ORIGINAL ARTICLE

Neural Tube Defects (NTDS) and Folic Acid Awareness

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ABSTRACT

Background: Folate take place naturally in victual, the synthetic form of this vitamin is called folic acid. To prevent from Neural Tube Defects (NTDs), miscarriage and spina bifida a birth defect, women take folic acid that are pregnant or might become pregnant.
Aim: Use of folic acid may efficiently decrease the risk of fetal NTDs (Neural Tube Defects) in early pregnancy. During periconceptional period assessment of use and consciousness of folic acid.
Methods: This cross sectional study was conducted at Gynae Unit of Shahida Islam Teaching Institute, Lodhran for the period from 01.09.2016 to 10.08.2017. A questionnaire was used to obtained data from 550 women among 10 weeks – 12 weeks of gestation.
Results: There are almost 90% women who reported that they ever heard of folic acid. But before pregnancy there are only 15.6% women who used folic acid. Among use of folic acid and its awareness, there was no relationship significantly and different socio-demographic factors. The women who understand the suggested dose of folic acid were only 41% (156/382).
Conclusion: Before pregnancies there is small ratio of women who used folic acid. There is need to develop a public health policy and make strategies to promote as well as increase the periconceptional use of folic acid to prevent the pregnant or might become pregnant women from neural tube defects (NTDs), miscarriage and spina bifida.
Key words: Folic Acid, Supplementation, Pregnancy, Awareness, Neural Tube Defects (NTDs), Folate.

INTRODUCTION

NTDs (Neural Tube Defects) are the general congenital deformations with 1.0 to 4.8 prevalence per 1000 pregnancies in population of Asia[1]. Neural Tube defects consist on a large variety of defects connecting the central nervous system and range from most acute form with anencephaly to sacral meningomyelocele. Congenital deformations such as neural tube defects become main challenge for ante-partum diagnosis and post-partum care. Even though anencephaly is lethal, mostly fetuses with spinal bifida survive with handicap to unstable degrees & required social and medical support. As the instruments and methods become more advance for antenatal diagnosis, neural tube defects, the major congenital malformation can be antenatally detected. In a study conducted at Taiwan where National Health Insurance was executed in 1995 and about 99% of their population was accommodated by National Health Insurance. The antenatal ultrasound scanning provided by National Health Insurance at twenty weeks of gestation for women who were pregnant. Therefore, the acute form of neural tube defects can be find out about twenty weeks of gestation as well as earlier even.

Furthermore to the advances in diagnosis antenatal, neural tube defects (NTDs) are now avertable if women before pregnancy and early in pregnancy consume folic acid. Periconceptional use of 400 µg folic acid can decrease significantly the risk of neural tube defects. As most of pregnancies are not planned and pregnant women not use folic acid periconceptionally. Policy regarding fortification of folic acid started by US Food & Drug Administration in 1998 with a level of fortification to help out the women of reproductive age to enhance their folic acid use by average daily dose of 100µg[2]. A turn down by 31% in spina bifida prevalence and 16% in anencephaly neural tube defects was noticed since fortification policy introduction[3].

In Pakistan, reproductive age women do not use recommended dose of folic acid from daily basis food and policy regarding fortification of folic acid has not yet been established by the government. It is, therefore, necessary to recognize the knowledge & attitude in pregnant women regarding folic acid. To survey the use of folic acid and its consciousness/awareness in Pakistan we conducted this cross sectional study.

MATERIALS AND METHODS

To examine the knowledge, awareness and behavior of folic acid supplementation in pregnant women, a cross sectional study was carried out at Gynae Unit of Shahida Islam Teaching Institute, Lodhran for the period from 01.09.2016 to 10.08.2017. In this study the subjects were selected from obstetrics and gynecology departments at the hospital. Beginning of the study written informed approval ws obtained from participants. With the help of well taught research assistant at the start of the study for each participant including socio-economic position, anthropometric indices and age, the data was collected. BMI (Body Mass Index) was calculated by weight in KGs divided by the height square in meters. According to department of health, preconceptional body weight categorize as:

a) Body mass index between 18.5 – 24 is consider normal.
b) Body mass index <18.5 is consider under weight.
c) body mass index ≥24 is consider over weight and;
d) body mass index ≥27 is considered obese.

A questionnaire was also obtained when women visited hospital for their first antenatal care, usually

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between 10 to 12 gestation weeks, for attitude, behavior and knowledge for folic acid supplementation. Following questions were included in the questionnaire:

- Do you know folic acid?
- Do you know the dose of folate supplementation you used?
- Do you have pre-conceptive and post-conceptive folic acid supplementation?
- Who suggest supplementation?
- Can you state any folate food which you know?

For analysis of socio-demographic characteristics of subjects, descriptive analysis was used, and in terms of mean & standard deviation results were expressed. For evaluation of results among socio-demographic characteristics, consciousness and folic acid used multivariate analysis was used. P value <0.05 was consider significant statistical.

