



## Spatial Variation of Female Contraceptive Use in Nigeria

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**Abstract:** The research investigated the geographical distribution of female contraceptive utilization in Nigeria, employing a retrospective methodology to gather archived population data. For over six years, data regarding contraceptive practices among women aged 15-49 has extracted from the National Bureau of Statistics (NBS) and the Nigeria Demographic Health Survey (NDHS). Spatial variations in contraceptive usage across Nigeria were assessed using the ANOVA statistical technique. Results indicated an increase in female contraceptive prevalence from 15.3% in 2016 to 18.1% in 2021, with Oyo, Imo, and Lagos states exhibiting the highest rates of usage. The study noted a higher prevalence of modern contraceptive methods in the southern region, attributed to increased awareness. Significant disparities in contraceptive usage among Nigerian women were confirmed ( $P < 0.05$ ), with notably low utilization rates in the north-eastern geopolitical zones. Furthermore, analysis revealed significant differences ( $P < 0.05$ ) in the types of modern contraception employed, particularly in the pronounced variance between injectables and other methods. The study underscores the importance of providing accurate and timely information on diverse contraceptive options to Nigerian women, emphasizing the need for informed family planning strategies.

**Keywords:** Modern, Contraceptive, Use, Nigeria, Women

### Introduction

The world's population is anticipated to reach 9.8 billion people by the year 2050, up from the official number of 7.3 billion in 2015 (Eshete and Adissu, 2017). Nigeria has 140 million people and is the tenth most populated Sub-Saharan developing country in the world, with an annual growth rate of 3.2% (Olalekan et al., 2020). The rapid pace of population increase in Nigeria, where there are more people than resources, has been one of the main hindrances to economic progress (Etukudo and Inyang 2014).

Nigeria's fertility rate is currently higher than the world average, and although more than doubled in the last decade, contraception rates among women of reproductive age (ages 15-49) continue to be low (Egbo, 2021). The poor usage of contraception, in particular, has contributed to a rise in the population growth rate (Mahmood and Ringheim 1996; Dasgumpta et al 2015).

Unwanted pregnancies are most commonly caused by unintentional sexual activity in Nigeria, and many women prefer to get abortions (Otoide et al 2001). These women patronize unapproved settings and quacks for abortions because they are prohibited in Nigeria (unless a doctor recommends it to save a mother's life). The results of a covert abortion are severe, even fatal, and frequently result in the death of the mother. Abortion accounts for 20% to 40% of maternal deaths in Nigeria (Oriji 2009). to avoid unwanted pregnancy and abortion, women patronize the use of modern contraceptives.



Most Nigerian women face several obstacles when trying to get and use contemporary contraception (Osinowo et al 2020). Literature to date has shown that some characteristics, the most important of which are education, poverty, and gender inequality, are associated with people's access to family planning and contraception (Bearinger et al 2007; Watkins 2012; Shen and Han's 2014). Studies have found that socio-demographic parameters such as age, parity, education, religion, location of residence, current employment, marital status, spousal communication, and other factors can explain observed variations in the use of contraceptives by women in sub-Saharan Africa (Odimegwu et al 1997; Omo-Aghoja 2009; Adebowale et al 2013).

Birth control is used to satisfy society's demands regarding reproductive health and prevent population growth (Shrestha et al 2000). Birth control is a method whereby a couple chooses the interval between their pregnancies by using contraceptives (Idiaye et al 2021). According to the International Women's Health Coalition's study, the Contraceptive Prevalence Rate (CPR) among married women aged 15 to 49 was 8% for contemporary techniques and 12% for all methods, which is still shamefully low in Nigeria (Nwachukwu and Obasi 2008). He however, calls for more studies for the continuous update of this rate.

Due to physical, social, emotional, and economic limitations, people have been utilizing contraceptives to control reproduction for millennia (Sarna 2000; Evans 2009). Female condoms, diaphragms, foam tablets, oral contraceptive pills (OCP), Depo-Provera, surgical implants, and IUCD are examples of temporary man-made or artificial contraceptive treatments (Bitzer 2010; Daniels et al 2013). For both men and women, voluntary surgical procedures such as vasectomy and tubal ligation are among the permanent contraceptive techniques (WHO 2011).

Each method's effectiveness rates for contraception vary, with surgical treatments and contemporary techniques being far more successful than the majority of natural methods. Male and female condoms, oral hormonal tablets, intrauterine devices (IUD), implants, male and female sterilisation (vasectomy and tubal ligation), injectables, vaginal barriers, and emergency contraception are only a few of the modern contraceptive techniques that have been created (Lasong et al 2020).

Modern contraceptive technologies enable individuals and couples to have the number of children they wish and to choose the spacing between pregnancies. Avoiding unsafe abortions, birth injuries, and all other pregnancy-related issues, lowers mother and infant mortality (Prata, 2009). The three traditional forms of birth control are withdrawal (coitus interrupts), sexual abstinence, and lactation amenorrhea (which consists of women breastfeeding their babies exclusively during six months postpartum).

Women who solely rely on traditional techniques for spacing or restricting their pregnancies may experience unwanted pregnancies or other health issues since they are less successful than contemporary contraceptive methods (Darroch and Singh 2013).

Family planning is essential to stop population growth and reduce the high incidence of unintended pregnancies. Family planning is an important technique for spacing births and lowering the risk of maternal and infant mortality (Da Vanzo et al 2007). Effective contraception will lower the prevalence of high-risk pregnancies and maternal death rates. Studies have also demonstrated that equitable access to contraception for all women, especially in rural areas, will help avert between 30% and 40% of maternal deaths (Collumbien et al 2004; Cleland et al 2011; Ahmed et al 2012).

