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Original Article

Health Information Needs and Risk Health Behaviors of Pregnant Women in Anambra State, Nigeria

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Abstract

Introduction: This study investigated the health information needs and risky health behaviors of pregnant women in Anambra State. The vast majority of maternal deaths could be prevented if women had access to health information on their risky health behaviors during pregnancy. The study's specific objectives are to determine the risky health behaviors of pregnant women in Anambra State and identify their health information needs regarding these behaviors.

Methods: The descriptive survey research design was adopted for this study. The population comprised 8,984 pregnant women. Borg and Gall statistical tool was used to determine the sample size of 898. A questionnaire structured by the researcher was used as a data collection instrument for the study. Three experts validated the instrument. Data obtained were analyzed using mean ratings.

Results: The study revealed that pregnant women in Anambra State indulge themselves in so many risky health behaviors, and they have several unmet health information needs that could be attributed to their risky health behaviors.

Conclusion: Concerted efforts should be made as a matter of urgency to provide health information to pregnant women in bite-sized and self-explanatory formats (information repackaging), especially for vulnerable women (poor, illiterates), to help meet their health information needs. This can mitigate the rising effects of pregnancy-related complications in Nigeria.

Introduction

Information is often the most critical aspect of human life, serving as the key to solving problems. In our information-driven society, access to accurate information is essential for success. Undoubtedly, information plays a vital role in decision-making, with the power to either benefit or harm an individual. Everyone, regardless of their academic, political, or social status, needs information to lead a healthy and thriving life. Today, many people suffer or die from chronic diseases simply because they lack access to

the correct information at the right time.

Information aids in living a healthy life. Health, according to the World Health Organization, is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. In other words, information and health work hand in hand because information is the gateway to making a perfect decision concerning healthy living. Therefore, pregnant women need health information in order to take necessary preventive measures because prevention, they say, is better than cure (1). According to the Australian Law Reform Commission, ALRC, health information is information or an opinion about the health or a disability (at any time) of an individual or an individual's expressed wishes about the future provision of health services to him/her, or a health service provided or to be provided to an individual. It could be generalized that information is the right channel for meeting people's worries and needs. This is the more reason why the information needs of pregnant women should be appropriately identified and adequately met because any wrong decision taken at this point can put the woman and the unborn child into trouble, which may eventually take their lives (2).

Information needs stem from a partial awareness of something missing, leading to searching and locating the information that will bring about a greater understanding and meaning of what is confusing. NCLN, OjukwuCLN, and DeborahCLN (3) argue that an information need represents a real-life scenario characterized by an inseparable link between 'information' and 'need.' It takes only information to assuage an information need. Thus, the author's sum of information needs to be the amount of positive information that an individual or group of users need to have for their work recreation and other purposes. Furthermore, information needs occur whenever individuals need to learn how to handle a particular situation. Therefore, the quality of information an individual receives enhances her rightful choice of health care, as the case may be.

Unquestionably, every individual needs health information in order to take necessary preventive measures, but pregnant women need health information more for proper health decisions that will lead them to a safe and successful delivery. Pregnancy usually lasts for forty weeks, beginning from the first day of the woman's last menstrual period. Access to health information during this period is essential for expectant mothers, especially health information on how to abstain from risky health behaviors and adopt a healthy lifestyle that will be of immense benefit to the woman and her unborn child. Complications that go with pregnancy are so numerous, most of which could be attributed to the risky behaviors of pregnant women.

Risky health behaviors are unhealthy lifestyles people live, ignorant of the harm they are putting their lives through. Some of these are tobacco use, alcohol consumption, drug use (out of doctor's prescription), unsafe sex behaviors, unhealthy dietary behaviors, being overweight, physical inactivity, and not going through proper maternal health care sessions, which comprises family planning, preconception, prenatal and postnatal care.

About 287,000 women die of pregnancy-related complications each year. The vast majority of maternal deaths may have been prevented if women had access to quality information on their risk health behaviors. Hence, providing information in line with pregnant women's needs may not only influence their knowledge but also positively affect their child delivery outcomes and quality of life. This is the more reason why the information needs of pregnant women on risk health behaviors should be identified appropriately and adequately met, hence the bedrock for this study (1).

