

Folic acid awareness among female college students

Neural tube defects prevention

Jameela A. Kari, MD, FRCPC, Ekblas S. Bardisi, Med. Student, Rabaa M. Baitalmal, Med. Student, Ghofran A. Ageely, Med. student.

ABSTRACT

الأهداف: لمعرفة مستوى وعي طالبات الجامعة فيما يختص بأهمية تناول حمض الفوليك التكميلي في فترة ما قبل الحمل من أجل منع حدوث عيوب الأنابيب العصبي الجنيني (NTDs). كما تمت دراسة ردود أفعالهن بعد توعيتهم بأهمية حمض الفوليك في فترة ما قبل الحمل.

الطريقة: تم توزيع 500 استبيان على طالبات من ثلاث كليات: كلية الآداب، كلية العلوم، الكلية الصحية - جدة - المملكة العربية السعودية، خلال شهر ابريل 2008م. وقد تضمنت الأسئلة استعلاماً عن مدى معرفتهن وعلمتهن بأهمية حمض الفوليك في فترة ما قبل الحمل، وعما إذا كان سيطبقن ما تعلمهه بعد الاستماع لمحاضرات ألقتها طالبات السنة الرابعة في كلية الطب، واللاتي تم تدريبهن والإشراف عليهن من قبل أستاذتهن من أعضاء هيئة التدريس في جامعة الملك عبد العزيز.

النتائج: لقد تم تعبئة وإرجاع 217 استبيان (43.4%). كان متوسط أعمار المشاركات (20.96±2.25) عاماً. لم يكن لدى (88%) من المشاركات في الاستبيان علم بأهمية حمض الفوليك في منع عيوب الأنابيب العصبي الجنيني (NTDs). وبعد الاستماع للمحاضرات أكدت (82.9%) أنهن سيستخدمن حمض الفوليك في فترة ما قبل الحمل وأن (98.6%) سينقلن الرسالة المهمة عن أهمية حمض الفوليك للآخرين.

خاتمة: هناك حاجة لزيادة الوعي عن أهمية حمض الفوليك بين النساء اللواتي هن في سن الإنجاب. وقد كان تواجد طالبات الطب في عملية تنفيذ طالبات الجامعة طريقة فعالة ومؤثرة لزيادة وعيهن. كما أن هناك حاجة لبرامج تنفيذية مشابهة من أجل تقليل حدوث الحالات المرتفعة العدد من عيوب الأنابيب العصبي الجنيني . (NTDs)

Objectives: To investigate the level of awareness among female college students on the importance of preconception folic acid supplementation in preventing neural tube defects (NTDs). We have also studied their response after educating them.

Methods: This is a questionnaire-based study. Five hundreds questionnaires were distributed to the female

students of the 3 colleges, namely, Humanities, Sciences, and Health in Jeddah, Kingdom of Saudi Arabia in April 2008. The questions included an enquiry on their knowledge regarding the importance of folic acid preconception, and if they will implement what they learned after listening to lectures, delivered by the 4th year medical students, who were trained and supervised by the faculty members of the King Abdul-Aziz University.

Results: Two hundred and seventeen questionnaires were filled, and returned (43.4%). Mean age \pm SD was 20.96 ± 2.25 years. Almost 88% were not aware of the importance of folic acid in preventing NTDs. After listening to the lecture, 82.9% thought that they will surely use folic acid preconception, and 98.6% will relay the important message about the importance of folic acid to others.

Conclusion: There is a need to increase the awareness of the importance of folic acid among females' childbearing age. Medical students' involvement in educating college students was an effective way to increase their awareness. Similar educating programs are required, in order to reduce the high incidence of NTDs.

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From the Princess Al-Jawhara Center of Excellence in Research of Hereditary Disorder, King Abdul-Aziz University Hospital, Jeddah, Kingdom of Saudi Arabia.

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Address correspondence and reprint request to: Professor Jameela Kari, Princess Al-Jawhara Center of Excellence in Research of Hereditary Disorder, King Abdul-Aziz University Hospital, PO Box 80215, Jeddah 21589, Kingdom of Saudi Arabia. Tel. +996 55677904. Fax. +996 (2) 6684603. E-mail: jkari@doctors.org.uk