Family planning benefits include reduced population growth, poverty, improved welfare, environmental preservation, and reduced demand for public goods and services (Rele et al 2019). By avoiding adolescent pregnancies and spacing newborns at certain intervals, effective contraceptive usage helps reduce maternal mortality (Starbird et al., 2016). Because of its considerable role in balancing population growth

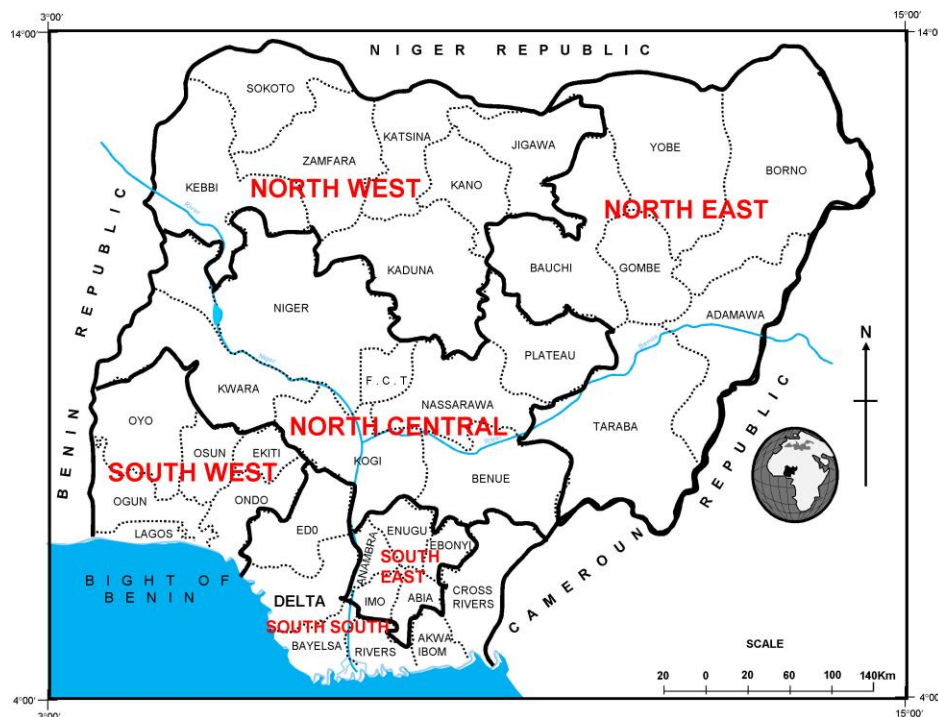


and economic development through the management of fertility rates, contraceptive usage is one of the most affordable solutions to demographic concerns according to demographic reasoning. This reduces the demand for limited natural resources (Seltzer 2002; Vlassoff et al 2009; Singh and Darroch 2012).

Arising from the calls and the problems associated with no usage of contraceptives, this study examines the spatial variation in female contraceptive usage in Nigeria.

### Study Area

Nigeria lies between the  $3^{\circ}15'N$  and  $4^{\circ}01'N$  north latitudes and  $7^{\circ}22'E$  and  $8^{\circ}16'E$  east longitudes. Nigeria consists of 36 states and the Federal Capital Territory (FCT) (Fig 1). Nigeria shares borders with Benin, Cameroon, Chad, and Niger, and has 853 miles of shoreline on the Gulf of Guinea and 910,768 square kilometres of land in West Africa. The northern plains contrast with the southwestern lowlands, the south-eastern mountains, and the central hills and plateaus. Nigeria has a total land area of 923,768  $km^2$  and a water area of 13,000  $km^2$ . The total border of Nigeria is 4,047 km long. Nigeria shares borders with Benin (773 km), Cameroon (1,690 km), Chad (87 km), and Niger (1,497 km). Nigeria's climate is characterized by a high latitude zone that becomes progressively drier as you move north from the coast. Nigeria's climate is characterized by the dry season and the wet season, the dry season is also known as the Harmattan season, and the little dry season (August break) (Efe 2006). The relative coldness of the wet and harmattan seasons formed a *sin qua non* for increase in sexual intercourse and usage of contraceptives (Efe 2006 and 2013)



**Fig 1:** Map of Nigeria

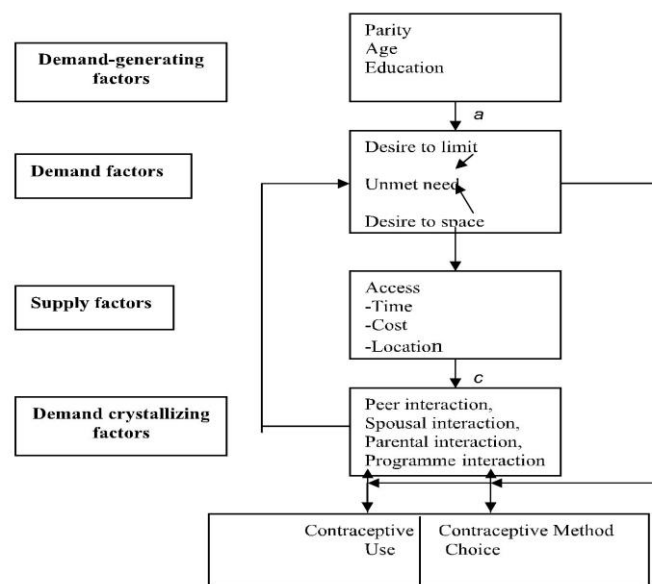


## Conceptual Issues

Fertility decisions are based on the idea that as societies modernize, changes occur, such as changes in rational decision-making and family composition. According to this model, the population's percentage of current contraceptive users is the total number of new (adopted), ongoing (continued), and restarted (restarted) users. These can be used to distinguish between pre and post-use contraceptive stages.

These stages are themselves influenced by socioeconomic, cultural and macroeconomic factors (Fig 2). Decision-making consists of three elements for her: Knowledge, motivation, and assessment of birth control. Women's use of contraception requires a perception that means of controlling fertility are available and accessible. This allows us to act on these perceptions according to the Davis and Blake (1956) model.

The structural model of contraceptive use is an underlying fertility factor. The model addresses the factors impacting contraceptive use and reproduction on both the demand and supply sides.



**Fig 2:** Conceptualization of Fertility Decision (Source: Adapted from Davis and Blake , 1956)

The simple form of these models suggests that extrinsic individual background factors influence female fertility preferences. These factors include the woman's age, education, reproductive status, marital relationship, family support, and family planning program variables. The specific ways individual and behavioural variables influence outcomes are of primary interest.

