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SPECIAL ISSUE: CELEBRATING 20 YEARS OF GEOGRAPHY IN KADUNA STATE UNIVERSITY - ADVANCES AND FRONTIERS IN GEOGRAPHY

Knowledge of Antenatal and Obstetric Care among Women of Childbearing Age Group in Some LGAs in Kaduna State, Nigeria

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ABSTRACT

The knowledge of antenatal care (ANC) among pregnant women has played a major role in the reduction of maternal and perinatal mortality in women of reproductive age, yet the global burden is still high in many developing countries, including Nigeria. This study aimed to investigate the level of knowledge of ANC and awareness of health services among women in the reproductive age group in six LGAs in Kaduna State, Nigeria. A total of 863 women were interviewed. The study used descriptive statistics in SPSS v20 and prevalence ranking to analyze the data. The results revealed that the age distribution showed that the mean age of the respondents was 25.8 ±6.4 years. The majority (48%) was between 25 and 34 years, with 18.8% between 35 – 39 years, 6.5% older than 45 years, and 5.0% under 19 -24 years. Varying levels of awareness of each activity carried out during ANC were recorded, with BP check ranking highest, 78.8 %. This was closely followed by 67.2% and 58.6% representing those who agreed to be aware of education on breastfeeding, family planning, and nutritional care. The reason behind the high level of awareness in this study might be a result of high literacy levels. Effective strategies to encourage women's education, coupled with improvements in ANC quality, are essential in combating maternal and perinatal mortality in women.

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1 Introduction

Maternal Mortality Ratio (MMR) is the number of women who die as a result of complications during pregnancy and childbirth in a given year. It is estimated that there are 450 deaths per 100,000 live births across all developing regions and approximately 920 per 100,000 live births in sub-Saharan Africa, the highest rate in the world (World Health Organization [WHO], 2023). Nigeria's mortality ratio of 1,100 per 100,000 is higher than the regional average, with an estimated 59,000 maternal deaths (Onuekwusi & Odoemelam, 2020). Nigeria, which has approximately 2% of the World's population, contributes almost 10%of the world's maternal deaths (Obafemi, 2021). Although complications related to childbirth and pregnancy are not always predictable, most maternal deaths are from preventable or treatable causes (WHO, 2025). Four major interventions have been identified by the World Health Organization (WHO) as critical to reducing maternal mortality in developing countries: antenatal care, skilled birth attendance, and emergency obstetric care (WHO, 2025).

Antenatal care (ANC) describes the healthcare services a woman receives throughout her period of pregnancy by skilled healthcare professionals, and is important in helping to ensure a healthy pregnancy state and childbirth (Geltore & Anore, 2021). Antenatal care makes it possible for healthcare professionals to closely monitor Women, thereby increasing the chances of identifying pregnancy-related complications such as gestational diabetes and preeclampsia at an early stage in pregnancy. Early detections may result in behavioural changes and direct medical interventions that circumvent potential emergencies during pregnancy, and that will minimize negative impacts on pregnant women and on their fetuses (Sheffel et al., 2019). Obstetric care deals with the care of a woman's reproductive tract and her child during childbirth and her postnatal period (a period beginning immediately after the birth of a child and extending for about six weeks (Buckingham et al., 2021).

It is estimated that 99% of pregnant women in developed countries receive ANC and 97% use skilled obstetric services at delivery, while 65% and 53% of women in developing countries use ANC and skilled obstetric care, respectively (Abame et al., 2019). It is also estimated that nearly 15% of pregnancies end in fatal prenatal obstetric complications, including bleeding, infections, hypertension, obstructed labour, and complications of abortion (Geleto et al., 2020). However, in Nigeria, only 64% of pregnant women received antenatal care from qualified healthcare providers, while 37% of the deliveries take place in health institutions, and 57% of deliveries take place at home (NPC, 2025). A regional disparity also exists. Data revealed that only 28% of women in the Northwest zone, and only 54% in the Northeast zone of Nigeria received antenatal care from trained health provi-

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ders (NPC, 2025). Many efforts have been taken to enhance maternal health service utilization, yet several studies still show that a large number of maternal mortalities, especially in developing countries, have been due to low levels of maternal health care-seeking behavior (Ezemenahi et al., 2024).

