P-ISSN: 2617-9806
E-ISSN: 2617-9814

Impact Factor: RJIF 5.2
www.nursingjournal.net

International Journal of Advance Research in Nursing

Volume 8; Issue 1; Jan-Jun 2025; Page No. 45-51

Received: 25-10-2024
Accepted: 29-11-2024

Indexed Journal
Peer Reviewed Journal

Effect of educational intervention on knowledge of anaemia among pregnant women attending selected health centres in Abia state

Nnamdi NJ[1], Ekpenyong AU[2], Udo-Inyang FO[3], Nwachukwu NN[4], and Okorocha NA[5]

[1,3,4,5] Department of Nursing, Rhema University, Aba, Nigeria.

[2] Department of Nursing, University of Uyo, Uyo, Nigeria.

Corresponding Author: Nnamdi NJ

DOI: https://DOI.org/10.33545/nursing.2025.v8.i1.A.446

Abstract

Maternal anaemia during pregnancy is a serious public health concern. It affects around fifty-six percent of pregnant women in poor and middle-income nations globally. The study examined the effect of educational intervention on knowledge of anaemia among women who attended Primary Health Care centres in Abia state. The objectives were to

1. Determine the pregnant women's knowledge of anaemia pre- intervention. 2. Determine the pregnant women's knowledge of anaemia post intervention.

Methods: this was a quasi-experimental study of 400 pregnant women who were selected using purposive sampling method. The study population consisted of pregnant women who attended selected primary health care centres. A multistage sampling procedure was adopted. Two senatorial zones and two local government areas used for the study were selected by a simple random sampling. Four health centres were purposively selected. A sample size of 400 pregnant women was used. They were shared into two groups of control and intervention. Each of the group had 200 pregnant women. A validated questionnaire was used to collect data. A pre-test was done on both groups, using the questionnaire, before the educational intervention was administered on the intervention group. The teaching lasted for five weeks after which posts tests was administered. Data was analysed with the aid of the statistical package for Social Sciences, version 21. Descriptive analysis was done using frequencies and percentages and inferential statistics was analysed using chi square at 0.05 level of significance.

Results: Before the intervention, 76.0% and 85% of the participants in the control and intervention group had poor level of knowledge of anaemia. After the intervention, during post-test 1, 80.4% and 28% of the control and intervention respectively had poor knowledge. At post-test 11, 84.2% and 25.6% of the participants in the control and intervention groups respectively had poor knowledge. The hypotheses tested showed that there is a significant difference in pregnant women's pre and post-test knowledge on anaemia between the intervention and control groups (p-<0.001).

Conclusion: Encouraging more educational intervention that will improve the knowledge of the pregnant women will bring about reduction in maternal and child morbidity and mortality.

Keywords: Educational intervention, knowledge, anaemia, pregnant women

Introduction

One significant public health issue is maternal anemia during pregnancy (Sunuwar *et al.*, 2019) [27]. It affects about 56 percent of pregnant women in low- and middle-income nations globally (Munyogwa *et al.*, 2021) [18]. The two areas most impacted are Southeast Asia and Sub-Saharan Africa (Williams *et al.*, 2020) [32]. In particular, anaemia affects 43 percent of children globally, 29 percent of reproductive-age non-pregnant women, 38 percent of high-income pregnant women, and between 40 to 60 percent of low-income pregnant women (Kamau *et al.*, 2019; Ajepe *et al.*, 2020) [12. 3].

Due to the growth and development of the placenta and the fetus, as well as physiological changes in the mother's red blood cell mass, the demand for iron rises dramatically throughout pregnancy. A healthy food balance is essential during pregnancy to guarantee that the foetus receives enough energy to grow appropriately without the mother having to use her own tissues to support the pregnancy (Nimbalkar *et al.*, 2017; Serbesa & Iffa, 2019) [19, 25]. Anemia in pregnancy is defined by the World Health Organization's 2020 recommendations, as a hemoglobin level less than 11 g/dl. Mild anemia (Hb level 9-10.9 g/dl), moderate anemia (Hb level 7-8.9 g/dl), and severe anemia (Hb level 7-4.5 g/dl) are the three severity categories of anemia. While a hemoglobin level below 11 g/dL is considered anemia in pregnancy, impoverished countries such as Nigeria frequently utilize a threshold below 10 g/dL (Ugwu & Uneke, 2020; Omote *et al.*, 2020; Munyogwa *et al.*, 2021) [18, 30, 23].