## Methods and Materials

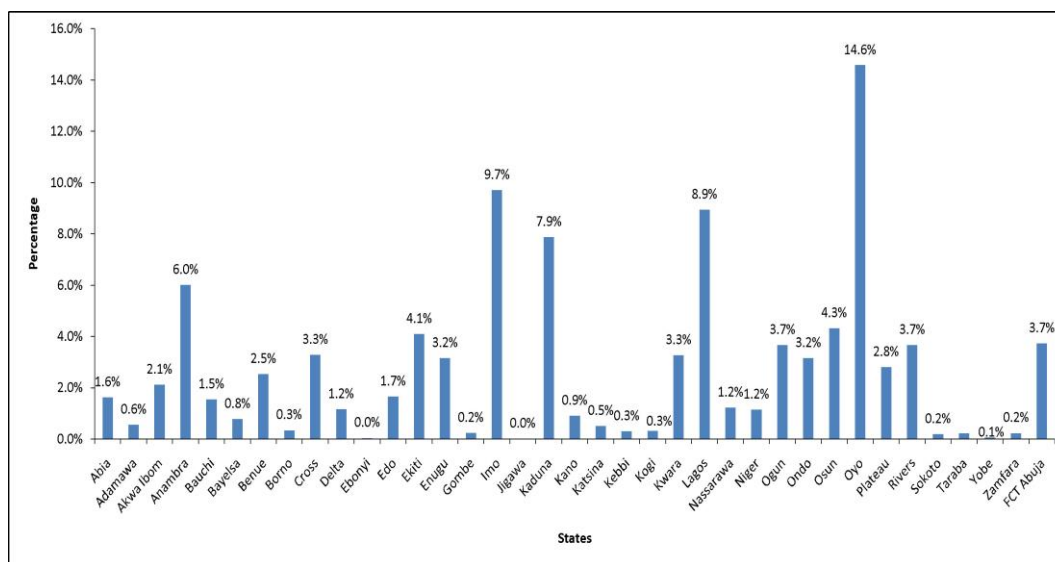
The study adopted retrospective survey designs relevant to the use of archival data on demographics and contraceptive use in Nigeria. The data includes archival demographic data on contraceptive use and prevalence among women of reproductive age (15-49 years) from the National Bureau of Statistics (NBS) and the Survey Nigeria Demographic Health (NDHS) for six (6) years. Contraceptive use data covers different methods, types of contraception, and rates of contraceptive use for the period 2016-2021. The



data contains the total number of contraceptive records used by each state and is plotted. Reasons for choosing these years include data availability, reliability, consistency, and continuity of records. A similar design was used by Adebowale et al (2013), Alemayehu et al (2015), Cavallaro et al (2017) and Bah et al. (2020). ANOVA was used to determine spatial variability in contraceptive use. Two-year moving averages and linear trend analyses were used to establish trends in contraceptive use.

**Results and Discussion**

Contraceptive use in Nigeria, indicates that Oyo, Imo, and Lagos states use 14.9%, 9.7%, and 8.9% of contraceptives in Nigeria, respectively, while Jigawa and Ebonyi states use the least, with 0.02% and 0.04%, respectively (Fig 3). This suggests that these two states have exceptionally low contraceptive use, whereas Oyo, Imo, and Lagos have the highest contraceptive use. Women's socio demographic and economic variables (age, parity, education, religion, kinds of marriage (monogamy vs. polygamy), urban vs. rural domicile, and household wealth) are among the demand factors related to contraceptive use in Nigeria (Ankomah et al 2011; Sekoni and Oladoin 2016; Okigbo et al 2017).



**Fig 3: Contraceptive Use in Nigeria**

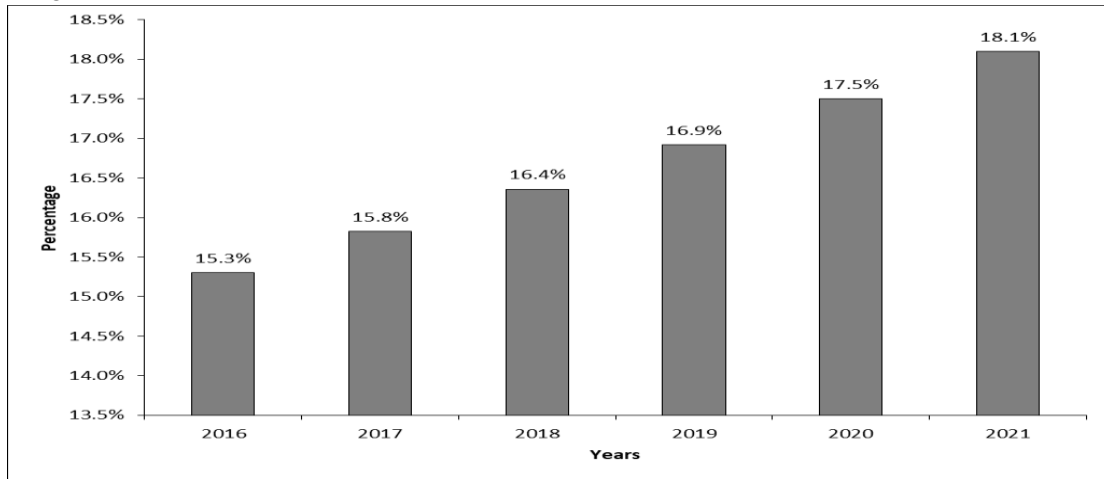
**Table 1: Method of Contraceptives in Nigeria**

Years	Any Method	Other method	Modern method	Traditional method	Total Users	Prevalence Rate
2016	7618		2,089,549	736,814	2,833,981	15.3%
2017	7849		2,160,155	762,000	2,930,004	15.8%
2018	8089		2,233,408	788,175	3,029,672	16.4%
2019	8334		2,309,455	815,378	3,133,167	16.9%
2020	8587		2,388,391	843,671	3,240,649	17.5%
2021	8848		2,470,376	873,107	3,352,331	18.1%

Source: NBS and NDHS (2022)