A healthy pregnancy begins long before a woman thinks about motherhood. For a couple not to adhere to preconceptions, healthcare is a risky one. Preconception healthcare focuses on things women can do before and between pregnancies to increase the chance of having a healthy infant and remaining a healthy mother (4). Preconception information prior to pregnancy can help couples make decisions about pregnancy and parenting, prevent problems during pregnancy, and improve the health of babies at birth (5). Preconception information helps the couple in planning and gives them time to improve their general health status prior to conception. About 1 in

four maternal deaths is related to heart disease, and women still die from bleeding, high blood pressure, blood clots, and infections. According to Kann, many of these deaths can be prevented through improvement in preconception care, access to health care and social services, quality of care received, and behaviors and health care practices of women. For example, a woman can start taking folic acid supplements before pregnancy (4). Furthermore, by planning ahead, a woman can avoid putting the fetus at risk before she knows she is pregnant during its first critical weeks of development (6).

Pregnant women have been reported to consume high amounts of processed energy-dense, salty foods, and sugary drinks. Regular consumption of such foods during pregnancy is an established risk factor for excessive gestational weight gain and obesity (7). Excess weight gain is one of the common risk behaviors of pregnant women. Excess weight or obesity gain in pregnancy is associated with hypertensive disorders of pregnancy, gestational diabetes, excessive fetal growth, prolonged labor, birth injury, and cesarean delivery (8). Furthermore, excess weight gain in pregnancy may be associated with an increased risk of long-term obesity in both mother and child (9). Maternal obesity is associated with complications during pregnancy, such as first and third-trimester miscarriages, preeclampsia, gestational diabetes, failed inductions of labor, and increased rates of cesarean sections (10). Health information on pregnancy nutrition is vital in order to avoid excess weight gain.

According to Kann, during pregnancy, women who drink alcohol are more likely to have a miscarriage or stillbirth, have a higher chance of having congenital disabilities and Fetal Alcohol Spectrum Disorder (FASD), abnormal facial features, short stature, low body weight, hyperactivity disorder, intellectual disabilities, and vision or hearing problems (4). Richards asserts that one in three African women uses a skin-lightening product and that aggressive bleaching is most common among Nigerian, Ghanaian, Togolese, and South African women. The author posits that women use this pill called glutathione during pregnancy to lighten the skin of their unborn babies while they are still in the womb. In his words, this drug, according to NAFDAC, is illegal and can cause congenital disabilities, including damage to the limbs and internal organs (11).

Smoking by women in Nigeria is now a common phenomenon, and women do not even consider the risk factors involved. According to Kann, some of the risks of smoking during pregnancy include the likelihood of miscarriage, adverse effects on the placenta, which is the source of the baby's food and oxygen, babies being born too early or having low birth weight, and smoking during and after pregnancy is a risk factor of Sudden Infant Death Syndrome (SIDS). In addition, babies born by women who smoke are more likely to have a cleft lip or cleft palate (4).

Alcohol intake by Nigerian women in this digital era is said to be on the increase. Seemingly, women now compete with men when it comes to taking alcohol without thinking of the side effects involved. Pirani opines that women who drink alcohol are more likely to have miscarriage or stillbirth, and other risks to the fetus include a higher chance of having congenital disabilities and FASD (12).

The age of a pregnant mother could also be a risky one. Pregnant teens are more likely to run into complications like early labor. In addition, they are prone to high blood pressure and anemia (lack of healthy red blood cells). On the other hand, pregnant women in their late 30s and above are at increased risk of having miscarriages and delivery complications, including excessive bleeding during labor, premature labor, and prolonged labor, and they are likely to have infants with a genetic disorder, such as Down syndrome (13).

The most painful risk behavior of pregnant women is abortion (termination of pregnancy), specifically in young girls. This could be achieved through so many measures like taking pills, taking concoctions, and going to the hospital. The health risks that go with abortion are so numerous, some of which include heavy or persistent bleeding, infection, damage to the cervix, scarring of the uttering lining, perforation of the uterus, damage to other organs, and death. Most women prefer abortion to birth control measures without thinking

of the risks involved.

Abstinence from sex, primarily at the late stage of pregnancy, is another risky behavior that ends most women in caesarian operations, which could lead to bleeding or even death. Faulkner opined that sex aids in easier labor and recovery. According to him, having an orgasm increases the contractions in the pelvic floor, aiding to strengthen the muscles one will need for labor and after delivery. Faulkner went further to state that if a pregnancy stage is full term or has passed the due date, having sex can help the body prepare because semen contains prostaglandins, which can help ripen the cervix (14).