The most common hematologic condition that occur during pregnancy is anemia. It significantly raises the risk of maternal and fetal illness and death (Ugwu & Uneke, 2020) [30]. There are several reasons why pregnant women may develop anemia- deficits in iron, folic acid, vitamin A, and vitamin B12, as well as parasitic illnesses including malaria

and hookworm (Oumer, 2019; Habib, 2019; Kamau *et al.*2019; Ngimbudzi *et al.* 2021) [13, 24, 9]. Worm infestations during pregnancy cause malnourishment, iron deficiency anaemia, and increased susceptibility to several diseases. Apart from the anaemia that the mother experiences, the baby may also face difficulties due to intrauterine growth retardation and low pregnancy weight gain. These outcomes could lead to low birth weights and increased chances of perinatal mortality. Future mental and physical problems, as well as poor academic performance, are more common in the children of anaemic mothers. Furthermore, growth retardation and low iron reserves are common in preterm infants during the first year of life (Okafor *et al.*, 2017; Stephen *et al.*, 2018; Allen, 2018; Mehrotra *et al.*, 2018) [21, 26, 5, 17]. One of the main risk factors for anemia is eating less raw vegetables, and low level of education (Nwankwo, 2022) [20]. Reducing the incidence of anemia in pregnant women requires improving their nutritional condition with more vitamin A, iron, and iodine diets (Kassa *et al.*, 2017) [14].

Pregnancy-related anaemia can contribute to a cycle of poverty by lowering living standards, productivity, and educational achievement, all of which have a detrimental long-term effect on the country's economic growth (Ugwu & Uneke,2020: WHO, 2023) [30]. Pregnant women in Nigeria have anaemia prevalence ranging from 12.2% to 62.2%, depending on the region (Ajepe *et al.*, 2020; Omote *et al.*, 2020) [3, 23]. Nigeria's prevalence of anaemia is higher than the five percent pregnant anaemia prevalence advised by the World Health Organisation, and this is problematic for the development of both the child and the nation. Pregnancy-related dietary adherence and increased awareness of this important health concern can help address it (Aktac *et al.*, 2018) [4]. Depending on their culture and level of knowledge, women's awareness of the need to prevent iron deficiency differs. Educating pregnant women is one way to improve their knowledge of and adherence to healthy dietary habits that help prevent anaemia. Given that poorer maternal education is linked to a higher risk of low birth weight, neonatal mortality, and preterm in women with severe iron deficiency, it is believed that understanding proper nutrition and dieting throughout pregnancy is essential for the health of both the mother and the fetus (Oumer & Hussein 2019) [24].

Educational intervention is one indispensable tool used by educators in achieving knowledge transfer and enhancing the teaching-learning process (De-Ries *et al.*, 2021) [7]. Educational intervention for pregnant women which contains pictorial representations and/or discussion maps is a vital tool to create conceptual understandings, unpack concepts, and generally promote group debate of ideas (De-Ries *et al.*, 2021) [7]. It is especially appropriate for individuals who learn best visually, especially rural women who may be disadvantaged academically (Odhiambo & Sartorius., 2020) [22]. Although it is used in the educational sector, no educational intervention that is designed in modules has been assessed or put into practice in relation to its impact on pregnant women's awareness anaemia in Nigeria, particularly in Abia State. Therefore, the present study was conducted to assess the effectiveness of an educational intervention package created in modules on the knowledge of anemia among pregnant women attending primary health care centres in Abia State.