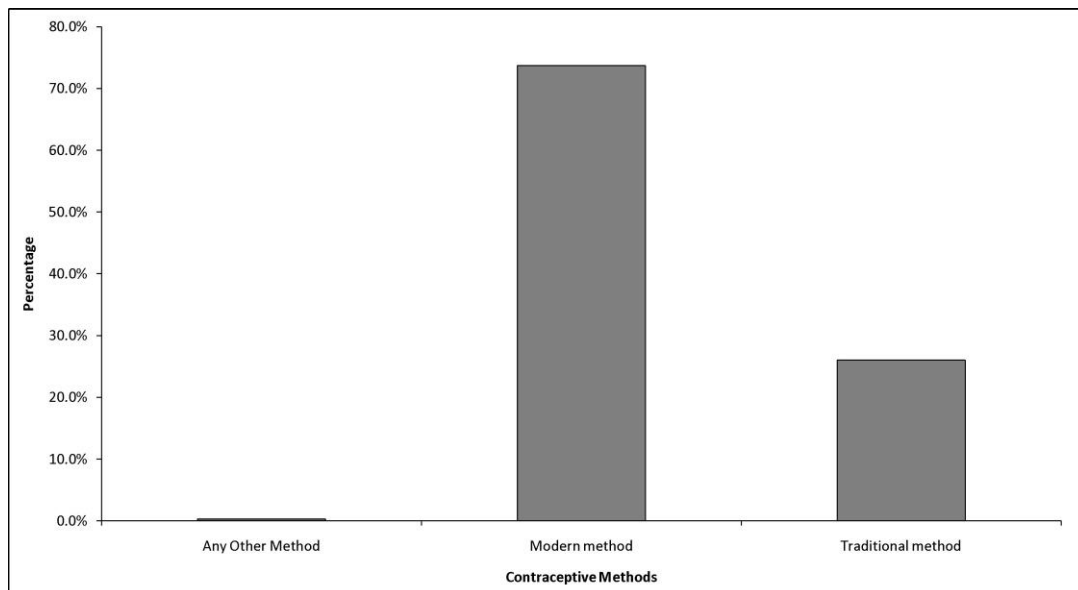


Table 1 depicts the method of contraception used by women in Nigeria. Female contraceptive use increased from 2016 to 2021, with a prevalence rate of 15.3% in 2016 rising to 18.1% in 2021 (see Fig 4). According to research provided by the International Women's Health Coalition, Nigeria's Contraceptive Prevalence Rate (CPR) remains deplorably low. Concerns about fertility, spousal objection, and fear of side effects were the main reasons given by women who had not used any form of contraception in the past (Bongaarts and Bruce 1995).



**Fig 4:** Contraceptive prevalence rate, Nigeria

Succinctly, women in Nigeria use modern contraceptives at a high rate (Fig 5). However, because many reproductive health initiatives are aimed at women, addressing the role of women in modern contraceptive behaviour is critical, especially given that contraceptive use rates remain low. The likelihood of using any method rises with the household wealth index, with individuals from wealthy households twice as likely to utilize traditional methods as those from the lowest homes.



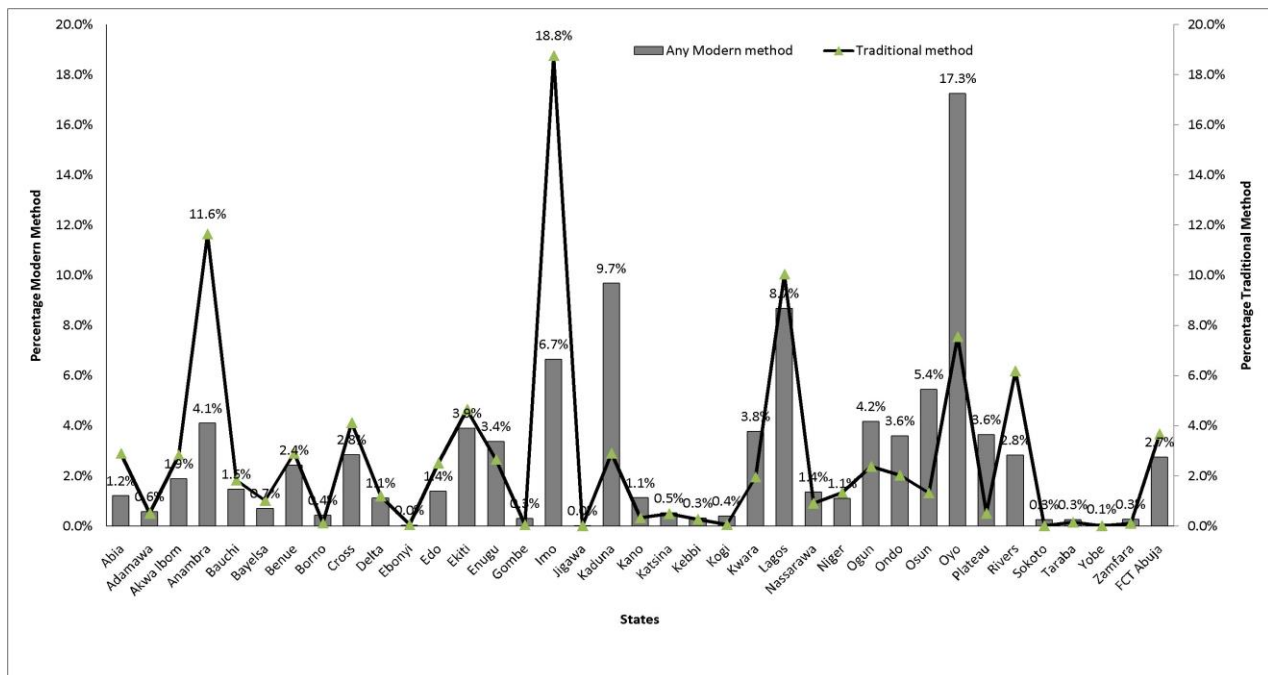
**Fig 5:** Contraceptive Methods in Nigeria



