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Spatial Patterns of Contraceptive Utilization Among Rural Women in Bayelsa State

DR. CLARKE TARELAYEFA
Department of Geography and Environmental Education, Isaac Jasper Boro College of Education, Sagbama Bayelsa State

Abstract- ***Despite considerable efforts aimed at improving reproductive health outcomes in Nigeria, contraceptive utilization among rural women remains relatively low and unevenly distributed across geographical locations. This study examined the spatial patterns of contraceptive utilization among rural women in Bayelsa State, Nigeria. A survey research design was adopted. Data were obtained though stuctured questionaires administered to rural women of reproductive age in selected rural communities within Bayelsa State. Descriptive statistics, mean scores and Analysis of Variance (ANOVA) were used for data analysis. Findings revealed that awareness of contraceptives was relatively high among respondents, although knowledge of specific contraceptive methods remained inadequate. Radio, newspapers/magazines and internet platforms constituted the major channels through which family planning information was accessed. Modern contraceptive methods were more widely utilized than traditional methods; however, the overall level of contraceptive utilization remained low. Significant spatial variations in contraceptive utilizaton were observed across the study area. The study concludes that geographical disparities in information access and socio-cultural conditions influence contracepive utilization among rural women in Bayelsa State. The study recommends strenghtening community-based famiy planning programmes, expanding reproductive health information dissemination and improving access to modern contraceptive services in underserved rural communities.***

Keywords: Contraceptive Utilization, Spatial Pattern, Family Planning, Rural Women, Bayelsa State, Nigeria.

I. INTRODUCTION

Family planning remains an important component of reproductive health and sustainable development. Contraceptive utilization enables women and couples to regulate fertility, prevent unintended pregnancies and improve maternal and child health outcomes. Globally, modern contraceptive use has increased over the past decade; however, significant disparities persist between urban and rural populations, particularly in developing countries.

Nigeria continues to experience high fertility rates and relatively low contraceptive prevalence compared with global averages. According to the National Population Commission and ICF (2023), Modern contraceptive prevalence among married women remains below global targets, with rural areas recording lower levels of utilization than urban centres.These disparities have implications for maternal mortality, population growth and socio-economic development.

Recent studies have shown that awareness alone does not necessarily translate into utilization of contraceptives. Differences in educational attainment, socio-cultural beliefs, access to information and geographical location inflence reproductive health decisions among women.From a geographcal perspective utilization reflect differences in access to information, health services and community-level influences.

Bayelsa State is characterized by dispersed rural settlements, difficult terrain and varying levels of infrastructural development. These characteristics may affect access to reproductive health information and services, thereby influencing contraceptive utilization patterns among rural women. Understanding these spatial differences is necessary for designing targeted family planning interventions capable of addressing local reproductive health challenges.

This study therfore investigates the spatial patterns of contraceptive utilization among rural women in Bayelsa State, Nigeria.

Aims and Objectives of the Study

The aim of the study is to examine the spatial patterns of contraceptive utilization among rural women in Bayelsa State, Nigeria.

The specific objectives are to:

1. Examine the pattern of contraceptive utilization among rural women in Bayelsa State.
2. Identify the types and methods of contraceptives utilized by rural women in Bayelsa State..
3. Determine whether significant spatial variations exist in contraceptive utilization among communities in Bayelsa State.
4. Examine factors influencing utilization among rural women in Bayelsa State.

Research Hypothesis

The following hypothesis guided the study:

HO1: There is no significant relationship between the level of knowledge and awareness and the adoption of contraceptives among rural women.