The knowledge of antenatal care (ANC) among pregnant women has played a major role in the reduction of maternal and perinatal mortality in women of reproductive age (Jesuyajolu et al., 2022). Srivastava et al. (2025) showed that bad outcomes in pregnancy are influenced by risk factors that can be detected at the first antenatal visit. Onasoga et al. (2012) in a study in Osun, Nigeria, identified the lack of knowledge about existing services in ANC, in addition to others, as one of the major factors influencing the utilization of ANC services. Cultural barriers have a significant impact on women's knowledge and utilization of antenatal and obstetric care services, such as language differences, traditional beliefs, and practices that may discourage seeking formal health care (Opara et al., 2025).

There is a need for a better understanding of the knowledge of antenatal care (ANC) among women of reproductive age in Nigeria to establish baseline data and identify priority areas for health education. This will guide healthcare providers in focusing maternal health counselling to improve service utilization. Thus, this study assessed the knowledge of ANC and obstetric care services among women of childbearing age in rural settings.

2 Materials and methods

2.1 Study area

Kaduna state is located between latitudes 9° 02' N and 11° 32′ N, North of the equator and between latitudes 6° 15′ E and 8° 50′ E east of the prime meridian (Figure 1). The state is bounded to the north by Katsina, Zamfara, and Kano State, to the west by Niger State, to the east by Bauchi State, and to the south by Plateau, Nasarawa, and the Federal Capital Territory, Abuja. The state is divided into three senatorial zones, namely, Kaduna North, Central, and South, and it comprises twenty-three (23) Local Government Areas with 255 political wards (NPC, 2025). The state has an area of land mass covering 46,053 square kilometres (Olaniyi et al., 2025).

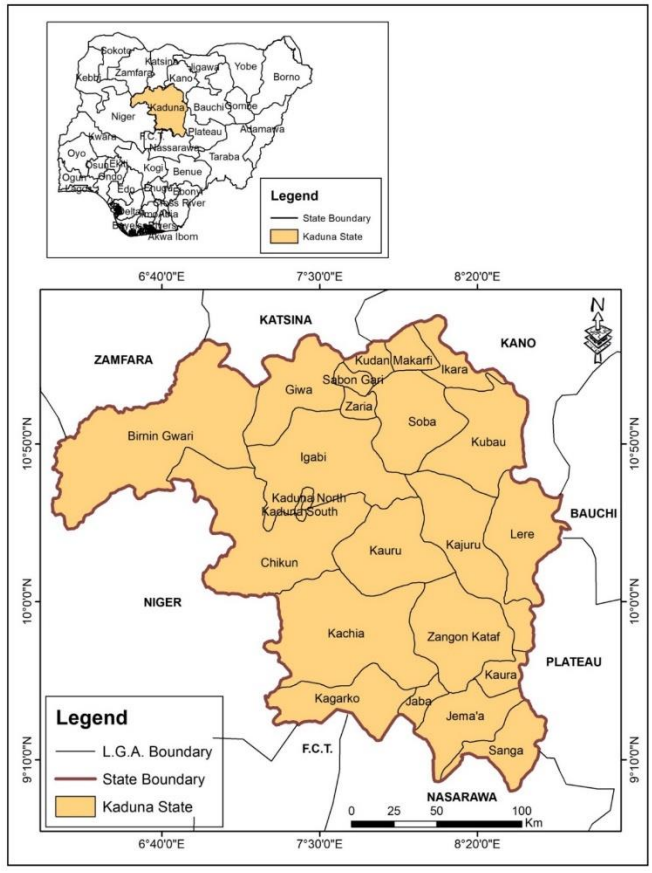

Figure 1: Map of study area.

The delivery of health services in the state had been enhanced through collaborative arrangements with both sectoral ministries and the development partners. The Ministries of Women's Affairs, as well as the Ministries of Local Government, have been involved with various aspects of the services delivered. The Ministry of Women's Affairs has been involved with community mobilization and engagement processes, thus ensuring more personnel are deployed in the delivery of health services.

