

Impact of education on knowledge and use of folic acid among Saudi women

Malak M.M.K. Al-Hakeem

ABSTRACT

Objectives: To assess the knowledge and practice of folic acid intake and its associated factors in women aged 18 - 60 years.

Methodology: A cross-sectional study was carried out at King Khalid University Hospital, Riyadh, Saudi Arabia. By using systematic sampling 4000 women were selected from different clinics.

Results: Out of 4000 women, 3702 (92%) responded. Their mean (standard deviation) age was 38.6 (11.8) years. University level education status was observed in 32.9% of women. About 79.7% of study subjects were married. The distribution of parity was primigravida (17%), multigravida (44.5%) and grandmultipara (38.5%). About 58% of study subjects responded that they know about folic acid. A statistically significant association was observed between educational status of subjects and their responses related to benefits of folic acid and its presence in different types of diet. About 31.5% of married subjects were aware of need of pre-pregnancy folic acid supplementation and 51.6% of them had received folic acid supplementation during their pregnancies. The sources of information for folic acid were doctor, nurse, internet, media, friends and family members.

Conclusion: Educational status of Saudi women was having positive impact on Knowledge and usage of folic acid. Measures could be taken to improve its usage in women of childbearing age by providing pre conception counseling at regular intervals by health care providers.

KEY WORDS: Folic acid, Knowledge, Education, Practice & Pregnancy.

Pak J Med Sci July - September 2012 Vol. 28 No. 4 686-690

How to cite this article:

Malak M.M.K. Al-Hakeem. Impact of education on knowledge and use of folic acid among Saudi women. Pak J Med Sci 2012;28(4):686-690

1. Malak Mohammed Musaid Khalid Al-Hakeem, Arab Board of Obstetrics and Gynecology (ABOG), Associate Professor & Consultant Obstetrics & Gynecology, King Saud University, College of Medicine, King Khalid University Hospital, Riyadh, Saudi Arabia.

Correspondence:

Malak M.M.K. Al-Hakeem,
Arab Board of Obstetrics and Gynecology (ABOG),
Associate Professor and Consultant Obstetrics & Gynecology,
Department of Obstetric and Gynecology (#36),
King Khalid University Hospital,
King Saud University,
P.O. Box 7805, Riyadh 11472,
Saudi Arabia.
E-mail: alhakeem.malak@yahoo.com

- * Received for Publication: February 27, 2012
- * Revision Received: April 13, 2012
- * 2nd Revision Received: June 29, 2012
- * Final Revision Accepted: June 30, 2012

INTRODUCTION

Divergent nutritional disorders prevail at different stages of reproductive and human life cycles, such as growth retardation in fetus, protein energy deficiency in children, non- communicable diseases in adults. The nutritional intake and its assessment have changed rapidly over past two decades. But initial focus is on pregnant women towards consequences of malnutrition to deficiency disorders. Neural tube defects (NTDs) are among the most common birth defects, contributing not only to infant mortality but also serious disability. About 50 to 80% of these defects can be prevented if a woman consumes sufficient folic acid daily before conception and throughout first trimester of her pregnancy.^{1,2}

Folic acid is the fully oxidized monoglutamyl form of water-soluble vitamin commercially used in supplements and fortified foods. Even though proper mechanism is not clear, a genetic defect or nutritional defect in homocysteine metabolism likely to appear in maternal fetal and it gets involved in pathogenesis of neural tube defects. Higher levels of homocysteine would be indicative of the presence of a metabolic defect which increases risk of NTDs and other congenital defects.³ There is high scientific evidence that folic acid taken around the time of conception prevents NTDs.⁴ Like other countries, Kingdom of Saudi Arabia (KSA) has been adopting folic acid flour fortification over last two decades; as a result there was decline in the incidence of NTDs.⁵ Several studies, through randomized trails, observational studies and systematic reviews have shown that maternal intake of folic acid (FA) supplements before and early in pregnancy reduces risk of neural tube defects in infants.⁶⁻⁸ Although increased folic acid intake may be achieved through diet or drug therapy, only drug therapy has been shown to be effective.⁹ Some dietary standards recognize the need for increased folic acid during pregnancy and have recommended higher intake levels.⁹ Women's knowledge of the need for periconceptional folic supplements, and compliance with recommendations, has not been studied. In the study¹⁰, published before current guidelines, 14% of women used periconceptional multivitamin supplements. Supplementation rates remain low for all pregnant women in Britain¹¹ and for those with documented NTDs in Canada.^{8,12} Knowledge of periconceptional folic acid supplementation for the prevention of NTDs was low in sample of patients from primary care practices in Canada.

