

Original Article

Knowledge and use of Folic Acid among Pregnant Women Attending Antenatal Clinics in Kaduna North Local Government Area, Kaduna State, Nigeria

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ABSTRACT

Background: Folic acid plays an important role during pre-conceptional period and the first trimester to reduce the incidence of Neural Tube Defects (NTDs). This study aimed to determine the knowledge and use of folic acid among pregnant women attending antenatal clinics in primary health care centers in Kaduna North Local Government area (LGA).

Methodology: A descriptive cross sectional study was carried out using a pretested interviewer-administered questionnaire. A total of 176 pregnant women were selected using systematic sampling technique. Data was collected and analyzed using SPSS version 23 and results were presented using tables. Chi square test of proportion was used to test for association. Fisher's Exact Test was used where conditions for Chi square test was not met. The level of statistical significance was set at p-value of <0.05.

Results: The mean age of the respondents was 27.9±6.1 years. Only 39.3% of respondents knew that folic acid prevents birth defects. About two thirds of the respondents (63.1%) had good knowledge on folic acid. Most of the respondents (88.6%) had good use of folic acid. The association between level of education, planned pregnancy and knowledge of folic acid were statistically significant (p=0.001 for both). There was also a statistically significant association between folic acid use and level of education.

Conclusion: About two thirds of the pregnant woman had good knowledge on folic acid but there was low pre-conceptional use of folic acid. There should be awareness campaigns on folic acid with special focus on pre-conceptional folic acid use by the LGA health department.

Keywords: Folic acid, Knowledge, Neural Tube Defects.

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INTRODUCTION

The child bearing age is the period when women are most vulnerable in terms of nutrition because pregnancy and lactation increase their nutrient requirements but unfortunately, they do not get adequate micronutrients in their diets during this period.^[1] Majority of women are also not aware of the effect that their nutritional status has on their pregnancy and infant outcomes.^[1] Vitamins and minerals are not only essential for the development of the embryo but also for organogenesis in the fetus. The period of organogenesis is between 20 and 60 days of gestation. They are involved in cell growth and differentiation and are central components of cell structure, cell signaling, protein translation, enzymes, catalytic enzyme sites, and enzymatic reactions. Together, these processes are critical for organ development in the fetus.^[2]

Folate is a generic term for a water-soluble, B-complex vitamin that serves as an essential coenzyme in single-carbon transfers in the metabolism of nucleic and amino acids and thus fills an important function in purine and pyrimidine metabolism.^[3] It occurs in some natural foods as polyglutamate, a form less absorbed than free folate. Folic acid (a monoglutamic acid) is the oxidized and most active form of the vitamin; found rarely in food, it is the form used in vitamin preparations and food fortification. It is key in the making of nucleic acid that forms part of all genetic material, red blood cells and preserving the brain of the infants.^[3] This vitamin plays an essential role in pregnancy because it helps prevent certain birth defects.^[3]

Folate cannot be biosynthesized by human body and must be obtained either from diet or from supplements. It is required for growth and metabolism in the fetus.^[4] It also aids in the development of neural tube.^[5] The relationship between serious birth defects and their prevention by folic acid is well established.^[6] Folic acid deficiency can lead to the neural tube not closing the way it should, leading to open or occult spina bifida. It can also lead to anencephaly^[5]

Folic acid also prevents congenital heart defects, growth retardation, low birth weight of infant, smaller head and chest circumference, preterm delivery and cleft lip.^[5] It has been reported that more than 300,000 cases of neural tube defects occur worldwide each year, and many are in low-income countries.^[7] While the incidence of neural tube defects is falling in the United States of America (USA) and

Western Europe, these congenital abnormalities remain a significant health problem in Africa.^[7] According to WHO, an estimated 270,000 neonatal deaths globally were attributable to congenital anomalies, with NTDs being one of the most serious and most common of these anomalies. The prevalence of NTDs is 3.3/10,000 births in Nigeria.^[8]

There is an association between neural tube defects and inadequate maternal intake of folic acid before or during pregnancy.^[3] Folic acid supplementation has been shown to reduce the annual number of NTDs affected pregnancies by 50 to 70%.^[6] Periconceptional folic acid supplementation is effective in preventing primary and secondary NTDs and other congenital defects.^[9] Maternal intake of folic acid supplements a month before conception to the end of the first trimester is recommended.^[5]

Knowledge about the importance of folic acid among women contributes to its early use. This will not only improve the health status of the baby but also that of the mother.^[3] Folic acid is also essential to the mother as it prevents anemia which is common in developing countries due to inadequate nutrition.^[3] Therefore, this study aimed to assess the knowledge and use of folic acid among pregnant women attending antenatal care at primary health care centers in Kaduna North Local Government Area (LGA).