2.2 Data Sources

Data on knowledge of antenatal and obstetrics were collected through a questionnaire administered to respondents, while data on the number of women who attend antenatal (ANC) and use the various obstetric (OBSC) care services were obtained from the records of the primary health care centres (PHCs) for a period of one year. The sampling size, technique are presented in section 2.3.

2.3 Data Collection

Given a finite population, the sample size was determined using Eq. (1):

$$n = \frac{Z^2\sigma^2 N}{(N-1)e^2 + Z^2\sigma^2} \quad (1)$$

Where n represents the sample size, Z is the standard normal variate at 95% confidence level (1.96), σ is the standard deviation of the population (0.75), N stands for population size, and e is the margin of error (0.05). The study used the above formula with the study population to obtain a total of 863 respondents as the sample size.

Eq. (2) was used to determine the proportion of the respondents in each LGA.

$$\text{Sample size per LGA} = \frac{LGA\ population * Sample\ Size}{Total\ Selected\ LGA\ Population} \quad (2)$$

Table 1: Distribution of Sample Size

Senatorial District	LGA	Estimated Number of Women of Child-bearing Age (15-49 years)	Number of Respondents
North	Kudan	115,405	77
	Zaria	336,492	221
	Sub-Total	451,897	298
Central	Igabi	366,091	241
	Kajuru	94,902	62
	Sub-Total	460,993	303
South	Sanga	128,706	85
	Zangon-Kataf	269,621	177
	Sub-Total	398,327	262
	Total	590,047	863

Multi-stage sampling was carried out in 2024 to assess the utilisation of antenatal and obstetric care services among women of childbearing age (15-49years). A structured questionnaire has been designed in the English language, containing both closed-ended and open-ended questions that were used to collect information from 863 women who had delivered within the past five years. For respondents who do not understand the English language, the questions were translated into the local language during administration.

The first stage involved the purposive selection of the two (2) LGAs in each of the three senatorial districts in Kaduna State, which gave a total of six (6) LGAs. The two LGAs that were selected from each of the senatorial districts are one with the highest number of women of childbearing age and the one with the lowest number of women of childbearing age. The reason for this pattern of selection is that the LGAs with higher population tend to be more urban in nature, while the ones with lower population are considered rural; as such, knowledge of antenatal and obstetric care services could vary between urban and rural areas. The consideration of this in the study ensured adequate spatial spread for the generalization of research findings. The selected LGAs are Kudan, Zaria, Igabi, Kajuru, Sanga, and Zangon-Kataf. In each of the selected LGAs, a convenience sampling technique was used to administer the questionnaire to only women of childbearing age who had ever given birth within the 5 years preceding the survey date or were pregnant and attended antenatal visits in the various PHCs. The reason is that women haven't had a child in the past five years, perhaps have no recent experience with ANC and OBSC services, making them less relevant to the survey.

It is the category of sample that relies on the availability of respondents, that is, those who are close at hand or easily accessible. This was done till the required sample size in each of the selected LGAs is obtained. However, the respondent's right not to participate in the study was respected.

2.4 Data Analysis

Descriptive statistics on Statistical Package for Social Science (SPSS) version 21 were used to analyse data obtained from the questionnaire and hospital records. This is given in Eq. (3).

$$p_i^{\text{total}} = \frac{f_i}{N_{\text{total}}} \times 100 \quad (3)$$

where: f_i is the frequency (count) of category i. Also, N_{total} is the total number of observations in the dataset.

The study also used the Prevalence Ranking. Using this approach, activities carried out during the antenatal care were ranked by the proportion of respondents aware of each antenatal care component. The study computed the percentage of respondents who chose 'Yes' for every service, given in Eq. (4):

$$p_{Y_j} = \frac{f_{Y_j}}{N} \times 100 \quad (4)$$

Where f_{Y_j} is the number of respondents who answered "Yes" to activity j. N is the total number of respondents who answered the question. The ranking was subsequently carried out using Equation (5):

$$p_{Y1} \geq p_{Y2} \geq \cdots \geq p_{Yk} \quad (5)$$

2.5 Ethical Considerations

Ethical approval was obtained from the Kaduna State Primary Health Care Board. At each Local Government Area, permission was obtained from the chairman. At the community level, community leaders granted permission to conduct the study. The respondents and their spouses gave verbal consent to be interviewed.

