these situations.

Regarding the relevance of social media education on DVACMW (domestic violence against cohabiting and married women), most respondents agree that it can lead to attitudinal change. Abdulgaffar et al. (2017) support this, noting that social media helps in campaigns against violence, while Carlyle et al. (2019) found that Instagram messages increased engagement in IPV prevention efforts.

The study also suggests that respondents strongly agree that triggers of DVACMW include alcohol/drug misuse, infidelity, social influence, mental disorders, family orientation, anger, jealousy, and lack of respect. LoCascio et al. (2021) found psychological disorders to be strong predictors of IPV. Basar et al. (2019) indicate men often see violence as acceptable. Ajayi et al. (2022) reveal that male privilege, religious beliefs, rape myths, and cultural practices contribute to violence against women. Overall, the findings suggest that social media messages on DVACMW significantly shape audiences' attitudes toward domestic violence.

Conclusion

The study demonstrates a comprehensive awareness of domestic violence against cohabiting and married women (DVACMW) among respondents in Southeast Nigeria, primarily driven by social media, with Facebook being the predominant platform. The informative nature of social media messages is acknowledged, and these messages are believed to play a crucial role in curbing domestic violence. Health issues linked to DVACMW, such as depression, PTSD, anxiety, and substance misuse, are widely recognized. The study highlights that childhood exposure to domestic violence increases the likelihood of accepting or perpetrating abuse. Social media education is seen as instrumental in changing attitudes towards DVACMW. Key triggers for DVACMW include substance misuse, infidelity, social influence, mental disorders, and lack of respect, emphasizing the need for continued awareness and intervention efforts.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. The media should enhance and diversify social media campaigns to raise awareness about domestic violence, leveraging platforms like Facebook for maximum reach and impact.
2. The government should implement educational programs in schools and communities to address domestic violence, focusing on healthy relationships, conflict resolution, and recognizing abuse signs.
3. The government should strengthen mental health services for domestic violence victims, ensuring accessible counselling and integrating mental health education into social media campaigns.

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Electronic Records Management Skills Required By Administrative Secretaries of PublicUniversities in Enugu State, Nigeria.

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Abstract
The study evolved electronic records management skills required by administrative secretaries in public universities in Enugu State. Specifically, it determined electronic skills for records: creation; storage; and retrieval required by the administrative secretaries. The study adopted survey research design. Population was made up of 225 administrative secretaries and 23 business education lecturers from the two public universities in the state. Instrument for data collection was a structured questionnaire. Data were analyzed using mean and standard deviation and t-test was used to test at 0.05 level of significance. Major findings are 15 electronic record creation skills,including ability to create printed copies of records and files, ($\overline{X}_{g=}$3.29) among others. 12 electronic records storage skills,these include ability to use of e-mail to store faculty/department records ($\overline{X}_{g}$=3.80) among others. 12electronic record retrieval skills, including ability to use of classification scheme to search for records ($\overline{X}_{g}$=3.75) among others.There is no significant between the mean responses of the administrative secretariat and the Business education lectures on all the electric records management skills.

Keywords: Electronic, Records, Management, Skills, Administrative, Secretaries, Public Universities, Creation, Storage, Retrival.

Introduction

Electronic records are information generated electronically and stored by means of computer technology. Thee records include information or data files, created and stored in electronic form through the use of computers and application software(Makhura 2020).Electronic records are information that are available in electronic formats and such datacan be accessed and utilized electronically. Electronic records unlock the contents previously difficult to access in paper form, enable more effective sharing of information and contribute to knowledge network flow. On daily basis, organizations generate records to support the activities they carry out and these records need to be managed properly. Poor records management practice couldlead to corrupt practices, lack of accountability and poor governance structures. The major aim of any practice adopted for electronic records management in the public universities is to achieve effectiveness in the university administration. Electronic records management practices in public universities according to Bake (2015), are the processes of creation, control, storage, retrieval, and disposal of students and staff records. Public universities are described as parastatals that award professional, non-

professional certificates and involved in providing higher education opportunities. According to Osakwe (2020), records in most public universities are kept manually by the administrative secretaries.

Administrative secretaries in public universities are saddled with the responsibilities of assisting their boss and equally acts for their boss when directed. According to Akinleye (2019) administrative secretaries are executive assistants who has mastery of office skills, demonstrates the ability to assume responsibility without direct supervision, exercise initiatives and judgement and make decision within the scope of assigned authority. Skills are referred to learned response often as a result of adequate training in a specific area, which afford one to perform a task and achieve particular goal (Ibeneme, & Emele, 2021). In other words, skill refers to expertise that has been developed through training and experiences gained overtime together with a high level performance in relation to professional practices (Olatunde, 2022). In public universities, administrative secretaries are in charge of students and staff records, office correspondence, minutes of meetings, and other related affairs in the university.Records kept in public universities include but not limited to student's records, staff records, admission records, academic records, faculty records, department records, medical records, registration of students, certificate, students awarded degrees, online forms, transcripts, checking of results.The administrative secretaries in public universities require competency in using computers and application software in management of students and staff records (Ibeneme & Emele, 2021).

However, in most public universities, especially in Enugu State, Students' scores are not securely stored for easy retrieval and use when the need for them arises.The choice of public universities in Enugu State was based on the evidence of levels of inadequate electronic records management skills by the Administrative Secretaries for effective records management of students and staff records. Some students have had to carry over courses they had passed previously, whose scores were discovered to be missing and the administrative secretaries who are in charge of preparation of transcript, sometimes, find it very difficult to prepare the transcript because of scores that cannot be found in the records (Osakwe, 2020). Popoola and Oluwole (2017) stress concern over the alarming rate of misplacement or loss of vital records, and the slow rate at which needed records are retrieved from their storage files in public universities, because of manual storage of vital information. For instance,many times records relating to students' results are reported missing during final years by administrative secretaries and other officers handling students' results. Some students have

to carry over courses they had passed previously due to manual storage of those results. Similarly, vital official document has severally been declared missing in various offices in public universities due to manual storage of such document. It therefore becomes necessary to determine electronic records management skills required by administrative secretaries for effective and efficient record management in Public Universities in Enugu State, Nigeria.

Purpose of the Study

The main purpose of this study was to evolve electronic records management (ERM) skills required by administrative secretaries in public universities in Enugu State, Nigeria. Specifically, the study determined electronic records:

1. creation skills required by administration secretaries of public universities in Enugu State,
2. storage skills required by administrative secretaries of public universities in Enugu State.
3. retrieval skills required by administrative secretaries of public universities in Enugu state,

Methodology

Design of the Study: Thestudy adopted descriptive survey research design.

Area of the Study: The study was carried out in two public Universities in Enugu State, Nigeria,namely University of Nigeria Nsukka (UNN), and Enugu State University of Technology (ESUT).

Population for the Study: Population for the study was made up of 225 administrative Secretaries and 23Business Education lecturers in the two universities studied. The choice of this population wasinformed by the that the administrative secretaries are in charge of all records keeping in the institutiond, while Business Education lecturers are responsible for inculcating and imparting these identified electronic records management skills into students during training, who may be employed as administrative secretaries after graduation.

Sample for the Study: Ninety-eight (98) administrative secretaries were randomly selected from the two universities, while the entire 23 lecturers of Business Education departments in the two universities (18 from UNN and five from ESUT) were studied due to the manageable size.

Instrument for Data Collection: Questionnaire was used for data collection. It was developed based on literature reviewed and specific purposes of the study. The instrument was divided into section A and B. Section A contained demographic information of the

respondents, while section B sought information on the electronic records management skills required by administrative secretaries of public universities in Enugu State. The instrument was designed on a four-point rating scale, with response options as Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree with corresponding values of 4, 3, 2 and 1 respectively.

Method of Data Collection: One hundred and twenty-one (121) copies of the questionnaire were administered by hand to respondents with the help of two research assistants.All the 121 copies were returned representing 100 percent return rate within two weeks of the administration.

Method of Data Analysis: Weighted mean was used to answer the research questions based on real limit of: Strongly Agree (SA) 3.00 - 4.00, Agree (A) 2.00- 2.99, Disagree (D) 1.00 – 1.99. Strongly Disagree (SD) 0.00-1.99. Standard deviation was used to determine the spread of the respondents around the mean and from the opinion of one another. While t-test was used to test the null hypotheses at 0.05 level of significance.

Findings of the Study

Table 1: Mean Responses and Standard Deviationof Administrative Secretaries and Business Education Lecturers on the Electronic Records Creation Skills Required by Administrative Secretaries of Public Universities Enugu State.

S/N	Electronic Record Creation Skills	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	R
	Ability to:						
1	create printed copies of records and file	3.34	0.85	3.23	0.83	3.29	SA
2	create folder structure on computer systems for electronic record	3.34	0.87	3.30	0.84	3.32	SA
3	create and save documents on labeled storage devices	3.38	0.67	3.38	0.59	3.38	SA
4	allocate standardize file name to create documents	3.06	0.97	3.06	0.78	3.06	SA
5	create databases for students' records / results	3.99	1.10	3.77	1.02	3.88	SA
6	allocate reference numbers to students	3.84	1.00	3.86	1.10	3.85	SA
7	create folders for information about faculties and department	3.87	1.19	3.98	1.21	3.93	SA
8	enter data into database applications for future updates	3.86	1.05	3.87	1.11	3.87	SA
9	identify records and transactions which need to be captured	3.88	0.96	3.76	0.91	3.82	SA
10	create and upload student's results in a database	3.01	1.02	3.03	1.03	3.02	SA
11	create database for examination questions, scores and grades	3.12	0.96	3.04	0.99	3.08	A
12	create word processed documents	3.95	1.03	3.89	0.98	3.92	SA
13	arrange digital records file in a logical order using classification system	3.49	1.19	3.76	1.14	3.63	SA
14	update staff nominal roll/ records of staff for promotion and retirement	3.66	1.16	3.98	1.20	3.82	SA
15	upload students curriculum/ course content in website	3.95	1.08	3.84	1.08	3.90	SA

$\bar{X}_1$ = Mean of Administrative secretaries, $\bar{X}_2$ = Mean of Business Education Lecturers, $\bar{X}_g$=Gand mean; R = Remarks, Number of administrative secretaries = 98; Nunmber of Business Education Lecturers = 23; SA = Strongly agree.

Table 1 shows that all the 15 items were strongly agreed on as the electronic records creation skills required, for their grand means range from $\bar{X}_g$3.92-3.02.The standard deviation which ranged from 0.63 to 1.20 indicated that the opinions of the respondents are not far from each other and from the mean.

Table 2: Mean Responses and Standard Deviation of Administrative Secretaries and Business Education Lecturers on the Electronic Records Storage Skills Required by Administrative Secretaries of Public Universities in Enugu State.

S/N	Electronic Record Storage Skills	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	R
	Ability to:	3.74	1.15	3.85	1.10	3.80	SA
1	use Email to store faculty/ department records						
2	use automatic back up in the server to store Student/staff records	3.87	0.97	3.89	0.97	3.88	SA
3	use external hard disk to store students' academic records	3.48	1.23	3.78	1.05	3.63	SA
4	use storage devices such as flash drives, CD-ROM Zip drives etc., as backups for students/staff records	3.86	1.08	3.66	1.04	3.76	SA
5	print out documents and file in a hard copy	3.95	1.17	3.91	0.98	3.93	SA
6	transfer student's/staff data to back-ups system for offsite storage	3.59	1.22	3.79	1.08	3.69	SA
7	migrate data periodically to a new software version	3.27	1.13	3.78	1.13	3.53	SA
8	store records to folders on the computer system with unique name	3.81	1.04	3.91	1.06	3.86	SA
9	store data on database applications for future updates and use	3.82	1.17	3.62	0.97	3.72	SA
10	create Backup devices labeled with their original names	3.60	1.20	3.65	1.01	3.63	SA
11	duplicate copies of records	3.82	1.16	3.98	1.18	3.90	SA
12	store data regularly	3.55	1.28	3.87	1.16	3.71	SA

$\bar{X}_1$ = Mean of Administrative secretaries, $\bar{X}_2$ = Mean of Business Education Lecturers, $\bar{X}_g$=Gand mean; R = Remarks, Number of administrative secretaries = 98; Nunmber of Business Education Lecturers = 23; SA = Strongly agree.

Table 2, shows that all the 12 electronic records storage skills obtained grand means of above 3.00($\bar{X}_g \geq$ 3.00). This implies that the 12 skills are required by administrative secretaries for storing electronic records. The standard deviation score ranged from 0.97 to 1.22 showed that the opinions of the respondents are not far from each other and from the mean.

Table 3: Mean Responses and t-test Analysis of Administrative Secretaries and Business Education Lecturers on the Electronic Records Retrieval Skills Required by Administrative Secretaries in Public Universities in Enugu State.

S/N	Electronic Record Retrieval Skills	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SDg	R
	Ability to:	3.71	1.01	3.79	1.02	3.75	1.02	SA
1	use classification scheme to search for records							
2	use computer assisted retrieval system to search for documents	3.70	1.09	3.76	1.10	3.73	1.10	SA
3	use catalogues to search for records	3..34	0.78	3..87	0.88	3.61	0.83	SA
4	use tracking card to locate documents	3..94	1.02	3.97	1.09	3.96	1.05	SA
5	consult index for location of record	3.53	1.13	3.70	1.15	3.62	1.14	SA
6	use functionally arranged electronic directory to retrieve records from electronic system	3.55	0..38	3.34	0.97	3.45	0.68	SA
7	use file naming conventions to retrieve records	3..06	1.14	3..01	1.10	3.04	1.12	SA
8	use label removal media to search for document	3.24	1.07	3.65	1.13	3.45	1.10	SA
9	use appropriate software to retrieve damaged files	3.77	0.98	3.78	0.98	3.76	0.98	SA
10	locate documents through the use of retention schedule	3.62	1.04	3.91	1.02	3.77	1.03	SA
11	retrieve information from print file hard copies	3.33	1.01	3.56	1.03	3.45	1.02	SA
12	retrieve documents constantly from storage system	3.81	1.20	3.89	1.18	3.85	1.19	SA

$\bar{X}_1$ = Mean of Administrative secretaries, $\bar{X}_2$ = Mean of Business Education Lecturers, $\bar{X}_g$=Gand mean; R = Remarks, Number of administrative secretaries = 98; Nunmber of Business Education Lecturers = 23; SA = Strongly agree.

Table 3 shows that the 12 electronic records retrieval skills each with grand mean scores ranging from $\bar{X}_g$3.96 to 3.04. This implies that the administrative secretaries in UNN and ESUT require the 12 skills for retrival of electronic records.The standard deviation ranged from 0.68 to 1.19 indicating that the opinions of the respondents do not differ from each other and from the mean.

Discussion of Findings

It was found that administrative secretaries and business education lecturersstronglyagreed that electronic records creation skills required by administrative secretaries in public universities for effective administration in public universities are: ability to create printed copies of records and file, create folder structure on computer systems for electronic record, create and save documents on labeled storage device, among others. These findings are consistent with the findings of Kemoni (2018) who found that for effective administration in any organization that secretaries must be able to create valid and relevant records using electronic record system for efficiency and reliability purposes. The author further declared that the most effective way of creating such electronic record is when it is carried out at the

point of using electronic records procedures. The findings of this study is also consistent with the study of Ezeonwurie and Ugwoke (2021) who found that most agencies and ministries are having difficulties in record creation due to inadequate skills sets required to create a more robust electronic creation system for effective decision making.

It was found that administrative secretaries and business education lecturers strongly agreed that electronic records storage skills required by administrative secretaries of public universities for effective administration in public universities are: ability to use email to store faculty/department records, use automatic backup in the server to store student/staff records, ability to use external hard disk to store students' academic records, ability to use external hard disk to store students' academic records among others are the electronic records storage skills required by administrative secretaries for effective administration in Public Universities. The findings are in line with Wamukoya and Mutula (2021) who stated that storage of records is essential to electronic records management as it ensures that records are intact, secure, and accessible for as long as tertiary institutions need such records. The findings are also in agreement with Ibeneme and Emele (2021) who stated the secretarial functions and its effect depends much on the availability of office technology equipment, as well as the skills and competencies of the secretaries in using them appropriately.

Administrative secretaries and business education lecturers strongly agreed that electronic records retrieval skills required by administrative secretaries of public universities for effective administration of public universities are: ability to classify scheme to search for records, use computer assisted retrieval system to search for documents, use tracking card to locate document, consult index for location of records among others are the electronic retrieval skills required by administrative secretaries of public universities as strongly agreed by administrative secretaries and business education lecturers for effective administration in public universities. These findings are in consensus with Osakwe (2020) who revealed that ability to use cataloging procedures to search for records, and ability to use tracking card to locate document and retrieve information from print files, are sure ways for effective management of records in organizations.

Conclusion

It was found that the administrative secretaries and Business Education lecturers agreed in all the electronic records creation; storage, and retrieval skills required by administrative secretaries of public universities in Enugu State.Findings of previous studies are consistent with the findings of the present study.The 39 identified electronic records management

skillsare required by administrative secretaries in public universities in Enugu State.Acquisition of the skills would no doubt enable administrative secretaries improve their activities in maintenance of proper records keeping in public universities in Enugu State.

Recommendations

Based on the findings the following recommendations were made:

1. Management of public universities in Enugu State should employ trained administrative secretaries based on the findings of the study.
2. Ministry of Education, and National Universities Commission (NUC) should draw up appropriate policies and guidelines on electronic records management procedures.
3. Management of public universities in Enugu State should organize seminars, and workshops regularly for her secretaries based on the sklills identified in this study.
4. Administrative secretaries in public universities in Enugu State who are lacking on these skills should enroll in the evening and weekend ICT training for self-upgrade.

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Utilization of Colour-coded Bins for Management of Solid Waste among Households in Obio Akpor Local Government Area, Rivers State

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Abstract
General objective of the study was to investigate issues relating to utilization of colour-coded bins for management of household solid wasted in Obio Akpor Local Government Area Rivers State. Specifically, the study determined: level of awareness of use of color-coded bins in HSW among households in area of study; level of utilization of colour-coded bins by the households; perceived benefits of use of colour-coded bins among the households; challenges households face in the use of color-coded bins and ways of enhancing the use of colour-coded bins by the households.This study employed survey research design. Population was made up of households in Obio/Akpor LGA. Data was collected with questionnaire. Data were analyzed using mean, frequency, percentages and standard deviation. Results of the study showshow awareness levels for five indicators range from 71.92 to 17.85 percent; two colours of bins that are always used are blue (91.86%) and green for organic waste (80.5%); nine benefits of use of coloured bins ($\overline{X}$=3.02 -2.53); 10 challenges ($\overline{X}$=3.23 -2.53) household face in the use of the bins; and nine ways of enhancing utilization ($\overline{X}$=3.27 -2.79). based on the findings three recommendations were made.