Materials and methods: Study area: Four basic health care facilities in Abia State were chosen for the study. Abia State is in Nigeria's south-east geopolitical zone, Abia State is bordered to the north and northeast by the states of Anambra and Enugu, to the west by the states of Ebonyi and Imo, to the east by Cross River State, to the southeast by the state of Akwa Ibom, and to the south by the state of Rivers. Abia state has numerous primary health centres within the local governments. Abia state like every state in Nigeria has three senatorial zones-*viz*; North, Central and South senatorial zones and seventeen local governments. Abia central and Abia South senatorial zones were used for the study. The selected local government in Abia Central is Umuahia South L.G.A (Ubakala PHC and Old Umuahia PHC). For Abia South, the local government selected is Aba South L.G.A. In Aba South L.G.A, the health centres selected are Aba town hall PHC and Eziukwu PHC.

Study design: This is an intervention study that utilised a quasi-experimental pre-test and post-test design.

The study population: This comprised pregnant women attending primary health care centres in the selected LGA across two senatorial zones in Abia state. The total population comprised 422 pregnant women from all the health centres.

Exclusion criteria: Pregnant women with medical conditions such as sickle cell anaemia, diabetes mellitus, and those on clinician-supervised diet or restricted diet.

Sample size determination: The total population of 422 was used for the study. However, 400 pregnant women were eventually selected. These were the women that met the inclusion criteria.

Sampling method: A multistage sampling technique was adopted. First Abia state was clustered into three zones in line with the existing senatorial zones. The second stage involved randomly selecting two senatorial zones from the three zones. One LGA was selected from each of these zones using simple random sampling. The third stage involved purposely selecting two PHCs in each of the selected LGA in Abia south and Abia central, these two senatorial zones were used for the study. The selection was based on the following criteria; busiest, comprehensive and viable PHC. A total of four PHCs were used for the study. The fourth stage was randomly assigning two of the PHC each to the intervention and control group respectively. The pregnant women attending each of these randomly assigned PHC (intervention and control) who met the inclusion criteria served as participants for the study in the respective groups. They were recruited consecutively as they attended the ANC based on the inclusion criteria.

Instrument for data collection: For the purpose of gathering data, the researcher created a self-structured questionnaire adapted from previous studies. It was divided into sections. Section one contains socio-demographic data including obstetrics and antenatal history of the respondents. Section two contains 8 items questions relating to knowledge of anaemia. Each item is a multiple-choice

response format to choose from the correct response. Each correct response receives a score of 12.5 marks with a total of 100mks, and the grading is on three levels. A score of 0-35 denotes poor knowledge, 36-65 denotes fair knowledge, and 66-100 denotes good knowledge

Reliability of the instruments: This was ascertained by pilot testing the self-structured questionnaire among 40 pregnant women (representing 10% of the total population of the study). Pregnant women attending Amokwe item PHC in Abia North senatorial zone who were not part of the study were used. Using a split half reliability test, the internal consistency test was done using the Cronbach's alpha coefficient and it showed a strong dependability.

Stages of data collection
Data collection was done in stages

Phase one
Pre intervention stage: This involved administering a pre-test during antenatal visits to the participants using the questionnaire which was collected immediately after filling it.

Phase two: Delivery of intervention Package (EIP): This entailed the researcher delivering the educational intervention package exclusively to the participants/respondents in the intervention group. The delivery of the educational package was done for nine days, lasting for five weeks, in each of the PHCs. Mop up sessions were organised for other participants who were not able to meet up the chosen days. A session of the delivery lasted for a maximum of 45 minutes excluding questions and answer time. During this period, a placebo in the form of a seminar on "child immunisation" was delivered to the control group.

Phase three
Post intervention phase. (Data collection): One (1) week after the intervention, the post-test one was administered to both the intervention and control group. Post-test two was done after 3 weeks.

Data analysis
The statistical software for social sciences (SPSS) version 21 was used to analyze the data. The demographic characteristics variables were summarized using descriptive statistics of frequency and percentage, as well as mean and standard deviation.

Results
The results were presented according to the research objectives and hypotheses.

Table 1: Socio-demographic characteristics of participants. n=200 for the control and intervention groups respectively.