3 Results

3.1 Demographic Characteristics of Respondents

Table 2 revealed that the mean age of the respondents was 25.8 ±6.4 years. The majority (48%) was between 25 and 34 years, with 18.8% between 35 – 39 years, 6.5% older than 45 years, and 5.0% under 19 years. Christianity was the predominantly practiced religion among the respondents (52.7%) as it accounted for more than half of the respondents, whereas (42.9%) practiced Islam, and (4.4%) were traditionalists.

Table 2: Demographic Characteristics of the Respondents

Age (years)	Frequency	Percent
15 – 19	43	5.0
20 – 24	72	8.3
25 – 29	187	21.7
30 – 34	227	26.3
35 -39	162	18.8
40 – 44	116	13.4
45 – 49	56	6.5
Total	**863**	**100**
Religion		
Islam	370	42.9
Christianity	455	52.7
Traditional	38	4.4
Total	**863**	**100.0**
Marital Status		
Married	790	91.5
Divorced	47	5.4
Widowed	26	3.0
Total	**863**	**100.0**
Type of Marital Union		
Monogamy	554	64.2
Polygamy	309	35.8
Total	**863**	**100.0**

The distribution of respondents by marital status shows that 91.5% of the respondents are married, while only 5.4% and 3.0% were either divorced or widowed. In terms of the type of marital union, 64.2% were monogamous, whereas 35.8% practiced polygamy.

3.2 Socio-economic Characteristics of the Respondents

Table 3 revealed that 93.5% of the respondents possess at least one form of formal education, and most (49.0%) having tertiary education qualifications, followed by 37.1% with a secondary level of education, more than half of respondents (93.5%) possess at least one form of formal education, 49.0 %, 37.1%, 7.4% and 6.5 % also attended tertiary, secondary primary, Quran education respectively.

Table 3: Educational Level, Occupation, and Monthly Income of the Respondents

Educational Qualification	Frequency	Percent
Qur'anic	56	6.5
Primary	64	7.4
Secondary	320	37.1
Tertiary	423	49.0
Total	863	100.0
Occupation		
Farming	70	8.1
Business/trading	182	21.1
Civil service	294	34.1
Artisan	93	10.8
Student	160	18.5
Others	64	7.4
Total	860	100.0
Monthly Income		
Below ₦10,000	82	9.5
₦10,000 - ₦20,000	127	14.7
₦21,000 - ₦30,000	183	21.2
₦31,000 - ₦40,000	188	21.8
₦41,000 and above	283	32.8
Total	857	100.0

Civil service (34.1%) and business/trading (21.1%) were the occupation types mostly engaged by the respondents (Table 3). A significant proportion were students and artisans, as they accounted for 18.5% and 10.8% respectively. The least occupation engaged in by the respondents was others, such as knitting, homemaking, unemployed, which showed for only 7.4%. The income of the respondents indicated that 32.8% earn N41,000 and above monthly, closely followed by 21.8% and 21.2% with N31,000 - N40,000 and N21,000 - N30,000, respectively. It was found that only 9.5% of them earn below N10,000 monthly, representing the lowest income category.

3.3 Age of Respondents at First Marriage

Figure 2 revealed that most (36.4%) had between 20-24 years as their age bracket at first marriage, closely

followed by those who had their first marriage between 25 – 29 years, which accounted for 33.2%. It was found that they were respondents whose age at first marriage was between 15 – 19 years and 30 – 34 years, as each had 10.0%. The least age at first marriage was less than 15 years, with only 1.3%.