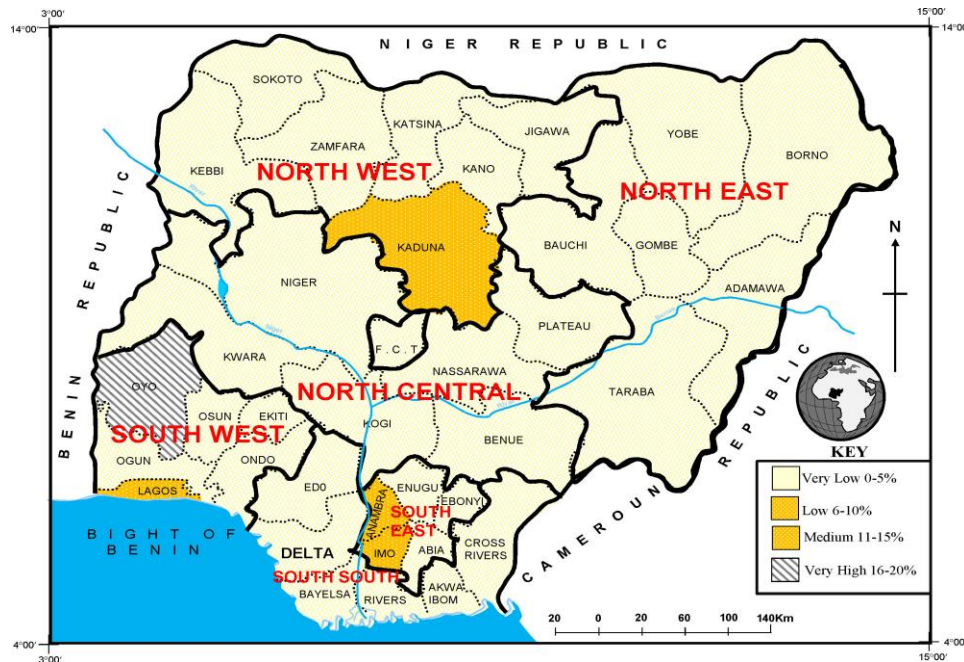
The highest and lowest rates of modern contraceptive use were found in the states of Oyo and Kaduna, at 17.3% and 9.7%, respectively, and 0.04% and 0.02%, respectively, in Jigawa and Yobe. While Jigawa, Yobe, and Zamfara states have the lowest prevalence of traditional methods, Imo and Anambra had the highest rates, with 18.8% and 11.6%, respectively. (Fig 6). Sociocultural ideas and practices hamper modern contraceptive utilization and attitudes towards contraceptive use.

The spatial distribution of contraceptive usage is depicted in Fig. 7, which shows a high level of non-usage. However, Oyo state is ranked the highest state with contraceptive use, while Kaduna, Anambra, Imo, and Lagos states are ranked medium contraceptive user states in Nigeria and contraceptive use is extremely low in all other states of Nigeria. It is suggested that religion may play a role in encouraging the avoidance of contraception. Urbanism as a way of life predates the European invasion of Nigeria.

In this study, the usage of modern contraceptive methods is distributed among 37 states, however, the distribution is unequal. Oyo state has the highest number of modern contraceptive female users, whereas Kaduna, Imo, and Lagos states have Nigeria's second-highest female contraceptive user population. In Nigeria, an estimated 3% of contraceptive users (367046 women aged 15-45 years) utilize contraception.

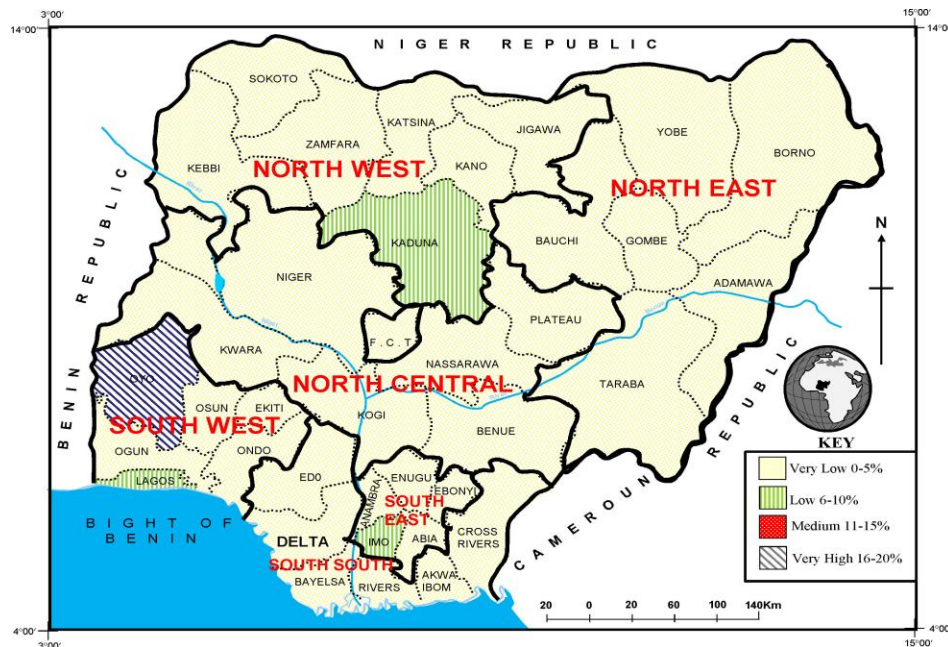


**Fig 6:** Contraceptive Methods by States in Nigeria



**Fig 7:** Spatial Distribution of contraceptive usage in Nigeria

The geographical regions of Nigeria are geopolitically classified into six zones. Women in Nigeria's North-east, North-central, and South-South geopolitical zones rarely use modern contraceptives, whereas one-third of women in the South-West, Northwest, and South-East utilize modern contraceptive techniques (Fig 8). This means that more than two-thirds of Nigerian women do not utilize modern contraception.