	Control	intervention	χ^2	p
Age				
18-24	50(25.0)	55(27.5)	15.799	0.015
25-31	80(40.0)	85(42.5)		
32-38	30(15.0)	28(14.0)		
39-45	25 (12.5)	25(12.5)		
46-52	10(5.0)	7(3.5)		
53 and above	5(2.5)	0(0.0)		
Marital status				
Married	156(78.0)	158(79.0)	15.128	0.004
Single	28(14.0)	38(19.0)		
Divorced	8(4.0)	2(1.0)		
Separated	8(4.0)	0(0.0)		
Widowed	0(0.0)	2(1.0)		
Level of Education				
No formal education	2(1.0)	4(2.0)	16.213	0.003
Primary school	4(2.0)	2(1.0)		
JHS/JSS	116(58.0)	150(75.0)		
SHS/SSS	76(38.0)	44(22.0)		
Tertiary	2(1.0)	0(0.0)		
Religion				
Christian	196(98.0)	194(97.0)	4.677	0.197
Muslim	2(1.0)	4(2.0)		
Traditional	0(0.0)	2(1.0)		
Others	2(1.0)	0(0.0)		
Occupation				
Trader	90(45.0)	70(35.0)	16.616	0.005
Civil servant	40(20.0)	46(23.0)		
Unemployed	28(14.0)	56(28.0)		
Artisans	42(21.0)	28(14.0)		
Spouse employed				
No	16(8.0)	14(7.0)	0.144	0.704
Yes	184(92.0)	186(93.0)		
Monthly income of participants				
Below 35000	44(22.0)	64(32.0)	9.392	0.052
36000-50000	48(24.0)	50(25.0)		
51000-80000	70(35.0)	64(32.0)		
81000-120000	36(18.0)	22(11.0)		
121000 and above	2(1.0)	0(0.0)		

Table 2 provides a breakdown of the sociodemographic characteristics of participants. The majority 80(40.0) and 85(42.5) of participants across the control and intervention group respectively were in the age range of 25-31 years. The largest percentage of respondents [156(78.0) and 158(79.0)] control and intervention group respectively were married, and a significant portion [116 (58.0) and 150(75.0)] had completed junior secondary school education. Christianity with [196(98.0) and 194(97.0)] control and intervention group respectively was the dominant religion among the participants, and many of them were traders, the highest percentage of participants earned a monthly income between 51,000 and 80,000 naira.

Table 2: Antenatal care history of the participants

	Control	intervention	χ^2	p
Number of Antenatal Visits				
1	50(25.0)	32(16.0)	12.227	0.007
2	76(38.0)	110(55.0)		
3	38(19.0)	28(14.0)		
4 and above	36(18.0)	30(15.0)		
Have you ever been given iron/folate tables since you became pregnant?				
Yes	160(80.0)	174(87.0)	12.661	0.002
No	40(20.0)	26(13.0)		
Are you taking these tablets currently				
Yes No	152(76.0) 48(24.0)	162(81.0) 38(19.0)	1.481	0.224
Gestational age of current pregnancy				
1st Trimester	56(28.0)	38(19.0)	6.894	0.032
2nd Trimester	106(53.0)	106(53.0)		
3rd Trimester	38(19.0)	56(28.0)		
How many children have you given birth to				
None	46(23.0)	48(24.0)	10.566	0.061
One	54(27.0)	44(22.0)		
Two	62(31.0)	78(39.0)		
Three	26(13.0)	28(14.0)		
Five	8(4.0)	2(1.0)		
Six and above	4(2.0)	0(0.0)		

Participants' antenatal clinic (ANC) visits are shown in Table 3. The majority of individuals in the intervention group, 110 (55.0), had attended the ANC twice, whereas only 76 (38%) of the control group had done so. In terms of pregnancy, the majority, 106 (53.0%) and 106 (53.0%) the control and intervention are in their second trimester respectively. The number of children varied with a significant proportion having two children in both control and intervention.