Keywords: Household, Solid,Waste, Management, Coloured-coded,Bins, Utilization, Awareness, Benefits, Challenges.

Introduction

Household solid waste management encompasses a spectrum of activities, including supervision, gathering, conveyance, processing, recycling, and disposal (Omer, 2021). Solid waste management has emerged as a crucial concern on a global scale, especially in urban areas where garbage production has surged due to fast industrialization and population expansion. Sustaining the environment, advancing sustainable development, and preserving public health all depend on efficient waste management techniques. Color-coded bins are one cutting-edge method that has become popular all over the world for garbage segregation. Using specific colors, this technique divides waste into different categories, such as organic, recyclable, and general waste, to make sorting and identification easier. Successful implementation of such systems has led to notable gains in recycling rates and waste management efficiency in countries such as Germany, Sweden, and Japan (Sahoo *et al*.,2022).

If household refuse is not appropriately gathered, sorted, and processed, as is frequently the case in countries with limited technical efficiencies, it can result in not only the hazardous

elements but also all refuse having the potential to become unsafe, leading to long-term and cumulative environmental and human health consequences (Gutberlet and Uddin, 2017). The well-being of households, particularly in economically disadvantaged households, is not only impacted by the accumulation of uncollected refuse (Uddin *et al*., 2016) but can also be jeopardized by waste management installations, which may encompass landfills, dumps, and incineration facilities (Gutberlet, 2011). To effectively tackle the environmental, economic, and social repercussions of mismanaged household solid waste, innovative strategies are imperative. Among these, the deployment of colour-coded bins offers a systematic and practical approach to address this challenge. Color-coded waste bins are containers assigned a particular colour corresponding to a specific type of waste (Deva *et al*., 2019). These colours adhere to a standardization making them readily identifiable universally. When members of a household correctly employ these waste bins, it will significantly facilitate waste handling, categorization, and recycling processes. Colour-coded bins offer a promising avenue for addressing this challenge by categorizing waste into distinct streams - recyclables, organics, hazardous materials, and non-recyclables. This categorization aims to transform the way households interact with their waste, potentially resulting in higher recycling rates, reduced contamination, and increased public engagement in responsible waste disposal within their homes.

In many developing countries, including Nigeria, household solid waste management predominantly relies on open dumping due to its lower cost compared to other disposal methods (Nwosu and Chukwueloka, 2020). However, this non-sanitary and non-engineered approach lacks essential features like liners, gas and leachate collection, leading to multiple environmental pollution issues involving air, water, and soil (Fadhullah *et al*., 2022). The ineffective management of household solid waste has profound effects on public health. These effects encompass physical, biological, non-communicable diseases, psychosocial, and ergonomic health risks. Inefficient waste management provides breeding grounds for disease-carrying biological vectors like flies, rodents, and insects, leading to various diseases such as diarrhoea, dysentery, food poisoning, and respiratory issues (Fadhullah *et al*., 2022). Gases released from landfill waste, including methane and carbon dioxide, can cause inflammation and respiratory problems. Furthermore, there is a potential link between waste dumpsite pollution and certain cancers, birth defects, and cognitive issues (Gutberlet and Uddin, 2017). Colour-coded bins serve as a vivid and unmistakable reminder to households about the significance of waste separation. Their vibrant colours act as constant prompts, encouraging individuals to pause and consider the proper disposal of their waste (Amusan *et al*., 2018). In

practice, these colour-coded bins typically represent several common categories of household waste: Blue bins identified by their blue colour, are intended for recyclables like paper, cardboard, glass, and plastic. Placing recyclable materials in the blue bin promotes responsible recycling practices, reducing the environmental impact and conserving valuable resources (Deva *et al*., 2019).

In Nigeria, the challenges of solid waste management are exacerbated by inadequate infrastructure, lack of public awareness, and insufficient government policies. The country generates an estimated 32 million tons of waste annually, with only about 20% being properly manage. In urban areas like Lagos and Port Harcourt, the situation is particularly dire, with overflowing dumpsites and poor waste collection services leading to environmental pollution and health hazards. The introduction of color-coded bins in Nigerian cities has been proposed as a viable solution to enhance waste segregation at the household level, thereby improving overall waste management practices. In Obio Akpor Local Government Area in Rivers State, the need for effective waste management strategies is urgent. The area has witnessed rapid urbanization, resulting in increased waste generation and inadequate disposal practices. Households often lack the necessary tools and knowledge to segregate waste effectively, leading to a reliance on open dumping and burning, which pose significant health and environmental risks. The implementation of a color-coded bin system could empower residents to take an active role in waste management by providing them with the means to sort their waste correctly. Green bins, marked with the colour green, are designated for organic waste, which includes food scraps, yard trimmings, and other biodegradable materials. Collecting organic waste in these bins supports the creation of compost, contributing to sustainable waste management and soil enrichment.

Yellow bins, featuring a yellow hue, are used for the safe disposal of hazardous materials commonly found in households, such as batteries and chemicals. Properly segregating these hazardous materials in the yellow bin prevents environmental contamination and potential health risks (Sahoo *et al*., 2022). Red bins, distinguished by their red colour, are reserved for non-recyclable and non-compostable household waste that is destined for landfill disposal. Placing such waste in the red bin ensures it undergoes appropriate waste management procedures (Deva *et al*., 2019). These bins, uniquely distinguished by specific colours, provide an intuitive and straightforward means for households to separate their waste

effectively (Liu, 2018). By streamlining the sorting process of household solid waste, these colour-coded bins significantly raise the quality and purity of materials designated for recycling and composting (Leeabai *et al*., 2021). In the realm of visual communication, the impact of colour in elucidating recycling behaviours has been leveraged to decode the symbolism behind colours in recycling practices (Schloss *et al*., 2018).

Objectives of the Study

The general objective of the study was to investigate issues relating to utilization of colour-coded bins for management of household solid waste (HSW) in Obio Akpor Local Government Area (LGA) Rivers State. Specifically, the study determined:

(1) level of awareness of use of color-coded bins for HSW management among households in Obio Akpor LGA.
(2) level of utilization of colour-coded bins among households in Obio Akpor LGA.
(3) perceived benefits of use of colour-coded bins among households in Obio Akpor LGA.
(4) challenges households face in use of color-coded bins in Obio Akpor LGA.
(5) ways of enhancing the use of colour-coded bins by households in Obio Akpor LGA.

Methodology

Design of the Study: This study employed survey research design

Area of the Study: The area of the study was Obio Akpor Local Government Area (LGA) of Rivers State, Nigeria.It is situated approximately 10 kilometers from the state capital, Port Harcourt. The area encompasses several communities that are characterized by a mix of urban and semi-urban settings. It is one one of the major cities in the state. There are many industries in the area.

It is estimated that there are over 200 streets within the LGA. These streets range from major thoroughfares to smaller residential lanes, facilitating access to various neighborhoods and local amenities. The estimated number of households in Obio Akpor is approximately 60,000 to 80,000 reflecting the high population density and urban characteristics of the area (Tabansi*et al*.,2022).

Population for the Study: Population for this study was made up ofall households in the Obio Akpor LGA. The households are made up of different categories of socio-economic groups and classes. The homemakers in the households were the respondents in the study.

Sample for the Study: Forty (40) streets were purposively selected for this study.Seletion was based on the length of the street diversity of households in the street, accessibility of the street and waste management practices in the street. A total of 10 households were purposively selected from each street, to give a total 400 households. Only households that had waste bin were selected. One homemaker was selected from each household, to give a total of 400 homemakers.

Instrument for data Collection:A questionnaire that consists of sections A and B was used for data collection. Section A consist of socio-demographic information, while section B comprised 25 items structured based on the specific objectives with a 4-point scale (strongly agreed (SA), Agree (A) Disagree (D) and Strongly disagree (SD). The instrument was validated by three expers in Home Management.Reliability of the instrument was established through test-retest. Twenty copies of the questionnaire were administered twice to 20 Home Management students who were not part of the population. Within two weeks interval, returned data were analyzed using Pearson's (R) Correlation Coefficient and the result was 0.83 correlation coefficient.

Data collection Techniques: Four hundred copies of the questionnaire were administered with the help of two trained research assistant. At the end of the research exercise which lasted for one month, 381 copies were returned.

Data Analysis Techniques: Data obtained were analysed using frequencies, percentages, and means. Based on the 4-point scale (1, 2, 3 and 4) of the instrument, a cut-off mean of 2.50 was used for decision making.

Results

Socio-demographic Characteristics of the Respondents

Data analysis on the socio-demographic characteristics of the respondents shows that majority of respondents (156(40.9%) are within the age bracket of 41 and 50years, 108(28.3%) of them are 50 years and above, 98(25.7%) of them are within 31 and 40 years while 19((5%) are within 21 and 30 years of age. Majority of the respondents (300(78.5%) are males while 81(21.26%) are females. About 218 (57.22%) of the respondents had household size of 5-9 persons, followed by 83(21.75%) with household size of 10 and 80(21%) with the household size of 1-4 persons. The table also showed that more than half of the respondents (250(65.6%) attained primary level of education,76(19.95%) have secondary education,35(91.9%) have tertiary education while 20(5.2%) had no formal education. Most of the respondents are married [200(52.43%)], 80(21%) are single, 70(18.37%) are divorced while 31(8.14%) got separated from their husbands. About 158 (41.47%) representing

majority of the respondents were civil servants followed by 106(27.82%) respondents who were into business. Most of the respondents (86.9%) have lived in the community for over 10 years.

Table 1: Percentage Responses on Level of Awareness of use of Colored-Coded Bins Among Households in Obi Akpor LGA.

S/N	Awareness Indicators	A	NA
1	Goals of using the bins	274(71.92%)	107(28.08%)
2	What the colours stand for	267(70.08%)	114(29.92%)
3	Who is introducing such innovations	210(55%)	171(45%)
4	How innovations operate	263(69.03)	118(30.97%
5	Responsibilities of the households	68 (17.85%)	313(82.15%)
	Overall Percentage Awareness	57.26%	42.74%

N=381: N= Number of Respondent;sA= percentage respondent that are aware of the use of coloured-coded bins;NA= percentage respondents that are not aware of use of coloured-coded bins.

Table 1 shows that 274(71.92%) of the respondents are aware of the goals of using the bins while 107(28.08%) are not aware. Also 267(70.08%) of the respondents knows what the colour stands for while 114(29.92%) does not know what the colour stands for. Also 210 (55%) of the respondents know who is introducing such innovations while 171(45%) does not know who is introducing such innovations. About 293(69.03%) are aware of how the innovations operate while 118(30.97%) of the respondents are not aware of how it operates. Only 68 (17.85%) of the respondents know the responsibilities of the household members while 313(82.15%) does not know the responsibilities in using the coloured coded bins. The overall percentage awareness of respondents was 57.26%.

Table 2: Percentage Responses of Level/Extent of Utilization of Colour-coded Bin by Households in Obi-Akpor LGA.

S/N	Coloured Bins	AL%	SO%	NE%
	Level/Extent of Utilization Coloured-coded Bin:			
1	Yellow for contagious waste	30(7.87)	317(83.3)	34(8.92)
2	Red for highly contagious waste	31 (8.14)	40(10.50)	310(81.4)
3	Blue for glass	350(91.86)	15(3.94)	15(3.94)
4	Green for organic waste	308(80.8)	40(10.50)	33(8.66)
5	Brown for general waste	40(10.50)	300(78.74)	40(10.50)
	Overall percentage level of utilization	39.83	37.40	22.77

AL= Percentage of respondents that use always; SO = Percentage of respondents that use sometimes; NE = percentage of respondents that never use colour-coded bins.

Table 2 shows that while there is significant usage of certain colour-coded bins particularly blue for glass with 350 (91.86%) respondents and green for organic waste with 308 (80.80%) respondents, there is a notable inconsistency in the use of bins for contagious (Yellow) and highly contagious (Red) waste. This therefore suggests a need for enhanced awareness and

education on the importance and proper use of all color-coded bins to improve waste segregation practices in the community. The percentage level of utilization of coloured-coded bins by household(39.83%) especially those who always use the bin is considered poor.

Table 3: Percentage Responses of the Perceived Benefits of the Use of Colour-coded Bins by Households in Obi Akpor LGA.

S/N	Benefits of Use of Colour-coded Bins	$\bar{X}$	SD	RMK
1	Use of colour-coded bins makes waste segregation easier	2.88	0.94	B
2	Colour-coded bins makes for efficient collection	2.93	0.94	B
3	Colour-coded bins reduces cross-contamination	2.98	1.10	B
4	Colour-coded bins enhances visibility	2.96	1.04	B
5	Colour-coded bins improves healthier environment.	2.84	1.10	B
6	Promotion of sustainability and environmental stewardship	2.82	1.15	B
7	Empowerment of residents through active participation	2.21	0.64	NB
8	Increased recycling rates and reduced landfill waste	2.86	0.96	B
9	Provision of source of livelihood	3.02	1.20	B
10	Positive influence on neighboring households to adopt similar practices	2.53	0.79	B

$\bar{X}$ = Mean ; SD = Standard deviation; RMK = Remark; B = Benefit; NB = Not benefit

Table 3 shows that the benefits of using colour-coded bins in household solid waste management among households in Obio/Akpor local government area of Rivers State with a grand mean and standard deviation values of 2.80 and 0.81, reveal that all the benefits identified (makes waste segregation easier, efficient collection, reduced cross-contamination, enhanced visibility and healthier environment and provision of source of livelihood) were the benefits except empowerment of residents through active participation which was not an accepted benefit of the use of colour-coded bins in household solid waste in this local government area.

Table 4: Percentage Responses on the Challenges Households faced in use of Coloured-coded Bins in Obi Akpor LGA.

S/N	Challenges of Use of Coloured-Coded Bins	$\bar{X}$	SD	RMK
1	Household Solid Waste (HSW) among respondents are littered around their environment.	2.88	0.94	C
2	HSW are not sorted and packaged properly according to their types	2.96	1.04	C
3	Issue of the use of coloured-coded bins is not taken seriously by household members.	2.98	1.00	C
4	Visitors to the household members have a very wrong perception of the use of colour-coded bins.	2.93	0.90	C
5	Management of environmental health facilities does not have the right policy on HSW management.	2.84	1.00	C
6	Stigmatization of individuals who practice waste segregation	2.61	0.99	C
7	Insufficient availability of bins in neighborhoods	3.03	1.20	C
8	Fear of contamination and unpleasant odors	3.23	1.25	C
9	Vandalism or theft of bins	2.80	0.96	C
10	Inconsistent collection services from waste management authorities	2.58	0.98	C

$\bar{X}$ = Mean ; SD = Standard deviation; RMK = Remark; C = Challenge.

Table 4 shows that all the 10 challeges obtained mean scores of 2.50 and above ($\bar{X} \geq 2.50$). This implies that each item is a challenge faced by households in the use of colour-coded waste bins in Obio Akpor LGA.

Table 5: Percentage Responses of the ways of enhancing the use of Coloured -Coded bins by Households in Obi Akpor LGA.

S/N	Ways Of Enhancing The Use Of Coloured-Coded Bins	$\bar{X}$	SD	RMK
1	Coloured-coded bins should be classified correctly	3.23	1.03	WOE
2	Handlers of household waste should be properly educated.	2.92	1.10	WOE
3	HSW generated should be handled by knowledgeable individuals	3.17	1.01	WOE
4	HSW generated should include right documentation and disposal colour-code	3.11	1.07	WOE
5	HSW should be kept in the right containers and bags.	3.24	0.98	WOE
6	Place clear, easy-to-understand signage on the bins to avoid confusion	2.92	1.11	WOE
7	Introduce reward systems or recognition program for households that consistently use the bins	2.04	1.01	NWAE
8	Implement a system to monitor the effectiveness of the color-coded bin program	2.79	0.97	WOE
9	Collaborate with NGOs, schools, and community groups to promote the initiative and reach a wider audience.	3.15	1.15	WOE
10	Coordinate with waste management services to establish and communicate regular collection schedules	3.27	1.08	WOE

$\bar{X}$= Mean ; SD = Standard deviation; WOE= Way of enhancing; NWOE= Not a way of enhancing; RMK=Remark

Table 5 reveals that nine items obtained means of 2.50 and above ($\bar{X} \geq 2.50$). This implies that these are nine ways of enhancing the use of colour-coded bins by households in Obi Akpor LGA.

Discussion

The study showed that the respondents having the awareness of the use of colour-coded bins with respect to awareness indicators (knowing goals of using the bins, what the colour stands for, who is introducing such innovations and how the innovations operate) in the area are low to moderate. According to Udom (2024) level of education plays a crucial role in shaping individuals' participation in waste management such that higher education levels correlate with increased awareness, positive attitudes, and proactive behaviors regarding waste management practices since majority of the respondents were learned. The result also conforms to Adzawla *et al*., (2019) who asserted the importance of the decision on solid waste collection due to the influence of education. In industrialized areas, the amount of waste generated is high, but the awareness about waste management is lacking (Ferronato and Torretta 2019). The finding corresponded with the results of Njiru (2015) who opined that

majority of respondents who were aware of use of coloured coded bins were learned nurses, teachers, doctors, engineers etc.