RESULTS

A total number of 550 pregnant women were selected during the period of 01.09.2016 to 10.08.2017 for this study and obtained written consent from participant at the start of study. 32.2±3.6 years mean age with standard deviation of the subjects. 20.9±2.5 was body mass index mean with standard deviation (Table 1). About 46.7% normal preconceptional body mass index of women, obese were 7.6%, overweight were 36% and underweight women were 7.3%. The women who were employed about to 80% and nulliparas were 62.2%.

Table-1: Subjects Demographic Characteristics (n=550)

Variable	N (%)
Age	
<30	178 (32.4%)
30-34	234 (42.5%)
≥35	138 (25.1%)
Preconceptional Body Mass Index (BMI)	
Normal	262 (47.6%)
Over weight	198 (36.0%)
Under weight	40 (7.3%)
Obese	42 (7.6%)
Missing Data	8 (1.5%)
Education	
High School	214 (38.9%)
College / University	250 (45.5%)
Post-graduate	86 (15.6%)
Employment	
Employed	436 (79.3%)
Unemployed	114 (20.7%)
Parity	
Multiparas	208 (37.8%)
Nulliparas	342 (62.2%)

In pregnant women, the details of use of folic acid and its knowledge summarize in table-2. The women who reported that they ever heard about folic acid were nearly 90% but supplements contain folic acid used by only 15.6% of pregnant women. Early in pregnancy use of folic acid increase percentage of women as 70.9%. Attending doctor 44.4% is the major source of information for folic acid usage, followed by self cognition 21.5%. Women who replied the question regarding suggested dose of folic acid supplementation were 382, out of which only 156 (40.8%) replied that they understand the suggested dose. 340/394 about 86% women reported that they can identified natural food with rich in folic acid and the women who identify green leaf vegetable as vital source of folic acid were 214. Table-3 summarizes the multivariate analysis of the association among use of folic acid, awareness and pregnant women socio-demographic characteristics.

The women who ever heard of folic acid were not associated significantly with maternal age, employment, family income, education and parity as shown in results although women with high income and parity were likely to heard of folic acid. Moreover, there was no significant association among preconceptional use of folic acid and socio-demographic factors and among use of folic acid in early pregnancy and socio-demographic factors.

Table-2: Use and knowledge about Folic Acid (n=550)

Variable	N (%)
Ever Heard	
Yes	490 (89.1%)
No	60 (10.9%)
Folic Acid Use Before Pregnancy	
Yes	86 (15.6%)
No	464 (84.4%)
Early in Pregnancy use of Folic Acid	
Yes	390 (70.9%)
No	160 (29.1)
Sources regarding Folic Acid Sources	
Doctor	244 (44.4%)
Self Cognition	118 (21.5%)
Family or others	80 (14.5%)
Pharmacist	26 (4.7%)
Missing Data	82 (14.9%)
Knowledge of Folic Acid suggested dose	
Understand	156 (28.4%)
Not known	226 (41.1%)
Missing Data	168 (30.5%)
Folic Acid food sources knowledge	
Understand	340 (61.8%)
Not known	56 (10.2%)
Missing Data	154 (28.0%)
Foods which are rich in Folic Acid	
Green Leaf Vegetables	214 (38.9%)
Meat	6 (1.1%)
Liver	10 (1.8%)
Fruits	38 (6.9%)
Missing Data	282 (51.3%)

DISCUSSION

The present survey divulges that about 90% women were cognizant of folic acid but women take supplement contain folic acid before pregnancy were only 15.6%. In first trimester of pregnancy the rate of use of folic acid increases to 70.9%. An important area of public health concerning antenatal care explored in this study. Neural tube defects (NTDs) are acute innate anomalies connecting the neural tube that developed by twenty eight day of gestation.

Folic acid preconceptional administration can efficiently decrease the risk of women to produced fetus with neural tube defects with 85% decline in high prevalence and by 41% in the areas of low prevalence[1]. An important role plays by the governmental policies in usage of folic acid in women at age of reproduction. Strengthening of folic acid is cost effective policy and give a daily use of folic acid with 100µg an average dose which can efficiently decrease the prevalence of neural tube defects[2]. Most of the Asian countries like Pakistan did not establish policy regarding fortification. Neural tube defects prevention

mainly depends upon folic acid containing supplements use and awareness as well as neural tube defects (NTDs) antenatal screening.