Table 3: Summary of level of knowledge on anaemia among pregnant women before the intervention in both control and intervention groups.

	Groups	
	Control	**Intervention**
Knowledge	**F (%)**	**F (%)**
Pre test		
Poor	152 (76.0)	170 (85.0)
Fair	48(24.0)	30 (15.0)
Good	0 (0.0)	0(0.0)

Prior to the intervention, 76.0% of participants in the control group had poor knowledge of anaemia, while in the intervention group, 85.0% had poor knowledge. Among the control group, 24.0% had fair knowledge while in the intervention group, 15.0% had fair knowledge. None of the groups had good knowledge.

Table 4: Summary of Level of knowledge of anaemia among pregnant women in the selected PHC after the intervention in both control and treatment groups.

	Group	
	Control	**intervention**
Knowledge	**F (%)**	**F (%)**
Post I		
Poor	156(80.4)	56(28.0)
Fair	38(19.6)	86(43.0)
Good	0(0.0)	58(29.0)
Post II		
Poor	128(84.2)	40(25.6)
Fair	22(14.5)	70(44.9)
Good	2(1.3)	46(29.5)

From the table above, results show that, in the first post-intervention assessment, there was a significant improvement in knowledge in the intervention group from zero (0%) good knowledge before intervention to an increase of 29%, while poor knowledge reduced significantly to 28% at post-test 1, also fair knowledge improved significantly to 43% at post-test 1. However, in the control group there was no significant improvement in knowledge. The poor level of knowledge was at 80.4% at post-test 1. The level of good knowledge remained at 0%. At post-test 1, 80.4% of the control group and 28.0% of the treatment group still have poor knowledge.

Table 5: Mean comparison of knowledge of anaemia among control and intervention at different intervention times

	Control	intervention	t	p
Pre treatment	37.62±13.43	37.38±10.64	0.139	0.890
Post I	38.98±12.10	54.49±14.62	5.212	<0.001
Post II	32.21±14.64	54.19±17.36	5.271	<0.001

The control group exhibited a mean knowledge score of 37.62 (sd = 13.43) during the pre-treatment phase, while the intervention group had a slightly lower mean score of 37.38 (sd = 10.64). The difference in knowledge scores between the two groups during this phase was not statistically significant, t (398) = 0.139, p = 0.890. Following the intervention, significant improvements in knowledge were observed. In the post-test 1, the control group's mean knowledge score increased to 38.98 (sd = 12.10), whereas the intervention group demonstrated a substantially higher mean score of 54.49 (sd = 14.62). The difference in knowledge scores between the two groups during this phase was statistically significant, t (392) = 5.212, $p< 0.001$. Similarly, in the post-test 2 phase, the control group had a mean knowledge score of 32.21 (sd = 14.64), while the intervention group showed a significantly higher mean score of 54.19 (sd = 17.36). The difference in knowledge scores between the two groups during this phase was also statistically significant, t (306) = 5.271, $p< 0.001$.

Discussion

According to the results of this study, 85.0% of participants in the intervention group and 76.0% of participants in the control group showed insufficient knowledge regarding anemia prior to the intervention. Since the majority of the participants had been pregnant before and are in their second trimester, they may have heard about anaemia but do not have an in-depth knowledge it. The findings are consisted with findings of Habib *et al.* (2018) [9], Appiah *et al.* (2020) [6], Kolade et al (2020) [16] and Ademuyiwa *et al.* (2020) [2]. Who found that majority of their participants have heard about anaemia but lack in-depth knowledge. As a result, there is a need to raise pregnant women's awareness of anaemia.

Pregnant women's knowledge of anaemia, after the intervention in both the control and intervention group

According to the results, the intervention group's level of knowledge significantly improved from 0% excellent knowledge before the intervention to 29% and 29.5% in post-tests 1 and 2, respectively. From 85% prior to the intervention, poor knowledge decreased dramatically to 28% after test 1 and 25% after test 2. Additionally, fair knowledge increased dramatically from 15% before the intervention to 43% after test 1 and 44.9% after test 2. However, in the control group there was no significant improvement in knowledge. These findings suggest that the educational interventions package administered had a positive effect on improving the level of knowledge of anaemia among pregnant women in the intervention group.