Neural tube defects (NTDs) are among the most common birth defects, contributing to infant mortality and serious disability. It includes defects of the spine (for example, spina bifida), and the brain (for example, anencephaly) that occur during early

pregnancy, often before a woman knows she is pregnant. Almost 50-80% of these defects can be prevented, if a woman consumes sufficient folic acid daily before conception, and throughout the first trimester of her pregnancy.^{1,2} Over the last 2 decades, folic acid food fortification was adopted by many countries, including the Kingdom of Saudi Arabia (KSA).³⁻⁶ In KSA, there was an apparent decline in the incidence of NTDs after the folic acid flour fortification.⁶ However, the incidence is still high, and usually associated with serious morbidity.⁶⁻⁹ This emphasizes the need for innovative programs to increase folic acid consumption by women of childbearing age, to further reduce NTDs. Wald et al¹⁰ had recommended in a meta-analysis of 13 studies, that folic acid fortification levels should be increased. Additionally, they recommended that women planning a pregnancy should take 5 mg folic acid tablets daily, instead of the 0.4 mg dose presently recommended.¹⁰ In this study, we have investigated the level of awareness among female college students about the importance of folic acid supplementation before conception in preventing NTDs. We have also evaluated their response after the medical students educated, and lectured them on the importance of folic acid taken pre-conception, and offered them leaflets and posters regarding the subject.

Methods. After obtaining the permission of the Ministry of Higher Education of KSA to carry out the study, the questionnaire on the importance of folic acid in preventing NTDs was prepared. The target population was female students from 3 different female collages without any exclusion criteria. The educational materials (lecture, leaflets, and posters) were offered to 800 subjects. However, only 500 questionnaires were distributed. The Ministry of Higher Education randomly selected the 3 colleges, and the questionnaires were distributed to the available students. The survey was conducted on April 2008, and it does not need an ethical approval as it involves questionnaires outside the hospital. The questionnaires were written in the Arabic language, and were self-administered. It consisted of 9 questions with 8 multiple choices questions. The first section was on the sociodemographic data of the students (college and age). The second section was to explore their knowledge regarding folic acid, and its sources. The third section was to evaluate their response after the educational program. It included questions concerning the best time to take folic acid in order to prevent NTDs, the appropriate dose of folic acid, and the best source to get the recommended dose, their attitude toward folic acid intake, and their attitude toward relaying the message on the importance of folic acid. The data were described and analyzed, by using the SPSS statistical package version 13.

Results. Out of 500 distributed questionnaires, 217 (43.4%) women returned the filled out questionnaires. The mean age \pm SD was 20.96 ± 2.25 years. The study population included 31.8% from the Health College, 31.3% from the Science College, 35.9% from the Humanities College, and 0.9% were staff members. Before exposure to the educational program, very high percentage (88%) were not aware on the importance of folic acid in the prevention of neural tube defects. Only 12% knew the importance of folic acid in the prevention of NTDs, and the most common information sources were from medical professionals (42.3%), or from the television, radio, Internet, books, and magazines (34.6%). There was a remarkable improvement in the knowledge of our cohort study after the exposure to the educational program. Seventy-eight percent answered correctly the answer of preconception for the question of the best time they should take the folic acid in order to prevent NTDs. Eighty-four percent got the right answer of the daily dosage. However, only 63.6% of the subjects answered correctly the question regarding the best source to obtain the daily requirement of folic acid. Their attitude changed significantly, as 82.9% thought that they will surely use folic acid preconception, and 98.6% will relay the message of the importance of folic acid in preventing NTDs to others (Table 1).

Discussion. Our results showed that a high percentage of educated women (88%) were not aware on the importance of folic acid in preventing NTDs. This is similar to a report from Qatar, as only 14% of Arabic Qatari women knew that folic acid can prevent birth defects. However, 53.7% of them reported that they heard of folate, and 41.3% of educated women

Table 1- Responses obtained from the filled questionnaire.

Parameters	Percentage
The response rate	43.4
Mean age \pm SD (years)	20.96 ± 2.25
Was not aware of the importance of folic acid	88
Correct answer after education regarding the timing of folic acid intake in order to prevent neural tube defects	78
Correct answer after education regarding the dosing of folic acid intake in order to prevent neural tube defects	84
Correct answer after education on the best sources of folic acid	63.6
Attitude changed after education and thought that they will surely use folic acid preconception	82.9
Relay the message of the importance of folic acid in preventing neural tube defects to others	98.6