The low level of utilization of the coloured coded bins especially yellow and red which are sometimes and at times never used compared to the blue and brown which are the highest used by household is in consonance with the finding of Njiru (2015) who opined that choice of bins could be influenced by sex, level of exposure through education and among others. According to Kalaivani (2017) many residents lack awareness and understanding of the specific purposes of these bins, leading to confusion about what waste should be disposed of in them, which ultimately results in improper waste segregation practices. Kalaivani (2017) also opined that insufficient availability of bins in neighborhoods, coupled with inconsistent waste collection services, further discourages their use, as residents may find it more convenient to dispose of waste in general bins rather than seeking out the designated colour-coded

The identified perceived benefits (makes waste segregation easier, efficient collection, reduced cross-contamination, enhanced visibility and healthier environment and among others) in this study agreed with the findings of Ayodeji (2012) who noted that colour-coded bins facilitate better segregation of waste at the source and that the practice helps households to separate recyclable materials from general waste, ultimately reducing the volume of waste sent to landfills. According to Banga (2013), the use of colour-coded bins encourages households to participate in recycling programs. By clearly marking bins for different types of waste (e.g., recyclables, organic waste), residents are more likely to engage in recycling efforts, leading to increased recovery of valuable materials. Adeyemo and Gboyesola (2013) highlighted that adopting colour-coded bins raises awareness about environmental issues among households. The visual cues provided by the bins serve as constant reminders for residents to think about their waste management practices and their impact on the environment.According to Adeyemo and Gboyesola (2013), the systematic organization of waste through colour-coded bins can lead to more efficient waste collection and processing. Waste management authorities can better plan collection routes and schedules when waste is sorted effectively at the source.

The identified challenges households faced in the use of coloured-coded bins by households in Obi Akpor Local Government Area in this study are also in agreement with the finding of Ayuba (2013), Geng (2017) and Adeyemo and Gboyesola (2013) but also opined that lack of

awareness and community participation could be the other challenges affecting households. The results of this work collaborated with the findings of both Ali *et al*. (2017) and Al Emadi (2011) contribute valuable insights into enhancing the use of color-coded bins in waste management and recommendations focus on public education, community engagement, policy support, and infrastructure improvements, all aimed at promoting effective waste segregation practices in the area. According to Snehal *et al*.(2022) Often, due to poor separation practices, some solid waste especially hospital waste is mixed with general waste, resulting in harmful overall waste flow and that waste disposal handlers are not safe due to their exposure to various health risks and inadequate training in waste management. In a study, Singh and Gupta (2019) identified key challenges related to vandalism and theft of public waste bins, including increased maintenance costs and reduced availability of bins, which lead to improper waste disposal and littering in urban environments. These issues not only compromise the efficiency of waste management systems but also negatively impact public perception and community engagement in maintaining cleanliness.

Conclusion

The study on the utilization of colour-coded bins for the management of solid waste among households in Obio Akpor LGA, reveals several critical insights. While the implementation of colour-coded bins has the potential of significantly enhancing waste segregation and promote responsible waste management practices, the actual utilization remains suboptimal. Certain factors such as lack of awareness, inconsistent availability of bins, and cultural attitudes towards waste disposal contribute to this challenge. Despite that these barriers remain issues of concern, there is a notable interest among residents in adopting better waste management practices when provided with adequate information and resources.

Recommendations

1. Local authorities should ensure that colour-coded bins are consistently available and well-maintained throughout the community.
2. Introducing incentive programs for households that demonstrate effective waste segregation could encourage more residents to participate actively in the initiative.
3. Providing targeted training sessions for households on how to effectively use colour-coded bins can improve utilization rates.

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Strategies for Enhancing Entrepreneurial Skills Acquisition among Industrial Technical Education Students in Public Universities in Enugu State, Nigeria.

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Abstract
This study evolved strategies for enhancing entrepreneurial skills acquisition among industrial technical education (ITE) students in public universities of Enugu State. Specifically it determined enhancement strategies related to teachers; students; school; facility; and industry. Descriptive survey research design was used. Population was made up of 138 respondents comprising 35 ITE lecturers, 33 instructors and 70 students. Questionnaire was used for data collection. Data were analyzed using mean andstandard deviation. Finding include 10 teacher-related strategies such as enhancement of teachers' qualification and skill ($\overline{X}$ = 2.77) and others. Other findings are eight student-related strategies,including students' guidance ($\overline{X}$ = 2.91) and others; nine school-related strategies, such as curriculum review ($\overline{X}$ = 2.84)among others; seven facility-related strategies, such as, organization of workshop ($\overline{X}$ = 2.91) and others. 11 industrial-related strategies, such as, avoidance of cultural factors among workers ($\overline{X}$ = 2.82).Based on the findings the study made four recommendations for enhancement of entrepreneurial skills acquisition among industrial technical education students in public universities in Enugu state.

Keywords: Strategies, Entrepreneurial, Skill, Acquisition, Industrial, Technical, Education, Students.

Introduction

Industrial technical education (ITE) is designed to increase the opportunities for productive youth empowerment and socio-economic development in a working environment (UNESCO, 2015). ITE programmes in universities offer training in building/woodwork technology, electrical/electronic technology and metal work/ auto mechanic technology. Objectives of ITE program in universities include training of teachers who can occupy teaching and leadership positions in secondary schools, technical colleges, colleges of education, universities and training program in industrial establishments, training of entrepreneurs in the mechanical trades and graduates who can be self-employed in their various trades (Federal Republic of Nigeria, 2013). Industrial technical education being an aspect of Technical vocational education and training (TVET) plays important roles in the development of their students and the future of any society (European Commission, 2011). The program is in the fulfillment of the need for professionally qualified technical teachers who can impart

technical knowledge and vocational skills to their students and thereby contribute to the economic development of Nigeria (Obe et al, 2021). ITE also offers entrepreneur skills which in turn provide for human and societal needs (Ruqayyah, 2013, Jimoh et al (2020). Supporting this, Chimere et al (2019) also indicated that the absence of technological knowledge and skills could lead to the inability of human to function well in the society.

Skill is the ability to perform a given task usually gained through training or experience. Skill acquisition can be seen as a process of learning how to do things. It involves the development of new skills and practicing technique of doing things through training and experience for self-reliance and sustenance (Florence & Ekpungu, 2015). It thus involves the act of getting new knowledge or ability required for executing task (Ogundele, 2013). The acquisition of skill is central to production of skilful work force for employment in any fields of human endeavors (Magnus 2015). Rowell (2020) defined entrepreneur skill acquisition as a systematic training given to individuals to equip them with life skills that will enable them make a meaningful impact in their life and contribute positively to the society. Macpherson (2019) noted that entrepreneur skill acquisition through ITE program is a specialized and all-round training program designed by education authorities to change the students on graduation from job-seekers to wealth creators. These include the management, technical, communication, marketing and ICT skills (Rowell, 2020). Technical skills involves the ability to understand the specific activities in planning, troubleshooting, servicing of equipment, detecting faults, soldering making and interpreting drawings and symbols. Management skill includes the ability to coordinate all resources of an organization through planning, organizing, directing, and controlling to achieve organizational objectives. Marketing skills involve identifying relevant markets accurately, establishing linkages with other businesses, capturing and retaining customer attention, identifying and using market opportunities and understanding business law. Communication skills involve the ability to shear ideas both verbally and writing to share ideas with customers and partners. ICT skills involve the ability to operate digitally. These skills are offered in ITE programs in public and private universities in Nigeria. Public university is the university that is owned and managed by the state or federal Government while the private universities are are owned by private bodies or individuals. The extents to which the ITE students are requiring entrepreneur skill remain questionable. It is therefore necessary to involve ways or strategies for enhancing the acquisition of skill by the students.

These strategies are described as the careful plans or methods that should be followed to achieve a reliable entrepreneurship. These strategies could be related to teachers, students,

school, facility and industrial strategies, that is what each group should do. The teacher related strategies involve the services that should be provided by or to the teachers such as innovation in teaching strategies. Students related strategies involve the services that should be given to or performed by students such as access to training equipment. The school related strategies include the services that should be provided by or to the school such as strategic planning. The facility related strategies involve the activities that should be done to provide and manage facility such as organization of workshop. The industrial related strategies include the services that should be provided by or to the industries such as partnership with the schools.

Olakunri (2006), Ngor &Tambari (2017) Shiria (2020) and (UNESCO, 2015) noted that insufficient entrepreneur skill acquisition is been attributed to lack of up-to-date facilities and workforce skills. Thus entrepreneur skill acquisition in ITE programs can be through the related strategies. Adding to these strategies, (Manabete & Bobbi (2014) UNESCO-UNEVOC (2019) and Oluwafei & Jinadu, Enhancement of entrepreneur skill acquisition in ITE is therefore necessary and could be achieved through various strategies as mentioned above to ensure that the skills acquired by ITE students are relevant in this fast growing world of work. This study was done in public universities in Enugu state which comprises of university of Nigeria Nsukka (UNN) and Enugu state university of science and technology (ESUT).

Purpose of the study

The general purpose of the study was to evolve strategies for enhancing entrepreneur skill acquisition among industrial technical education (ITE) students in public universities in Enugu state. Specifically, the study determined those enhancement strategies that are related to:

(1) teachers

(2) students

(3) school

(4) facility and

(5) industries.

Methodology

Design of the study: The study made use of descriptive survey research design.

Area of the study: The study was carried out in the public universities in Enugu State, Nigeria. There are two public universities in Enugu state which comprises of university of Nigeria Nsukka (UNN) and Enugu state university of science and technology (ESUT).

Population for the study: The population made up of 138 individuals including 17 male and seven female ITE lecturers with 40 students from UNN (ITE Departmental office of UNN 8/8/ 2022), and eight male and three female ITE lecturers with 30 students from ESUT (ITE Departmental office ESUT 11/8/ 2022. The instructors comprises of 14 male and six female from UNN and eight male and five female from ESUT. All the lecturers possessed MSc and Ph.D and the instructors had at least first degree certificates and/or Higher National Diploma, in related ITE fields. There was no sampling since the population is of manageable size.

Instrument for data collection: A 45-items questionnaire that has 4 points rating of strongly agree (4), agree (3), disagree (2) and strongly disagree (1) was used for data collection. It was developed through literature reviewed and based on the objectives of the study. The instrument was validated by three experts from ITE UNN. Cronbach Alpha method was used to test the reliability and an overall reliability coefficient of 0.85 was obtained.

Data collection methods: 138 copies of the instrument were distributed by the researchers and one research assistant and 130 copies were retrieved back giving a 94percentage rate.

Data analysis techniques: Data generated were analyzed using mean and standard deviation. Any mean value that is greater than or equal to 2.50 was accepted while mean values less than 2.50 were rejected.

Findings

Table 1: Mean Responses and Standard Deviation on the Teachers Related Strategies for Enhancing Entrepreneur Skill Acquisition in ITE

S/N	Teacher-related Strategies	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_3$	SD_3	$\bar{X}_g$	R
1	Enhancement of qualifications and skills	2.82	1.15	2.92	1.12	2.58	0.97	2.77	A
2	Conferences and workshop attendance	2.88	1.92	3.00	1.14	2.91	0.98	2.93	A
3	Innovations in the teaching strategies	2.99	1.00	3.05	0.95	2.90	0.97	2.98	A
4	Utilization of Improved echniques of instructional delivery activities	2.89	1.05	2.73	1.08	3.13	0.99	2.92	A
5	Improvement of communication skills	3.08	0.98	2.89	0.99	2.99	1.02	2.99	A
6	Enhanced instructional planning skills	3.03	0.95	3.08	0.99	2.89	0.94	3.00	A
7	Acquisition time management of skills	3.02	0.97	2.96	1.04	2.86	0.95	2.95	A
8	Improved job security for teachers	2.90	0.94	2.98	0.99	2.78	1.08	2.89	A
9	Improved job satisfaction for teachers	2.78	1.08	3.13	1.02	3.03	0.97	2.98	A
10	Increased salary for teacher	3.11	0.96	3.00	0.94	2.99	1.09	3.03	A

$\bar{X}_1$ =lecturers mean score, $\bar{X}_2$=Instructors mean score, $\bar{X}_3$ =Students mean score, $\bar{X}_g$ = Grand meanSD₁=standard deviation of lecturers,SD₂= Standard deviation of Instructors, SD₃= Standard deviation of students, A= Agree, R = Remarks.

Table 1 shows that all the 10 items suggested as the teacher-related strategies for enhancement of entrepreneur skill acquisition of ITE students in universities have their grand mean ($\bar{X}_g$) values all above 2.50. This shows that the ITE lecturers, instructors and students accepted the suggested items as the teacher related strategies that should be adopt for enhancement of entrepreneur skill acquisition in ITE programs of universities. More so, the standard deviation of the 10 items ranges from 0.94 to 1.92 showing that the respondents were not far from each other in their responses.

Table 2: Mean and Standard Deviation on the Students Related Strategies for Enhancement of Entrepreneur Skill Acquisition in ITE

S/N	Students-related Strategies	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_3$	SD_3	$\bar{X}_g$	R
1	Student guidance	2.80	1.10	2.98	1.12	2.96	1.09	2.91	A
2	Students access to training equipment	2.88	1.02	3.00	1.14	2.98	1.13	2.95	A
3	Funding students	2.99	1.90	2.98	0.95	3.13	0.91	3.03	A
4	Security of student	2.89	1.05	3.08	1.08	2.91	1.05	2.96	A
5	Students' avoidance of group influence	3.08	1.00	3.03	0.99	3.02	1.00	3.04	A
6	Students' management of time	3.03	0.95	3.11	0.99	3.10	0.98	3.08	A
7	Students' embracing innovations in their study	3.00	1.08	3.08	1.04	3.07	0.95	3.02	A
8	Qualitative training for students	2.90	1.00	3.03	0.99	2.98	0.97	2.97	A

$\bar{X}_1$ =lecturers mean score, $\bar{X}_2$=Instructors mean score, $\bar{X}_3$ =Students mean score, $\bar{X}_g$ = Grand meanSD₁=standard deviation of lecturers,SD₂= Standard deviation of Instructors, SD₃= Standard deviation of students, A= Agree, R = Remarks.

Table 2indicate that all the eight items are student-related strategies for enhancement of entrepreneur skill acquisition of ITE students in universities have their grand mean ($\bar{X}_g$) values all above 2.50. This shows that the ITE lecturers, instructors and students accepted the suggested items as the student related strategies for enhancement of entrepreneur skill acquisition in universities. More so, the standard deviation of the eight items ranges from 0.95 to 1.91 which shows that the respondents were not far from each other in their responses.

Table 3: Mean and Standard Deviation on the School Related Strategies for Enhancing Entrepreneur Skill Acquisition in ITE.

S/N	School-related Strategies	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_3$	SD_3	$\bar{X}_g$	R
1	Review of curriculum	2.80	1.10	2.88	1.12	2.86	1.00	2.84	A
2	Enhance planning of relevant school activities	2.88	1.04	3.05	1.14	3.08	1.05	3.00	A
3	Disciplinary actions for students	2.99	0.98	2.69	0.95	3.11	1.10	2.93	A
4	Embrace innovations	2.89	1.05	3.08	1.08	2.75	1.00	2.90	A
5	Practice institution and industrial partnership	3.08	1.10	3.03	0.99	3.15	1.10	3.08	A
6	Manage available resource effectively-for instance, money and time	3.03	1.02	3.02	0.99	2.92	1.04	2.99	A
7	Security of life and facilities in school	3.07	1.90	3.08	1.04	3.00	0.98	3.05	A
8	Encourage team working spirit.	2.90	0.95	3.03	0.99	3.05	1.01	2.99	A
9	Promote creativity in instructional delivery	2.78	1.08	3.15	1.02	2.73	1.09	2.88	A

$\bar{X}_1$ =lecturers mean score, $\bar{X}_2$ =Instructors mean score, $\bar{X}_3$ =Students mean score, $\bar{X}_g$ = Grandmean; SD₁ = standard deviation of lecturers;SD₂= Standard deviation of Instructors, SD₃= Standard deviation of students, A= Agree, R = Remarks.

Table 3 indicates that all the nine items are school-related strategies for enhancement of entrepreneur skill acquisition of ITE students in universities have their grand mean ($\bar{X}_g$) values all above 2.50. This shows that the ITE lecturers, instructors and students accepted the suggested items as the school related strategies for enhancement of ITE student entrepreneur skill acquisition in universities. More so, the standard deviation of the nine items ranges from 0.95 to 1.10 which shows that the respondents were not far from each other in their responses.

Table 4: Mean and Standard Deviation of the Facility Related Strategies for Enhancing Entrepreneur Skill Acquisition.

S/N	Facility related strategies	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_3$	SD_3	$\bar{X}_g$	R
1	Organization of workshop	2.80	0.95	2.88	1.12	3.05	1.01	2.91	A
2	Power supply	2.88	1.08	3.05	1.14	2.73	1.09	2.97	A
3	Innovative facilities supply	2.99	0.99	3.10	0.95	2.99	1.18	3.02	A
4	Security of the facilities	2.89	1.00	2.69	1.08	3.06	1.00	2.88	A
5	Maintenance of workshop	3.08	1.22	3.03	0.99	2.88	1.07	2.99	A
6	Management workers	3.03	0.98	2.99	0.99	3.05	1.05	3.02	A
7	Safety practices	3.02	1.06	2.87	1.04	2.69	1.00	2.86	A

$\bar{X}_1$ =lecturers mean score, $\bar{X}_2$ =Instructors mean score, $\bar{X}_3$ =Students mean score, $\bar{X}_g$ = Grand mean;SD_1=standarddeviation of lecturers; SD_2= Standarddeviation of Instructors, SD_3= Standard deviation of students, A= Agree, R = Remarks.

Table 4 shows that all the sevenitems suggested as the facility-related strategies for enhancement of entrepreneur skill acquisition of ITE students in universities have their grand mean ($\bar{X}_g$) values all above 2.50. This shows that the ITE lecturers, instructors and students accepted the suggested items as the facility related strategies for enhancement of ITE student entrepreneur skill acquisition in universities. More so, the standard deviation of the seven items ranges from 0.95 to 1.14 which shows that the respondents were not far from each other in their responses.