The result of the post intervention assessment agrees with Hassan *et al.* (2020) [10], Abu-Baker *et al.* (2021) [1] and Khani *et al.* (2021) [15]. Their findings showed that after intervention the experimental group's level of knowledge grew dramatically after the educational intervention. Similar to the previous research mentioned, there were significant changes in the degree of awareness of anemia throughout pregnancy. This high degree of efficacy might be explained by the form of the educational intervention package utilized in this study, the method it was delivered, and the surroundings of the location where it was delivered. Furthermore, hypotheses tested showed that significant increases in knowledge were seen in the intervention group after the intervention. The intervention group demonstrated a comparable gain in mean score at post-test 2, however the control groups mean score declined dramatically between pre-intervention and post-test 2. This shows that, in comparison to what was seen in the control group, the intervention was successful in boosting the mean score of participants' knowledge of anemia. This study backs up the conclusions of Tirharini *et al.* (2018) [29]. Their results showed that the family support for maternal behavior in avoiding anemia had increased in the intervention group after educational intervention.

Conclusion

This study has been able to examine the effect of educational intervention on knowledge of anaemia. The pre-test revealed that the pregnant women have poor knowledge of anaemia. For this reason, an educational intervention was implemented to seek improvement on knowledge of anaemia. The educational intervention was effective in improving the knowledge of anaemia among the participants in the intervention group. This assertion was made from the findings seen in the pre-test and post-test. This educational intervention package developed and tested in this study with a positive outcome will encourage self-directed learning among the women.

Recommendation

It is important that the nurses and other healthcare providers who care for pregnant women imbibe a health education plan that will focus on awareness of anaemia and its prevention to the pregnant women during ANC clinics.

Declarations

Ethical consideration: An ethical clearance with protocol number FMC/QEH/G596/Vol.10/591 was obtained from the Research and Ethics Committee of Federal Medical Centre, Umuahia. Administrative permit was obtained from the health executive secretary of the LGAs and the officers in charge of the PHCs. verbal consent was obtained from each participant after the purpose of the study had been explained by the researcher. The participation for the study was

optional and participants had the right to decline participation or withdraw from the study any time they so desired with no penalty or loss of benefits. Anonymity and confidentiality of information provided was assured.

Consent for publication
All authors gave consent for the publication of the work.

Competing interest
There is competing interests.

Funding
Funding for this study was provided by the authors.