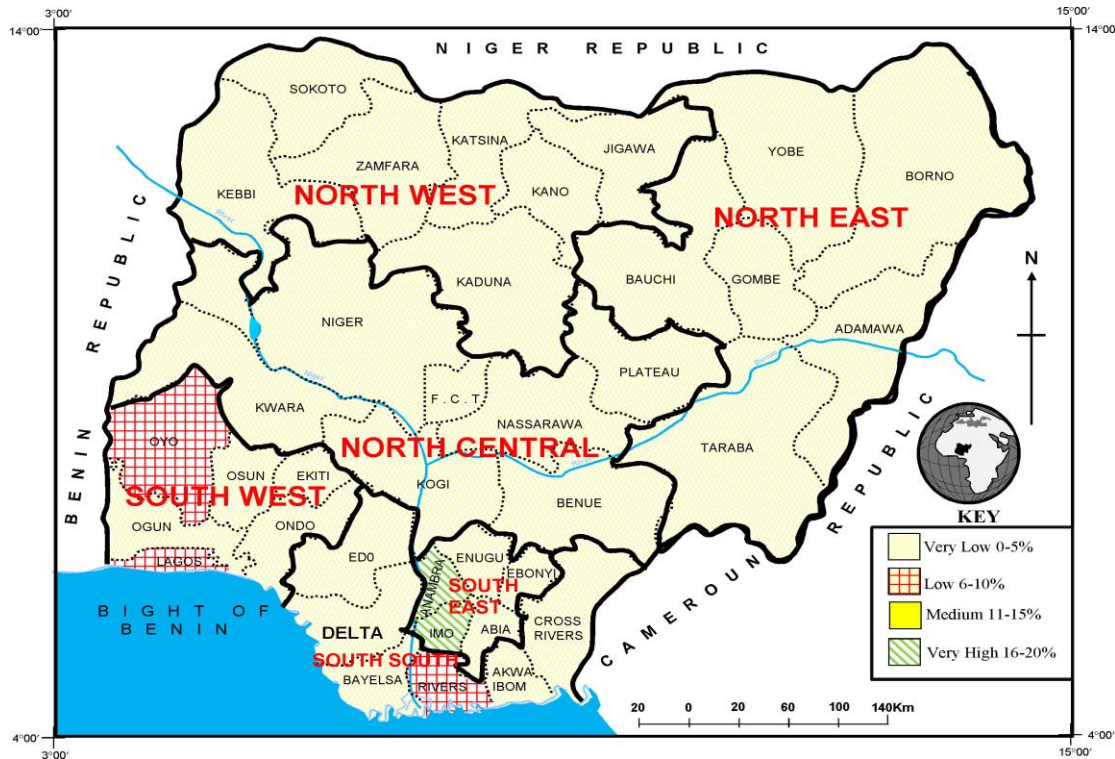


**Fig 8:** Spatial distribution of Female Modern contraceptive Methods





The spatial distribution was evenly spread over 34 states, including the federal capital territory (FCT), accounting for 89% of all traditional female methods. Differences in the distribution and use of the traditional female contraceptive technique were noticeable in Nigeria, with the southwest, southeast, and south-south having a minimum usage of one-third of the population. Imo state has the highest rate of traditional female contraception use in Nigeria (Fig 9).



**Fig 9:** Spatial distribution of Female Tradition contraceptive method

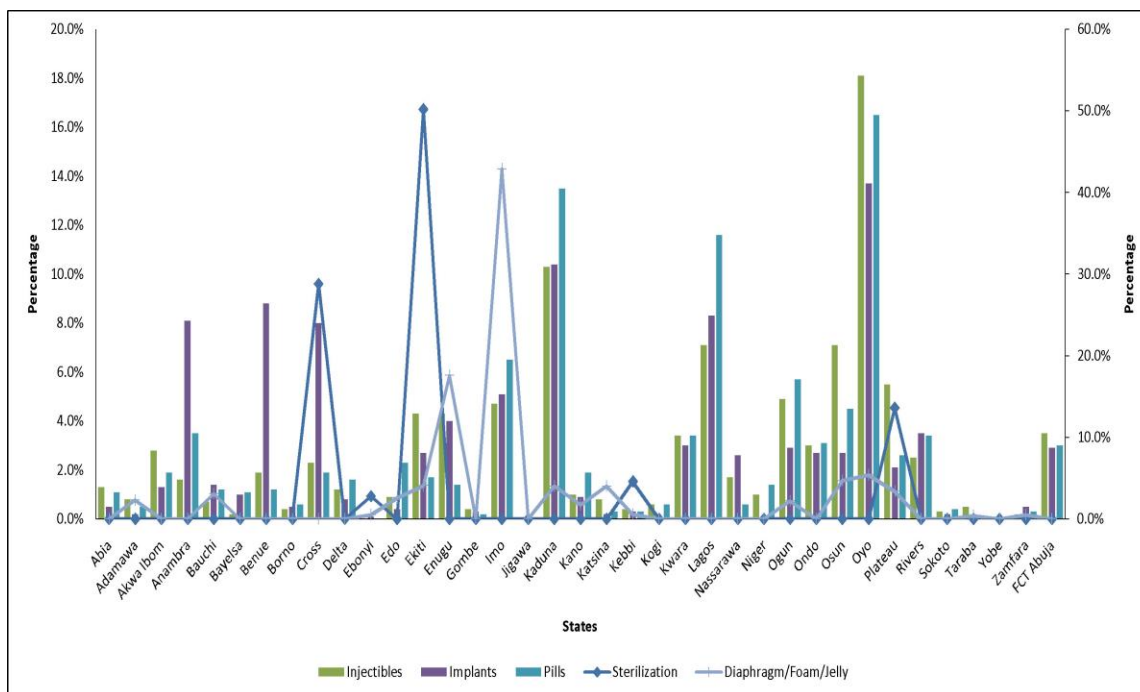
**Table 2:** Types of Modern Contraceptives

Years	Female sterilization	IUD	Injectable	Implants	Pill	Female condom	Diaphragm /Foam/Jelly	LAM
2016	3017	193,217	893,743	317,709	478,458	21373	24379	157,653
2017	3107	199,856	924,028	328,221	494,575	22153	25152	163,063
2018	3202	206,750	955,454	339,119	511,288	22966	25951	168,678
2019	3299	213,917	988,079	350,414	528,631	23819	26774	174,522
2020	3399	221,359	1,021,957	362,126	546,621	24710	27625	180,596
2021	3500	229,101	1,057,148	374,278	565,293	25644	28501	186,911
<b>Total</b>	<b>19524</b>	<b>1264200</b>	<b>5840409</b>	<b>2071867</b>	<b>312486</b>	<b>140665</b>	<b>158382</b>	<b>1031423</b>
Percentage	0.1%	9.3%	42.8%	15.2%	22.9%	1.0%	1.2%	7.6%