Tetanus can occur during pregnancy or within six weeks after termination of pregnancy. Women who deliver under unhygienic conditions and with low Tetanus Toxoid (TT) vaccination are at risk of developing tetanus (15). Maternal and neonatal tetanus are the two significant types of tetanus that affect a pregnant woman. Available data indicate that 18 States (out of 36 and the Federal Capital Territory) are at risk for Maternal and Neonatal Tetanus, and many hospital-based studies have identified Maternal and Neonatal Tetanus as a problem of high magnitude in Nigeria (16).

Health information needs of pregnant women on risk health behaviors

The information needs of users can only be effectively provided when you know the subject content, the level of users who will make use of the information, and how best to process the source of information for easy access to these users. In the words of Das and Sarker, pregnant women have several unmet information needs during pregnancy (17).

Literature on pregnant women has shown that they have information needs regarding nutrition (18), family planning (19), total well-being of the fetus (20), medication (21), pre and postnatal care (22–24), breastfeeding (25–27), birth facilities (23,28), support against abuse (29,30), obstetric danger signals (31,32), and healthy lifestyles (33,34). According to Fenwick (35), pregnant women face challenges of unmet information needs and inadequate support concerning assurance and anxiety during child delivery. Recent studies have noted an increased number of cases of unplanned cesarean sections as a result of unmet information needs that have developed into emotional disorders (36, 37). Physical and psychological changes during pregnancy can, however, be treated with medication (38).

According to Thompson, Robertson, and Nassar (39), pregnant women's knowledge of obesity in their study revealed that 62.9% of women had not received any information on the ideal weight gain recommended to pregnant women by their healthcare providers and the implications of obesity for pregnancy and after delivery. Thompson et al. further stress that 39% of the pregnant women in their study were already obese or overweight, and none of the women had prior knowledge of the effects of being obese. Furthermore, two-thirds of the pregnant women had not received any advice from their healthcare providers on the necessity to measure and maintain a particular weight. Thompson et al. and Waring (39, 40) suggest that pregnant women need adequate advice on how to maintain their body mass in order to prevent gaining excessive weight. Obesity among pregnant women could lead to complications, stillbirth, and cesarean delivery (41). Although most healthcare providers provide advice on health topics, the aspect of weight gain is often left out (39).

Preconception information needs of pregnant women need to be addressed, too. In the words of Hefferman preconception health information is a prevention strategy that helps couples prepare for pregnancy in order to provide the healthiest environment possible to the earliest embryonic cell. Preconception health information has been recognized as enhancing pregnancy outcomes by optimizing health during the most critical period, 17 to 56 days after conception (42).

Pregnant women seriously need information on family planning. The importance of family planning must be emphasized. Obionu remarks that family planning is an essential measure against maternal and childhood mortality and morbidity. He goes further to stress that it is a vital and integral component of primary health care, which aims at

promoting responsible parenthood, controlling the population, and improving the quality of life (43).

Hence, providing information in line with pregnant women's needs may not only influence their knowledge but also positively affect their child delivery outcomes and quality of life. This is the more reason why the information needs of pregnant women on risk health behaviors should be identified appropriately and adequately met, hence the bedrock for this study.

From the literature review, no literature known to the researcher has ever tried to find out the risky health behaviors of pregnant women in Nigeria; hence, this study attempts to fill this research gap.

The study aims to examine the health information needs of pregnant women and their risk health behaviors in Anambra State. The specific objectives of the study are to:

1. Find out the risky health behaviors that exist among pregnant women in Anambra State
2. Identify the health information needs on risky health behaviors of pregnant women in Anambra State.