References
1. Abu-Baker NN, Abusbaitan HA, Al-Ashram SA, Alshraifeen A. The Effect of Health Education on Dietary Knowledge and Practices of Pregnant Women in Jordan: A Quasi-Experimental Study. Int J Women's Health. 2021;13:433-443.
2. Ademuyiwa IY, Ayamolowo SJ, Oginni MO, Akinbode MO. Awareness and Prevention of Anemia among Pregnant Women attending Antenatal Clinic at a University Teaching Hospital in Nigeria. Calabar J Health Sci. 2020;4(1):20-26.
3. Ajepe A, Okunade K, Sekumade A, Daramola E, Beke M, Ijasan O. Prevalence and Foetomaternal Effects of Iron Deficiency Anaemia among Pregnant Women in Lagos, Nigeria. PLoS ONE. 2020;15(1):e0227965. https://DOI.org/10.1371/journal.pone.0227965.
4. Aktac S, Sabuncular G, Kargin D, Gunes FE. Evaluation of nutrition knowledge of pregnant women before and after nutritional education according to sociodemographic characteristics. Ecol Food Nutr. 2018;37(6):441-455. https://DOI.org/10.1080/03670244.2018.1544561.
5. Allen LH. Anemia and iron deficiency: effects on pregnancy outcome. Am J Clin Nutr. 2018;71(5):1280-1284. https://DOI.org/10.1093/ajcn/71.5.1280.
6. Appiah PK, Nkuah D, Bonchel AD. Knowledge of and Adherence to Anaemia Prevention Strategies among Pregnant Women Attending Antenatal Care Facilities in Juaboso District in Western-North Region, Ghana. J Pregnancy. 2020;2020:2139892. https://DOI.org/10.1155/2020/2139892.
7. De-Ries K, Schaap H, Van-Loon A, Kral M, Meijer P. A literature review of open-ended concept maps as a research instrument to study knowledge and learning. Qual Quant. 2021;55(5):1467-487. https://DOI.org/10.1007/s11135-021-01113-x.
8. Felisian S, Mushy SE, Tarimo EA, *et al.* Sociocultural practices and beliefs during pregnancy, childbirth, and postpartum among indigenous pastoralist women of reproductive age in Manyara, Tanzania: a descriptive qualitative study. BMC Women's Health. 2023;23(1):123. https://DOI.org/10.1186/s12905-023-02277-4.
9. Habib A, Afzal M, Parveen K, Hussain M, Gilani SA. Knowledge, attitude and practices of pregnant women regarding iron deficiency anaemia in a rural area of Lahore. J Health Med Nurs. 2018;50:45-51. www.iiste.org.
10. Hassan H, Manaf RA, MCommMed S, Appannah G. The effectiveness of theory-based intervention to improve haemoglobin levels among women with anaemia in pregnancy. Med J Malaysia. 2020;75(6):715-719.
11. Jack MZ, Hui TJ, Ariffin NABC, Mun OS, Nagandla K, Idris N. Prevalence of iron deficiency anemia in pregnancy and its therapeutic response to treatment: a retrospective audit in a tertiary hospital in Seremban, Malaysia. Int J Adv Med. 2022;9:1090-1095.
12. Kamau MW, Mirie W, Kimani ST. Maternal knowledge on iron and folic acid supplementation and associated factors among pregnant women in a rural County in Kenya. Int J Afr Nurs Sci. 2019;10:74-80.
13. Kamau M, Mirie W, Kimani S, Mugoya I. Effect of community-based health education on knowledge and attitude towards iron and folic acid supplementation among pregnant women in Kiambu County, Kenya: A quasi-experimental study. PLoS ONE. 2019;14(11):e0224361. https://DOI.org/10.1371/journal.pone.0224361.
14. Kassa G, Muche A, Berhe A, Fekadu G. Prevalence and determinants of anemia among pregnant women in Ethiopia: a systematic review and meta-analysis. BMC Hematol. 2017;17:17.
15. Khani Jeihooni A, Rakhshani T, Harsini PA, *et al.* Effect of educational program based on theory of planned behavior on promoting nutritional behaviors preventing anemia in a sample of Iranian pregnant women. BMC Public Health. 2021;21:2198. https://DOI.org/10.1186/s12889-021-12270-7.
16. Kolade OA, Hanson VF, Adebiyi SO, Egoh R. Awareness, knowledge and the health implications of anaemia among pregnant women attending antenatal clinic in central hospital, Warri Nigeria. Int J Res Health Sci Nurs. 2020;6(1):34-52.
17. Mehrotra M, Yadav S, Deshpande A, Mehrotra H. A study of the prevalence of anemia and associated sociodemographic factors in pregnant women in Port Blair, Andaman and Nicobar Islands. J Fam Med Prim Care. 2018;7:1288-1293. https://DOI.org/10.4103/jfmpc.jfmpc_139_18.
18. Munyogwa M, Gibore N, Ngowi A, Mwampagatwa I. Effect of nutritional education intervention to reduce anaemia during pregnancy in Dodoma City, Tanzania: protocol for a cluster randomized controlled trial. Biol Methods Protoc. 2021;6(1):12. https://DOI.org/10.1093/biomethods/bpab012.
19. Nimbalkar PB, Patel JN, Thakor N, Patni M. Impact of educational intervention regarding anaemia and its preventive measures among pregnant women: an interventional study. Int J Reprod Contracept Obstet Gynecol. 2017;6:5317-5321. https://DOI.org/10.18203/2320-1770.ijrcog20175137.
20. Nwankwo B, Joseph S, Usman NO, Oyefabi AM. Anemia in pregnancy: Prevalence among clients attending antenatal clinics in Chikun LGA, Kaduna, Nigeria. J Clin Sci. 2022;19:123-129. https://www.jcsjournal.org/text.asp?2022/19/4/123/360620.
21. Okafor I, Okpokam D, Antai A, Usanga E. Iron status of pregnant women in rural and urban communities of Cross River State, South-South Nigeria. Niger J Physiol Sci. 2017;31(1):121-125.
22. Odhiambo JN, Sartorius B. Mapping of anaemia prevalence among pregnant women in Kenya (2016-2019). BMC Pregnancy Childbirth. 2020;20:711. https://DOI.org/10.1186/s12884-020-03380-2.
23. Omote V, Ukwamedua H, Bini N, Kashibu E,