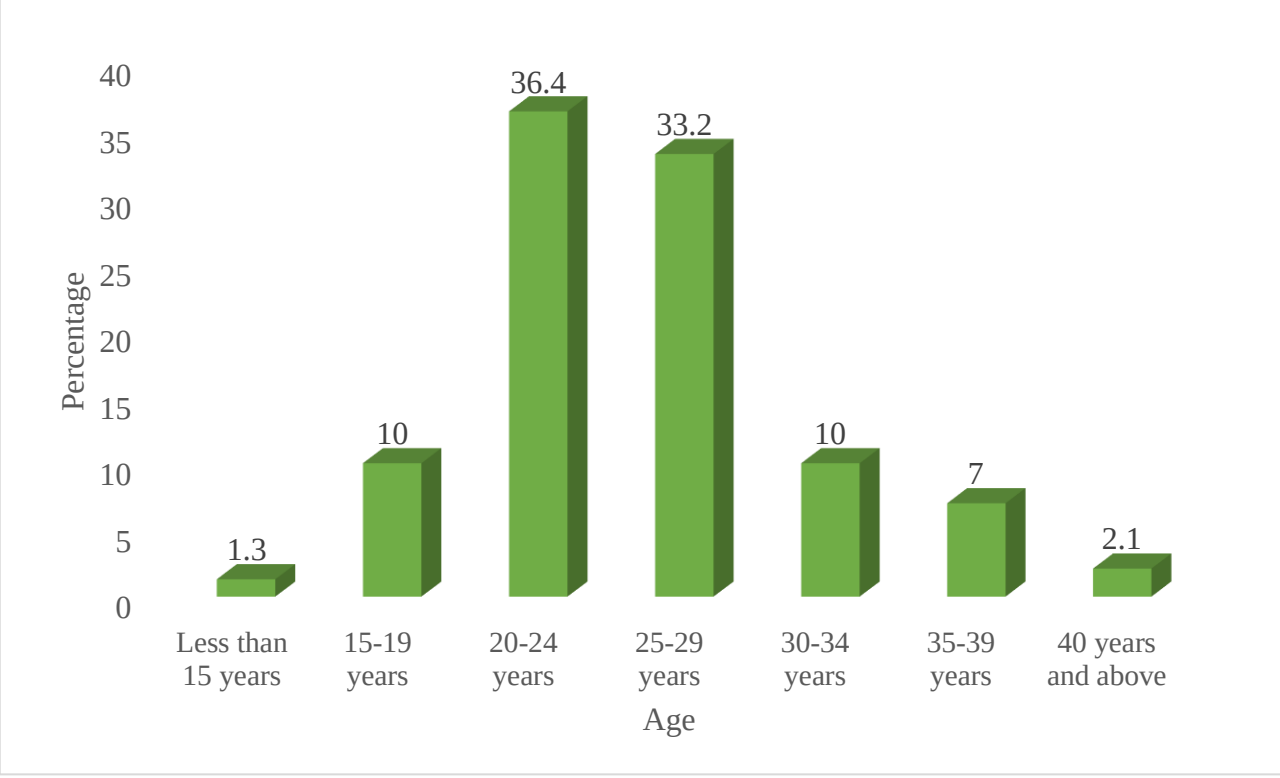

Figure 2: Respondents' age at first marriage

3.4 Distribution of the Respondents Based on Number of Children Born and Number of Children Alive

Table 4 revealed that the number of children ever born and children alive of the respondents; more than half of the respondents have less than four (4) children ever born.

Table 4: Children Ever Born and Children Alive of the Respondents

Children Ever Born	Frequency	Percent
Less than 4	499	57.8
4 – 6	285	33.0
7 – 9	52	6.1
10 and above	27	3.1
Total	**863**	**100.0**
Children Alive		
None	45	5.2
1 – 2	324	37.5
3 – 4	335	38.8
5 and above	159	18.5
Total	**863**	**100.0**

This was followed by 33.0% which accounted for those with 4 – 6 children ever born. This is an indication of high parity among the women in the study area, which is expected to impede the utilisation of ANC services.

The possible explanation might be attributed to the fact, according to Belay et al. (2025), that women with higher parity may have developed self-confidence not to attend ANC, and to deliver at home. In corroboration of this assertion is a study done in Kenya, which showed that women of high parity are less likely to initiate ANC on time or to make the recommended number of visits, assuming that they are experienced (Muriithi et al., 2024). It was found that 3.1% representing the least, had 10 or above children ever born. Regarding the number of children alive, 38.8% agreed to have 3-4 children, closely followed by 37.5% with 1 – 2 children. There were those with none, showing the least with 5.2% only.