Methods

A descriptive survey research design was adopted for this study. This research design was considered appropriate for this present study because only a portion of the population was studied, and findings from this are expected to be generalized to the entire population. The population of the study comprised 8,984 pregnant women who registered for prenatal care in all the general hospitals in Anambra State during the period of study. The sample size for this study consists of 898 registered pregnant women drawn from all the state teaching/general hospitals in Anambra State (January-December, 2020) who were statistically determined using a mathematical model developed by Borg and Gall (44) percentage model. A researcher-made questionnaire was used as the instrument for data collection. The instrument went through face and content validation by three experts. A pilot study was done to test the reliability of the instrument, and the reliability coefficient was established using Cronbach Alpha. Reliability coefficients of the Risk Health Behaviors section and Health Information Needs of Pregnant Women section were obtained at .79 and .70, respectively. Copies of the questionnaire were administered between January and December 2020 by the researcher with the help of tutored research assistants. The sample size of 898 was randomly selected; for example, a hospital with registered pregnant women of 610 in number was randomly selected this way (610×898 divided by 8984 =61); the participants were selected from the pregnant women who used the hospital within the period of the study.

The response rate was 96.9%. The Data collected were analyzed using arithmetic mean. Since a 4-point scale was used to answer research questions, the decision level was between 2.50 values. Thus, any item with a mean score of 2.50 and above was positively interpreted, while any item with a mean score below 2.50 was negatively interpreted. SPSS software version 24.0 was used as a tool for data analysis in research. Descriptive statistics was used to analyze the data.

Results

This section is concerned with data presentation, analysis, interpretation, and discussion of findings. The results are presented and analyzed based on the research questions that guided the study.

As shown in Table 1, a greater percentage of the respondents were in the 31-40 weeks of their pregnancy. This is followed by those at 21-30 weeks and those at 11-20 weeks. Respondents at 1-10 weeks of their pregnancy were the least, making up just 10.22%. The table indicates that the majority of the respondents were at the last stage of pregnancy. This shows that pregnant women register for prenatal care to deliver their babies. This may be a result of poor health information and the dangers that come with late registration.

As Table 1 shown, the majority of the pregnant women, 214, are having their first pregnancy. For those on their second pregnancy, 204 follow this. Respondents on their third pregnancy made up (198) while those on their fourth and fifth pregnancies were the least, with 147 and 108 pregnant women. This may be that pregnant women, after going through their first and second deliveries, now relax

in seeking prenatal care when it gets to their third, fourth, and fifth pregnancy. Health information will play a vital role here in changing their wrong mindset.

Table 1. Respondents' demographic data

Demographic Data	*N	%
Stage of Pregnancy		
1-10 Weeks	89	10.22
11-20 Weeks	101	11.60
21-30 Weeks	314	36.05
31-40 Weeks	367	42.14
Total	**871**	**100.0**
No. of Pregnancy		
1st Pregnancy	214	24.57
2nd Pregnancy	204	23.42
3rd Pregnancy	198	22.73
4th Pregnancy	147	16.78
5th Pregnancy	108	12.40
Total	**871**	**100.0**
No. of Antenatal Visit		
Once	201	23.08
Twice	215	24.68
Three times	192	22.04
Four times	151	17.34
Five times and above	112	12.86
Total	**871**	**100.0**
Age Bracket (12years -55 years)		
12-18 years	64	7.35
19-30 years	301	36.88
31-35 years	269	34.56
36 years and above	244	28.01
Total	**871**	**100.0**

As shown in Table 1, most pregnant women, 24.68%, have had antenatal visits up to two times. This is followed by those who have had one visit (3.08%) and those who have had three visits

(22.04%). Respondents with four visits and five visits were the least, as they made up 17.34% and 12.86%, respectively. Based the obtained results, obviously, pregnant women seem to exhibit poor attendance at their prenatal appointments. This could pose a big threat to them and their unborn babies.

The respondents' age bracket, as shown in Table 1, shows that 36.88% of the respondents are between the ages of 19-30. This is followed by those between the ages of 31-35 years and 36 years and above, with 34.56% and 28.01%, respectively. Respondents between the ages of 12-18 were the least as they only made up 7.35% of the respondents. According to the results, girls with teenage pregnancy seem to exhibit poor attendance to their prenatal care schedules, and a great percentage of pregnant women fall within the risky age bracket.