Ubandoma J, Ranyang A. Prevalence, severity, and correlates of anaemia in pregnancy among antenatal attendees in Warri, South-Southern Nigeria: A cross-sectional and hospital-based study. Anaemia. 2020;2020:1915231. https://DOI.org/10.1155/2020/1915231.
24. Oumer A, Hussein A. Pregnant mothers' knowledge, attitude and practice towards preventions of iron deficiency anaemia in Harar Town, Ethiopia. Int J Public Health Sci. 2019;8(2):202-210. https://DOI.org/10.11591/ijphs.v8i2.19476.
25. Serbesa ML, Iffa MT. Pregnant women's knowledge, attitude, and practice regarding the prevention of iron deficiency anemia among Ethiopian pregnant women. Caspian J Reprod Med. 2018;4(1):1-7.
26. Stephen G, Mgongo M, Hashim TH, Katanga J, Stray-pedersen B, Msuya SE. Anaemia in pregnancy: prevalence, risk factors, and adverse perinatal outcomes in Northern Tanzania. Anemia. 2018;2018:1846280. https://DOI.org/10.1155/2018/1846280.
27. Sunuwar D, Sangroula R, Shakya N, Yadav R, Chaudhary N, Pradhan P. Effect of nutrition education on hemoglobin level in pregnant women: A quasi-experimental study. PLoS ONE. 2019;14(3):e0213982. https://DOI.org/10.1371/journal.pone.0213982.
28. Teweldemedhim LG, Amanuel HG, Berhe SA, *et al.* Effect of Nutrition Education by Health Professionals on Pregnancy-Specific Nutrition Knowledge and Healthy Dietary Practice among Pregnant Women in Asmara, Eritrea: Quasi-Experimental Study. BMJ Nutr Prev Health. 2021;4:e000159. https://DOI.org/10.1136/bmjnph-2020-000159.
29. Triharini M, Armini NKA, Nastiti AAA. Effect of educational intervention on family support for pregnant women in preventing anemia. Belitung Nurs J. 2018;4(3):304-311.
30. Ugwu N, Uneke C. Iron deficiency anemia in pregnancy in Nigeria—A systematic review. Niger J Clin Pract. 2020;23(7):889-896.
31. WHO. New World Health Assembly (WHA) Resolution to Accelerate Efforts on Food Micronutrient Fortification. Departmental news/Geneva, Switzerland. 29 May 2023. Available from: https://www.who.int/news-room/fact-sheets/detail/anaemia.
32. Williams P, Poehlman J, Moran K, Siddiqui M, Kataria I, Rego M, Saldanha N. Strategies to address anaemia among pregnant and lactating women in India: a formative research study. Public Health Nutr. 2020;23(5):795-805. https://DOI.org/10.1017/S1368980019003938.

How to Cite This Article
Nnamdi NJ, Ekpenyong AU, Udo-Inyang FO, Nwachukwu NN, Okorocha NA.. Effect of educational intervention on knowledge of anaemia among pregnant women attending selected health centres in Abia state. International Journal of Advance Research in Nursing. 2025; 8(1): 45-81