Table 5a Mean and Standard Deviation of the Industrial Related Strategies for Enhancement of Entrepreneur Skill Acquisition

S/N	Industry related strategies	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_3$	SD_3	$\bar{X}_g$	R
1	Avoidance of cultural factors among workers	2.80	0.99	2.69	1.12	2.98	1.00	2.82	A
2	Enhanced school-industrial relationship	2.88	1.00	3.03	1.14	3.06	0.99	2.99	A
3	Consider industrial training	2.99	1.09	2.99	0.95	2.78	1.00	2.92	A
4	Organization and management of students as responsibility for industrial workers.	2.89	0.99	2.89	1.08	3.10	1.09	2.96	A
5	Focus on productivity	3.08	0.98	2.87	0.99	2.69	1.12	2.88	A
6	Good relationship among workers	3.03	1.00	3.11	0.99	3.03	1.09	3.05	A
7	Environmental security.	3.02	1.02	3.06	1.04	2.99	0.99	3.02	A
8	Innovation and creativity in industry.	2.90	1.03	2.78	0.99	2.87	0.98	2.85	A
9	Team working spirit in the industry	2.78	0.99	3.10	1.02	2.89	1.00	3.01	A
10	Ensuring job satisfaction for stasff.	3.11	1.00	3.06	0.94	2.87	1.02	3.01	A
11	Determination to achieve stated objectives	2.78	1.09	2.77	1.01	3.11	1.03	2.88	A

$\bar{X}_1$ = lecturers mean score, $\bar{X}_2$ = Instructors mean score, $\bar{X}_3$ =Students mean score, $\bar{X}_g$ = Grand mean;SD_1=standarddeviation of lecturers; SD_2= Standarddeviation of Instructors, SD_3= Standard deviation of students, A= Agree, R = Remarks.

Table 55 indicates that all the 11 items suggested as the industrial-related strategies for enhancement of entrepreneur skill acquisition of ITE students in universities have their grand mean ($\bar{X}_g$) values all above 2.50. This shows that the ITE lecturers, instructors and students accepted the suggested items as the industry related factors for the enhancement of ITE student entrepreneur skill acquisition in universities. The standard deviation of the 11 items ranges from 0.95 to 1.14 showing that the respondents were not far from each other in their responses.

Discussions

The finding of the study in Table 1 reveals that the 10 teacher-related strategies for the enhancement of entrepreneur skill acquisition of ITE students in universities. The non hypotheses 1 in table 1b was uphold showing that there is no difference in the responses of the respondents on the teacher related factors for enhancement of entrepreneur skill acquisition of ITE students in universities. This finding implies that the teacher related factors are necessary to be considered for enhancement of ITE student entrepreneur skill acquisition in public universities in Enugu state. This is in line with objectives of ITE program in universities as stated by UNESCO (2015)includes training of teachers who can occupy teaching and leadership positions in secondary schools, technical colleges, colleges of education, universities and training program in industrial establishments, training of

entrepreneurs in the mechanical trades and graduates who can be self-employed in their various trades. Jinadu (2016) also recommended that the ITE teachers should adapt to changes by making themselves available for re- training on the innovation skills and equipment, there is therefore need to look into teacher related factors for enhancement entrepreneur skill acquisition of ITE students in universities.

The finding of the study in Table 2 reveals that the eight student-related factors for enhancement of entrepreneur skill acquisition of ITE students in universities. This finding is in line with the study of Ngor &Tambari (2017) who maintained that intensifying ITE entrepreneur skill acquisition creates more jobs, eradicate poverty and sustain employment of workers. Manabete & Bobboi, (2018) also narrated some of the challenges for enhancement of entrepreneur skill acquisition to include poor accessibility to equipment, lack of intensive and qualitative training of students among others. The study of Macpherson (2019) also maintained that entrepreneur skill acquisition is designed by education authorities to change the students on graduation from jobseekers to wealth creators. Supporting this, Obe, Mmadu & Ona (2021) noted that entrepreneur skill acquisition brings about functional education which leads to self-employment, student creativity, youth development, innovation and others. There is need therefore to look into student factors as a way of enhancing entrepreneur skill acquisition for proper development of ITE students.

The finding of the study in Table 3 reveals that the nineschool-related factors for the enhancement of entrepreneur skill acquisition of ITE students in universities were all accepted. This finding is in line with the study of Ngor &Tambari (2017) who observed that curriculum reviews and introduction of new technologies in ITE instructional delivery, evolvement of new skills among others will help in enhancement of entrepreneur skill acquisition. Ezeani, (2014) in his study indicated that entrepreneur skill acquisition is integrated into the curriculum of industrial technical education in universities of Nigeria to solve the unemployment and poverty problems of students after graduation. It is therefore necessary that these factors should be used for enhancement of entrepreneur skill acquisition for ITE students in public universities.

The finding of the study in Table 4 reveals that the sevenfacility-related factors for enhancement of entrepreneur skill acquisition of ITE students in universities were all accepted by the respondents. This finding implies that the facility related factors should be considered for enhancement of ITE student's entrepreneur skill acquisition in public universities in Enugu state. This finding is in line with the study of Shiria (2020) who stated

that lack of proper skill acquisition of ITE students is been attributed to lack of up-to-date facility. The study of Manabete & Bobboi, (2018) also enumerated some of the hindrances of enhancement of entrepreneur skill acquisition to include lack of functional facilities and others. It is therefore necessary to look into facility related factors for enhancement of entrepreneur skill acquisition of ITE students in universities.

The finding of the study in Table 5 reveals that the 11 industrial related-factors for enhancement of entrepreneur skill acquisition of ITE students in universities were all accepted by the respondents. The implication of this finding is that industrial related factor is one of the factors that facilitate enhancement of entrepreneur skill acquisition of ITE students which needed to be looked into. This finding is in line with the study of Olakunri, (2006) that put forward that development of industry is a continuous and progressive increase and expansion of the volume of goods and services provided in a given economy with improvement in the social, political and economic life of present as well as future generation. Olakunri adding to that stated that ITE is a sure way for achieving the national development through inculcating in their students, teachers, school and their related industries the innovation and stamina needed in making the economy more productive and competitive. Ezenwafor (2015) in his study suggested some of the strategies that may help enhancement of entrepreneur skill acquisition in ITE to include institution-industry partnership, inculcation of new net work equipment, retraining of lecturers and provision of adequate funding among others. There is need therefore to bring into consideration the industrial related factors for enhancement of entrepreneur skill acquisition of ITE students in universities.

Conclusion

The aim of enhancement of entrepreneur skill acquisition into the curriculum of ITE in universities was to solve the unemployment problems of ITE student after graduation. This purpose has not been achieved due to the technological advancement which has brought about drastic changes in ITE workplace and business environment in Nigeria. In view of this; the study considered the necessary related strategies thus teacher, student, school, facility and industrial that should be looked into for enhancement of entrepreneur skill acquisition of ITE students in universities. There is need therefore to embrace the suggested strategies for enhancement of entrepreneur skill acquisition of ITE students in universities as a way out.

Recommendations

Based on the findings, the following recommendations were made:

1. Stake-holders (Teachers, student) should provide the innovative equipment and facilities for easy acquisition of entrepreneur skills in industrial technical education in Nigerian.
2. School should reform their curriculum to include new technologies.
3. Industries should maintain institution-industry partnership as it concerns entrepreneur skill acquisition of ITE students in universities.
4. Teachers should maintain regular workshops and conferences for upgrading of skills to new technologies.

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Perceptions of Issues Relating to Early Marriage among Pastoral Women in Saki East Local Government Area, Oyo State, Nigeria

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Abstract
The main objective of the study was to examine perceptions of issues relating to early marriage among pastoral women in Saki East Local Government Area (LGA) of Oyo State. Specifically, the study determined socioeconomic characteristics of the women, perception on women's early marriage, and effects of early marriage among pastoralist women. Population was made up of pastoralists women in the LGA.Interview schedule was used for data collection. Frequency, percentage, mean score and standard deviation were used to analyze data collected. Findings show that 48.3% of respondents are between 21 and 30 years, while 28.3% are below 20, reflecting the prevalence of early marriage. Educational attainment is low, with 51.7% having no formal education. Large household sizes (45.0% with 1–5 members) and reliance on subsistence farming limit economic stability. Early marriage is driven by the perception to raise many children ($\bar{X}$= 3.30). Perceivedeffects of early marriage are linked to health risks, including increased exposure to HIV/AIDS ($\bar{X}$= 3.14), Vesicovaginal Fistula ($\bar{X}$= 3.43) and deprivation of child education and wellbeing ($\bar{X}$= 3.01). Recommendations include improving access to education, healthcare, and economic opportunities for pastoralist women to reduce early marriage and its negative effects.

Keywords: Pastoralist, Women, Early, Marriage, Cultural, Rite, Poverty, Violence, Promiscuity,

Introduction

Marriage is legally defined as a union of two partners in a personal relationship. Early marriage, also known as child marriage, is when one or both spouses are under 18 years old (United Nations Children's Fund [UNICEF], 2023). This practice is considered a serious human rights violation that affects millions of children worldwide, particularly girls known as girl-child marriage (UNICEF, 2021). Globally, an estimated 650 million girls and women alive today married before their 18th birthday (Efevbera & Bhabha, 2020). South Asia and sub-Saharan Africa regions accounted for 20 countries with the highest prevalence of girl child marriage. The highest rate of child marriage is in sub-Saharan Africa, with 37% of young women marrying before the age of eighteen (World Vision International, 2020). An estimated 44% of girls in Nigeria are married before their eighteenth birthday, suggesting one of the highest rates of girl-child marriage globally (Save the Children International, 2021; Efevbera & Bhabha, 2020).

Global records of consequences of early marriage are far-reaching and devastating. Early marriage particularly the girl-child marriage has been linked to negative outcomes like reduced formal education, health risks, and perpetuation of gender inequality (Isiugo-Abanihe et al., 2022). Girl-child marriage leads to the exclusion of girls from their families, friends, communities, and significant others, with severe consequences for their physical and psychological well-being (Adeyemi et al., 2023). The socio-cultural dynamics perpetuating early marriage are complex. Early marriage has also been linked to higher incidences of maternal mortality and infant death, as young brides are often unprepared for the health challenges of early pregnancies (Adekoya, A., & Sokunbi, 2021). Early marriage limits women's access to education, perpetuates poverty, and hinders their participation in economic activities, contributing to a cycle of dependency and vulnerability. Studies show that early marriage increases exposure to health risks, domestic violence, and lower socio-economic status (Suleiman & Musa, 2023; Olatunji & Adebisi, 2022). According to Adekanbi & Bello (2020), early marriage significantly curtails educational opportunities and reduces women's participation in income-generating activities. This finding is corroborated by Olatunji & Adebisi (2022), who emphasize that early marriage among pastoralists often leads to economic dependency, reinforcing cycles of poverty. Further research by Fatima & Usman (2021) points out that such marriages often increase young girls' vulnerability to domestic violence and long-term health complications, undermining their socio-economic potential.

Legal changes in Nigeria, such as the endorsement of Section 29(4)(b) of the 1999 Constitution, have drawn attention to child marriage. Under the Child Rights Act 2003, the minimum legal age of marriage is 18 years. However, Multi Indicator Cluster Survey conducted by UNICEF (2018) showed that Nigeria is home to over 23 million child brides indicating 2 in 5 young women were married in before the age of 18. The North West and North Eastern part of Nigeria have the highest prevalence of child brides at 68% and 57% respectively. Early marriage, particularly among pastoralist women that originate from the Northern part of Nigeria, remains a significant socio-economic challenge in Southern parts of Nigeria where many settled for pastoral purposes.

In pastoralist communities, livestock herding is their main means of livelihoods for men while women focuses on processing livestock products. Early girl-child marriages is high in their communities due to religious reasons, cultural factors, economic considerations, avoidance of unwanted pregnancy taken as not socially accepted, and the assumption that the girl will give birth to many kids (Lowe et al., 2021; Adeyemi et al., 2023).

Similarly, the pastoralists that settled in Saki East Local Government Area (LGA) hold on to these traditional customs as their girls are often married off at a young age lesser than 18 (Adebayo & Abayomi, 2022). The practice of early marriage among pastoralist women, particularly in Saki East LGA, not only deprives young women of educational opportunities but also perpetuates cycles of poverty, limits their economic potential, and increases health risks associated with early pregnancies. Despite growing awareness of its negative consequences, early marriage remains prevalent due to deeply rooted cultural norms and economic pressures. If rates of girl child marriage remain unchanged globally, about 12 million girls under age 18 will continue to marry each year (Efevbera & Bhabha, 2020) and also hinders the realisation of the Sustainable Development Goals (SDGs) of eradicating poverty, hunger, discrimination, and poor health to engender gender equality, inclusivity, and development.

Understanding the effects of early marriage within this specific context is essential for creating targeted interventions that improve the socio-economic status of these women. Recent literature emphasizes the urgent need for relevant empirical data to reform policy and community education program to mitigate the adverse consequences of early marriage and empower young women for a more equitable future in Nigeria (Fatima & Usman, 2021). It is thus necessary to address the gap in understanding the issues regarding the early marriage among the pastoralist women.

Objectives of the Study

The general objective of this study was to investigate perceptions of issues relating to early marriage among pastoral women in Saki East Local Government Area (LGA), Oyo State, Nigeria. Specifically, the study determined:

1. socioeconomic characteristics of pastoralist women in the study area
2. perceptions of pastoralist women on early marriage in the study area.
3. perceived effects of early marriage among pastoralist women.

Methodology

Design of the Study: This study adopted a descriptive survey research design.

Area of the Study: The research was carried out in Saki East LGA Oyo State Nigeria. The LGA has five major communities.The major language spoken is Yoruba. Farming is the main occupation in the study area. The major occupation practiced by pastoral women is cheese making otherwise called *wara* in Yoruba. The pastoral males look after the cattle for grazing during the day and safe guide the cattle during the night.

Population for the Study: The population for the study comprised of all 205 pastoral married women in the five communities in the area of the study.

Sample for the Study: Only 120 pastoral women were purposively selected for the study. These were women who indicated that they were involved in early marriage. They also indicated willingness to participate in the study.

Instrument for Data Collection: The study used interview schedule to collect data. The interview schedule was developed based on the objectives of the study. it was validated by three experts in family living. The instrument was pilot-tested and reliability was established using Cronbach alpha. A coefficient of 0.72 was obtained. The instrument had a 5-point scale of strongly agree=5, agree=4, undecided=3, disagree=2, strongly disagree=1.

Data Collection Method: The instrument was administered to married pastoralist women with the help of research assistants due to their low level of education. One hundred pastoral married women were interviewed using the interview schedule, since almost all of them were illiterate and could neither read nor write. Three trained research assistants who were fluent in Yoruba language were involved in the data collection. All the 120 copies of interview schedule were retrieved.

Data Analysis Techniques: Frequency, percentage, mean ($\bar{X}$) and standard deviation (SD) were used to analysed data. The total numerals assigned to 5 scale for issues regarding knowledge and effects of early marriage was 15.Based on the 5-point scale, mean score at 3.0 was considered as cut off point. Thus, variables scoring 3.0 and above mean scores ($\bar{X} \geq 3.0$) were considered as high perceptions and high effects perceived.

Results

Socio-economic characteristics of respondents: The age distribution shows that less than half (48.3%) of the respondents fall between the ages of 21 and 30, while 28.3% are below 20. The educational attainment data indicates that above half (51.7%) of the respondents had no formal education with only a small percentage (8.3%) achieving tertiary education. The majority of respondents (45.0%) have household sizes between 1 and 5, with a significant proportion having larger families (up to 15 members). Above half (51.7%) of the respondents engage in trading, while 40 percent rely on livestock production. The data reveals that the most (67.3%) of respondents have between 1 and 10 years of farming experience. Self-labor is the dominant source of labor (75.0%), reflecting the reliance on family members for farming activities. The majority of respondents (85.0%) earn between ₦1 and ₦50,000 monthly, highlighting the low-income levels among pastoralist women.

Table 1: Mean Response and Standard deviation on Perception of Pastoralist Women on Early Marriage in Saki LGA

S/N	Perception of Pastoralist Women on Early Marriage	$\bar{X}$	SD	Remark
	Early marriage:			
1	is a way of life.	1.70	1.29	NP
2	is preferred so as to get dowry from the grooms parent.	2.68	1.17	NP
3	is a cultural rite that must be performed quickly.	2.01	1.17	NP
4	protects girls from sexual assault.	2.52	1.19	NP
5	is supported because of economic purposes.	2.76	1.16	NP
6	enables girls parents to marry off their young daughter before the girls become an economic liability.	2.61	1.24	NP
7	enables girls to give birth to many kids.	3.30	1.27	P
8	reduces burden for the care of a daughter.	2.81	1.34	NP

$\bar{X}$ = Mean responses; SD = Standard deviation; NP= Not a perception; P = A perception.

Table 1 shows perception items of pastoral women on early marriage. Early marriage enable girls to raise many kids ($\bar{X}$ = 3.30) had the highest mean score as the only perception of the respondents on regarding early marriage. This reflects the women preference for large family size among pastoral people.

Table 2: Mean Response and Standard deviation on Perceived Effects of Early Marriage among Pastoralist Women in Saki LGA

S/N	Perceived Effects of Early Marriage	$\bar{X}$	SD	Remark
1.	Increased maternal and infant health risk	1.68	0.78	NPE
2.	Greater exposure to human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS).	3.14	0.78	NPE
3.	Greater exposure to domestic and sexual violence.	2.54	0.84	NPE
4.	Deprivation of child education and wellbeing.	3.01	0.84	PE
5.	Poverty.	2.67	0.71	NPE
6.	High maternal mortality rates.	2.20	0.51	NPE
7.	Increase domestic violence against women and girls.	2.54	0.63	NPE
8.	It leads to vesicovaginal fistula (VVF).	3.43	0.76	PE
9.	It leads to divorce.	2.82	0.40	NPE

$\bar{X}$ = Mean responses; SD = Standard deviation; NPE = Not Perceived effect; PE = Perceived effect.

Table 2 shows that the leading perceived effect of early marriage is that early marriage leads to vesicovaginal fistula ($\bar{X}$= 3.43).This is an abnormal connection between the bladder (vesico) and the vagina, allowing urine to leak into the vagina mainly caused by childbirth injuries. Another perceived effect of early marriage indicated is deprivation of child education and wellbeing ($\bar{X}$= 3.01).This is a denial or limitation of access to educational opportunities, resulting in a lack of knowledge, skills, and social development. Yet another perceived effect is that, early marriage leads to greater exposure to human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) ($\bar{X}$ = 3.14). The findings imply a growing concern that early marriage among girls may increase the risk vesicovaginal fistula, HIV/AIDS and be deprived of formal education and wellbeing opportunities.

