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Original Research Article

Assessing the knowledge on periconceptional use of folic acid among women visiting a tertiary care hospital in South India

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ABSTRACT

Background: Periconceptional folic acid supplementation is an essential element for the prevention of neural tube defects. Neural tube defects are congenital malformations affecting the brain and spinal cord associated with substantial mortality, morbidity, disability, and psychological impact. Mere awareness about its use and benefits can prevent a major proportion of these complications. Hence the present study is designed to assess the knowledge of use of periconceptional folic acid among women.

Methods: This was a descriptive cross-sectional study conducted at Kempegowda institute of medical sciences, Bengaluru. 250 women attending the outpatient department, consenting to participate in the study were assessed about their knowledge on periconceptional use of folic acid by a self-designed questionnaire and the responses were analysed.

Results: Out of 250 women, 194 (77.6%) were aware of folic acid. Among the 194 women 151 (77.83%) had learnt about it only after the diagnosis of pregnancy. The major source of information were health care providers in 182 (93.8%) women. The knowledge that it prevented neural tube defects was known to 79 out of 194 women. However only 18 (9.27%) women took folic acid periconceptionally.

Conclusions: Among the study population the level of knowledge on periconceptional use of folic acid was low. The major source of information about the use of folic acid was from health care workers during early pregnancy. Periodic health education, awareness programs, periconceptional counselling at individual level can help in optimizing the intake and preventing the burden of neural tube defects.

INTRODUCTION

Folic acid is the synthetic form of naturally occurring essential vitamin folate, which belongs to water-soluble vitamin B group. Folate is a natural nutrient found in foods such as leafy vegetables, legumes, egg yolks, liver, and citrus fruits.¹ Folate has role in transmethylation reactions and in de novo biosynthesis of DNA in growing cells. It also serves as a substrate for enzymatic reactions involved in synthesis of amino acid and vitamin metabolism.²

Folic acid requirements are increased in pregnancy because of the rapidly dividing cells in the foetus and elevated urinary losses. It is required for foetal body metabolism, growth and development in pregnant women. Low folate status in pregnancy has been associated with neural tube defects, megaloblastic anaemia and other adverse outcomes like congenital heart defects, oral clefts, foetal growth restriction, low birth weight, and preterm delivery.³ The development and closure of the neural tube is normally completed within 28 days after conception, before many women are aware

that they are pregnant.⁴ When this closure does not occur, it results in open NTDs ranging from lethal anencephaly to less severe spina bifida causing paralysis of lower limbs.

Global prevalence of NTD is approximately 1 to 5/1,000 live births and the risk of recurrence is 2-3%. In India, the prevalence of NTDs is around 1.4/1,000 births.⁵ The aetiology of neural tube defects is multifactorial and can be attributed to genetic predisposition, vitamin deficiencies or teratogen exposure. Of these, low levels of folate in the maternal blood prior to conception have been implicated as the most important cause.⁶

Periconceptional period begins from 1 month prior to conception until the first 3 months of pregnancy.⁷ WHO and Government of India CDC recommends that women of reproductive age who could become pregnant consume at least 400 micrograms of folate every day periconceptionally. The recommended daily intake of folic acid during pregnancy by the ICMR is 500 mcg.⁸⁻¹⁰ Knowledge about the periconceptional intake of folic acid plays a significant role in preventing the associated maternal and foetal morbidity. In the backdrop of the COVID-19 pandemic with increase in the intake of multivitamins as immunity boosters our study was designed to assess the level of knowledge of women about periconceptional folic acid.

METHODS

The present study was a cross-sectional descriptive study done at KIMS hospital Bengaluru, over a period of 3 months from July 2021 to oct 2021. The study population were the women attending the outpatient department of obstetrics and gynaecology they were selected random sampling. Verbal informed consent was taken from individuals willing to participate in the study. These women were interviewed with a self-designed questionnaire which collected information on their demographic profile and their knowledge about folic acid. Descriptive analysis of the data collected was done. The categorical variables were presented as frequency and percentages.

RESULTS

A total of 250 women were included in the study. The age of the women ranged from 18 to more than 50 years and the mean age was 29.36 years. The proportion of women belonging to urban and rural population was 98 (39.2%) and 152 (60.8%) respectively. As for educational level, most 106 (42.4%) of the women completed their secondary education and 83 (33.2%) were graduates and 12 (4.8%) were illiterate. Majority of them 122 (48.8%) belonged to middle class according to modified Kuppaswamy classification and 181 (65.6%) were unemployed. Married women 194 (77.6%) were more in number compared to 56 (22.4%) unmarried. The

demographic characteristics of study population is shown in (Table 1).

Table 1: Demographic details.

Parameters	Variables	N	%
Age	18-25	95	38
	26-33	107	42.8
	34-41	29	11.6
	42-49	11	4.4
	>50	8	3.2
Residence	Rural	98	39.2
	Urban	152	60.8
Occupation	Employed	69	27.6
	Unemployed	181	65.6
Education	Illiterate	12	4.8
	Primary school	10	4
	High school	39	15.6
	PUC	106	42.4
	Diploma or bachelors degree	83	33.2
Socioeconomic status	Upper	12	4.8
	Upper middle	21	8.4
	Middle	122	48.8
	Lower middle	85	34
	Lower	10	4
Marital status	Married	194	77.6
	Unmarried	56	22.4

It was seen that 194 (77.6%) out of 250 women were aware about folic acid and majority of them 182 (93.8%) had heard about it from health care providers. The use of folic acid was learnt only after diagnosis of pregnancy in 151 (77.83%). 79 women (40.72%) knew it prevented neural tube defect and 94 (48.45%) believed it helps growth of foetus and 16 (8.24%) knew it prevented anaemia. 6 women (3.09%) knew about food rich in folic acid. Only 18 (9.27%) and 12 (6.18%) of the women knew the appropriate time and the correct dosage to take folic acid respectively. However only 18 women (9.27%) took folic acid periconceptionally. The knowledge regarding folic acid is presented in (Table 2).