HO2: There is no significant variation in the use of contraceptives among rural women

II. LITERATURE REVIEWS

Conceptual Review

Contraceptive Utilization and Spatial Variations

Contraceptive utilization refers to the adoption and use of methods aimed at preventing or delaying pregnancy among women of reproductive age. Contracptive methods may be modern, including pills, injectibles, implants, intrauterine devices, and condoms, or traditional methods such as withdrawal and periodic abstinence. The use of contraceptives contributes significantly to improved maternal and child health, reduction in unintended pregnancies, and fertility regulatin (Ross, 2021). Despite increased awareness of family planning methods in Nigeria, utilization remains relatively low among rural women due to socio-economic, cultural and geographical barriers (Akamike et al.,2020)

Studies have revealed marked spatial disparities in contraceptive utilization across Nigeria. Bolarinwa et al. (2021) found a significant geographical clustering in modern contraceptive use among women of reproductive age, with southern states generally exhibiting higher utilization rates than northern states. Such spatial inequalities have been attributed to differences in access to healthcare facilities, educational attainment,socio-economic status, and cultural practices. Similarly, Akinyemi (2021) observed substantial spatio-temporal variations in reproductive healthcare utilization across Nigeria, emphasizing the importance of geographical location in determining access to family planning services.

Among rural women, contraceptive utilization is influenced by several factors. Education has consistently been identified as a major determinant, as educated women are more likely to understand and adopt family planning methods (Blackstone, Nwaozuru, & Iwelunmor, 2017). Economic status also plays an important role, as women with higher incomes are better able to access reproductive health services. Furthermore, cultural and religious beliefs, partner approval, and fear of side effects significantly influence contraceptive uptake in many rural communities (Akamike et al., 2020).

Accessibility to healthcare facilities is another critical factor influencing contraceptive utilization.Women residing in remote rural settlements often experience limited access to health facilities, poor transportation networks, and inadequate availability of family planning commodities, thereby reducing utilization rates (Ujah & Kirby, 2022). Exposure to health information through mass media and healthcare providers has equally been shown to positively influence contraceptive use among rural women (Bolarinwa et al., 2021). These findings suggest that spatial factors, particularly distance and accessibility to healthcare services, are important determinants of contraceptive utilization among rural women in Bayelsa State.

Theoretical Framework

Diffusion of Innovation Theory

This study is anchored on the diffusion of innovation theory propounded by Everett Rogers in 1962. The theory explains how new ideas, innovations or technologies spread within a social system over time through communication channels. According to

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Rogers, the adoption of an innovation depends on individual's awareness, interest evaluation, trial and eventual acceptance of the innovation.

In the context of contraceptive utilization, modern contraceptive methods constitute innovations whose adoption is influenced such as knowledge awareness, socio-cultural norms, communication networks and accessibility. Rural women who are adequately informed about the benefits and availability of contraceptives are more likely to adopt such methods than those with limited awareness.

The theory is relevant to this study because it provides an explanation for the observed spatial variations in contraceptive utilization among rural women in Bayelsa State. Difference in access to information, healthcare facilities and social interactions across communities may influence the rate at which contraceptive methods are adopted. Consequently the diffusion of innovation theory offers a useful framework for understanding the patterns and determinants of contraceptive utilization in the study area.

III. STUDY AREA

Bayelsa State is located in the core Niger Delta region of southern Nigeria. It lies approximately between latitudes 40 15'N and 50 23'N and longtitudes 50 22'E and 60 45'E. The state is bounded by Delta State to the north, Rivers State to the east and the Atlantic Ocean to the south and west. Bayelsa State occupies a land area of about 16,773km2 and is characterized by extensive wetlands, mangrove swamps, creeks and river networks.

The state comprises eight local government areas (LGAs), namely Yenagoa, Southern Ijaw, Brass, Nembe, Ogbia, Kolokuma/Opokuma, Sagbama and Ekeremor. The predominantly rural nature of many communities in the state makes it suitable for investigating contraceptive utilization among rural women. The major occupation of the inhabitants include fishing, farming, petty trading and artisanal activities. The dispersed settlement pattern, poor accessibility and inadequate healthcare facilities in many rural communities have implications for access to reproductive health services and contraceptive utilization.