Discussion

Findings on age of the respondents,reflects the prevalence of early marriage among younger women in pastoral communities, consistent with Adedokun *et al*. (2012), who found that a large percentage of young mothers in northern Nigeria marry early, resulting in limited life opportunities. Also aligns with global trends where early marriage disproportionately affects younger women, restricting their educational and economic potential (UNICEF, 2020). Regarding the educational attainment data, lack of education among pastoralist women exacerbates their vulnerability, as low educational levels limit their ability to make informed decisions about health, fertility, and economic activities. This is substantiated by Abdulkadir *et al.* (2021) that lack of education perpetuates a cycle of poverty and dependency, especially in northern Nigeria where traditional norms still encourage early marriage and limit girls' access to schooling. Large household sizes found in this study are common in pastoralist communities due to the value placed on having multiple children for labor and economic stability. However, research by Babatunde and Akeem (2022) suggests that larger household sizes often lead to increased economic strain, especially among households with low incomes, as resources such as food, education, and healthcare become stretched. The highlights of dual livelihood strategies of pastoralist women in this study, balancing commerce with traditional roles in livestock management support report by Fadairo *et al*. (2022) who highlight that the economic role of women in pastoralist communities is evolving, with trading and entrepreneurship offering new avenues for income generation, although constraints like early marriage continue to restrict their full participation in the economy. Limited experience reflects how early marriage and household responsibilities reduce women's ability to accumulate long-term farming knowledge. In contrast, male pastoralists often have extensive experience due to their uninterrupted involvement in livestock and crop farming (Amusan and Olayinka, 2021). This gender gap in agricultural experience further limits women's contributions to household food security and economic well-being. Self-labor is the dominant source of labor among respondents, reflecting the reliance on family members for farming activities. The dominance of self-labor among respondents is consistent with the findings of Dogo et al.(2020), who noted that pastoralist households in northern Nigeria tend to use family labor for subsistence farming. This can limit productivity, as the absence of hired labor constrains the scale of farming operations and output, especially among households with limited male labor due to migration or conflicts. The low-income levels among pastoralist women could restricts their ability to access healthcare, education, and better livelihoods. This is supported by Adeola and Samuel (2022),

who found that early marriage often exacerbates poverty, as women are unable to contribute meaningfully to household income due to restricted educational and employment opportunities.

The results on the knowledge of pastoralists women on early marriage is in consistent Suleiman and Musa (2023) that early marriage is often linked to the belief that starting a family early ensures more children, which is seen as a source of labor and security in pastoralist settings. Closely followed by economic burden of caring for daughters as another significant driver of early marriage ($\overline{X}$= 2.8). Olatunji and Adebisi (2022) explain that in rural economies, marrying off young girls is perceived as a means of reducing financial responsibility for parents, especially in resource-constrained households. Furthermore, economic motivations (2.3) are frequently cited in early marriage practices, where families seek financial relief through dowry payments or other forms of economic support. According to Fatima and Usman (2021), this practice is often a survival strategy in impoverished rural communities where early marriage helps alleviate financial pressure.

Findings on the effects of early marriage the finding implies a growing concern that early pregnancies and lack of proper healthcare may increase the risk of reproductive cancers, such as cervical cancer, among young girls. The finding is substantiated by Olayinka and Ahmed (2023) that early marriage exposes women to greater health risks due to inadequate access to maternal care. This was closely followed by greater exposure to HIV/AIDs. Early marriage often leads to an increased risk of HIV/AIDS, particularly in rural areas where access to healthcare and sexual education is limited. Musa and Abiola (2022) found that young brides in pastoralist communities are particularly vulnerable due to limited awareness and the lack of control over their reproductive health. In addition, divorce is another notable consequence of early marriage, especially when young girls are unprepared for the demands of marital life.

Conclusion

The study highlights the significant perception issues regarding early marriage among pastoralist women in Saki East LGA. Based on finding, perception that early marriage enables girls to give birth to many kids was the main cause of early marriage among pastoralist women that leads to larger family size. Early marriage has caused the victim health risks including greater exposure to HIV/AIDS, the risk of Vesicovaginal Fistula during childbirth, as well as deprivation of child education and wellbeing.

Recommendations

Based on the findings, the following were suggested

1. Efforts should be made to enhance access to formal education for girls who particularly married as child in pastoral communities.
2. Educational programs focusing on the negative effects of early marriage, particularly health risks, should be implemented and provide alternative livelihood opportunities for pastoralist families, reducing the economic motivation for early marriage.
3. There is need for advocacy re-orientation programme in pastoral communities that emphasis the capability of girls at 18 years and above to still bear many children.

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Soft Skills Needed By University Business Education Students for Gainful Employment on Graduation in Public Universities In Enugu State

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Abstract
This study evolved soft skills needed by university business education students for gainful employment in Enugu state. Specifically, it determined decision making skills, problem solving skills and creativity skills needed by business education students for gainful employment. Survey research design was adopted. Population was made up of 106 lecturers and final year students of public Universities offering Business education programme in Enugu, Nigeria. Questionnaire was used for data collection. Findings include12 decision making skills such as ability to: process available information to arrive at a conclusion ($\overline{X}$= 3.75), identify alternatives/choices in a given situation ($\overline{X}$= 3.55); 12 problem solving skills include ability to: to frame, analyze, synthesize information in order to solve problem ($\overline{X}$= 3.65), apply knowledge from many different areas in solving a task ($\overline{X}$= 3.55); 12 creativityskills such as ability to: make connections from various pieces of information ($\overline{X}$= 3.75), see and identify problems ($\overline{X}$= 3.45). Based on the finding five recommendations were made.

Keywords:Soft, Skills, Business Education, Students, Decision, Marking, Problem, Solving, Creativity.

Introduction
Business education is designed to produce skillful and dynamic business educators, office administrators and businessmen and women who would effectively compete in job market or become successful entrepreneurs through inculcating in its recipients, attitudes, knowledge, skills, values that are required in the business world (Hodges & Burchell 2023). Mfam and Ntino (2018) also reported that business education concerns itself with development of knowledge and attitude needed for success in any business occupation. Global trends however have shown that students recently are leavingschool without acquiring the requisite skills in the area of both hard and soft skills so as to foster individual, community or national development through gainful employment (Chertavian, 2019). To avert this negative trend, Business education students need both soft and practical skills in order to be effective in their workplace. Business educationembraces skill building programmes in decision making, problem solving, creative thinking as well as leadership training and wealth generation(Okanazu, Madu, & Anyakoha, 2017). Business education further aims at raising awareness on students about business and skills that would make it's recipient self-reliant, and independent productive citizens of the society (Igbokwe, 2019). According to Okoye (2017), in business education programme, students are expected to

acquiresoft skills like decision making, problem solving, and creative thinking skills to enable them be gainfully employed on graduation.

Skill ispractical ability, manual dexterity through repetitive performance of an operation, and organized sequence of actions, proficiency executed and usually displayed in flexible but systematic temporal pattern (Uloko, 2018; Odu, 2019, Okorie, 2021). Generally, skills can be grouped into hard and soft skills. Soft skills are interpersonal and behavioural skills that help one work well with other people (Herrity, 2024). According to Kenton, David and Eichler (2024), soft skills are character traits and interpersonal skillsthat characterize a person's ability to interact effectively with others so as to ensure organizational success.They are those skills which make one employable, self-reliant, and relevant to the society. Soft skills are individual's ability to turn ideas into action (European Skills Panorama, 2017). They include decision making, problem solving, creative thinking and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives. Soft skills are vital in promoting competitiveness and in fostering innovative economic sustainable development (European Commission, 2017). Soft skills provide benefits thatenable students of Business education function effectively in the current highly competitive environment and strong market forces in other to turn business problems into business opportunities. Decision making, problem solving and creativity skills are crucial for Business education student.

Decision making refers to the choice of the most appropriate solution among possible alternatives (Kolman, 2023). The ability to make effective decisions is a good leadership skill that earns favour with employers and can help one gain promotions. Duncan and Dunifon, (2021) noted that virtually every job involves some level of individual decision making. Allcareer paths require a large amount of decision making. Rangu, *et* al (2024) noted that decision making is the act of choosing between two or more courses of action. It involves choosing between possible solutions to problem which could come through either an intuitive or reasoned processes. The possibilities of attainment of organizational goals and objectives hinge on the sole act of decision making and when the right decisions are made at the right time, organizational or individual problems will be solved.

Problem-solving skills are the ability to identify and analyze problems, brainstorm, evolve and analyze answers, then implement the best solutions (Kaplan, & Petta, 2023). As stated by Pachauri and Yadav (2022), problem-solving skill is ability to proffer solution to complex and emerging problems as it occursIt is a skill that is very relevant and which a graduate of business education should possess in order to excel greatly in his chosen career and to be gainfully employed. Kaplan, and Petta, (2023) further opined that a student with

good problem-solving skills is both a self-starter and a collaborative teammate who is proactive in understanding the root of a problem and works with others to consider a wide range of solutions before deciding how to move forward.Acquisition of these skills will enable students/graduates of business education to identify business problems and become critical thinkers so as to turn the identified business problems into opportunities thereby increase an organization's productivity and sustainability and working collaboratively with other employees in the organization to see to the achievement of the organization's set objective (Ajaero, 2019; Tang, 2018).

Creativity skills according Perry (2024) cover a broad spectrum of logical, emotional, and practical abilities that contribute to the generation of original and innovative ideas, and solutions. These skills enable one to pave the right approach for problem-solving and innovation and at the same time enable individuals to approach challenges with flexibility and adaptability (Elizabeth,2024). Creativity skill is the ability to come up with unique, original solutions. It is the ability to bring something into play that either did not exist before or, at least, is relatively new for its context(Jennifer, 2023). It entails using one's initiative to create new ideas which can be made into a reality. It also involves showing a strong personal drive and not waiting to be told to do things. Creativityincludes both mental and physical processes undertaken by an individual or group to solve specific problems resulting in the production of statistically infrequent solution which are useful to the society (Ikpeama& Nwaokokorom, 2017). Creativity obviously involves some form of display of ability to do something and most often in a new way. It involves developing problem solving skills, evolving new technologies and ways of solving problem. Possession of creativity skill gives rise to self and gainfully employment(Bortz, 2017).However, when creativity is lacking, it is obvious that a coherent framework for the implementation of strong entrepreneurial culture will equally be missing thus, resulting in unemployment, lack of due process to encourage innovations, and related challenges (Carroll, 2017). Consequently, acquisition of creativity skills, along side decision making and problem solving skills is highly advocated for business students to enhance their ability to obtain gainful employment on graduation, hence the need for this study.

Purpose of the Study

The general purpose of this study was to evolve soft skills needed by university Business education students for gainful employment in Enugu state.Specifically, the study determined:

1. decision making skills needed by university Business education students (UBES) for gainful employment,

2. problem solving skills needed by UBES for gainful employment.
3. creativity skills needed by UBES for gainful employment,

Methodology

Research Design: Descriptive survey research design was used for the study.

Area of the Study: The study was carried out in two public universities in Enugu state, namely,University of Nigeria, Nsukka (UNN) and Enugu State University of Science and Technology (ESUT). Both Universitiesoffer Business Education programmes. Enugu state is in the South Eastern part of Nigeria.There are 17 Local Government Areas in the State; these Local Government Areas are similar in many respects as they share common boundaries. They are principally Igbo speaking and Christians.

Population for the Study: The population for the study was 106 persons, made up of 26 business education lecturers - (18 from UNN and eight from ESUT) and 80 final year students(53 from UNN and 27 from ESUT) in 2021/2022academic session. Office of the Head of Department of Business Education UNN and ESUT 2024. The entire population was studied since it was small and manageable.

Instrument for Data Collection: The instrument for data collection was a structured questionnaire. It was developed based on literature reviewed and purpose of the study. The instrument was divided into A and B sections. Section Afocused on personal information of the respondents while the rest dealt with the three specific purposes of the study. It had a 4-point rating scale of strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) with the respective value of 4, 3, 2 and 1. Three university experts Business Education validated the questionnaire. To establish reliability of the instrument, it was 20respondents that were not part of the study population,andCronbach Alpha reliability method which yielded 0.87.

Method of Data Collection: Hundred and six (106) copies of the questionnaire were distributed by hand with the help of two trained assistant. Only 103 copies were retrieved and used for the analysis.

Method of Data Analysis: Data were analyzed using mean and standard deviation.Based on the 4-point of the instrument scale mean of 2.50 ($\overline{X} \geq 2.50$)and above was considered “agree” while item with the mean less than 2.50 ($\overline{X} \leq 2.50$)was considered “disagree.

Findings of the Study

Table 1: Mean Responses and Standard Deviation of Lecturers and Business Education Students on Decision Making Skills Needed by University Business Education Students.

S/N	Decision Making	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}g$	R
	Ability to:						
1	identify the problem or decision to be made.	3.5	0.9	3.6	0.9	3.54	SA
2	identify alternatives/choices in a given situation	3.8	0.7	3.3	0.6	3.55	SA
3	seek information on each alternative	3.6	0.9	3.7	0.8	3.65	SA
4	consider consequences of each alternative	3.7	0.6	3.7	0.7	3.7	SA
5	select/choose the best alternative	3.1	0.8	3.6	1.7	3.35	A
6	act on the decision/choice	3.7	0.8	3.9	0.9	3.8	SA
7	evaluate the decision	3.2	1.1	3.8	0.8	3.5	SA
8	make further decision based on the evaluation outcome	3.5	0-7	3.4	0.7	3.45	A
9	employ sound and logical reasoning in decision making.	3.8	0.6	3.6	0.9	3.7	SA
10	consider consequences associated with alternative solutions.	3.6	0.9	3.5	0.8	3.55	SA
11	process available information to arrive at a conclusion.	3.7	0.7	3.8	0.6	3.75	SA
12	think objectively and relates concepts to the goals of organisations	3.5	0.9	3.7	0.8	3.6	SA

$\bar{X}_1$ = Mean of lectures; SD_1 = Standard deviation of lecturers; $\bar{X}_2$ = Mean of students; SD_2 = Standard deviation of students; $\bar{X}_g$= Grand mean; R= Remark; A= Agree; SA = Strongly agree

Table 1 shows mean scores by lectures ($\bar{X}_1$) and those by the students ($\bar{X}_2$), as well as the grand mean ($\bar{X}_g$) of both groups. All the 12 items obtained means of 2.50 and above ($\bar{X} =\geq$ 2.50). The 12 items are thus decision making skills needed by university Business education students for gainful employment.

Table 2: Mean Responses and Standard Deviation of Lecturers and Business Education Students on Problem Solving Skills Needed by University Business Education Students

S/N	Problem solving skills	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}g$	R
	Ability to:						
1	identify and evaluates different solutions to a problem.	3.6	0.9	3.1	0.8	3.35	A
2	understand a problem by breaking it down into smaller parts.	3.3	0.6	3.7	0.6	3.5	SA
3	identify key issues, implications and identify solutions.	3.7	0.8	3.9	0.9	3.8	SA
4	apply knowledge from many different areas in solving a task.	3.5	0.7	3.6	0.7	3.55	SA
5	make complex choices and decisions on pressing problems .	3.6	1.7	3.4	0.1	3.5	SA
6	exercise sound reasoning in understanding and solving problem.	3.9	0.9	3.2	0.9	3.55	SA
7	identify and ask significant questions that clarify various points of view and lead to better solution.	3.8	0.8	3.8	0.5	3.8	SA
8	ability to frame, analyze, synthesize information in order to solve problems	3.4	0.7	3.9	0.8	3.65	SA
9	develop problem solving skill necessary for every job.	3.6	0.9	3.5	1.2	3.55	SA
10	develop problem solving skills for self- reliance.	3.5	0.8	3.4	1.1	3.45	A
11	use inborn problem solving skills that will serve life purpose	3.8	0.6	3.8	0.9	3.8	SA
12	use problem solving skill necessary for day-to-day job	3.7	0.8	3.5	0.7	3.6	SA

$\bar{X}_1$ = Mean of lectures; SD_1 = Standard deviation of lecturers; $\bar{X}_2$ = Mean of students; SD_2 = Standard deviation of students; $\bar{X}_g$= Grand mean; R= Remark;A = Agree; SA = Strongly agree

Table 2 shows mean responses by lectures ($\bar{X}_1$) and those by the students ($\bar{X}_2$), as well as the grand mean ($\bar{X}_g$) of both groups on problem solving skills needed by the students. All

the 12 items obtained means of 2.50 and above ($\overline{X}$ =≥ 2.50). The 12 items are thus problem solving skills needed by university Business education students for gainful employment.

Table 3: Mean Responses and Standard Deviation of Lecturers and Business Education Students on creativity Skills Needed by University Business Education Students

S/N	Creativity skills	$\bar{X}_1$	S_1	$\bar{X}_2$	S_2	$\bar{X}_g$	R
	Ability to:						
1	Come up with new and original ideas.	3.1	0.8	3.3	0.8	3.2	A
2	Welcome new ideals and see things in new ways.	3.7	0.6	3.8	0.7	3.75	SA
3	take original ways to challenges.	3.0	0.9	3.6	0.9	3.3	A
4	approach things open-mindedly.	3.6	0.7	3.7	0.6	3.65	SA
5	encourage experimentation of new ideas.	3.3	0.1	3.1	0.8	3.2	A
6	see and identify problems.	3.2	0.9	3.7	0.8	3.45	A
7	generate new ideas and solve a problem in a new way.	3.8	0.5	3.2	1.1	3.5	SA
8	brainstorm potential solution.	3.9	0.8	3.5	0.7	3.7	SA
9	assess ideals and put the best ones into practice.	3.5	1.2	3.8	0.6	3.65	SA
10	find solutions and solve human problems.	3.4	1.1	3.6	0.9	3.5	SA
11	make connections from various pieces of information.	3.8	0.9	3.7	0.7	3.75	SA
12	become aware of something that has never been seen before	3.6	0.7	3.5	0.9	3.55	SA

$\bar{X}_1$ = Mean of lectures; SD_1 = Standard deviation of lecturers; $\bar{X}_2$ = Mean of students; SD_2 = Standard deviation of students; $\bar{X}_g$= Grand mean; R= Remark; A = Agree; SA = Strongly agree

Table 2 shows mean scores by lectures ($\overline{X}_1$) and those by the students ($\overline{X}_2$), as well as the grand mean ($\overline{X}_g$) of both groups. All the 12 items obtained means of 2.50 and above ($\overline{X}$ =≥ 2.50). The 12 items are thus creativity skills needed by university Business education students for gainful employment.