Table 2. Mean ratings on the Risk Health Behaviors that exist among pregnant women

Row	Item statement	SA	A	D	SD	Total	Mean	Remark
1	I give birth every year	122	409	340	0	871	2.75	Agree
2	I always take sugary drinks (e.g., Sprite, Fanta, and Coke)	201	375	295	0	871	2.89	Agree
3	I am obese	247	428	196	0	871	3.06	Agree
4	I do not seek for doctor's advice before I conceive	247	400	224	0	871	3.03	Agree
5	I smoke/ take snuff	0	408	305	158	871	2.32	Disagree
6	I still take alcohol	175	398	298	0	871	2.86	Agree
7	When I take in by mistake, I go for abortion	224	483	164	0	871	3.07	Agree
8	I do not take tetanus vaccination while pregnant	0	390	242	239	871	2.15	Disagree
9	I mix drugs sometimes from the patent medicine dealers when I'm sick.	118	436	317	0	871	2.77	Agree
10	I abstain from sexual intercourse especially at the late stage of pregnancy	134	426	311	0	871	2.80	Agree
11	I normally take herbs to reduce the weight of the baby	217	529	125	0	871	3.11	Agree
12	I do not adhere to doctor's antenatal appointments	179	407	285	0	871	2.88	Agree
13	I do not take routine drugs	229	508	134	0	871	3.11	Agree
14	I'm comfortable with high heeled shoes/ tight clothes	193	451	227	0	871	2.96	Agree
	Grand Mean						2.84	Agree

Note; ≥2.50=Agree, <2, 50=Disagree

SA=Strongly agree, A=Agree, D=Disagree, SD=Strongly disagree

With the significant mean value of 2.84, obviously, most items in Table 2 are risk health behaviors pregnant women indulge in, some of which are constantly taking sugary drinks (for example, Sprite, Fanta, and Coke) (=2,89), being obese (=3.06), not seeking for doctor's advice before conception (=3.03), taking alcohol (=2.86), going for abortion when conceive by mistake (=3.07)taking herbs to reduce the weight of the baby (=3.11), not adhering to doctor's antenatal appointments (=2.88), not taking routine drugs (=3.11).

Based on the decision rule of 2.50, the respondents,

however, indicated that they do not indulge themselves in smoking/ taking snuff (=2.32) and not taking tetanus vaccination while pregnant (=2.15). These items were less significant because their mean scores were not up to the significant mean value of 2.84.

Table 3. Mean ratings of the health information needs of pregnant women

Row	I need information on the following	SA	A	D	SD	Total	Mean	Remark
1	Diets and supplements	24	656	79	112	871	2.67	Agree
2	Infections and treatment care	104	648	49	70	871	2.90	Agree
3	How to take care of medical risks such as hypertension and diabetes	131	589	59	92	871	2.87	Agree
4	Where and how preconception information can be obtained especially on when to conceive.	84	731	20	36	871	2.99	Agree
5	How to lose weight or maintain a healthy weight	159	670	10	32	871	3.09	Agree
6	How to prevent complication during pregnancy	133	731	3	4	871	3.14	Agree
7	Harmful traditional practices that affect the health of the mother and the fetus.	475	139	70	187	871	3.03	Agree
8	Exercise and rest	93	271	181	326	871	2.47	Disagree
9	Type of malaria drugs to take during pregnancy.	379	281	79	132	871	3.04	Agree
10	Family planning	34	293	220	324	871	1.22	Disagree
11	Danger signs that can harm the baby	418	392	50	11	871	3.39	Agree
12	How to feed a new born baby	74	309	188	300	871	2.44	Disagree
	Grand Mean					2.87		Agree

Note; ≥2.50=Agree, <2, 50=Disagree

SA=Strongly Agree, A=Agree, D=Disagree, SD=Strongly Disagree

Based on the significant mean value of 2.87, as shown in Table 3, some of the areas of health information needs of pregnant women in Anambra State include infections and treatment care (=2.90), how to take care of medical risks such as hypertension and diabetes (=2.87), where and how preconception information can be obtained especially on when to conceive (=2.99), how to lose weight or maintain a healthy weight (=3.09). Indicatively, some of the items are below the decision rule of 2.50, showing that they are not part of their information need.

Discussion

The results obtained for research objective one reveal that pregnant women in Anambra State get themselves involved in risky health behaviors such as always taking sugary drinks (for example, Sprite, Fanta, and Coke), being obese, taking alcohol, and not adhering to doctor's antenatal appointments. This is in line with the findings of Khlood, Heather, and Moira (7) that pregnant women have been reported to consume high amounts of processed energy-dense, salty foods and sugary drinks, which is an established risk factor for excessive gestational weight gain and obesity in pregnancy. Wolfe,

Rossi, and Warshark (10) clearly explained that maternal obesity is associated with complications during pregnancy, such as first and third-trimester miscarriages, preeclampsia, gestational diabetes, failed induction of labor, and increased rates of cesarean sections. This confirmed the findings of the World Health Organization in that the number of women dying of pregnancy related complications each year in Nigeria is still alarming (1).