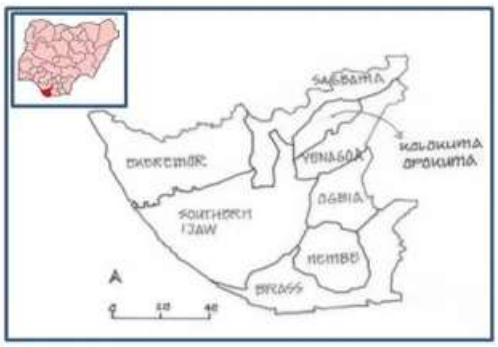

Figure 1 (Map of Bayelsa State showing the selected LGAs)

IV. METHODOLOGY

The study was conducted in rural communities of Bayelsa State, Nigeria.A descriptive cross-sectional survey design was adopted to examine the spatial patterns of contraceptive utilization among rural women of reproductive age (15-49 years). A multistage sampling technique was adopted. Bayelsa State was stratified into its three senatorial districts, from which six predominantly rural areas (Yenagoa, Southern Ijaw, Brass, Nembe, Sagbama, and Ekeremor) were purposively selected to ensure adequate spatial representation across the state. A total of 138 women of reproductive age were sampled, wih 23 respondents selected from each LGA.

Primary data were collected through the administration of structured questionnaires, which elicited information on respondents socio-demographic characteristics, contraceptive awareness, utilization patterns, and factors influencing contraceptive use.Data were analyzed using the Statitical Package for Social Sciences (SPSS) version 25.Descriptive statistics, including frequencies and percentages were used to summarize contraceptive utilization paterns, while spatial variations across the selected LGAs were examined using cross-tabulations. Simple linear regression analysis was employed to determine the relationship between knowledge/awareness and contraceptive

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adoption, whereas Analysis of Variance (ANOVA) was used to examine spatial variations in contraceptive utilization. All hypothesis were tested at 0.05 level of significance

V. RESULTS AND DISCUSSION

TABLE 1 Socio-Demographic characteristics of respondents in Bayelsa State

Variable	Category	Frequency	Percentage (%)
Marital status	Single	71	51.45
	Married	50	36.23
	Divorced	18	12.94
Education status	No formal education	38	27.94
	Adult literacy	27	19.57
	Secondary education	36	25.90
	Tertiary education	38	27.54
Source of livelihood	Government employees	15	10.87
	Farmer	63	45.32
	Commercial sex worker	12	8.69
	Self employed	34	24.64
	Family support	15	10.87

Table 1 presents the socio-demographic characteristics of the respondents. The results show that the majority of the respondents were single (51.45%), while 36.23% were married and 12.94% divorced. In terms of educational attainment, respondents with tertiary education and those without formal education each accounted for (27.54%) followed by secondary education (25.90%) and adult literacy education (19.57%). Regarding occupation, farming constituted the major source of livelihood (45.32%) while self-employment accounted for 24.64%. This suggests that the respondents were predominantly rural dwellers engaged in agrarian activities.

TABLE 2 Spatial distribution of contraceptive utilization of contraceptive utilization among rural women in Bayelsa State

L.G.A	Modern contraceptive use (%)	Traditional contraceptive use (%)	
Yenagoa	13.0	34.8	52.2
Southern Ijaw	21.7	30.4	47.8
Brass	17.4	26.1	56.5
Nembe	13.0	21.7	65.2
Sagbama	8.7	52.2	39.1
Ekeremor	47.8	30.4	21.7
Overall state average	20.3	32.6	47.1

Table 2 shows that modern contraceptive use was highest in Ekeremor (47.8%) and lowest in Sagbama (8.7%). Non-use of contraceptive was highest in Nembe (65.2%), while traditional methods were predominantly used in Sagbama (52.2%). Overall, 20.3% of respondents used modern contraceptives 32.6% used traditional methods and 47.1% did not use any contraceptive method.

Table 3 Contraceptive methods used among rural women in Bayelsa State

Method	Frequency	Percentage %
Condom	51	36.9
Oral pills	38	27.54
Uterine implant	37	22.46
IUD/female Sterilization	18	13.04
Total	138	100.00

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Table 3 indicates that condoms constituted the most commonly used contraceptive method (36.96%) followed by oral pills (27.54%), uterine implants (22.46%) and IUD sterilization (13.04%).

