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Original Research Article

Periconceptional folic acid intake: a one year survey among mothers of patients with myelomeningocele in a regional neurosurgical centre in Northwestern Nigeria

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ABSTRACT

Background: Management of myelomeningocele, the most common neural tube defect in our environment, is quite challenging, and the outcome is usually less pleasing to parents/caregivers. Periconceptional folic acid ingestion reduces the incidence, especially in developed countries with mandated policies for folic acid fortification of staple foods. Awareness of preventive role of folic acid and periconceptional intake has not been studied in our centre. This study aimed to assess the knowledge of the proper intake of folic acid in preventing Myelomeningocele among mothers of patients with myelomeningocele.
Methods: This was a prospective cross-sectional study conducted at Usmanu Danfodiyo university teaching hospital (UDUTH) Sokoto state, Nigeria over 12 months period after obtaining ethical clearance and informed consent. Data of mothers of patients with myelomeningocele who presented to the neurosurgical outpatient clinic of our facility was entered into a well-designed proforma. Data was analyzed using simple descriptive statistics, and results were presented in tables and pie chart.
Results: Fifty-four mothers were recruited. The most common age range was 20-35 years (70%), with a mean age of 23.8 years±5.49 SD. Nineteen (35%) out of 54 mothers had heard prior information about folic acid, and only 16 (30%) were aware of its appropriate time of intake in preventing myelomeningocele. None of the mothers ingested folic acid in the periconceptional period.
Conclusions: There was poor awareness and knowledge of the appropriate timing of folic acid intake in preventing Myelomeningocele in our centre.

Keywords: Myelomeningocele, Folic acid, Periconceptional, Prevention, Knowledge, Mothers

INTRODUCTION

Myelomeningocele is common in our environment.[1,2] Management is associated with substantial psychological, social, and economic costs to the parents/caregivers, and the treatment outcome is usually less pleasing to them.[3] Despite improved outcomes with surgical and supportive care, affected individuals have long-term residual disabilities and morbidities leading to high levels of health care requirements.[4,5] As such, primary prevention is paramount in reducing the multiple burdens of illness and disabilities associated with myelomeningocele. The causes of congenital central nervous system anomalies are uncertain.[6] However, evidence suggested that in about 25% of the cases where the causes are known, they appeared to be multifactorial, involving a complex

interaction between genetics and environmental factors.[7] Observational and interventional studies have all pointed to a 50-70% protective effect on women who consume adequate amounts of folates on neural tube defects (NTDs).[8,9]

Reduction in the incidence and prevalence of NTDs in developed countries with mandated policies for folic acid fortification of staple foods has reduced the economic burden to a greater extent.[3] In developing countries, the full potential of folic acid to reduce the risk of NTDs has not been realized.[10] Contributing factors include lack of policy mandating folic acid fortification of staple foods, malnutrition, and socioeconomic and educational issues in the consumption of folic acid; as such, preventable NTDs continue to occur.[2,10,11]This study aimed to determine the knowledge and awareness of appropriate intake of folic acid in preventing myelomeningocele among mothers of patients with myelomeningocele.

METHODS

This prospective, cross-sectional study consecutively recruited mothers of patients with myelomeningocele who presented to the outpatient clinic of UDUTH over 12 months between February 2020 to January 2021, after obtaining ethical clearance and informed consent. A convenience sampling technique was used, in which all mothers of patients with myelomeningocele that presented during the study period and consented were recruited. A total of 63 mothers presented during the study period. Fifty-four (54) mothers consented and were recruited, while 9 mothers declined and were excluded. Data obtained at the time of enrolment included the mother's age and level of education, awareness of the preventive role of folic acid on myelomeningocele, antenatal care, periconceptional folic acid intake, and other risk factors for myelomeningocele. Data was analyzed using simple descriptive statistics, the chi-square test for categorical variables, and multivariate logistic regression to identify folic acid awareness predictive factors, with results presented in tables and a pie chart. P value was set at 0.05.

RESULTS

Fifty-four (54) mothers were recruited over the study period. The mother's most common age range was 20-35 years (70%), with a mean age of 23.8 years±5.49 SD. The majority (65%) had formal education: Seventeen (32%) had primary education, 13 (24%) had up to secondary level, and 5 (9%) had tertiary education. Forty-six (85%) were full-time housewives, while 8 (15%) were gainfully employed (Table 1). Only 9 (17%) mothers attended antenatal care (ANC).

Nineteen (35%) out of the 54 mothers heard prior information about the role of folic acid in the prevention of myelomeningocele. Nine (47%) during antenatal care, 7 (37%) through family and friends and 3 (16%) through the media. Only 9 (17%) of mothers took folic acid in their last pregnancy, while 45 (83%) did not. Six (67%) mothers took it during the third trimester, 3(33%) during the second, and none in the first. Most (70%) of the mothers were unaware of the appropriate timing (periconceptional) of folic acid intake in preventing myelomeningocele. All mothers showed willingness to take folic acid in the periconceptional period in their subsequent pregnancies (Table 2). Seventeen (31%) mothers had a febrile illness in the first trimester. The majority (57%) had consanguineous marriages. None had other risk factors for myelomeningocele (Table 3). On multivariate logistic regression analysis, only antenatal care (p=0.0001 at 95% CI) and tertiary education (p=0.0001 at 95% CI) were predictive factors for folic acid awareness.