Discussion of Findings

The study reveals that the decision making skills needed by UBES for gainful employment includes ability to identify the problem or decision to be made, identify alternatives/choices in a given situation, seek information on each alternative, consider consequences of each alternative, select/choose the best alternative among others. This study is in line with the study carried out by Rangu, Raju and Jagammadha (2024), who noted that decision making is the act of choosing between two or more courses of action. To Kolman (2023), it is the ability to arrive at a conclusion of certainty. Decision making is a selection process where one or two or more possible solutions are chosen to reach the desired goal. It is refers to the choice of the most appropriate solution among possible alternatives. Duncan and Dunifon, (2021) noted that virtually every job involves some level of individual decision making. To the authors certain career paths like business, marketing, management, retail and psychology are among those that often require a large amount of decision making. Making decisions that produce successful results for one's department or organization makes one look

good and makes one promotable for leadership role. Decision making requires the person vested with the responsibility to possess particular skills, of which intelligence is the most important. Experience, on the other hand, throws more light into situation and aids in decision making.

The study further found out that the problem solving skills needed by UBES for gainful employment include ability to identify and evaluates different solutions to a problem, understand a problem by breaking it down into smaller parts, identify key issues, implications and identify solutions among others. This study corroborated the study of Kaplan and Petta, (2023) who noted that problem-solving skills are the ability to identify problems, brainstorm and analyze answers, and implement the best solutions. In furtherance, the authors noted that an employee with good problem-solving skills is both a self-starter and a collaborative teammate; they are proactive in understanding the root of a problem and work with others to consider a wide range of solutions before deciding how to move forward. Furthermore, Pachauri and Yadav (2022) asserted that problem solving skill is the ability to proffer solution to complex and emerging problems as it occurs. To them, it is a skill that is very relevant and which a graduate of business education should possess in order to excel greatly in his chosen career and to be gainfully employed in any establishment for sustainable development of the organization. The study also relate to Tang (2018) study who noted that acquisition of problem solving skills will enable students/graduates of business education identify business problems and become critical thinkers so as to turn the identified business problems into opportunities thereby increase the organization's productivity and sustainability and working collaboratively with other employees in the organization to see to the achievement of the organization's set objective. The finding of the study is also in line with the study of Ajaero (2019) which stated that problem-solving skills for business development and productivity involve critical thinking, understanding of the business, team spirit, decisiveness and courage.

Creativity formation skills needed by university business education students for gainful employment include: ability to come up with new and original ideas, Come up with new and original ideas, welcome new ideals and see things in new ways, approach things open-mindedly, approach things open-mindedly, see and identify problems., generate new ideas and solve a problem in a new way, brainstorm potential solution, assess ideals and put the best ones into practice, find solutions and solve human problems, make connections from various pieces of information and become aware of something that has never been seen before. This study is in line with the study carried out by Creativity skills according Perry

(2024) cover a broad spectrum of logical, emotional, and practical abilities that contribute to the generation of original and innovative ideas, and solutions. These skills enable you to pave the right approach for problem-solving, and innovation. Such skills enable individuals to approach challenges with flexibility and adaptability. (Elizabeth,2024). Furthermore, Jennifer (2023) asserted that creativity skills are the ability to bring something into play that either did not exist before or, at least, is relatively new for its context, using one's initiative to create new ideas which can be made into a reality, Showing a strong personal drive and not waiting to be told to do things among others. The finding of the study also align with the study of Andrews and Higson (2022) who conceptualize and identify key individual and business related skills and competencies required by employers of business graduates and holders of other higher level qualifications, to include ability to strategize, pursue and achieve certain goals with available resources, prevent conflicts and resolve issues as they arise and to discover whether higher education business programmes are meeting the needs of the European marketplace.

Similarly, the findings of the study corroborated the study of Ikpeama, and Nwaokokorom, (2017) when they confirmed that creativity is a mental process undertaken by an individual or group to solve specific problems resulting in the production of statistically infrequent solution which are useful to the society. According to them, creativity obviously involves some form of display of ability to do something and most often in a new way. It involves developing problem solving skills, evolving new technologies and ways of solving problem. Possession of creativity formation skill gives rise to self and gainfully employment (Bortz, 2017).

Conclusion

This study indentified the three sets of soft skills that are needed by Business education students for gainful employment.These include decision making, problem solving and creativity skills. The acquisition of these groups of soft skills will enable students of Business education function effectively in the current highly competitive environment and strong market forces to turn business problems into business opportunities. Based on the findings made Business education students strongly need decision making, problem solving and creativity skills so as to be gainful employed upon graduation from public schools in Enugu state.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. The soft skills indentified by this study should be infused into university curriculum of Business education.
2. Opportunity to imbibe decision making, problem solving and creativity skills identified in this study should be given to students.
3. Students should be given opportunity to be part of decisions makers in their teaching and learning processthrough thinking out of the box.

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Female Undergraduate Students' Perceptions on Issues Relating To Transactional Sex in Universities in Nigeria

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Abstract
The study investigatedfemale undergraduate students' perceptions on issues relating to transactional sex in universities in Nigeria. Specifically, the study determined students' perceptions on:reasons undergraduate female students engage in transactional sex; risks associated with transactional sex; and ways of curbing transactional sex among undergraduate female students.The study adopted a descriptive survey research design. Population was 8,864 female undergraduates of Kogi State University. Instrument for data collection was questionnaire. Data were analyzed using mean and standard deviation. Findings include 10 perceived reasons why female students engage in transactional sex, which include:peer pressure ($\bar{X}$=3.13),lack of parental supervision ($\bar{X}$=3.27),among others. Other findings are nine perceived risks associated with transactional sex which include, high risk of physical abuse ($\bar{X}$=3.56), unwanted pregnancy ($\bar{X}$=3.12) among others; and eight perceived ways of curbing transactional sex, which include provision of scholarship scheme for indigent students ($\bar{X}$=3.54); provision of micro loans for students ($\bar{X}$=3.50), and others. Based on the findings, the study made three recommendations, including,among others that university administration should develop part-time job scheme for indigent students with females being given special considerations.

Keywords: Sex, Transactional, Female, Undergraduates, Indulgence, Students, Causes,Risks, Perceptions

Introduction

The occurrence of transactional sex between consenting adults is a phenomenon that has spanned generations, and evident in all cultures. Transactional sex involves the exchange of sex for money, shelter, gifts, services or other favours (Amo-Adjei, *et al*, 2014). It could also be defined as nonmarital sexual relationship motivated by an implicit assumption that sex will be exchanged for material support or other benefits" (Wamoyi, *et al*, 2019). It is mostly associated with adolescent girls and young women. Transactional relationships, sex and prostitution may be thought of as lying on a spectrum. At one end, transactional sex may have very many apparent similarities with the practice of prostitution, particularly when cash is given by a sexual partner after a single act of sex, or where there is a 'relationship' involving multiple sexual encounters that is entirely sustained by receipt of material reward (Jewkes & Morrell, 2012). However, the difference is entrenched in fact that a primary motivation for the transactional sexual relationship is love which prostituting is devoid of.

According to Moore, *et al* (2007), motivations for engaging in transactional relationships are not mutually exclusive and often young women are driven by both subsistence and consumerist desires. Studies that have explored motivations to engage in transactional sex suggest a number of reasons like poverty and economic necessity which is the major key driver behind transactional sex. Dunkle, *et al* (2011) noted that areas with limited employment opportunities and high poverty rates, some females engage in transactional sex as a survival strategy by often depending on men for financial stability. Hence, transactional sex occurs in diverse contexts like the need for social mobility or status, which contains material goods such as clothes, jewelry, and technology devices among others. The pursuit of these goods often leads some young female to engage in relationships with older men, (Leclerc-Madlala, 2013). Some individuals also engage in transactional sex because they desire both the material benefits and the emotional or sexual fulfillment that comes with the relationship (Wamoyi, *et al*, 2011). It is also influenced by gendered socio-economic and cultural factors. For instance, Chatterji, *et al* (2015) observed that in some parts of Africa, it is considered appropriate for a man to provide gifts and monetary support to his partner in exchange for affection and sex. Transactional sex can thus be culturally embedded and reinforced by societal expectations, rather than solely driven by economic necessity. It often poses challenges to the health of the women involved.

Available reports indicate that women's biological susceptibility to infection and their inability to negotiate for safe sex in transactional sex relationships placethem at higher risk of contracting HIV particularly in the context of multiple concurrent partnerships (Higgins et al., 2010; Foley and Drame, 2013). Despite the obvious effects of transactional sex, some undergraduate students still do indulge in it. Studies has shown various health issues relating to transactional sex. For instance, Ranganathan, *et al* (2016) reported that in South Africa transactional sex often coexists with other risky sexual behaviours such as an early sexual debut, multiple concurrent sexual partnerships, and inconsistent condom use. Irrespective of the context, evidence links transactional sex to undesirable sexual and reproductive health outcomes including sexually transmitted infections (STIs), unintended pregnancies and unsafe abortions (Choudhry et al., 2014). Existing literature also reported that transactional sex is primarily motivated by basic survival or subsistence needs (Dunkle & Wingood, 2010).

There are various reports that transcational sex occur in universities in different countries, for instance there are studies in Uganda (Sagrove 2007; Samara 2010), and in Tanzanca (Wamoyi *et al* 2020). In Nigeria, Ajayi and Somefun, 2019)based on their study of two public universities, reported existence of transactional sex, nothing among others, that

17.9 percent of their respondents had received money, gifts or various types of favour in exchange for sex. Another study by Okonkwo, (2016) on rethinking linear accounts of transactional sex in literature with structuration theory on female Nigerian university studentsindicates that components in which students' analytical external structure, such as gender structure, patterns their internal structure or habitusincluding their sexual scripts, also suggests that women do depend on men for money, gift or favour in exchange for sex.

Earlier study by Nwokocha, (2007) attributed transactional sex to poverty and observed its socio-demographic consequences which include: dropping out of school, high rate of rural-urban migration, exposure to being raped, exposure to alcoholism, sexually transmitted infections (STls), among others.

Furthermore, Azuike et al., (2021) reprted that transactional sex exchanges are frequently driven by socio-economic disparities, with students from economically disadvantaged backgrounds seeking financial support to meet their basic needs, while others may pursue luxury items or social status within peer groups. This practice appears to be widespread among female students, where economic hardship and social pressures contribute to the normalization of transactional sex.

Since transactional sex is a social problem, it is necessary to evolve ways of curbing it. A step in this direction could be to find out the perceptions of the female undergraduate students on issues relating to transcational sex, hence this study.

Objectives of the Study

The main objective of the study was to investigate perceptions on transactional sex indulge among female undergraduates in Nigerian Universities. Specifically the study determined female students' perceptions on:

1. possible reasons undergraduate female students engage in transactional sex.
2. risks that could be associated with transactional sex among undergraduate students.
3. ways of curbing transactional sex among undergraduate female students.

Methodology

Design of the Study: The study employed a descriptive survey research design.

Area of the Study: This study was carried out in one of the universities in Kogi State, Nigeria. Kogi State University, Anyigba was chosen because female students from various regions of Nigeria attend the university, fostering a diverse academic community. Kogi State serves as a bridge between northern and southern Nigeria, making it a melting pot of ethnic, linguistic, and cultural diversity.

Population for the Study: The population of this study was made up of 8,864 female undergraduate students within the age range of 18 to 25 from Kogi State University, Anyigba. Based on population data for the 2018/2019 academic session, the undergraduate female students were enrolled across eight faculties and the students represented a mix of urban and rural origins, with varying academic interests and career aspirations (Academic Planning Unit, Kogi State University, 2019). This diversity in academic disciplines and cultural backgrounds provided a rich context for the study.

Sample for the Study: The sample for the study was made up of 200 female undergraduate students. This was chosen using the population chart developed by Morrisson, & Murtin, (2011). The chart posits that populations below 10,000 should have samples below 300 respondents. Simple random sampling technique was used for deriving the samples. The sample was achieved by sampling 25 female students each from the eight faculties in Kogi State University.

Instrument for Data Collection: The instrument for data collection was a questionnaire. The questionnaire was developed based on literature review and specific objectives of the study. The instrument a 4-point scale with response categories of Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1). It was validated by three university Home Economics experts. To establish the reliability of instrument, 20 copies were administered to 20 female students in Federal University, Lokoja, Kogi State.Data collected were analysed using Cronbach Alpha method to determine the internal consistency of the instrument, which a reliability coefficient of 0.956.

Method of Data Collection: Two hundred copies of the questionnaire were distributed to the respondents by hand with the help of two research assistants. The two hundred copies were all completed and retrieved.This gave a 100 return rate.

Data Analysis: Mean and standard deviation were used for data analysis. Based on the 4-point scale of the instrument, 2.50 was taken as a cut-off mean. Any item that has a mean score above 2.50 were taken as “agreed”, while, any item that falls below 2.50 was regarded as “disagreed”.

Results

Table 1: Mean Responses and Standard Deviation of Female Undergraduate Students on Reasons Female Students Engage in Transactional Sex.

S/N	Reasons undergraduate female students engage in transactional sex	$\overline{X}$	SD	Remark
1	Peer pressure	3.13	0.95	Agreed
2	Lack of parental supervision	3.27	0.63	Agreed
3	Perception of men in society as the providers	3.49	0.78	Agreed
4	Perception of men having multiple partners as being acceptable	3.19	0.99	Agreed
5	Need to keep up with fashion trends	3.09	0.85	Agreed
6	For improvement of examination grades	3.11	0.87	Agreed
7	Pressure to keep up with new technologies such as phones	3.05	0.89	Agreed
8	Need for resources (money or other materials)	3.65	0.80	Agreed
9	Passing of exams	3.12	0.75	Agreed
10	Making up for poor family background	2.91	0.99	Agreed

$\overline{X}$ = *Mean responses of Undergraduates, SD = Standard Deviation of the responses*

Table 1 shows that the ten (10) items with the mean score ranging from 2.91 to 3.65. These are therefore 10 possible reasons undergraduate female students engage in transactional sex as perceived by the respondents. Item No 8 – indicating that students engage in transactional sex due to need for resources (money or other materials) scored the highest mean of 3.65($\overline{X} \leq 2.50$). This probably indicated that this could be one of the main reasons undergraduate female students engage in transactional sex.

Table 2: Mean Responses and Standard Deviation of Female Undergraduate Students on Perceived Risks Associated with Transactional Sex

S/N	Risks associated with transactional sex	$\overline{X}$	SD	Remarks
1	High risk of physical abuse	3.56	0.80	Agreed
2	Unwanted pregnancy	3.12	0.75	Agreed
3	Dropping out of school	2.04	1.03	Disagreed
4	Inconsistent use of condom	2.90	1.09	Agreed
5	Inappropriate use of contraceptive pills	2.75	0.96	Agreed
6	Unsafe abortion	2.50	1.00	Agreed
7	Contraction of sexually transmitted infections (STI)	3.83	0.60	Agreed
8	Contraction of sexually transmitted diseases (STDs)	3.87	0.53	Agreed
9	High risk of HIV/AIDs contraction	3.24	0.93	Agreed
10	Higher risk of rape	2.88	1.05	Agreed

$\overline{X}$ = *Mean responses of Undergraduates, SD = Standard Deviation of the responses*

Table 2shows that the (10) items with the mean score ranging from 2.04 to 3.87. These are therefore the possible risks associated with transactional sex among undergraduate students as perceived respondents. Item No eight (8) indicate contraction of sexually transmitted diseases (STDs) scored the highest mean of 3.87. This probably indicated that respondents saw this as a very common risks associated with transactional sex among undergraduate students.

Table 3: Mean Responses and Standard Deviation of Female Undergraduate Students on Ways of Curbing Transactional Sex

S/N	Ways of curbing transactional sex	$\bar{X}$	SD	Remark
1	Provision of scholarship scheme for indigent students	3.54	0.73	Agreed
2	Provision of micro loans for students	3.50	0.77	Agreed
3	Organizing of institution wide campaigns on contraceptive usage and its health effects	3.30	0.80	Agreed
4	Organizing of institution wide campaigns on transactional and its health effects	2.93	1.04	Agreed
5	Orientating students on the effects of abortion	2.98	1.06	Agreed
6	Encouraging abstinence through posters pasted around school	3.06	0.98	Agreed
7	Encouragement of gender equality to ensure men are not seen as sole providers	2.74	0.98	Agreed
8	Encouraging emotional support and caring (including for a partner's health, e.g., through testing for STDs and HIV)	2.99	1.03	Agreed

$\overline{X}$ = *Mean responses of Undergraduates, SD = Standard Deviation of the responses*

Table 3 shows that the eight (8) items with the mean score ranging from 2.74 to 3.54. These are therefore possible ways of curbing transactional sex among undergraduate female students as perceived by the respondents. Item No 1 – indicating that provision of scholarship scheme for indigent students scored the highest mean 3.54. This probably indicated that the best ways of curbing transactional sex among undergraduate female students.

Discussion

The study identified the reasons undergraduate female students engage in transactional sex. The reasons identified by the present study is in line with findings in previous studies. Reasons undergraduate students engage in transactional sex as discovered by the present study include; peer pressure, lack of parental supervision, perception of men in society as the providers, perception of men having multiple partners as being acceptable, need to keep up with fashion trends, for improvement of examination grades, pressure to keep up with new technologies such as phones, need for resources (money or other materials), passing of exams and poor family background. These findings were consistent with studies conducted by Chatterji *et al*. (2015); Lander and Blanck (2015); Fuller (2012); and Steele (2013). A recent study by Dunaev, *et al* (2023) who emphasized that financial hardship and economic instability directly correlates with an increased likelihood of engaging in transactional sex as a means of survival. Also, Miri, (2022) agreed with the above findings that there are many reasons undergraduate students engage in transactional sex and these include the age of the individual, lack of employment opportunities, poverty and economic inequality, number of household members, structural and intimate partner violence, orphan status, educational level and among others.

The risks associated with transactional sex among undergraduate as identified by the study include the following; high risk of physical abuse, unwanted pregnancy, inconsistent use of condom, inappropriate use of contraceptive pills, unsafe abortion, contraction of sexually transmitted infections (STI), contraction of sexually transmitted diseases (STDs), high risk of HIV/AIDs contraction, higher risk of rape, etc. These findings were also consistent with studies conducted by Atwood *et al*., 2011; Lee, 2013; Choudhry *et al*., 2014; Blommaert, 2014 amongst others. However, the rejected item which identifies dropping out of school as one of the risks associated with transactional sex was accepted in the study carried out by Zembe *et al*. (2013). In agreement with the above findings, the different risks involved in transactional sex include increased risks of STDs and higher risks of violence assaults leading to trauma and long-term health consequences (Decker, *et al*, 2019), stigma and discrimination which can lead to low self-esteem, depression, anxiety (Platt,2019), substance abuse (Duff, *et al*, 2019) and among others.