METHODOLOGY

This descriptive cross sectional study was carried out among pregnant women attending antenatal clinics in Primary Health Care (PHCs) centers in Kaduna north LGA. A minimum sample size of 160 was calculated using the formula $n = z^2 p q/d^2$ ^[10] where p is proportion of the pregnant women who had knowledge that folic acid prevents NTDs from a previous study (0.118)⁴. A non response rate of 10% was added bringing the final sample size to 176.

A multi-stage sampling technique was used in this study. Six out of the 12 wards in Kaduna North were selected using simple random sampling by balloting. From each ward, one PHC was picked using simple random sampling by balloting, making a total of 6 PHCs. Pregnant women that came for antenatal were selected using systematic random sampling after a list of women

who were for ANC was collected. One in every three pregnant woman was selected according to their sitting arrangement until the required sample size was reached.

A pretested, structured, interviewer-administered questionnaire was used to collect data. The questionnaire had four sections. The questionnaire was pretested in PHC Tudun Wada, Kaduna, which is a similar community to the study area. Adjustments were made to the questionnaire based on the observations noted during the pretest. Ethical approval was sought and obtained from the Ethics and Scientific Committee of Barau Dikko Teaching Hospital, Kaduna. Permission was obtained from the LGA chairman through the PHC coordinator of Kaduna north LGA and from all the supervising heads of the selected PHC facilities before the study was conducted. Information about the study was provided to each participant and their anonymity and the confidentiality of their responses and voluntary participation was emphasized following which informed consent was obtained from each participant.

Data was collected, cleaned and analyzed using Statistical Package of Social Science (SPSS) programme version 23. Descriptive summary statistics using mean and standard deviation was done for numeric data while frequencies and proportions were used for categorical data. Chi square test of proportion was used to test for association. Fisher's Exact Test was used where conditions for Chi square test are not met. The level of statistical significant will be set at p- value of <0.05.

The questions for knowledge were scored one mark for each correct answer, while incorrect or 'don't know' responses were scored zero. The scores were added up and the percentage scores were obtained. The scoring system then graded knowledge as $\geq 60\%$, 40-59%, <40% for good, fair and poor respectively. The response for use of folic acid was scored one mark for each correct answer, while incorrect or 'don't know' responses will be scored zero. The scores were added up. Score of $\geq 60\%$ was regarded as good while 40% - 59% was regarded as fair and < 40% as poor.

RESULTS

A total of 176 questionnaires were administered and all questionnaires were correctly filled and analyzed. This gave a response rate of 100%. The mean age of the respondents was

Table 1: Background Information of respondents (n=176)

Variables	Frequency (176)	Percentage (%)
Age (in years)		
18-24	56	31.8
25-31	70	39.8
32-38	41	23.3
39-44	9	5.1
Total	176	100.0
Tribe		
Hausa	112	63.6
Igbo	26	14.8
Yoruba	30	17.0
Others	8	4.6
Total	176	100.0
Religion		
Islam	131	74.4
Christianity	45	25.6
Total	176	100.0
Marital status		
Married	167	94.9
Divorced	8	4.5
Widowed	1	0.6
Total	176	100.0
Parity		
1	50	28.4
2	57	32.4
≥ 3	69	39.2
Total	176	100.0
Level of education		
None	31	17.6
Primary	24	13.6