The maternal mortality rate will still be very high because the outcome of all the risky health behaviors revealed in pregnant women are not favorable in any way but end in one complication or another. Not until pregnant women desist from such acts will the maternal mortality rate still be on the increase. The results challenge the findings of Osinusi et al. (16), who stated that pregnant women avoid tetanus vaccinations, leading to significant problems in Nigeria. However, this does not appear to be the case for pregnant women in Anambra state, possibly because the government provides the tetanus vaccine for free and even goes beyond hospital boundaries to administer it.

The findings for research objective two reveal that pregnant women need information on infections and treatment care, how to take care of medical risks such as hypertension and diabetes, where and how preconception information can be obtained, primarily on when to conceive, how to lose weight or maintain a healthy weight, how to prevent complication during pregnancy, harmful traditional practices that affect the health of the mother and the fetus, type of malaria drugs to take during pregnancy, danger signs that can harm the baby, and information on diets and supplements, This is in line with the discovery of Das and Sarker (17), and Fenwick (35) that pregnant women face challenges of unmet information needs during pregnancy. This may be because appropriate media/channels for disseminating maternal health information have not been adopted. In this era of information explosion, massive sensitization is essential, specifically for the poor masses, to get the right information needed in all spheres of life at every given point in time.

The findings contradict those of Engebretsen et al. (27), Mekuria and Edris (25), and Tuthil, Chan, and Butler (26), who found that pregnant women need information on breastfeeding. This may be because they are used to the regular practice of breastfeeding their husbands. Practice leads to perfection, which automatically turns a novice into an expert.

In the course of this research, the following were observed as potential areas to be investigated:

1. Preconception information needs of pregnant women in Nigeria
2. Use of mobile technology and aps in meeting the health information needs of pregnant women in Nigeria.

Conclusion

In this study, it is deduced that pregnant women do not space out their children, they take sugary/caffeinated drinks, add so much weight, do not utilize preconception care information, take alcohol, abort unwanted pregnancies, mix drugs from chemists when sick, abstain from sexual intercourse especially at the last trimester, take herbs to reduce the weight of the baby, do not adhere to antenatal appointments do not take routine drugs, wear high heeled shoes and tight clothes.

They need information on diets and supplements, infections and treatment care, how to take care of medical risks such as hypertension and diabetes, where and how preconception information can be obtained, especially on when to conceive, how to lose weight or maintain a healthy weight, how to prevent complications during pregnancy, harmful traditional practices that can affect the health of the mother and the fetus, type of malaria drugs to take during pregnancy, family planning, and danger signs that can harm the baby.

It has empirically proven that pregnant women in Anambra State indulge themselves in so many risky health behaviors, endangering their lives and that of their unborn child. The record is now straight; it has been revealed that the health information needs of pregnant women in the healthcare needs of Anambra State remain primarily unaddressed, posing severe risks. Misinformation can lead to fatalities, miscarriages, or infertility. In today's world, overwhelmed with information, it is crucial that healthcare providers urgently leverage contemporary

methods to disseminate accurate health information. For urban populations, this includes utilizing text messaging, social media, and webinars. In rural areas, effective strategies encompass phone calls, church meetings, community library health awareness sessions, and gatherings of local women's groups. These efforts are essential to counteract the increasing incidence of pregnancy-related complications.

Declaration

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Conflicts of Interests

The author declares no conflict of interest in conducting this research.

Ethical Statement

I, the author, certify that this is my original work and has not been published anywhere or is under review for publication in any journal. I take full responsibility for the integrity of the work as a whole, from inception to published article. Every necessary data is available and will be provided if anyone needs them.

All the pregnant women used for the study gave their informed consent before they participated in the study. The researcher was subjected to ethical clearance by the ethical committees of the hospitals used for the study in Anambra state.

I certify that my research study complies with our institution's regulations and does not violate any existing copyright or other third-party rights.

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Authors' contributions

The author wrote the work, starting with the introduction and discussing the results until the final manuscript.

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