The study also identified possible ways of curbing transactional sex among undergraduate female students includes the following; provision of scholarship scheme for indigent students, provision of micro loans for students, organizing of institution wide campaigns on contraceptive usage and its health effects, organizing of institution wide campaigns on transactional and its health effects, orientating students on the effects of abortion, encouraging abstinence through posters pasted around school, encouragement of gender equality to ensure men are not seen as mere providers, encouraging emotional support and caring (including for a partner's health, e.g., through testing for STDS and HIV). These findings were consistent with findings made in studies conducted by several authors such as Brouard & Crewe, 2012; Van Der Heijden & Swartz, 2014; Zembe et al., 2013; Shefer, *et al* 2012; Pettifor, 2015; Dworkin et al., 2013 and Kyegombe et al., 2014. Similarly, studies suggested that transactional sex can be curbed through comprehensive sexual education programs on campuses (Blaise, et al, 2019), ensuring the availability of counselling support services from experts in Home Economics and her related fields (Choi. et al, 2019), creating safe and inclusive campus environment that will support dialogue about sex, relationship, and mental health (Sinha,2019), continuous monitoring and assessing the widespread and factors associated with transactional sex among undergraduate students (Blaise, et al, 2019).

Conclusion

The data suggest that most students who engage in transactional sex rarely use measures of protection such as condoms. This is not surprising. Most of the partners who engage students in risky sexual behaviour are of higher social and economic status who are

more powerful to dominate scene of sexual encounters. Inequality in social and economic status makes it very difficult for the students to negotiate safe sex, hence, they are vulnerable to STIs and HIV. This study was purely quantitative and therefore generalization may be difficult. The insightful findings it has generated could be useful as a preliminary assessment of the prevalence of transactional sex and the associated sexual health problems among undergraduates.

Recommendations

In line with the findings of this study, the following are recommendations that would lead to curbing the menace of transactional sex among university undergraduates;

1. University administrations should develop part-time job scheme for indigent students with females being given special consideration.
2. All stakeholders must invest deliberate effort to assist the vulnerable population from the risky effects of transactional sex.
3. The need to use protection in form of contraceptive devices may also be publicized in the university community with special emphasis on the student population.

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Attitude of Physical Education Teachers towards Inclusion of Special-need Students in Regular Health and Physical Education Class in Secondary Schools in Nsukka LGA.

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Abstract

The study focused on the attitude of physical education teachers (PET) towards inclusion of special-need students in regular health & physical education (HPE) class in secondary schools in Nsukka local government Area (LGA) of Enugu state, Nigeria. Specifically, it determined the belief-related and opinion-related attitudes of male and female of PET towards inclusion of special-needs students in regular HPE classes. It used survey research design. Population consisted of 172 HPE teachers in secondary schools in Nsukka LGA. Questionnaire was used for data collection. Means, standard deviation and t-test at 0.05 significant level were used for data analysis. Results revealed 10 belief-related attitudes of male and female PET towardsspecial-needs students' inclusion in regular HPE classes.These include among others, that inclusion is beneficial for all students ($\overline{X}$= 4.62). Other findings are 10 positive additional opinion-related attitudesof the male and female PET.These include, among other, that inclusion requires additional training for PET teachers($\overline{X}$= 4.37). There is no significance differenceon the mean rating of male and female teachers on the belief-related regarding the inclusion of special-needs students in regularPE class as all the items had p value >0.05 except for one item. There is also no significance difference on mean ratings of the teachers on the opinion-related attitudes. Based on the findings, the study recommended that ministry of education and other related agencies, should make enhanced provision for adequate facilities and equipment suitable for special need students and more motivation of PET.

Keywords: Special, Need, Students, Physical, Education, Teachers, Inclusion, Belief-related Attitude, Opinion-related Attitude.

Introduction.

Inclusive education not only offers the least restrictive environment for disabled learners facilitating their ability to express their opinion and engage in activities with their peers, while also fostering a sense of belonging. The special-need students are children enrolled into formal education settings who are from the two extremities, they can either be gifted or handicapped. International legislation in many countries promotes inclusive education for students with special-needs (SN) by educating them with their peers in regular schools. Felder (2018) noted that diverse understanding of inclusion have varying implications and imports for action. This inclusion is transformational in nature as it has a way of meeting the various needs and expectations of the mainstream and special needs student (Al-Hroub & Jouni, 2023).

The term inclusive education is challenging to explore based on multiple perspectives underlying it (Rapp & Corral-Granados, 2021). Inclusive education is justice-based because it focuses on social justice and democracy stipulates that every child has the right to be educated in the schools within their local areas, where their strengths and needs for support are identified by using responsive approaches (Lalvani, 2024; Hernández-Torrano, et al., 2020). Inclusive education is a global principle with the purpose of ensuring the promotion of equality and equity by eliminating the barriers to learning and socal participation of all (Honkasilta, & Koutsoklenis, 2024). Strogilos (2018) opined that despite inclusion, the special-needs should have differentiated instructions in other to meet their diverse needs resulting in exclusion in inclusion. However, it seems that inclusion attempts have not been very successful for many special needs students. This is because most regular teachers do not support inclusion education (Lindner, et al., 2023). In addition to the inadequate provision of material resources, training and upgrading of teachers for the special-needs education.

Successful inclusive education may provide the opportunity for all children, especially special-need students to develop to their best potential. Jessica (2017) averred that children with special-need are the children who have the disorder/deviations from the conditions of the average children which is generally normal in terms of physical, mental or social behavior characteristics. Children with special-need will certainly face many problems dealing with their difference during their growth, including in education.Special-needs are those who cannot benefit fully from regular classroom teaching and learning due to emotional, mental, physical or other impairments that may or may not be readily apparent (Fuandai, 2010). Handicapped condition is a special-need, because to socialize with theenvironment including education and teaching requires special treatment. Special-needs education involves addressing individual differences and needs of students with special-needs through individual planning and systematic monitoring of teaching procedures, adaptation of educational materials to achieve success in school and the society at large, which can only be possible in a classroom education (Akinade & Sulaiman (2010) and Anggono, et al., (2020) noted that there is no correlation between attitude and gender.

Physical education, as an academic subject that develops motor skills and provides students with the confidence to be physically active for a lifetime (Centre for Disease Control and Prevention [CDC], 2014). A physical education teacher refers to a person whose job is to

instruct ways to maintain the body through physical exercises. According to Osokoya, (2010) a teacher is a person that has acquired training in a college or university who is able to impart knowledge, skills, values and other abilities to learners. Physical education teachers have been described as trained professionals to impact learning to people. While teaching is the act of imparting knowledge, skills, values and other abilities to learners in such a way that learning can take place through the use of various teaching methods such as discussion method, lecture method, role-playing, field-trip, project method among others. In this study, a physical education teacher is a trained individual with licensed certificate to instruct students in physical activities. Since teachers play an important role in school systems and furthermore in societal function, proper inclusion of the special needs students can be affected by the attitudes of the physical education teacher. Again, inclusion of special needs student to the regular classes seems to pose more stress on physical health education teachers, hence the need for the study on the attitude of Physical Education teachers, towards inclusion education.

Attitude may be defined as a tendency to react positively or negatively in regard to an object. Attitude is defined as the tendency to react favorable or unfavorable to an event, object or people (Kumar, 2023). Attitudes can be belief-related or opinion-related. Shapariya (2021) averred that belief-related attitude is an acceptance of the existence of a thing without a proof, entirely based on values while opinion-related attitude is a feeling or view formed over a thing without any basis on facts or knowledge but on experience and assumptions. Teachers trained for special education hold positive views about inclusion than regular education teachers. The trained special education teachers are effective in reflection of beliefs as well as facilitating belief change in inclusive classroom (Dignath,et al. 2022). The belief-related and opinion-related attitudes displayed positively or negatively by most teachers towards special needs inclusion in regular classes are influenced by lack of incentives, low salaries, few special education trained teachers, lack of development and reinforcement (Farrukh, & Shakoor, 2018).Teachers hold the opinion-related attitude that there should be a change in the approach to the training of special-needs teachers by the content upgrading (Bibigul, et al., 2022). In this study, attitude refers to beliefs and opinions favorable or unfavorable to the physical education teachers in government secondary schools in Nsukka local government area regarding the inclusion of special-needs students in in health and physical education classes. Physical Education teachers' attitude towards successful inclusion of students with disabilities may have been influenced by number variables, however this study is interested in the influence of gender**.**

Gender has been identified as a demographic variable that can influence the attitudes of physical education teachers towards inclusion. Gender is the range of characteristics pertaining to, and differentiating between, masculinity and femininity. Gender refers to the characteristics of men and women that are socially constructed including norms, behaviours and roles associated with being a man or a woman, as well as relationships with each other. It is important to note that these socially constructed roles varies from culture to culture and can change over time. Gender-based discrimination connects with other factors of discrimination, including socioeconomic status and disability (World Health Organisation [WHO], 2024). Gender influences people's perception about themselves and each other, their action and interaction, and their resources and power distribution in the society Canadian Institutes of Health Research [CIHR], (2023).de Boer, et al. (2011) noted that affects teachers' attitudes towards inclusive education: gender.Ahmmed et al. (2012) stated that gender is a significant predictor of teachers' attitudes towards the inclusion of students with disabilities, with males holding a more positive attitude than females. Female teachers expressed more positive attitudes about special-needs students in regular classrooms than their male counterparts (Navarro-Mateu, et al., 2020; Saloviita, 2020). However, in the study of Monsen et al. (2014), gender had no association with the attitudes teachers towards inclusion. There is no significant difference between male and female teachers attitude towards inclusive education (Ediyanto, & Kawai, 2023; Singh, et al., 2020). Teachers with relatives that are special-needs shows positive towards inclusive education which is basically opinion-related (Schwab, 2021; Parey, 2019).

Education is a means of enlightening people to become better citizens, develop confidence and have societal relevance. It is a fundamental human right for all including the special-needs. Therefore, inclusion education provides the special need students the opportunity to be treated equally with the regular students of HPE classes. However, special needs students seem to be stigmatized and relegated to the background. Unfortunately, the situation is worrisome as the attitudes of some teachers especially in Nsukka LGA towards inclusion seem to have made the special-needs children to slack in physical education classes. This appears to result in the seclusion of these special-needs students from normal activities and loss of faith in their abilities.

Purpose of the Study.

The general purpose of the study was to investigate the attitude of PET towards inclusion of special-need students in regular health HPE classes in secondary schools in Nsukka Local Government Area. Specifically, determined various forms of;

1. belief-related attitude of PET towards inclusion of special-need students in regular HPE class in secondary schools in Nsukka Local Government Area;
2. opinion-related attitude of PET towards inclusion of special-needs students in regular HPE classes in secondary schools in Nsukka Local Government Area.

Hypotheses

Two null hypotheses were stated and tested at 0.05 level of significance as follows:

There is no significant difference in the mean responses of the male and female PET on:

HO_1: belief-related attitudes towards inclusion of special-need students in regular health and physical education class in secondary schools in Nsukka LGA

HO_2: opinion-related attitudes inclusion of special-need students in regular health and physical education class in secondary schools in Nsukka LGA

Methodology

Design of the study: Survey research was used in this study.

Area of the study: The area of this study was Nsukka LGA of Enugu State. This is one of the 17 LGAs in Enugu State and is made up of 20 communities. There are 38 public secondary schools in Nsukka LGA. There is inclusion of special-needs students in some of the schools. However, special provisions and equipment are not made for the special-needs within HPE.

Population for the study: Population for the study consisted of 172 physical education teachers in secondary schools in Nsukka local Government Area, Enugu State (Post Primary Schools Management Board (PPSMB), 2022). The PET are comprised of 79 males and 71 females, PET between the ages of 20-29 were 40; 30-39 were 60; 40 and above were 50; 1-5 years of experience were 39; 6-10 years of experience were 55 and 11years and above were 56. The entire population was used, since it was a manageable size.

Instrument for data collection: Questionnaire was the instrument used for the data collection. It was a structured based on the specific research purposes and literature review. The instrument had a five-point scale response options ranging from “Strongly Agree, SA” (5), “Agree, A” (4), “Neutral” (3), “Disagree D” (2) and ‘Strongly Disagree SD’ (1). Three

experts in health education face-validated instrument. Twenty copies of the questionnaire were administered on 20 respondents with similar characteristics with the study area. Cronbach Alpha reliability was used to determine the internal consistency of the items. A reliability index of 0.78 was obtained. The instrument was therefore deemed reliable for the study.

Method of Data Collection: A total of 172 copies of questionnaire were administered to the respondents by hands. Out of the 172 copies, only 150 were properly filled and retrieved. This represents 87 percent return rate,

Data analysis techniques: Means and standard deviation were used to analyze data on belief-related and opinion-related attitudes of teachers towards special needs inclusion. The $\overline{X} \geq 3.00$ was considered as positive attitude. Any $\overline{X} \leq 3.00$ was considered a negative attitude.t-test was used to test the null hypotheses at 0.05 level of significance. Values less than 0.05 level of significance was considered significant.

Results

Table 1: Mean Responses, Standard Deviation and t-test Results on Belief-related Attitudes of Physical Education Teachers towards Inclusion of Special n-eed Students in Regular Health and Physical Education (HPE) Class in Secondary Schools in Nsukka LGA (n=150)

S/N	Items on Belife-related Attitude	$\overline{X}_1$	SD_2	$\overline{X}_2$	SD_2	$\overline{X}_g$	t	P
	I Believe that Special-needs Students' Inlucion in Regular HPE Class:							
1	is beneficial for all students.	4.72	.452	4.54	1.045	4.62	1.351	.179
2	can improve their physical fitness	4.10	.995	4.29	.923	4.21	-1.210	.228
3	is not proper as special-needs require separate PE class	3.91	1.116	4.15	1.079	4.04	-1.305	.194
4	would enhance their social skills	4.41	.652	4.28	.634	4.34	1.247	.215
5	necessitates that physical education teachers be given additional support for effectiveness	4.44	.557	4.32	.954	4.37	.947	.345
6	would promote equality and fairness.	4.12	1.086	4.41	.993	4.28	-1.747	.083
7	would require too much extra work for the teacher	4.06	1.035	4.22	.875	4.15	-1.030	.305
8	is desirable because benefit from participating in regular hpe classes	4.25	.998	4.29	1.024	4.27	-.257	.798
9	is a legal requirement that must be fulfilled	3.62	1.383	4.20	.949	3.93	-3.022	.033
10	can promote positive relationships between special-needs and the non-disabled students	4.13	.945	4.37	.988	4.26	-1.470	.114

$\bar{X}_1$= Mean score of male physical education teachers; SD_1 = Standard deviation of male physical education teachers; $\bar{X}_2$ = mean score of female physical education teachers; SD_2 = Standard deviation of female physical education teachers; $\bar{X}_g$= Grand mean; t = t-test result; D = Degree of freedom = 148; P = 0.05

Table 1 shows that grand mean responses on belief-related attitudes of PET towards inclusion of special need students in regular HPE classes in secondary schools in Nsukka LGA

rangefrom 3.37 to 4.37, which that all the means are greater than the mean limit of 3.00($\bar{X} \geq 3.00$). This indicates that belief-related attitudes of PET towards inclusion of special need students in regular HPE classes are positive. Table 1 also reveals t values ranging from -3.022 to 1.351 which show that there no significant difference between the mean responses of both males and females teachersat 0.05 level of significance for nine of the belief-related attitudes..

Table 2: Mean Responses, Standard Deviation and t-test Result on Opinions-related Attitudes of Physical Education Teachers towards Inclusion of Special-need Students in Regular Health and Physical Education Class in Secondary Schools in Nsukka LGA.

S/N	Items on Opinion-related Attitude	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	t	P
	I feel that Including Special-needs Students in Regular Physical Education Classes:							
1	requires additional training for physical education teachers.	4.49	.560	4.23	.851	4.35	2.108	.037
2	can be challenging for physical education teachers.	3.82	1.371	3.93	1.225	4.29	-.487	.627
3	can be challenging due to the diverse needs of the students.	4.44	.557	4.17	1.086	4.29	1.860	.627
4	Will not challenge the teachers because they are able to teach special needs students.	4.04	1.043	4.34	1.102	4.21	-1.685	.094
5	Will not challenge HPET as they can collaborate with special education teachers to develop adapted physical education programs for special needs students.	4.49	.560	4.27	.786	4.37	1.909	.058
6	would involve too much individualized attention by the special needs students	4.47	.585	3.72	1.381	4.35	1.664	.098
7	Is not possible because HPET are not prepared to teach special needs students in regular HPE classes.	3.51	1.476	3.51	1.476	3.61	.886	.377
8	Would compromise the learning experience for other students	3.94	1.091	3.71	1.444	3.81	1.100	.273
9	would require too much extra work for me.	4.04	1.202	4.12	.894	4.09	-.454	.650
10	special needs students would be a distraction to other students in regular Health and Physical Education classes.	3.54	1.057	3.22	1.100	3.37	1.831	.069

$\bar{X}_1$= Mean score of male physical education teachers; SD_1 = Standard deviation of male physical education teachers; $\bar{X}_2$= mean score of female physical education teachers; SD_2 = Standard deviation of female physical education teachers; $\bar{X}_g$= Grand mean; t = t-test result; D = Degree of freedom = 148; P = 0.05.

Table 2 shows that the grand mean responses of PET on opinion-related attitudes towards inclusion of special need students in regular HPE classes in secondary schools in Nsukka

LGA ranges from 3.37 to 4.37,that is, all means ($\bar{X}$) are greater than the mean limit of 3.00. This indicates that opinion-related attitudes of PET towards inclusion of special need students in regular HPE classes are all positive. Table 2 also reveals t values ranging from -.454 to 2.108.This shows that there is no significant difference between the responses of the male and female teachers at 0.05 significant level of significance for the 10 opinion-related atitudes items, expect to item No. 7.