3.5 Spouse's educational level, occupation, and monthly income of the respondents

Table 5 revealed that most (64.1%) of the respondents have their spouse educated at the tertiary level, with 19.5% having secondary educational qualifications, whereas only 5.4% represent the least educated, having primary educational qualifications. This study indicates that the

educational level of their husband has a clear influence on the attendance of ANC and OBCS care services by women.

This study indicates that the educational level of their husband has a clear influence on the attendance of ANC and OBCS care services by women. This aligns with Alawode et al. (2025), who found a positive relationship between the household head's level of educational attainment with health care services utilization of the family. Also, Ganfure et al. (2025) suggested that men with higher educational attainment may play a more important role in child care decisions than men with less schooling.

Regarding the spouse's occupation, 41.1% agreed to be engaged in civil service, while 19.0% were involved in petty business and trading activities. Farming activities were the least occupied by the respondents' spouses, as they accounted for only 7.8%. Most (62.7%) of the respondents' spouses earn ₦41,000 and above monthly, followed by 23.1% who earn between ₦31,000 - ₦40,000. The least monthly income earned by the respondent spouse was found to be below ₦10,000, as it accounted for 1.8%.

Table 5: Spouse educational level, occupation, and monthly income

Education Qualification	Frequency	Percent
Qur'anic	39	11.0
Primary	47	5.4
Secondary	168	19.5
Tertiary	553	64.1
Total	863	100.0
Occupation		
Farming	68	7.8
Business/trading	164	19.0
Civil service	355	41.1
Artisan	79	9.2
Student	83	9.6
Others	114	13.2
Total	863	100.0
Monthly Income		
Below ₦10,000	16	1.8
₦10,000 - ₦20,000	30	3.5
₦21,000 - ₦30,000	77	8.9
₦31,000 - ₦40,000	199	23.1
₦41,000 and above	541	62.7
Total	863	100.0

3.6 Activities Carried Out During Antenatal Care

As indicated in Table 6, checking of blood pressure ranked the highest as 78.8% of the respondents agreed to aware of this antenatal care service. This was closely followed by 67.2% and 58.6% representing those who agreed to be aware of education on breastfeeding, family planning, and nutritional care, as well as conducting HIV/AIDs tests as among the antenatal care services provided.

Table 6: Awareness of antenatal care services

Antenatal Care Service	Yes		No		Rank Yes (%)
	Freq.	Percent	Freq.	Percent	
Checking of blood pressure (BP)	680	78.8	183	21.2	1st
Education on breastfeeding, family planning, and nutritional care.	580	67.2	283	32.8	2nd
HIV/AIDS test	506	58.6	357	41.4	3rd
Screening for hepatitis	415	48.1	448	51.9	4th
Giving the tetanus toxoid injection	343	39.7	520	60.3	5th
Checking of blood group	337	39.0	526	61.0	6th
Rhesus factor compatibility	191	22.1	672	77.9	7th
Syphilis	168	19.5	695	80.5	8th
Anaemia	155	18.0	708	82.0	9th

A significant proportion of the respondents agreed to be aware of screening for hepatitis (48.1%) and giving of tetanus toxoid injection (39.7%), and antenatal care services. It was found that treatment of syphilis (19.5%) and anaemia (18.0%) ranked the least among antenatal care services that most respondents were aware of.

3.7 Awareness of Obstetrics Care Services

Table 7 shows that most of the respondents, 73.3% agreed to be aware of control of excessive bleeding as among the obstetrics care services provided at the various primary health care clinics, which ranked the highest. Caesarean section was identified as another obstetrics care service, of which 67.4% agreed to be aware of. The least ranked obstetrics care service that respondents were aware of was eclampsia, as it accounted for 22.9%.

Table 7: Respondents' awareness of the various obstetrics care services provided.