27.9±6.1 years. The study revealed that about three quarters (74.4%) of the respondents were Muslims, 63.6% were Hausa and most (94.9 %) were married. Just over a third (39.2%) of the women had ≥ 3 children and only 22.7% planned their index pregnancy [Table 1]. All respondents (100.0%) had heard of folic acid, while about two thirds (63.1%) were aware that folic acid

has benefits. Just over a third (39.3%) of respondents knew that folic acid prevents birth defects. Only 6.8% knew that folic acid should be started before pregnancy. Majority (76.7%) knew the recommended dosage of folic acid. Only 6.3% of the respondents knew that birth defects occur mostly during the first trimester. About a third (33%) of the respondents were aware of NTDs [Table 2]. Almost two thirds of the respondents (63.1%) had good knowledge on folic acid. Most of the respondents (85.2%) used folic acid in their previous pregnancy and were also taking it in their current pregnancy (93.2%). Advice from doctor / nurse (49.7) was the main reason for the use of folic acid. Majority of the respondent (88.2%) source of folic acid was by prescription [Table 3]. Most of the respondent (88.6%) had good use of folic acid. There was a statistical significant relationship between age, level of education, planned pregnancy and knowledge of folic acid among the respondents. There was also a statistical significant relationship between age and the knowledge of folic acid among the respondents.

Table 2: Knowledge on Folic acid

Variables	Frequency (176)	Percentage (%)
Heard about folic acid	176	100.0
Source of Information		
Health workers	127	74.7
Internet	10	5.8
Radio/Television	2	1.2
Family	20	11.8
Friend	11	6.5
Know recommended dose of folic acid	135	76.7
Benefits of folic acid		
Prevents birth defects	44	39.3
Prevents anaemia	106	94.6
For growth of babies	102	92.9
Sources of folic acid		
As a drug	163	94.2
Fruits and vegetables	45	26.0
Animal sources	36	22.5
When to commence folic acid		
Before pregnancy	12	6.8
During pregnancy	119	67.6
I don't know	45	25.6
When birth defects are likely to occur		
First trimester	11	6.3
Third trimester	2	1.1
Don't know	163	92.6
Aware of neural tube defects	58	33.0

Table3 : Folic acid use among respondents

Variable	Frequency	Percent
Took peri- conceptional folic acid	11	6.3
Taking folic acid in currently	164	93.2
Frequency of use of folic acid		
Daily	167	94.5
Sometimes	9	5.5
Reasons for use of folic acid		
For general health	34	20.6
For baby's health	22	13.3
Friend/ Family advice	20	12.1
Health workers' advice	82	49.7
No reason	7	4.3
Source of folic acid		
By prescription	149	88.2
Over the counter	20	11.8

DISCUSSION

Folic acid supplementation is highly effective in optimizing folate status in pregnant women and also prevents the development of NTDs in newborn. NTDs are serious birth defects and the second most common major congenital abnormalities occurring in about 2-3% of live births.^[4] In this study, the mean age of the respondents was 27.9 years which was slightly lower than the mean age of 30.0, 29.9, 28.4 and 29.5 years found in similar studies in Ibadan, Jos, Irrua, all in Nigeria and Islamabad, Pakistan respectively.^{[4][11][12][13]} The lower mean age observed in this study may be because more than half (61.9%) of this study respondents were less than 30 years.

This study revealed that over a third of the pregnant women in this study had a parity of ≥ 3 , which was higher than the studies in Pakistan and Ibadan, Nigeria.^{[4][13]} The relatively higher level of parity in this study could be due to the low proportion of pregnant women that planned their pregnancies .

All the respondents in this study had heard of folic acid, which was similar to the finding in a study in China.^[14] It was higher than what was found in studies in Qatar and Jos.^{[9][11]} The high level of awareness among the study population could be as a result of previous intake of folic acid supplements during past pregnancies as the respondents were of parity one and above.

Folic acid is prescribed routinely in addition to iron supplements as part of the antenatal care package during pregnancy in this environment as recommended by WHO.^[15]

In this study, the source of information on folic acid for three quarter of the respondents was from health workers. This is similar to the findings in studies carried out in Ibadan, Nigeria and Qatar were the most common source of information about folic acid was from health workers.^{[4][9]}

In this study, about three quarter of the respondents knew the recommended dose for folic acid which is in contrast with the China study where less than half knew the recommended dose.^[14] Taking 0.4 mg of folic acid during the peri-conceptual period has been associated with up to 80% reduction in specific congenital anomalies including NTDs with associated hydrocephalus, oral facial clefts with or without cleft palate, congenital heart disease, urinary tract anomalies, and limb defects, as well as some pediatric cancers.^[16]