The findings of another study¹³ suggest that problem of folic acid should be included in the curricula of biology classes at schools to spread knowledge of this subject in females. A study which investigated level of awareness among female college students in Jeddah, KSA, on importance of preconception folic acid supplementation in preventing neural tube defects (NTDs) and emphasized increase in awareness of importance of folic acid among females childbearing age.¹⁴ However an assessment of knowledge and use of folic acid in Saudi women of childbearing age is important for an effective intervention programs. Association of educational status and parity of Saudi women with knowledge and use of folic acid was not found in the literature. This study was carried out to assess the knowledge and practice of Saudi women towards the

importance of folic acid intake and to observe an association between (i) the knowledge (ii) use of folic acid and their education level & parity.

METHODOLOGY

With an approval of college research ethical committee, a cross-sectional, descriptive study was conducted at antenatal clinics of Obstetrics and Gynaecology Department and other female clinics (Primary care clinics, Medical, Surgical, Pediatrics, ENT, ophthalmology and psychiatry) of King Khaled University Hospital (KKUH) during the three months period (March to May, 2010). The inclusion criteria was, all Saudi women (pregnant and non pregnant) who visited antenatal and other clinics, and had given consent to participate in the study. Study subjects in age range of 18 to 60 years were selected through systematic sampling by considering probability proportionate sample and using appointment list of patients at clinics as sampling frame. A pre tested questionnaire was distributed to literate subjects for self answering and for illiterate subjects, data were collected by interview. The questionnaire was tested by three physicians to check its validity and by 25 subjects for its reliability. The study variables were age, educational status, income status, marital status, number of children and family history of NTDs. The outcome variables were responses related to questions of knowledge of folic acid, sources of knowledge and consumption of folic acid food items. The sample size 4000 was calculated based on assumption of knowledge of folic acid as 10% with a width of 95% confidence interval as $\pm 1\%$, and sample size was increased by 15%, for non-response and incomplete information.

Table-I: Knowledge of Saudi women on benefits of folic acid to mother & baby and on types of diet that are rich in folic acid (n=3702).

<i>Knowledge About</i>	<i>% Responded "YES" (95% confidence interval)</i>
<i>Role of folic acid</i>	
Prevents congenital malformations	50.2 (48.6, 51.8)
Prevents miscarriage	4.6 (3.9, 5.3)
Increase Fetal weight	0.9 (0.6, 1.2)
<i>Food with folic acid</i>	
Fish	7.6 (6.7, 8.4)
Green Leafy Vegetables	40.7 (39.1, 42.3)
Fruits	10.1 (9.1, 11.1)
Meat	9.3 (8.4, 10.2)
Milk	6.2 (5.4, 7)

Table-II: Association between positive responses by Saudi Women towards knowledge on benefits of folic acid different types of diet rich in folic acid and educational status (n = 3670).

Knowledge About	Educational Status (%)					X2 -value	p-value
	Illiterate	Primary School	Secondary School	High School	University		
Role of folic acid							
Prevents congenital malformations (Yes = 1848)	5.2	8.9	12.3	26.5	47.3	639.7	<0.0001
Prevents miscarriage (Yes = 168)	7.7	6.0	10.7	19.6	56.0	46.5	<0.0001
Increase fetal weight(Yes = 35)	8.6	0	11.4	34.3	45.7	9.9	0.04
Food with folic acid							
Fish (Yes = 278)	9.0	10.8	9.7	21.1	49.3	40.2	<0.0001
Green leafy vegetable (Yes = 1493)	11.6	10.9	11.6	24.7	41.3	119.5	<0.0001
Fruits (Yes = 375)	9.9	9.6	13.1	22.4	45.1	38.1	<0.0001
Meat (Yes = 344)	15.7	13.4	13.1	23.0	34.9	1.6	0.80
Milk (Yes = 226)	18.6	8.4	12.4	26.1	34.5	6.3	0.18