Obstetrics Care Services	Yes		No		Rank Yes (%)
	Freq.	Percent	Freq.	Percent	
Control of excessive bleeding	633	73.3	230	26.7	1st
Caesarean section	582	67.4	281	32.6	2nd
Obstructed Labour	437	50.6	426	49.4	3rd
Eclampsia	198	22.9	665	77.1	4th

Figure 2 revealed that medical personnel at the primary health care clinic, with 28.0% were identified as the main source of awareness of antenatal and obstetrics care services. Medical personnel outside the clinic and friends were other sources of awareness of antenatal and obstetrics care services, as each accounted for 18.0%. The least sources of antenatal and obstetrics care services awareness among the respondents were print media and others which each was represented by 6.0%.

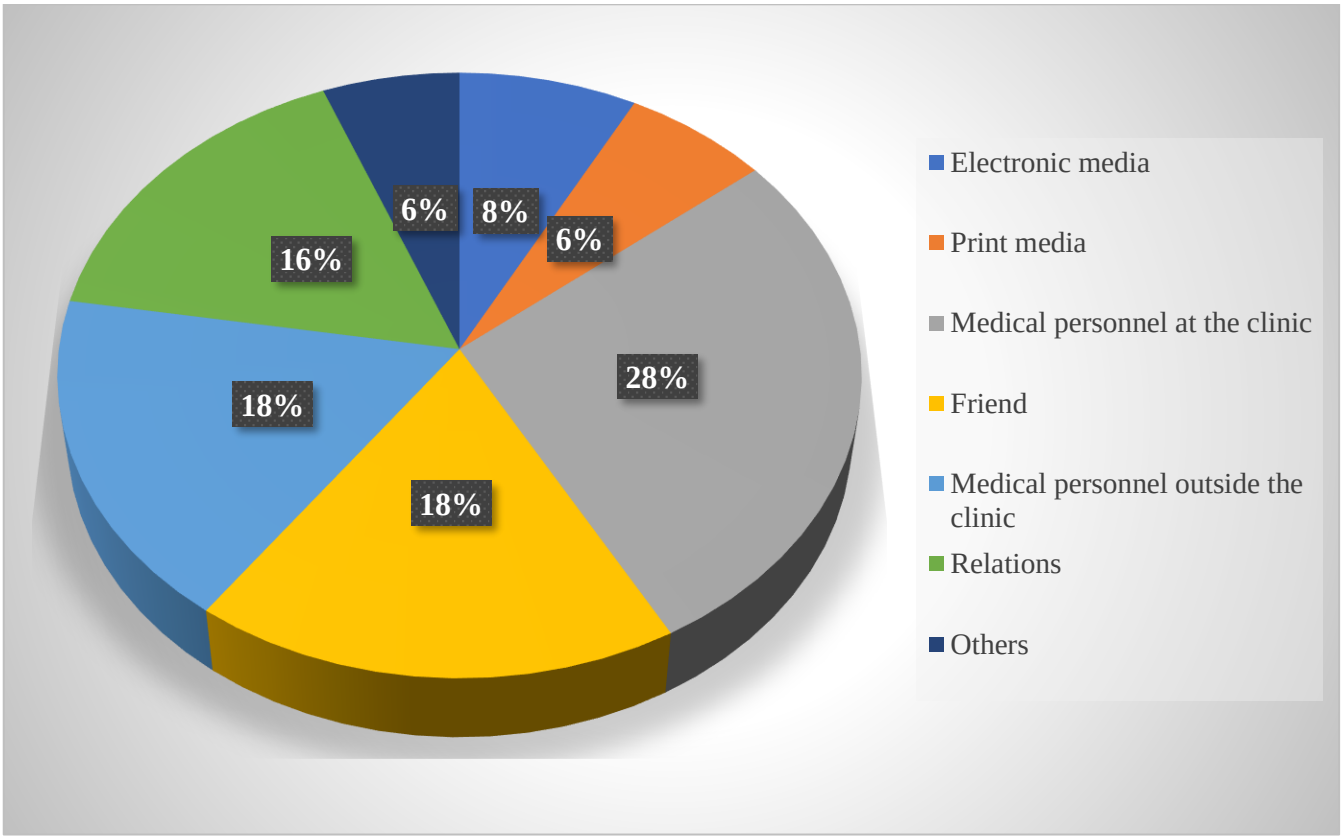

Figure 2: Source of awareness of Antenatal and Obstetric Care Service

3.8 Knowledge of Antenatal and Obstetrics Care Services

Table 8 revealed that most respondents tend to be knowledgeable that antenatal and obstetrics care services usually help to detect complications during pregnancy, as this was represented with the highest mean score of 2.941. This was followed by those who agreed that antenatal care services enable expectant mothers to learn about signs of obstetric complications (2.925) and help reduce perinatal and newborn morbidity and mortality (2.923). A significant proportion of the respondents agreed that non-use of antenatal care services is a determinant of babies having low birth weight, while its use helps to reduce maternal and neonatal morbidity and mortality.

Table 8: Knowledge of antenatal and obstetric care services

Statement	Disagree	Not Sure	Agree	Mean Score
ANC/OBS services help detect complications during pregnancy	5	40	806	2.941
ANC enables expectant mothers to learn about the signs of obstetric complications	11	40	775	2.925
ANC can help reduce perinatal and newborn morbidity and mortality	8	49	787	2.923
Non-use of ANC services is a determinant of babies having low birth weight	14	44	765	2.913
ANC/OBS services help reduce maternal and neonatal morbidity and mortality	12	56	759	2.903
ANC provides a pregnant woman with health services	5	78	766	2.896
It enhances birth preparedness	17	58	751	2.889
Through ANC/OBS, pre-existing health conditions are screened, diagnosed, and with timely interventions given	26	130	650	2.774
It provides a range of health-related information that helps women to improve their health and that of their babies	51	162	563	2.660
Attendance at ANC and use of OBS are not important	754	47	60	1.194

This suggests that most possess adequate knowledge of the importance of antenatal care services rendered in the antenatal clinic. This corroborates the findings of Onasoga et al. (2012) that the majority of the respondents agreed that attendance at ANC helps detect possible complications during pregnancy, as well as helps to reduce maternal and neonatal morbidity and mortality among pregnant women in Ife Central LGA, Osun State. On the other hand, the least mean score of 1.194 represents those who were of the view that attendance of antenatal care services and use of obstetric care is not important.