In this study only just over a third of the respondents knew that folic acid prevents birth defects. This was higher than what was found in the studies in Pakistan, Ibadan, and Qatar^{[4][9][13]} In the China study most respondents knew that folic acid could prevent birth defects.^[14] Majority of the respondents in this study knew other benefits of folic acid (prevention of anaemia and growth) which is in contrast with the study in Korea where less than a third of the respondents were aware of the benefits of folic acid.^[17]

Below half of the respondents in this study knew alternative sources of folic acid (fruits, vegetables and animal sources) which was similar to the findings in the Ibadan, Qatari and Abu Dhabi studies.^{[4][9][18]} This implies that they might be no deliberate effort by respondents to obtain folic acid from alternative sources. Folate can be obtained from both plant and animal sources. Those with significant amounts of folate are green vegetables, pulses, liver, yeast and legumes. Fruits, milk and cheese are also sources of folate.^[19]

This study showed that only a small proportion of the women were aware that folic acid should be taken during the peri-conceptual period in order to prevent NTDs. This is was also the case in an Ethiopian study.^[16] It was in marked contrast to the China study where over three quarter of the respondents knew the best time to take folic acid.^[14] The peri-conceptual period is a crucial time for

interventions that not only promote maternal health but also improve pregnancy outcomes.^[20] WHO recommends that all women should take a folic acid supplement from when they are trying to conceive or from 4 to 12 weeks before pregnancy until 12 weeks of pregnancy. Preconceptional folic acid supplementation is associated with increased fetal growth resulting in higher placental and birth weight, and decreased risks of low birth weight and small for gestational age.^[16]

About two thirds of the respondents in this study had good knowledge on folic acid Studies conducted in Pakistan.^[13] This level of knowledge may be due to the level of education of the respondents in this study. The highest level of education of almost half of the women in this study was secondary school.

Preconceptional folic acid is known to reduce the incidence of NTDs by 80%.^[21] Only a very small proportion of respondents in this study took folic acid before pregnancy which is similar to the studies done in Benghazi, Libya and Jos.^{[5][11]} This was in contrast with what was found in studies done in Korea, Puerto Rico, China.^{[14][17][22]} The low level of pre-conceptual intake of folic acid in this study which could be attributed to low level of awareness on pre-conceptual folic acid. This study observed that majority of the respondents used folic acid in their current pregnancy which was similar to the studies in China and Ibadan.^{[4][14]} The studies conducted in Benghazi, Sudan and Croatia found a lower proportion of pregnant women used folic acid supplementation than was found in this study.^{[5][8][23]} This study also found that most respondents' source of folic acid was by prescription, which was in contrast with the study conducted in Croatia where less than a quarter of them got it from recommendation by doctors.^[23]

The findings in this study showed a statistically significant association between the respondents' age and knowledge on folic acid. The knowledge on folic acid in this study was more in the age group 18-31 years, which is similar to the studies in Pakistan and China.^{[13][14]} From the results of this study, the association between planned pregnancy and knowledge on folic acid was also statistically significant. This finding was similar to the study conducted in Ibadan, Nigeria.^[4] There was also a statistically significant association between level of education and Knowledge on folic acid, which was similar to the finding in the China and Qatari studies.^{[9][14]} This study showed a significant

association between the use of folic acid and age of the respondents, which was similar to the finding in an Ethiopian study.^[24] In this study the folic acid use also had a statistical significant association with the level of education. Use increased significantly across educational level. This was similar to the study in China and Ibadan, Nigeria which showed that the higher the educational level, the higher the folic acid intake.^{[4][14]}

CONCLUSION

In this study, all the respondents were aware of folic acid, two thirds had good knowledge and there was good uptake among most of the respondents but the proportion that were aware of and took folic acid during the peri-conceptual period was very low. Health education on folic acid and its benefits should be done by health care workers during antenatal clinic visits. This would help in sensitizing the women on preconceptional folic acid and could improve uptake when planning for subsequent pregnancies. It is also necessary to educate members of the community on the importance of peri-conceptual folic acid.

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Conflict of Interest

There are no conflicts of interest

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