Data was analyzed using SPSS version 18.0 statistical software. Descriptive statistics (mean, standard deviation, and percentages) were used to describe study and outcome variables. The 95% confidence intervals for a proportion were calculated. Chi-square test was used to assess an association between categorical study and outcome variables. A p-value of <0.05 was considered as statistically significant.

RESULTS

The response rate was about 92% (3702 out of 4000). The subjects' mean (SD) age was 38.6 (11.8) years. The educational status was distributed as university level (32.9%), high school (23.3%), secondary school (11.9%), primary school (13.7%) and illiterate (18.3%). The marital status was single (13.2%), married (79.7%) and widow/divorced (7.1%). The parity among married women was primigravida (17%), multigravida (44.5%) and grandmultipara (38.5%). The prevalence of NTD was 2.4% and only 2.2% of women were having the family history of NTD.

About 58% of study subjects responded that they know about folic acid. The knowledge of Saudi

women on benefits of Folic acid to mother, baby and different types of diet that are rich in folic acid is given in Table-I. The association between educational status of study subjects and responses related to knowledge on the benefits of folic acid and diet in which it is rich, is highly statistically significant. The responses for diets containing meat and milk were not statistically significantly associated with educational status of subjects (Table-II). The knowledge and perceptions of Saudi married women on usage of Folic acid and its associated factors are given in Table-III. A proportion of 31.5% married women were aware of the need of pre-pregnancy folic acid supplementation and 51.6% of them had received folic acid supplementation during their previous pregnancies.

Awareness of the need of folic acid supplementation during the first three months of pregnancy was observed in 65.4% of subjects. A high proportion (89.6%) indicated a perception that all child-bearing age females must know about the importance folic acid and 99.1% of them thought that physicians/gynecologists should play a better role in educating all females about folic acid, whereas only 41.7% want to attend periodical

Table-III: Knowledge / perceptions and usage of folic acid among Saudi Married Women. (n = 2951)

Questions related to folic acid and its usage	% Responded "YES" (95% confidence interval)
Did you know, need of pre-pregnancy folic acid supplementation?	31.5 (29.8, 33.2)
Did you receive folic acid supplementation during your previous pregnancies?	51.6 (49.8, 53.4)
Did you know, need folic acid supplementation during first 3 months of pregnancy?	65.4 (63.7, 67.1)
Do you think it is important for child-bearing age females to know about folic acid?	89.6 (88.5, 90.7)
Do you think Physicians/Gynecologists should play a better role to educate all females about folic acid?	99.1 (98.8, 99.4)
Do you want to attend, educational lectures or workshops on folic acid supplementation?	41.7(39.9, 43.5)

lectures and seminars on folic acid. The association between distribution of responses of knowledge and perceptions on folic acid and their parity shows highly statistically significant association, as higher proportion of multigravida parity women responded positively, when compared with single parity and grandmultipara women (Table-IV).

The distribution of source of information about the knowledge of folic acid among 3702 subjects was: doctor (34.6%); nurse (1.9%); internet (4.6%); media (9.8%) and friends & family members (18.8%).

DISCUSSION

This study was carried out at a referral hospital of Riyadh City with a response rate of 92%, in which 58% of women had heard of folic acid. This finding is lower than 63.7% and 67% of knowledge as reported in other studies.^{15,16} These differences in knowledge level could be due the study subjects, where a study was a community survey among women aged 15-44 years and other study was carried out only with mothers who had given birth to their new born babies. It would be expected that the level of knowledge would be greater among those who had recently given birth. As regards benefits of folic acid, 50.2% of our study subjects were aware that it prevents congenital malformations, whereas level of awareness of folic acid importance, its functions and foods containing folic acid was very low. This level of knowledge was statistically significantly associated with level of educational status of our study subjects. That is higher proportion of women with university level of education responded

positively to questions related to knowledge and benefits of folic acid, when compared with women of lower educational status.