DISCUSSION

Globally 3-4 lakh neural tube defects occur each year. However, the true count is not known due to a lack of birth defects surveillance programs in many countries. The first reports on folic acid deficiency being a cause for neural tube defect was published by Smithells et al which showed the importance of nutrition as an aetiology of neural tube defects.¹¹ Ever since different mechanisms have been suggested for the causation of neural tube defect, like the presence of elevated folate receptor antibodies, DNA methylation defects early during embryogenesis, environmental and genetic factors.^{12,13} Several studies have assessed the knowledge of periconceptional folic acid consumption as a primary

preventive measure in curbing the burden of neural tube defects in both the developed and developing countries. Comparing the earliest to most recent studies, the level of knowledge is still low in many countries.¹⁴⁻¹⁶

Table 2: Knowledge of folic acid.

Parameters	N	%	
Heard of folic acid	Yes before pregnancy	194/388	77.6/19.58
	During pregnancy	151	77.83
	Along with other multivitamin	5	2.57
Knew the appropriate time to take folic acid	Yes	18	9.27
	No	176	90.72
Knew the correct dosage of folic acid to be taken	Yes	12	6.18
	No	182	93.81
Time started taking folic acid supplement	Before pregnancy	18	9.27
	During pregnancy	144	74.22
	Never consumed	32	16.49
Folic acid was used in previous pregnancy (N=93)	Yes	89	95.6
	No	4	43.01
Knew the role of folic acid	Prevent NTD	79	40.7
	Prevent anemia	16	8.2
	Helps growth of fetus	94	48.45
	As one of multivitamin	5	2.57
Where do you receive your information about folic acid?	Internet	3	1.54
	Health care provider	182	93.81
	Relative/friend	9	4.63

Only few studies in various countries have reported high level of knowledge.¹⁷⁻²² This study was aimed at assessing the knowledge on periconceptional use of folic acid among women visiting a tertiary care hospital in South India during the COVID-19 pandemic which has seen a surge in intake of multivitamins. In our study 77.6% of women had heard about folic acid which is comparable with the study done by Shanthi Ethirajan where 76.5% were aware and found to be higher than that reported in another south Indian study where only 36.3% knew.² The results are still less when compared to western population (94.8%), Chinese (82%) and middle eastern (81%) studies.²⁰⁻²² In our study while most of the women

(48.45%) believed it helped the growth of foetus, only 40.7% of them knew that folic acid consumption prevented neural tube defects. These results are higher when compared to results on knowledge of folic acid in preventing neural tube defects in another South Indian study by Shanthi Ethirajan (30.5%) and a study from the middle east (30%).²³ However women from the China (82%) and western countries knew better.^{20,21}

Studies have shown prevention of neural tube defects by folic acid is achieved only when it is administered in the correct time, dosage and frequency.²⁴⁻²⁹ In our study only 9.27% of women knew about the correct time to consume folic acid compared to study by Shanthi Ethirajan where 16% knew. 47.4% women from the middle east and 75.9% women from the Chinese study knew the correct time to take folic acid which implies that the knowledge about the appropriate time to consume periconceptional folic acid is poor among our women. In our study 9.27% of the pregnant women had taken folic acid periconceptionally which is less when compared to study by Shanthi Ethirajan (16%). About 41.5% and 46.3% of women from western studies and the Chinese study respectively had consumed folic acid periconceptionally.^{20,21}

Similar to other studies, it was found that the major source of information about folic acid was healthcare providers in 93.8% of the women, which is comparable with the study done by Shanthi Ethirajan and other Indian studies.^{2,23} Whereas studies conducted in china and middle east showed internet and information from siblings and relatives etc also contributed significantly. In comparison to other South Indian studies knowledge in our population from a metropolitan city was better, while only few women took periconceptional unlike other studies, highlighting the need for continual motivation. Since proportion of the health care providers as source of information is high, there is further need to involve them in appropriate periconceptional counselling and promoting the use of folic acid periconceptionally. Apart from effective supplementation programmes, dietary modification and food fortification can prove to be effective strategies as most of the population is not complaint with taking supplements.³⁰⁻³⁵

In the current pandemic situation with inadvertent use of multivitamins, our study did not differentiate the folic acid use during and pre-COVID times. Since our study population included all women irrespective of their current pregnancy status, there is a potential for bias in reporting of knowledge among women who visited opds with gynaecological complaints, as majority of women were aware of the importance of folic acid during pregnancy, there is a potential for bias in over-reporting folic acid use. Also, our study accurately could not collect information on compliance. There was a wide range of literacy levels among the mothers surveyed with those with lower literacy levels less likely to know the name of supplements taken.

CONCLUSION

Folic acid supplementation is a primary preventive measure which can curb the burden of neural tube defects. In the present study, it was seen that there is a significant lack of knowledge regarding the periconceptional use of folic acid and the major source of information was from health care workers. Adolescent and reproductive health programs focusing on use of folic acid despite being implemented by the government of India, the knowledge of periconceptional benefits of folic acid among women still remains meagre. This mandates an accelerated awareness programme among the women in the reproductive age group about the periconceptional use of folic acid. Women should be educated about it during wellness visits especially if pregnancy is contemplated. Also, the health care professionals need to be educated to create public awareness about periconceptional use and motivating women to be compliant with the consumption of folic acid.

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