Discussion

The findings in table 1 shows that the belief-related attitudes of physical education teachers towards inclusion of special need students in regular health and physical education class in secondary schools in Nsukka LGA is positive. For instance, teachers believe that special needs students' inclusion in regular Health and Physical Education (HPE) classes is beneficial for all students.This finding is surprising and not expected because of the culturally ingrained negative disposition and discrimination against the special needs. However, the positive attitude could be as a result of increased sensitizations, training of special needs teachers and increased enlightenment about the rights of the special needs in the public domain. This finding agrees with Dignath, et al., (2022) who reported that special needs teachers had a positive belief-related attitude towards inclusion of special need students in regular health and physical education class. However, the finding was inconsistent with (Navarro-Mateu, Franco-Ochoa, Valero-Moreno, & Prado-Gascó, 2020; Saloviita, 2020) who found that female teachers expressed more positive attitudes about special needs students in regular classrooms than their male counterparts. In Table 3, there was no significant difference in the belief-related attitude of male physical education teachers. This implies that physical education teachers do not significantly differ in their belief-related attitude towards inclusion of special need students in regular health and physical education class. However, there may be subtle differences not captured by the analysis. The finding is consistent with (Singh, Shiba & Singh, 2020) who found that there was no significant difference in the male and female teachers belief-related attitude towards inclusive education. Also, in a related study by (Anokye-Poku & Ampadu, 2020), there was no significant difference in the attitude of both male and female teachers. However, the study is inconsistent with Ahmmed, et al. (2012) who found that there was a statistical difference in the male and female belief-related attitudes of Bangladeshi teachers towards inclusive education. This could be as a result of the belief system of the different cultures and the type of inherent values placed on the special needs in the different geographical locations,

Results in Table 2 shows that the opinion-related attitudes of physical education teachers towards inclusion of special need students in regular health and physical education class in secondary schools in Nsukka LGA is positive. This is evidenced by a high mean score of teachers with the opinion of collaborating with special education teachers to develop adapted physical education programs for special needs students among others. This finding is not surprising because opinions are not deeply rooted, but operates at the perception and emotional level. The finding is consistent with (Aboelmaaty, et al., 2023; Wa Munyi, 2018) who found that the opinion-related attitude of teachers was positive. This finding corroborates with Muega, (2019) who found that teachers that expressed opinion-related attitude of a need for changes in the regular schools to meet with the needs of students with special needs by collaboration and skills that could empower them. The finding is inconsistent with Lindner, Schwab, Emara & Avramidis, (2023) who found that regular teachers do not favour inclusive education. This could be as a result of lack of confidence in their ability to cope with teaching the special needs without appropriate training. The findings in Table 4 showed no significant difference in the opinion-related attitudes of male and female physical education teachers towards inclusion of special need students in regular health and physical education class in secondary schools in Nsukka LGA. The finding is consistent with the finding of (Ediyanto, & Kawai, 2023) who found no significant difference in the opinion-related attitudes of male and female physical education teachers towards inclusion The finding is inconsistent with (Rakap & Kaczmarek 2010) who found that there is a significant difference in the opinion-related attitude of male and female teachers on special needs inclusion. These inconsistencies could be as a result of range of factors including cultural orientation, individual disposition, material resource availability and trained human resources for the special needs inclusion on regular school classes..

Conclusions

Based on the findings, it was concluded that belief-based and opinion-based attitudes of physical education teachers were positive towards the inclusion of special needs students in regular health & physical education classes in schools in Nsukka Local Government Area. Both male and female physical education teachers showed positive attitude towards the inclusion of special needs students in regular health & physical education class in schools.

There was no significant difference on the belief-based and opinion-based attitude of male and female physical education teachers towards the inclusion of special needs students in regular health & physical education classes in schools in Nsukka Local Government Area. The findings of this study provides a useful guide for the government and relevant stakeholders to make adequate provision for the training and equipment of school teachers for special needs inclusion in secondary schools in Nsukka LGA.

Recommendations:

Based on the findings of the study, the following recommendations were proffered:

1. Ministry of Education, in conjunction with relevant agencies, should encourage constant seminars and workshop for teachers on inclusive education.
2. Considering peculiarities of special needs students in the construction of school sports facilities and equipment by school authorities and Education Ministry.
3. The government should pay more attention to inclusive schools so that children with special needs and those who are gifted can channel their talents and abilities well.

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Microfinance Services and Promotion of Activities of Women Entrepreneurs: A Case Study of Alache Microfinance Bank (AMB) in Cross River State, Nigeria

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Abstract

This study examined ways microfinance services promote the activities of women entrepreneurs in Cross River State with Alache as a case study. Specifically, the study determined ways access to credit services and business support services of Alache Microfinance Bank (AMB) promote activities of women entrepreneurs in Cross River State. The study used a survey research design. Population was made up of 270 women entrepreneurs who were beneficiaries of AMB's microfinance programmes. Instrument for data collection was questionnaire. Data were analyzed using mean and standard deviation. Results reveal 12 ways access to credit services of AMB promote activities of women entrepreneurs in Cross River State. These include, among other, access to credit encourages women entrepreneurship to get credit as business loan interest rate is low($\overline{X}$=3.92). Also, business support services of AMB promote activities of women in 11 ways, including, financial advisory services improves the knowledge of women entrepreneurs in managing their finances ($\overline{X}$=3.85) and others. Based on the results, the study made three recommendations, including; expanding microfinance services to more rural areas, providing flexible conditions, and integrating financial literacy programmes into the services.

Keywords: Microfinance, Women, Entrepreneurs, Financial, Inclusion, Business, Support, Services, Economic, Empowerment

Introduction

Microfinance services have emerged as a powerful tool for promoting financial inclusion and empowering marginalized populations, particularly women, in various parts of the world. Microfinance provides financial services, including credit, savings, insurance, and remittances, to low-income individuals who lack access to traditional banking services. Microfinance targets low-income people without access to the formal lending system (Rehman et al., 2015). It is generally dedicated to needy communities to support economic development by expanding their entrepreneurial activities (OECD, 1998). Capacity building services, management, vocational skills training, consultancy, advisory services, marketing assistance, information, technological development, transfer, and business linkage promotion

are typical services rendered by the latter (Khavul et al., 2013). Women's entrepreneurship development has garnered increasing attention in recent years as a catalyst for economic growth and social advancement. Donors, international public institutions, governmental authorities, non-governmental organizations (NGOs), private corporations, charities, research institutes, and businesses have launched programs or policies to encourage and support female entrepreneurs.

According to Rua (2018), Women entrepreneurship is the economic activity of women who think of a business enterprise, initiate it, organize and combine the factors of production, operate the enterprise, undertake risks and handle economic uncertainty involved in running a business enterprise. They initiate programmes to improve entrepreneurial skill capacity, strengthen women's networks, facilitate funding and training, or create policies to encourage better startups and business expansion. Women are less likely than men to be involved in entrepreneurial activity globally (Vossenberg, 2023). Okafor and Mordi (2010) argued that women entrepreneurs contribute to whole entrepreneurial activities, which includes recognizing and harnessing opportunities in their surroundings by creating goods and services for their society. Vossenberg (2023) stated that women-owned enterprises contribute significantly to employment generation, income generation, and poverty reduction in developed and developing economies.

Studies (Singh, 2010; Duflo et al, 2015; Khan, et al, 2016; Khaleque, 2018; Egwu and Ugwuala, 2019) about women entrepreneurs have also proven their business excellence, economic growth, and development, as well as about sustainability and sustainable peace. Women are better at using credit than men (Khaleque, 2018). At the same time, many poor rural women lack ownership and control over property such as land (Khan, et al, 2016). Palaniappan, et al (2012), in their study, analyzed the motivational factors and other factors that influence women to become entrepreneurs, the major strengths and weaknesses of women entrepreneurs and the environmental opportunities and threats which promote entrepreneurship, and offered suggestions to promote women entrepreneurship in selected districts in Tamilnadu. They opined that women have been triumphant over domestic barriers and gaining access to various professions. Knowledge, adaptability, and business skills are an added advantage for women who indulge in entrepreneurship. They concluded that finance, lack of training, and education are the reasons why women entrepreneurs fail to reach their zenith (Palaniappan, et al, 2012; Baharudin, et al, 2021).

Khaleque (2018) acknowledged that in Nigeria, women entrepreneurs have played an important role in enterprise development, employment generation, and poverty reduction. Women have always played an active role in their local economies. Women not only produce food but also trade giving them a developed knowledge of local markets and consumers. Egwu and Ugwuala (2019) maintained that the role of women in sustainable development has become increasingly an important issue in recent years and this has been due to the shift of emphasis away from equity concerns to the recognition of the productive roles women play and the contribution they can make towards economic growth and development. In Cross River State Ogundiran et al (2024) disclosed that women's participation in entrepreneurial activities not only supports their family income but also plays a significant role in economic development and social well-being of the society. John-Eke and Gabriel (2023) further admitted that the participation of women in entrepreneurial activity makes them not only self-confident and self-dependent but also see themselves as actualized women. In a similar study, Okafor and Mordi (2010) appreciate their role and stressed that women entrepreneurs in the southern senatorial district are women who contribute to whole entrepreneurial activities, which includes recognizing and harnessing opportunities in their surroundings via the creation of goods and services for their society.

There are policies at the international and national levels that support women entrepreneurs. The most notable instruments and commitments are the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), the Convention on the Rights of the Child (CRC), the Vienna Conference on Human Rights, and the Beijing Platform for Action (BpfA), New Partnership for African Development (NEPAD), AU Solemn Declaration for Gender Equality, African Protocol on People's Rights, and the Rights of Women (APPRRW), International Conference on Population Development Plan of Action (ICPD PoA), the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs) and importantly, the Nigerian Economic Recovery and Growth Plan (2017-2020) (National Gender Policy, 2023). Despite these policies, Egwu and Ugwuala (2019) raised concerns that women entrepreneurs are not achieving their full productive potential. Women entrepreneurs are sidelined, neglected, and unrecognized by the government as one of the leading factors of economic development. This development has resulted in their low productivity and women losing confidence in participating in entrepreneurial activities. Scholars have stressed that women entrepreneurs face numerous barriers, including limited access to capital, markets, power instability, lack of training and development, and as such inexperience in managerial skills and competence. Information, and supportive networks,

impede their ability to start and grow businesses (Egwu and Ugwuala, 2019; Mboto, et al. 2023; John-Eke and Gabriel, 2023; Vossenberg, 2023). There is still the problem of less access to credit for women entrepreneurs (Alkire, et al., 2013), which is thought to be one of the major obstacles for them pursuing their income-generating activities (Mahmud, et al., 2019). The consequence of this is the increasing level of poverty in Nigeria and Cross River State in particular. The aim of the study was to determine ways microfinance services promote the activities of women entrepreneurs in Cross River State.

Objectives of the study

The general objective of this study was to investigate ways microfinance services promote activities of women entrepreneurs in Cross River State with Alache microfinance bank (AMB) as a case study. Specifically, the study determined ways the following services of AMB promote activities of women entrepreneurs in Cross River State through:

1. access to credit.
2. business support.

Methodology

Research Design*:*This study adopted the survey research design.

Area of the Study*:*The area of study was Obudu Local Government Area (LGA) in Cross River State, Nigeria. The area is largely agrarian. The residents (males and females) are mostly farmers and traders. Alache Microfinance Bank Limited is the case study used for the study. Microfinance has supported the development of small and medium-scale businesses in the study area.

Population and Sample of the Study*:*The population of the study consisted of 270 women, who are customers and beneficiaries of loans from Alache Microfinance Bank, situated in Obudu, Cross River State. The entire population was used because the size was small and manageable.

Instrument for Data Collection: Questionnaire was used for data collection. It developed based on literature review and the specific objectives of the study. The instrument had a 5-point scale. It was validated by three university experts in Business education.

MethodofDataCollection:Two hundred and seventy (270) copies of the questionnaire were administered to respondents. A comprehensive explanationofthemainobjectiveofthe study

was provided to the respondents. Illiterate respondents were guided asthe questionnaire served as an interview schedule for them. All the 270 copies of the questionnaire were retrieved. This represents a 100 per cent return.

Data Analysis Technique*:*Data collected was analyzed usingmean and standard deviation. Based on the 5-point scale of the instrument, 3.00 was adopted as the cut-off mean for decision making. Any item with mean of 3.00 and above ($\overline{X} \geq 3.00$) was considered a way AMB services (access to credit/business support) has promoted.

Findings

Table 1: Means Responses and Standard deviation on Ways Access to Credit Services of AMB Promote Women Entrepreneurial Activities.

S/N	Access to Credit Services	$\overline{X}_1$	SD_1	R
	Access to Credit Services:			
1.	promotes entrepreneurial activities.	3.65	0.82	Agree
2.	enables increased level of patronage.	3.22	0.65	Agree
3.	raises household income.	3.23	0.60	Agree
4.	leads to expansion in family savings.	3.46	0.92	Agree
5.	enhances culture of savings.	3.87	0.87	Agree
6.	enhances expansion of product line.	3.28	0.62	Agree
7.	leads to an increase in the number of employees.	3.54	078	Agree
8.	increases women interest in expand their business.	3.80	0.56	Agree
9.	encourages women entrepreneurship to get credit as business loan interest rate is low.	3.92	0.88	Agree
10.	encourages women entrepreneurs to request for credit.	3.11	0.78	Agree
11.	encourages female entrepreneurs to seek credit facility, as loan refund is made easy.	3.05	0.87	Agree
12.	encourages them to get credit facility as women are given adequate time for repayment.	3.65	0.82	Agree

N = No of women 270; $\bar{X}$ = Mean responses (3.00); SD = Standard deviation; R = Remark

Table 1 presents data on ways in which access to credit services of AMB activities promotes women's entrepreneurial activities. The Table shows that the mean scores for each of the 12 item is higher than 3.00 ($\overline{X} \geq 3.00$). This implies that access to credit services for AMB activities promotes women's entrepreneurial activities in the 12 ways presented in Table 1 in Cross River State.

Table 2: Means Responses and Standard Deviation on Ways Business Support Services of AMB Activities Promote Women Entrepreneurial Activities.

S/N	Business Support Services	$\bar{X}_1$	SD_1	R
1.	Training women entrepreneur enhances their marketing skills in business.	3.11	0.85	Agree
2.	Training women entrepreneurs improves their skills in managing their businesses.	3.14	0.78	Agree
3.	Managerial training improves women's record-keeping practice	3.09	0.66	Agree
4.	Managerial training improves women's financial knowledge	3.48	0.77	Agree
5.	Managerial training improves women access to new business opportunities.	3.06	0.64	Agree
6.	Financial advisory services improves the knowledge of women entrepreneurs in managing their finances.	3.85	0.58	Agree
7.	Financial advisory services enhance women's ability to save.	3.12	0.75	Agree
8.	Managerial training improves women's business decision making capacity.	3.14	0.62	Agree
9.	Business support services enhance stress-free saving procedures.	3.27	0.63	Agree
10.	Support services enables women to access loans and other relevant services.	3.50	0.60	Agree
11.	Support services encourages women to bargain for reasonable interest.	3.27	0.63	Agree

N = No of women 270; $\bar{X}$ = Mean responses (3.00); SD = Standard deviation; R = Remark

Tabel 2 shows that all the 11 items obtained means of 3.00 and above ($\bar{X} \geq 3.00$). This implies that the items are 11 ways the business support activites of AMB promote the entrepreneurial activities of women.

Discussions

The findings of the study reveal that access to credit services of Alache Microfinance Bank (AMB) promote activities of women entrepreneurs in 12 ways in Cross River State. The implication of this is that providing access to women entrepreneurs plays a significant role in developing women-owned micro and small enterprises and household income and consumption. These findings are consistent with those of Thompson (2002), Bonfiglioli, et al (2016), Okafor and Mordi (2010), Singh (2010), and Mahmud et al. (2019), that indicate, among others, that microfinance institutions provide micro-credit, and micro-credits have been source of encouragement to women entrepreneurs for a few decades, hence, micro-credit programs play a significant role in accelerating women's income. More so, statistics from the International Monetary Fund (2019) indicate that, worldwide, women earn 63 percent less than men, yet they spend three times as many hours in unpaid labour. Therefore, empowering women means allowing women to survive, and live a life of respect, dignity, self-esteem, and self-confidence, while helping them on making their own decisions. Access

to credit facilities will lead to business expansion, employment generation, and poverty reduction in Nigeria, and Cross River State in particular.

Findings of the study also reveal that business support services of Alache Microfinance Bank (AMB) promote activities of women entrepreneurs in 11 ways in Cross River State. Support services provided to the women by Alache Microfinance Bank include training on how to develop business plans, business monitoring, and growing and sustaining the business. This informal business education has provided a significant impact on business growth in the area. These findings are consistent with those of Thaher, *et al* (2021) in a study carried out in Jordan which reported a meaningful relationship between training, on the one hand, and the rate of income, assets, and savings of female entrepreneurs, on the other hand. The findingsare also supported by those of Salum (2014);Fidrmuc and Kostagianni, (2015); Abebe and Kegne (2023); and (Aina, 2003) who studied the role of microfinance services on entrepreneurial development in selected African countries.Their studies revealed microfinance institutions that play a significant role in enhancing micro-entrepreneurs, through the provision of loan services, consultation, training, and business monitoring services. Microfinance as a financial service provides access to financial services for low-income and unemployed people (Baharudin, et al, 2021). Business support services have been quite successful in reducing poverty and promoting economic development (Shkodra, 2019).

Conclusion

The study aimed to investigate ways microfinance services promote the activities of women entrepreneurs in Cross River State. The findingsshow that access to credit services of AMBpromote activities of women entrepreneurs by 12 ways in Cross River State and business support services of AMB promote the activities of women entrepreneurs through 11 ways in Cross River State. These results are supported by contemporary research and emphasised the need for financial institutions, especially microfinance banks to support women entrepreneurs in developing, monitoring, and sustaining the local economy.

Recommendations

This study recommends the following:

1. Microfinance banks should expand their services to more rural areas, by increasing access to financial services to women entrepreneurs. This should be done with.

2. Microfinance banks should provide more support services to women entrepreneurs. Thesecould include capacity-building services, vocational skills training, consultancy, advisory services, marketing assistance, technological development, transfer, and business linkage promotion.
3. Microfinance banks also need to offer their customers financial literacy training and savings.

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