These findings were similar to the results of a study reported by Nilsen et al¹⁷, in which maternal education was a strong predictor of use folic acid. It is also in agreement with the findings of a study where it has achieved the target of use of folic acid among highly educated women when compared with women of lower educational level.¹⁸ A study carried out among female college students revealed that the knowledge about folic acid in food and the function of folic acid was highly insufficient.¹⁹ The importance of educating women of childbearing age on folic acid was brought out in a study among female college students¹⁴, where 88% were not aware of importance of folic acid in preventing NTD's, but after listening to lecture, 82.9% indicated that they would surely use folic acid and 98.6% will communicate the important message about importance of folic acid to others. Our study subjects (41.7%) also wanted to attend lecturers and workshops on folic acid supplementation and 99.1% of them were of the view that physicians and gynecologists should play a role in educating women of child bearing age on the importance of folic acid. As regards usage of folic acid supplementation in pre-pregnancy stage, only 31.5% of our study subjects responded positively, but 51.6% had received folic acid during their previous pregnancies and 65.4% were aware that they need folic acid supplementation during first three months of pregnancies. The reason for this discrepancy was only 17.1% of our women had planned their pregnancies.

Table-IV: Association between positive responses on Knowledge and perceptions of Saudi Married Women towards usage of Folic Acid and parity (n = 2760).

Questions related to Folic acid and its usage	Parity (%)			X2 -value	p-value
	Single	Multigravida	Grandmultipara		
Did you know, need of pre-pregnancy folic acid supplementation?(Yes = 867)	26.4	54.0	19.6	193.2	<0.00001
Did you receive folic acid supplementation during your previous pregnancies? (Yes=1291)	12.0	58.0	30.0	204.7	<0.00001
Did you know, need folic acid supplementation during first 3 months of pregnancy? (Yes = 1835)	22.2	50.1	27.7	253.1	<0.00001
Do you think it is important for child-bearing age females to know about folic acid? (Yes = 2472)	15.1	45.3	39.6	84.96	<0.00001
Do you think Physicians/ Gynecologists should play a better role to educate all females about folic acid? (Yes = 2751)	17.4	45.0	37.6	9.3	0.01
Do you want to attend, educational lectures or workshops on folic acid supplementation?(Yes = 1133)	15.0	51.5	33.5	33.3	<0.0001

The marital status of women, planning of pregnancies and their parity were important factors for usage of folic acid. In our study, parity of women was statistically significantly associated with usage of folic acid during pre-pregnancy and during first three months of pregnancy, where higher proportion of multigravida women responded positively when compared with single parity and grandmultipara women. In another study, it was found that marital status (married women), and pregnancy (planned) were strong predictors for usage of folic acid.¹⁷ Our data shows only 2.4% of women had delivered their babies with NTD. This prevalence of NTD is low, as our study subjects were receiving folic acid supplementation during their previous pregnancies. As most of the women in our study had unplanned pregnancies, it would be better to adopt a strategy for daily intake of folic acid supplementation in the form of tablets for all the child bearing age women, rather than providing only during pregnancy period. To improve the overall knowledge level on folic acid and its usage, health professionals, particularly family physicians, gynecologists, nurses and pharmacists, should make a continuous effort in advising and educating all women of child-bearing age.

CONCLUSIONS

In conclusion, women with higher educational status and multi gravida have heard of folic acid but very few of them use it peri-conceptionally, due to unplanned pregnancies. Periodical counseling, awareness lectures, posters, messages between television programs by health authorities and professionals are required to emphasize importance of folic acid peri-conceptionally among all child bearing women. Even though this study cohort may not be completely representative of general population, but the findings could be useful to implement appropriate intervention programs.

ACKNOWLEDGMENT

The author sincerely thanks staff nurses and supporting staff for their help in data collection, entry and analysis.