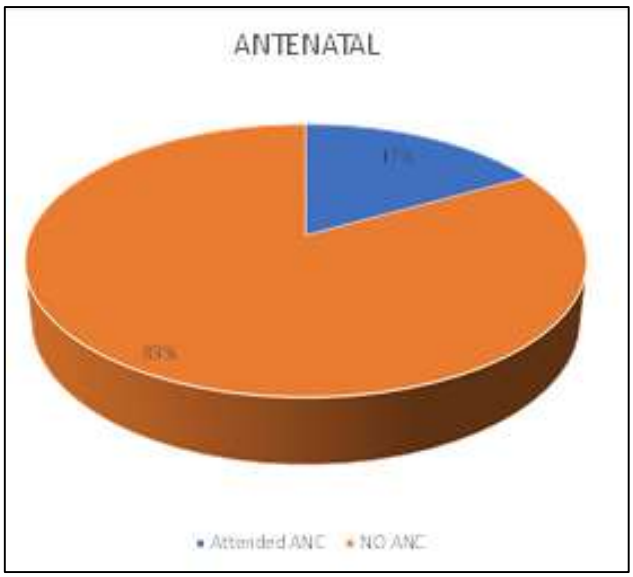

Figure 1: Total number of mothers that attended antenatal care and those that did not attend.

Table 1: Demographic characteristics of study participants (mothers).

Variables	N	Percentages (%)
Maternal age (In years)		
<20	16	30
20-35	38	70
>35	0	0
Level of formal education		
Primary	17	32
Secondary	13	24
Tertiary	5	9
None	19	35
Parity		
Primipara (1)	15	28
Multipara (2-4)	11	20
Grand multipara (≥5)	28	52
Occupation		
Housewife (full-time)	46	85
Employed	8	15

Table 2: Awareness and knowledge of timing of intake of folic acid in prevention of myelomeningocele.

Variables	N	Percentages (%)
Ever heard of folic acid, (n=54)		
Yes	19	35
No	35	65
Source of information, (n=19)		
Hospital/ANC	9	47
Media	3	16
Family and friends	7	37
Did you take it in your last pregnancy, (n=54)		
Yes	9	17
No	45	83
Timing of folic acid intake, (n=9)		
Pre-conception	0	0
Post conception		
i) First trimester	0	0
ii) Second trimester	3	33
iii) Third trimester	6	67
Awareness that appropriates folic acid intake prevents myelomeningocele		
Yes	16	30
No	38	70
Willingness to take folic acid in pre-conception period in subsequent pregnancy		
Yes	54	100
No	0	0

Table 3: Risk factors for myelomeningocele among mothers.

Variables	N	Percentages (%)
Periconceptional folic acid intake		
Yes	0	0
No	54	100
Total	54	100
Maternal fever in the first trimester		
Yes	17	31
No	37	69
Total	54	100
Consanguinity		
Yes	31	57
No	23	43
Total	54	100
Maternal diabetes		
Yes	0	0
No	54	100
Total	54	100
Maternal use of anticonvulsants		
Yes	0	0
No	54	100
Total	54	100
Previous child with NTD		
Yes	0	0
No	54	100
Total	54	100
Exposure to radiation		
Yes	0	0
No	54	100
Total	54	100

DISCUSSION

The most common congenital disability associated with folic acid deficiency is the neural tube defect.[12] Folic acid is an essential vitamin that reduces the incidence of NTDs by 50-70% when taken pre-conception and during the first trimester (periconceptional period).[8,9] Despite this benefit, periconceptional intake remains low in many countries as many women are not aware of the benefits and recommendations.[13,14]

From this study, the most common age range of the mothers was 20-35 years (70%), consistent with the findings of other authors in Sokoto and Kano.[15,16] This was contrary to the findings of Golalipour et al in northern Iran and El Koumi et al in Egypt, which reported a higher prevalence of NTDs with advanced maternal age (>35 years).[17,18] This could be attributed to the fact that the age range 20 to 35 years represents the active childbearing period in Nigeria and, therefore, the higher prevalence of congenital anomalies.

The majority (65%) of the mothers had formal education, which was in keeping with the findings of Anzaku et al in Jos.[19] However, only 5% had up to the tertiary level as opposed to 55% reported by Anzaku et al.[19] Our finding was contrary to that of Usman et al in northeastern Nigeria, who reported a high level of illiteracy as the majority of the participants had no formal education.[20] The high level of formal education in our study, though not up to the tertiary level in the majority, could be attributed to the increasing awareness of the benefits of formal education among women in our society. Eighty-five percent of the mothers were full-time housewives, which agrees with the findings of other authors in northeastern Nigeria and Ethiopia.[20,21] The mothers' low formal education attainment (primary level) could explain why most were not gainfully employed.