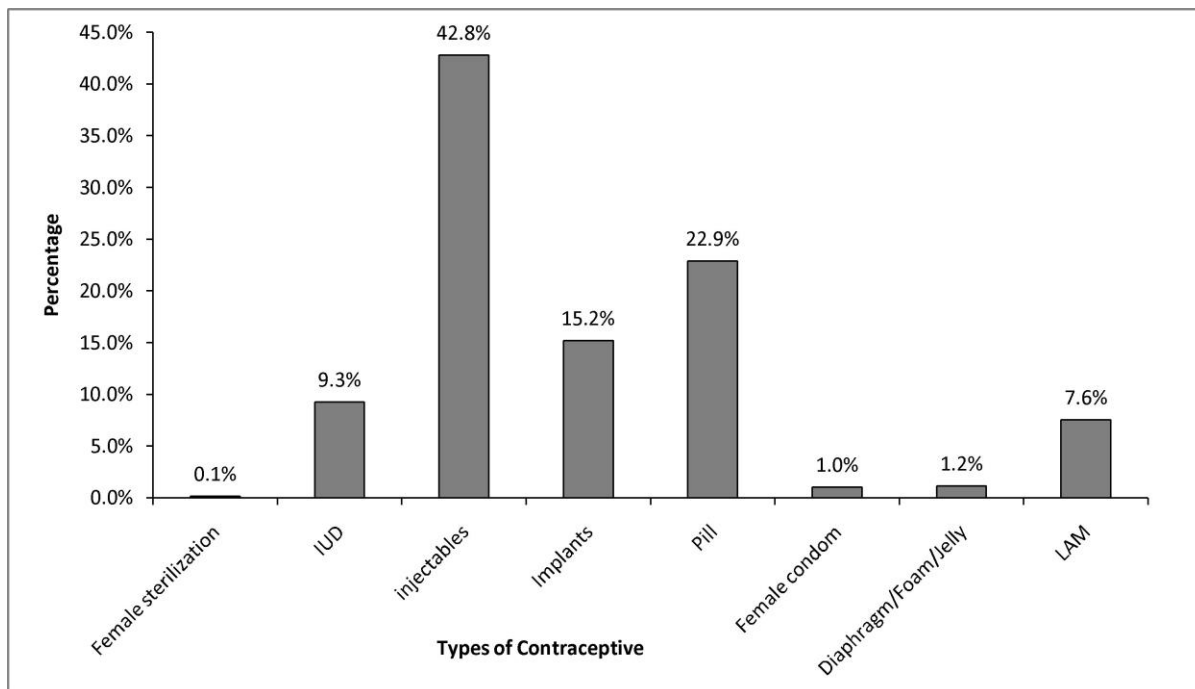
Table 2 depicts the various types of modern contraceptives used by Nigerian women. Female sterilization, diaphragm, and female condoms account for 0.1%, 1.0%, and 1.2% of all contraceptive methods used by



women in Nigeria, respectively (see Fig 10). Except in Cross Rivers, Ekiti, Kebbi, and Plateau States, there is a minimal spatial spread in the usage of female sterilization, which is near zero (Fig 10). Although female condoms are widely used in Lagos, Anambra, Ondo, Rivers, and Abuja states, they are rarely used in Nigeria's North East geopolitical zones. In Nigeria, however, most women use injectables as contraception (Table 2). In Nigeria, injectable contraception is the most widely used, with high rates in Kano, Oyo, and Lagos states and low rates in Taraba and Jigawa. Similarly, pills are the second most often used modern contraception in Nigeria, with a reasonably high prevalence in Ekiti state (Fig 11). IUD use among women in Nigeria is unevenly distributed, with 0% in states such as Rivers, Sokoto, Yobe, Kogi, Ebonyi, Benue, Anambra, and Kebbi, and moderately high in Oyo, Lagos, Osun, and Ekiti. Nevertheless, limitations associated with women's low economic placement within their families have hampered this population's usage of modern contraceptive services (Reed et al 2016).



**Fig 10:** Spatial Spread of Types of Modern Contraceptives in Nigeria



**Fig 11:** Types of Modern Contraceptive in Nigeria

Although traditional contraception is frequently used in Imo, Lagos, Anambra, and Oyo, it is nearly never utilised in Northern Nigeria (Figs 9 and 12). However, in Nigeria, most women practise monthly abstinence as a traditional practice. Periodic abstinence is the most generally practised in Nigeria, with high rates in Imo and Anambra and low rates in Sokoto, Yobe, Kogi, Kebbi, Katsina, Jigawa, and Gombe (Fig 12). Similarly, traditional withdrawal methods are popular in Imo state (Fig 12). Traditional contraception methods are evenly distributed among Nigerian women, with practically 0% in Northern Nigerian states. The usage of traditional contraceptives in Nigeria may be influenced by a lack of information, awareness, and misconceptions about contraception.

**Table 3: ANOVA on the variation in the use of female contraceptives in Nigeria**

Contraceptive Users					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2546084564384.667	2	1273042282192.334	15.552	.000
Within Groups	8840845541400.326	108	81859680938.892		
Total	11386930105784.992	110			

Table 3 depicts a statistical analysis of the variation in contraceptive use among Nigerian women. The model is significant at  $P < 0.05$ . As a result, there is a significant variation in contraceptive use among women in Nigeria.