Table 4 Reasons for contraceptive use and rural women in Bayelsa State

Reason	Frequency	Percentage (%)
Space children	58	42.03
Sexual pleasure	30	21.74
Easily accessible	24	17.39
Avoid unintended pregnancy	13	9.42
Avoid STIs/STDs	13	9.42
Total	138	100.00

Table 4 reveals that child spacing was the major reason for contraceptive use among respondents (42.03%), followed by sexual pleasure (21.74%) and accessibility of contraceptive methods (17.39%). Prevention of unintended pregnancy and STIs accounted for 9.42 each.

Table 5 Factors influencing contraceptive utilization among rural women in Bayelsa State

Factor	Frequency	Percentage (%)
Religious	81	58.70
Social	40	28.99
Economics	9	6.52
Political	5	3.62
Health	3	2.17
Total	138	

Table 5 shows that religious factors constitute the major determinant of contraceptive utilization (58.70%) followed by social factor (28.99%). Economic, political and health factors accounted for relatively smaller proportions.

Table 6: ANOVA Showing Spatial Variation in Contraceptive Utilization

Factor	F-Value	Significance (P-Value)
Economic	0.591	0.899
Political	1.214	0.249
Religious	7.473	0.000
Social	3.515	0.000
Health	4.736	0.000

The ANOVA results revealed statistically significant spatial variations in contraceptive utilization across the study area (p> 0.05). This suggests that geographical location influences contraceptive uptake among rural women in Bayelsa State.

VI. HYPOTHESES TESTING

HYPOTHESIS ONE

H01: There is no significant relationship between knowledge and awareness and the adoption of contraceptives amng rural women in Bayelsa State.

Regression Analysis Showing the Relationship between Knowledge/ Awareness and Contraceptive Adoption

Variable	R	R	Adjusted R	F	Sig
Knowledge and Awareness			0.513	0.263	0.261
146.878	0.000				

The regression analysis in Table 6 revealed a moderate positive relationship between knowledge and awareness and contraceptive adoption among rural women in Bayelsa State (R=0.513). The coefficient of determination (R =0.263) indicates that approximately 26.3% of the variation in contraceptive adoption is explained by women's level of knowledge and awareness. The analysis further showed that the regression model was statistically significant (F= 146.878, p<0.05). Since the probability value (0.000) is less than 0-05 level of significance, the null hypothesis was rejected.

HYPOTHESIS TWO

H0 2: There is no significant spatial variation in contraceptive utilization among rural women in Bayelsa State.

Table 7: ANOVA Results on Spatial Variation in Contraceptive Utilization

Contraceptive Method	F- value	Sig.
IUD	465.898	0.000
Injectables	716.304	0.000
Implants	1209.077	0.000
Pills	39.819	0.000
Female Condom	5.761	0.000
Withdrawal Method	596.477	0.000

The ANOVA results presented in Table 7 indicate significant variations in contraceptive utilization among rural women across the study locations. All the conraceptive methods examined recorded significance values less tan 0.05. Specifically. Implants recorded the highest variation ($F= 1209.077$, $p<0.05$), followed by injectables ($F=716.304$, $p<0.05$) and withdrawal methods ($F = 596.477$, $p<0.05$). Since the significance values for all methods were less than the 0.05 alpha level, the null hypothesis was rejected.

VII. DISCUSSION

The study revealed considerable spatial variations in contraceptive utilization among rural women in Bayelsa State, with Ekeremor recording the highest level of modern contraceptive use, while Sagbama and Nembe exhibited relatively low levels of utilization.

These disparities may be attributed to differences in access to healthcare facilities, information dissemination, and socio-cultural characteristics across the LGAs. This finding is consistent with the studies of Bolanirwa et al. (2023), Obede et al. (2026), and Olakunde et al. (2022), who reported significant disparities in contraceptive utilization among rural populations. The findings further showed that condoms were the most commonly utilized contraceptive method among rural women. Their predominance may be associated with affordability, ease of access, and effectiveness in preventing both pregnancy and sexually transmitted infections. This finding corroborates the report of Bawah et al. (2024) and Boadu (2022), who noted that male condoms remain one of the most widely used contraceptive methods in Nigeria.