Most of the mothers (83%) had no antenatal care. This finding was consistent with Ismail et al in Sokoto and Uba et al in Jos.[2,11] This emphasizes the need for more health education for women of reproductive age on the importance of antenatal care.

Our study showed a low level of awareness of the role of folic acid and its appropriate timing (periconceptional) of intake in preventing myelomeningocele. Of the 54 participants, only 19 (35%) ever heard of folic acid, and 16 (30%) were aware of its role and appropriate intake timing in preventing myelomeningocele. The primary source (47%) of information was the hospital/ antenatal clinic, which was in keeping with the findings of Okon et al in Benue and Usman et al in Adamawa.[12,20] It contradicted the findings of other authors who reported media as the primary source.[14,22] The low level of awareness through the media in our study could be attributed to the fact that most mothers were full-time housewives preoccupied with household activities that may not allow them to listen to the media. The low level of awareness in this study could be due to low antenatal clinic attendance, which was the most common source of information about the role of folic acid in preventing myelomeningocele. Our finding was consistent with the low awareness rate of 23.6% in Jos, 24.1% in Port-Harcourt, 25.5% in Ido-Ekiti, and 48% in Benue.[12,19,23,24] Awareness of the benefits of folic acid is still not optimum, even in industrialized countries.[25] A study in the USA reported a low level of awareness in women with unintended pregnancies with low levels of education and who were black, Hispanic, or from other racial-ethnic groups.[26] Our finding was similar to the low awareness rate (36%) reported in China.[27] In Jos, Nigeria, the level of awareness was relatively low despite the high level of formal education (87.3%) of women had at least secondary education), which indicates that a high level of formal education alone is not a determinant of the high level of awareness which agrees with findings of studies done in Iran and Saudi Arabia.[19,28,29] Our finding was contrary to the high level of awareness reported in northeastern Nigeria, 76.1% and 89% reported in Thailand and Australia respectively.[20,22,30]

In our study, none of the participants ingested folic acid in the periconceptional period, consistent with the findings of Idowu et al in Lagos, and other authors.[31-33] Even though the majority of the mothers were grand multiparous, none of them took the folic acid pre-conception, probably due to the low level of antenatal clinic attendance and the fact that periconceptional care where mothers are counseled on the need to take folic acid in the periconceptional period, especially for women that are planning to get pregnant is virtually non-existent in our environment. This low level of awareness calls for more health education of women of childbearing age regarding the benefits of ANC, periconceptional folic acid intake and other NTD preventive measures. Only 9 (17%) out of 54 mothers ingested folic in their last pregnancies, and the majority (67%) took it in the third trimester. The finding of late commencement of folic acid in pregnancy agrees with that of Uba et al and Usman et al in Jos and Adamawa, respectively.[11,20] A low rate of periconceptional folic acid intake was reported in other parts of Nigeria (7.4% and 3.7%),[19,20] Spain (6.9%) and Ireland (2.7).[14,34] Despite preconceptionally counseling mothers on the need to take folic acid periconceptionally, some studies reported a low compliance rate.[35,36] As such, fortifying staple foods is considered the more reliable and practical means of primary prevention of NTDs. Our finding was contrary to the high level of periconceptional folic acid intake reported in Ibadan, Nigeria, and in developed countries such as Canada and the USA, where 25-45% of women took folic acid in the periconceptional period.[37-39]

On multivariate analysis, only antenatal care (p=0.0001 at 95% CI) and tertiary education (p=0.0001 at 95% CI) positively influenced folic acid awareness among study participants. All patients with a tertiary level of education attended ANC and were aware of the role of folic acid in

preventing myelomeningocele. We found that a higher level of formal education is associated with better health-seeking behavior and adherence to medical advice.

After counselling, all the study participants (100%) consented to follow the folic acid recommendations (periconceptional intake) for preventing myelomeningocele in their future pregnancies, which agrees with the finding of Usman et al in Adamawa, Nigeria.[20] Our finding was contrary to the 85% compliance rate reported by Anzaku et al in Jos, Nigeria.[19]

The most common risk factors for myelomeningocele in this study were consanguineous marriage and maternal fever in the first trimester, similar to other authors' findings.[2,11,18] However, consanguineous marriage was not identified as a risk factor in a study by Idowu et al on the clinical profile of cranial and spinal dysraphism in Lagos, Nigeria.[31] This could be due to a higher rate of consanguineous marriages in the north compared to other parts of Nigeria.

Our findings were like that of other authors in Nigeria and other parts of the world. However, the hospital-based, single-centre nature, sample size, and study duration are some of the limitations we encountered.

CONCLUSION

Most of the mothers in our centre were ignorant of the role and periconceptional intake of folic acid in preventing Myelomeningocele. Therefore, comprehensive preventive strategies, including aggressive health education for women of reproductive age and policies mandating folic acid fortification of staple foods, need to be employed.

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