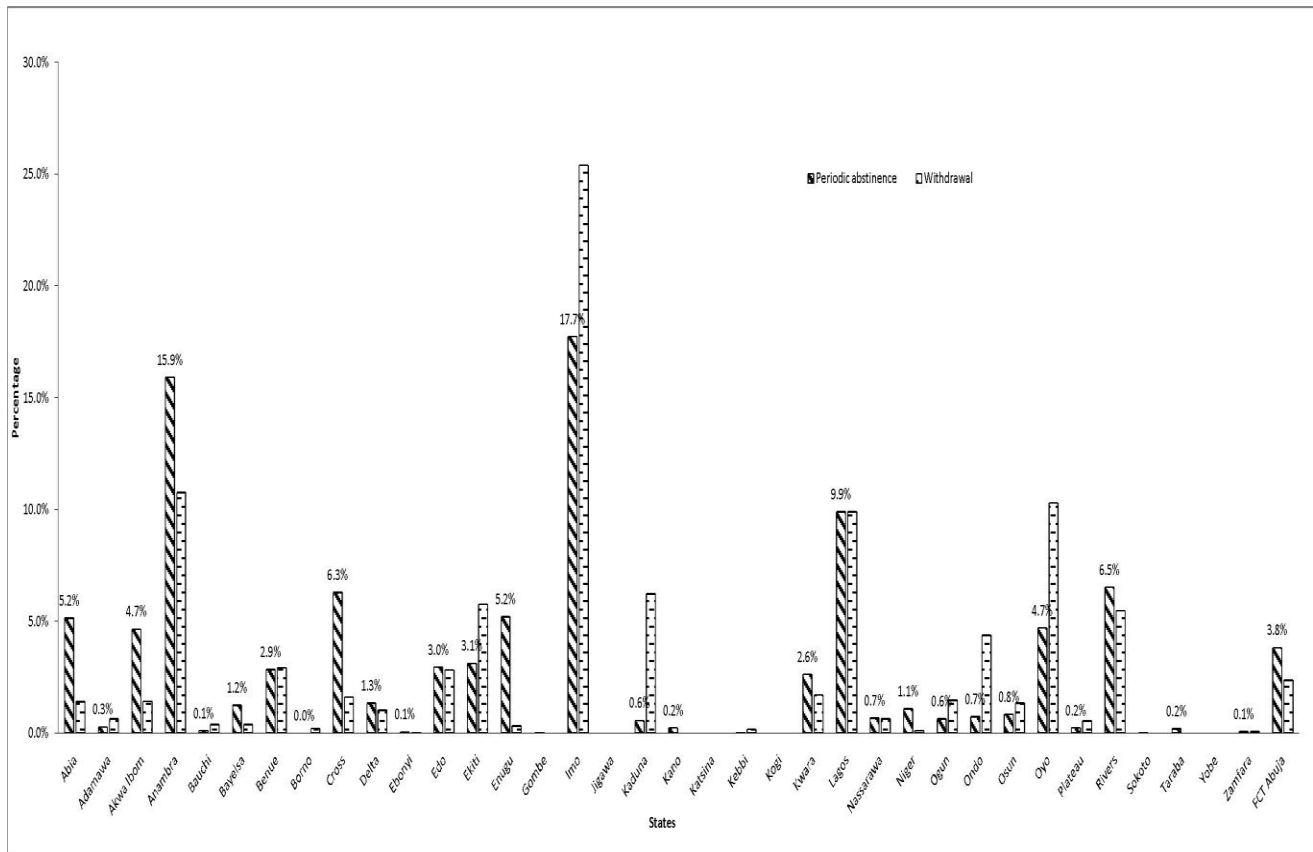


Fig 12: Types of Traditional Methods of Contraceptive Use in Nigeria

Table 4: Post Hoc

Multiple Comparisons							
Dependent Variable: Users Contraceptive Users							
	(I) Method of contraceptive	(J) Method of contraceptive	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	1 Traditional	2 Modern	-236799.541*	66519.528	.002	-394880.42	-78718.66
		3 Any Method	128914.054	66519.528	.133	-29166.83	286994.93
	2 Modern	1 Traditional	236799.541*	66519.528	.002	78718.66	394880.42
		3 Any Method	365713.595*	66519.528	.000	207632.71	523794.47
	3 Any Method	1 Traditional	-128914.054	66519.528	.133	-286994.93	29166.83
		2 Modern	-365713.595*	66519.528	.000	-523794.47	-207632.71

\*. The mean difference is significant at the 0.05 level.

There are results less than 0.05 in the Turkey HSD post hoc test (see Table 4). These figures correspond to a comparison of variances in contraceptive use among Nigerian women. This means that modern contraceptive methods differ greatly from other contraceptive methods used in Nigeria.

**Table 5: ANOVA on the variation in the types of female contraceptives used in Nigeria**

Types of contraceptives					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	751901464524.119	9	83544607169.347	9.862	.000
Within Groups	3049739139550.054	360	8471497609.861		
Total	3801640604074.173	369			

**Table 5** depicts a statistical analysis of the variation in types of contraceptive use among Nigerian women. The model is significant at  $P < 0.05$ . As a result, there is a significant variation in the types of contraceptives used among women in Nigeria.

**Table 6: Post Hoc**

Multiple Comparisons						
Dependent Variable: Types of contraceptives						
Tukey HSD						
(I) Type	(J) Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
3 injectables	1 Sterilization	157321.216*	21399.037	.000	89192.91	225449.53
	2 IUD	123681.324*	21399.037	.000	55553.01	191809.63
	4 Implants	101852.486*	21399.037	.000	33724.18	169980.80
	5 Pills	73393.054*	21399.037	.023	5264.74	141521.36
	6 Female Condom	154096.595*	21399.037	.000	85968.28	222224.90
	7 Diaphragm/Foam/Jelly	153568.351*	21399.037	.000	85440.04	221696.66
	8 LAM	129972.595*	21399.037	.000	61844.28	198100.90
	9 Periodic abstinence	98553.946*	21399.037	.000	30425.64	166682.26
	10 Withdrawal	105954.649*	21399.037	.000	37826.34	174082.96
	5 Pills	1 Sterilization	83928.162*	21399.037	.004	15799.85
3 injectables		-73393.054*	21399.037	.023	-141521.36	-5264.74
6 Female Condom		80703.541*	21399.037	.007	12575.23	148831.85
7 Diaphragm/Foam/Jelly		80175.297*	21399.037	.008	12046.99	148303.61

\*. The mean difference is significant at the 0.05 level.

There are results less than 0.05 in the Turkey HSD post hoc test (see Table 6). These figures correspond to a comparison of variances in the types of contraceptive use among Nigerian women. This means that injectables differ significantly from all other types of contraceptive use in this study. Moreso, Pills differ from sterilization, injectables, female condoms and diaphragm types in Nigeria.

### Conclusion

The study highlighted a notable increase in female contraceptive utilization from 2016 to 2021, with prevalence rates climbing from 15.3% to 18.1% during this period. Significant disparities in contraceptive usage were observed among Nigerian women, with notable concentrations in certain states such as Oyo, Imo, and Lagos, while the North-east region showed lower utilization rates. Modern contraceptive methods saw a rise in usage over time, ranging from 0% to 75% across different regions of Nigeria. While



the Northern part exhibited lower proportions of modern contraceptive use, the Southern regions and the Federal Capital Territory demonstrated higher rates. Traditional female contraceptive methods displayed varying levels of distribution throughout Nigeria, with approximately one-third of the population in the southwest, southeast, and south-south regions utilizing them, while they were more evenly dispersed across Northern states. The study advocates for ongoing education and awareness campaigns to underscore the importance of contraceptive use, emphasizing the need for family planners to offer timely, accurate, and comprehensive information about the available contraceptive methods for Nigerian women.

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