REFERENCES

1. Wilson RD, Johnson JA, Wyatt P, Allen V, Gagnon A, Langlois S, et al. Pre-conceptional vitamin/folic acid supplementation 2007: The use of folic acid in combination with multivitamin supplement for the prevention of neural tube effects and other congenital anomalies. *J Obstet Gynaecol Can* 2007;29(12):1003-1026.
2. Wilson RD, Davies G, Desilets V, Reid GJ, Summers A, Wyatt P, et al. The use of folic acid for the prevention of neural tube defects and other congenital anomalies. *J Obstet Gynaecol Can* 2003;25(11):959-973.
3. Green NS. Folic acid supplementation and prevention of birth defects. *J Nutr* 2002;132(8):2356S-2360S.
4. MRC Vitamin Study Research Group. Prevention of neural tube effects: results of the Medical Research Council vitamin study. *Lancet* 1991;338(8760):131-137.
5. Safar OY, Al-Dabbagh AA, Abuelienseen W, Kari JA. Decline in the incidence of neural tube defects after the national fortification of flour (1997-2005). *Saudi Med J* 2007;28(8):1227-1229.
6. Smithells RW, Sheppard S, Schorah CJ, Seller MJ, Nevin NC, Harris R, et al. Possible prevention of neural-tube defects by periconceptional vitamin supplementation. *Lancet* 1980;1(8164):339-340.
7. Berry RJ, Li Z, Erickson JD, Li S, Moore CA, Wang H, et al. Prevention of neural-tube defects with folic acid in China. China-U.S. Collaborative Project for Neural Tube Defect Prevention. *N Engl J Med* 1999;341(20):1485-1490.
8. Czeizel AE, Dudas I. Prevention of the first occurrence of neural-tube defects by periconceptional vitamin supplementation. *N Engl J Med* 1992;327(26):1832-1835.
9. Botto LD, Lisi A, Robert-Gnansia E, Erickson JD, Vollset SE, Mastroiacovo P, et al. International retrospective cohort study of neural tube defects in relation to folic acid recommendations: are the recommendations working? *BMJ* 2005;330:571-573.
10. Mulinare J, Cordero JF, Erickson JD, Berry RJ. Periconceptional use of multivitamins and the occurrence of neural tube defects. *JAMA* 1988;260(21):3141-3145.
11. Carter YH, Lilford RJ. Keeping track of folic acid awareness in the UK. *Lancet* 1996;348(9030):818.
12. Koren G. Periconception folic acid supplementation. Knowledge and practice of Canadian family physicians. *Can Fam Physician* 1997;43:851-852.
13. Potzsch S, Hoyer-Schuschke J, Seelig M, Steinbicker V. Knowledge among young people about folic acid and its importance during pregnancy; a survey in the Federal State of Saxony-Anhalt (Germany). *J Appl Genet* 2006;47(2):187-190.
14. Kari JA, Bardisi ES, Baitalmal RM, Ageely GA. Folic acid awareness among female college students. *Saudi Med J* 2008;29(12):179-181.
15. Sayers GM, Hughes N, Scallan E, Johnson Z. A survey of knowledge and use of folic acid among women of child-bearing age in Dublin. *J Public Health Med* 1997;19(3):328-332.
16. Clark NA, Fisk NM. Minimal compliance with the Department of Health recommendation for routine folate prophylaxis to prevent fetal neural defects. *Br J Obstet Gynaecol* 1994;101(8):709-710.
17. Nilsen RM, Vollset SE, Gjessing HK, Magnus P, Meltzer HM, Haugen M, et al. Patterns and predictors of folic acid supplement use among pregnant women; the Norwegian mother and child cohort study. *Am J Clin Nutr* 2006;84(5):1134-1141.
18. De Walle HE, De Jong-van den Berg LT. Ten years after the Dutch public health campaign on folic acid: the continuing challenge. *Eur J Clin Pharmacol* 2008;64(5):539-543.
19. Leininger DC, Ries CP. Knowledge and consumption of folate among college students. *J Am Diet Assoc* 1998;98(9):83.