knew more about folic acid, and used it more often in the periconceptional and first trimester period.¹¹ It is interesting that Canfield et al¹² from Texas, USA reported the need for educational strategies in Texas to target Hispanic women at high risk of NTDs, especially those who primarily speak Spanish.¹² Similarly, French et al¹³ from Canada reported that most of the women (95%) in her study had heard of folate, but only 25% knew that it could prevent birth defects. However, the most common sources of their information were magazines/newspapers, and television/radio, while in our cohort the source was mainly from health professionals.¹³ Lack of awareness on the importance of folate, was the most common reason given in the Canadian study, for choosing not to use folic acid supplements before pregnancy. However, similar to our study, 78% of the women indicated that, with knowledge of the benefits of folate, they would use supplemental folic acid daily to reduce the risk of birth defects.¹³ The level of awareness was much better in Australia (62.3%), although they reported that health promotion strategies have not reached all segments of the target population equally.¹⁴ Our study has a limitation, as it was carried out on college students only at one institution. It did not cover different social classes, or different ages of women of childbearing age. Educational strategies are required, in order to implement the recommendation, that women of reproductive age should take multivitamin supplements containing 0.4 mg-1mg folic acid daily, and women with previously affected offspring who intend to become pregnant should take daily supplementation containing 5 mg of folic acid in the periconceptional period to reduce the risk of recurrence.¹ Such strategies are particularly important in the KSA as the incidence of NTDs is still high despite the recent fortification of flour.⁶ Increasing the fortification level and including all cereals and grains, as well as flour, would result in more prevention of NTDs. Our trial of involving enthusiastic medical students after training them was successful. It resulted in improving the knowledge of women at risk (childbearing age), changed their attitude toward folic acid intake, and more importantly, they thought that they will relay the message of the importance of folic acid in preventing NTDs to others. Such educational strategies could be adapted by other medical and health school in KSA as well as other strategies, to improve public knowledge about the importance of folic acid in preventing NTDs. This could include television or radio programs, magazines, and Internet, as well as targeting physicians to educate women on the importance of folate in preventing NTDs.¹⁵ There is a need to increase the awareness on the importance of folic acid among childbearing age females. Medical students'

involvement in educating college students is an effective way to increase their awareness about the importance of folic acid pre-conception. Similar educating programs are required all over the country in order to reduce the high incidence of NTDs.

References

- 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 a multivitamin supplement for the prevention of neural tube defects and other congenital anomalies. *J Obstet Gynaecol Can* 2007; 29: 1003-1026.
- 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: 959-973.
- Recommendations for the use of folic acid to reduce the number of cases of spina bifida and other neural tube defects. *MMWR Recomm Rep* 1992; 41: 1-7.
- Van Allen MI, Fraser FC, Dallaire L, Allanson J, McLeod DR, Andermann E, et al. Recommendations on the use of folic acid supplementation to prevent the recurrence of neural tube defects. Clinical Teratology Committee, Canadian College of Medical Geneticists. *CMAJ* 1993; 149: 1239-1243.
- Castilla EE, Orioli IM, Lopez-Camelo JS, Dutra Mda G, Nazer-Herrera J, Latin American Collaborative Study of Congenital Malformations (ECLAMC). Preliminary data on changes in neural tube defect prevalence rates after folic acid fortification in South America. *Am J Med Genet A* 2003; 123: 123-128.
- Safdar OY, Al-Dabbagh AA, Abueleneen W, Kari JA. Decline in the incidence of neural tube defects after the national fortification of flour (1997-2005). *Saudi Med J* 2007; 28: 1227-1229.
- Murshid WR. Spina bifida in Saudi Arabia: is consanguinity among the parents a risk factor? *Pediatr Neurosurg* 2000; 32: 10-12.
- Asindi A, Al-Shehri A. Neural tube defects in the Asir region of Saudi Arabia. *Ann Saudi Med* 2001; 21: 26-29.
- Kari JA. Neuropathic bladder as a cause of chronic renal failure in children in developing countries. *Pediatr Nephrol* 2006; 21: 517-520.
- Wald NJ, Law MR, Morris JK, Wald DS. Quantifying the effect of folic acid. *Lancet* 2001; 358: 2069-2073.
- Bener A, Al Maadid MG, Al-Bast DA, Al-Marri S. Maternal knowledge, attitude and practice on folic acid intake among Arabian Qatari women. *Reprod Toxicol* 2006; 21: 21-25.
- Canfield MA, Anderson JL, Waller DK, Palmer SE, Kaye CI. Folic acid awareness and use among women with a history of a neural tube defect pregnancy--Texas, 2000-2001. *MMWR Recomm Rep* 2002; 51: 16-19.
- French MR, Barr SI, Levy-Milne R. Folate intakes and awareness of folate to prevent neural tube defects: a survey of women living in Vancouver, Canada. *J Am Diet Assoc* 2003; 103: 181-185.
- Bower C, Miller M, Payne J, Serna P. Promotion of folate for the prevention of neural tube defects: who benefits? *Paediatr Perinat Epidemiol* 2005; 19: 435-444.
- Locksmith GJ, Duff P. Preventing neural tube defects: the importance of periconceptional folic acid supplements. *Obstet Gynecol* 1998; 91: 1027-1034.