Child spacing emerged as the major reason for contraceptive utilization among respondents, indicating that rural women primarily adopt contraceptives for fertility regulation and maternal health improvement. Religious beliefs were identified as the most significant factor influencing contraceptive utilization, suggesting that socio-cultural and religious norms continue to shape reproductive behaviour in rural communities. This finding agrees with the works of Eshomy et al. (2022), Tegema et al. (2025), and Kasagaye et al., which identified religion and socio-cultural factors as important determinants of contraceptive uptake among women in Sub-Saharan Africa. Overall, the findings underscore the need for intensified family planning awareness campaigns and community-based sensitization programmes involving religious and community leaders to improve contraceptive utilization among rural women in Bayelsa State.

The study revealed that awareness of contraceptives among rural women was relatively high, consistent ith findings reported by Bolarinwa et al. (2021) and National Population Commission and ICF (2023). However, awareness did not necessarily translate into utilization, suggesting that knowledge deficits and socio-cultural ormationbarries continue to limit adoption.

The findings further demonstrated the communication channels such as radio, newspaprs and internet platforms play important roles in disseminating family planning information. Similar obervations have been reported by Ahmed et al. (2022), who identified access to reproductive health information as a critical determinant of contraceptive behaviour behaviour among rural women. The predominance of condoms and oral contracepttive pills among users reflects the accessibility and familarity of these methods. Nevertheles, overall utilization remained low, corroborating previous studies that reported persistent contraceptive gaps among rural populations in Nigeria. The significant spatial variation observed in the study highglights the importance of place-based factors in reproductive health outcomes. Differences in access to information, health facilities and community norms may account for variations in contraceptive utilization across rural communities.

The rejection of the null hypothesis indicates that knowledge and awareness significantly influence contraceptive adoption among rural women in Bayelsa State. This implies that women who possess adequate knowledge of contraceptive methods are more likely to adopt and utilize family planning services than those with limited awareness.

The finding underscores the critical role of health education, media campaigns and reproductive health sensitization programmes in enhancing contraceptive uptake. The relatively high explanatory power of the model further suggests that improving awareness could substantially incrase contraceptive utilization among women.

This finding corroborates earlier studies by Adewuyi et al. and Eliason et al., who reported that awareness and knowledge significantly predict contraceptive use among women in rural communities. The finding also supports the assumptions of the Diffusion of Innovation Theory, which posits that awareness is a prerequisite for the adoption of innovations, including modern contraceptive methods.

The significant ANOVA results demonstrate that contraceptive utilization varies significantly across rural communities in Bayelsa State. This finding suggests that contraceptive behaviour is spatially differentiated rather than uniformly distributed across the state.

The observed spatial disparities may be attributed to differences in accessibility to health facilities, socio-cultural practices, educational attainment, religious beliefs, and exposure to reproductive health information across the various Local Government Areas. For instance, the higher utilization of modern contraceptives observed in Ekeremor compared with Sagbama and Nembe may reflect variations in access to healthcare services and family planning information.

The finding is consistent with studies by Stephenson et al. which reported significant geographical disparities in contraceptive utilization across rural populations. The result also validates the proposition of Spatial Diffusion Theory, which emphasizes that innovations spread unevenly across space due to differences in accessibility, communication networks and socio-economic characteristics.

VIII. CONCLUSION

The study examined the spatial patterns of contraceptive utilization among rural women in Bayelsa State, Nigeria. Although awareness of contraceptives was relatively high, utiliztion remained generally low. Significant geographical variations were observed across rural communities, indicating that location-specific factors influence contraceptive behaviour. Improving access to family planning information and reproductive health services is essential for enhancing contraceptive uptake among rural women.

IX. RECOMMENDATIONS

1. Government should strenghten community-based family planning programmes in underserved rural communities
2. Reproductive health inormation should be disseminated through multiple communication channels including radio, internet platforms and community outreach programmes.
3. Health facilities offering family planning services should be expanded in remote areas.
4. Community leaders and women's groups should be actively involveed in reproductive health education campaigns

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