The findings in this study were positive concerning knowledge, as over 90% of the women sampled knew each activity carried out during ANC. The reason behind the high level of awareness in this study might be a result of high literacy levels. The high educational attainment among the respondents is expected to have a positive impact on the health-seeking behaviours. Even though knowledge about maternal health is not taught in schools, the very fact of having attended school seems to increase overall awareness and ability to obtain new knowledge, as reported in Nepal, Venezuela, and Southwestern Nigeria (Wilson et al. 2024). This also exposes women to more health-related education information, making them fully aware of the risks and complications associated with avoiding antenatal care services.

Additionally, education can be seen as playing a significant role in promoting women's eligibility for employment, thus raising their income levels. With high-income levels, the indirect cost associated with utilisation of antenatal care services, such as the cost of transport, is not expected to be problematic; also, access to health care facilities, electronic media such as television and radio, might have contributed to the high level of awareness among the respondents.

4 Conclusion

The study analysed the knowledge of Antenatal and Obstetric care among women of childbearing age in some selected LGAs in Kaduna State. Data collected for the study were analysed descriptively using frequency distribution tables and the Chi-square test. This study revealed that most respondents tend to be knowledgeable that antenatal and obstetrics care services usually help to detect complications during pregnancy. The reason behind the high level of awareness in this study might be as a result of high educational attainment and economic status among the respondents are expected to have a positive impact on the health-seeking behaviours. The findings further revealed that more than half of the respondents have less than four (4) children ever born. This is an indication of high parity among the women in the study area, which is expected to negatively impact the utilisation

of ANC services. This study has therefore improved maternal and child health outcomes, and it also empowers women with vital health information, strengthening family well-being.

The study therefore recommends that the government educate mothers, improve men's involvement and religious teachers, strengthen community participation, increase political commitment, and boost accessibility to maternal health care services. Emphasis should also be placed on capacity building for skilled birth attendants and PHCs.

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