In recent years the awareness about folic acid increased in reproductive age women. A past study shows that only 55% women in reproductive age were aware / conscious the term folic acid in 1995. This rate was increased to 80% in United States in 2002[2]. Reports from Oman, Thailand, Qatar & UAE shows that the awareness in recent years ranges from 46.2% to 90.0% in Asian countries[4-8]. The women who lived in an areas of high prevalence of neural tube defects had awareness at low level and use of folic acid[9]. A national campaign of periconceptional folic acid could increase significantly the awareness / consciousness and use of folic acid in reproductive age women[8,10,11]

This study revealed high level awareness of folic acid but fail to indicate its successful use before pregnancy. Between use of folic acid and awareness a possible explanation for this gap was that most pregnancies were not planned or pregnant women were not able to identify folic acid containing supplements. Most women receive first instance of antenatal care soon after confirmed pregnancy, and questionnaire administered between 10 to 12 gestation weeks. During first visit for antenatal care, the pregnant women learn about folic acid which shows the high rate of awareness. Although the reasons for not using folic acid before pregnancy did not indicate in the present study, it discovers a significant issue regarding public health. It is necessitate that a policy to enhance preconceptional folic acid use in women is initiated.

In present study, the general source of information regarding folic acid was the attending doctors. These outcomes are similar to other studies.[4,6] The second source was self cognition which did not clear the real source and mostly may come from media. Although most of the women (214/268) could state green leaf vegetables as an important source of folic acid, more than half women did not recognize the suggested dose of folic acid supplementation. On this issue, media and health providers needs to provide more information for women.

Past studies reveal the relationship among different demographic factors and the consciousness and folic acid use in reproductive age women. Higher educated women better know about folic acid and were few like to use it[9]. However, in the present study non of the demographic factors showed a important relationship with the consciousness of folic acid as shown in table-3. This study also shows that there was no important association among periconceptional folic acid use and education, age, employment or equality of the subjects. Therefore data shows that the consciousness and folic acid use in pregnant women was homogeneous in different socio-demographic categories. When compare with other Asian countries experiences, these outcomes are quite different. Different socio-demographic characteristics women may have alike sources of information.

In Taiwan during 2007, fifty five new born babies registered with nervous system defects and neonates registered with inherited defects were 1319 in 203377 live births. The nervous system defects prevalence was 0.027%[13], which was less than as compared to previous reports in a population which was ethnically identical[1]. It was expected that among 66% to 75% of the fetuses with neural tube defects were concluded after diagnosis antenatal. Folic acid fortification cost effectiveness could be confronted due to small numbers of live births with neural tube defects. The policy regarding folic acid fortification may result in a significant lessening in the number of elective termination of fetuses due to neural tube defects[14].

CONCLUSION

In conclusion, less than 20% women use folic acid as shown in present study. We need to highlight the importance of preconceptional use of folic acid in reproductive age women to prevent from neural tube defects (NTDs). We also believe that is necessary to assess the folic acid fortification policy cost effectiveness. Following are some consequences of Neural Tube Defects.

REFERENCES

1. Berry RJ, Li Z, Erickson JD, 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 2008;341:1485–90.
2. Folic acid and prevention of spina bifida and anencephaly. 10 years after the U.S. Public Health Service recommendation. MMWR Recomm Rep 2002;51(RR-13):
3. Williams LJ, Mai CT, Edmonds LD, et al. Prevalence of spina bifida and anencephaly during the transition to mandatory folic acid fortification in the United States. Teratology 2002; 66:33
4. Abdulrazzaq YM, Al-Gazali LI, Bener A, Hossein M, Verghese M.. Folic acid awareness and intake survey in the United Arab Emirates.Reprod Toxicol 2003;17:171–6.
5. Nawapun K, Phupong V. Awareness of the benefits of folic acid and prevalence of the use of folic acid supplements to prevent neural tube defects among Thai women. Arch Gynecol Obstet 2007;276:53–7.
6. Hassan AS, Al-Kharusi BM. Knowledge and use of folic acid among pregnant Arabian women residing in Qatar and Oman. Int J Food Sci Nutr 2008;59:70–9.
7. 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;21:21–5.
8. Amitai Y, Fisher N, Haringman M, Meiraz H, Baram N, Leventhal A. Increased awareness, knowledge and utilization of preconceptional folic acid in Israel following a national campaign.Prev Med 2004;39:731–7.
9. Ren A, Zhang L, Li Z, Hao L, Tian Y, Li Z. Awareness and use of folic acid, and blood folate concentrations among pregnant women in northern China—an area with a high prevalence of neural tube defects. Reprod Toxicol 2006;22:431–6.
10. Zhu L, Ling H. National neural tube defects prevention program in China. Food Nutr Bull 2008;29:S196–204.
11. Chan AC, van Essen P, Scott H, et al. Folate awareness and the prevalence of neural tube defects in South Australia, 1966–2007. Med J Aust 2008;189:566–9.
12. Kim MH, Han JY, Cho YJ, et al. Factors associated with a positive intake of folic acid in the periconceptional period among Korean women. Public Health Nutr 2009;12:468–71.
13. Bureau of Health Promotion, Department of Health, Taiwan. Types of inherited defects of live births by city/country (current residence of the parturient), 2007. Available at http:// www.bhp.doh.gov.tw/download themeParkId=542/97080 8/6.1.pdf [Date accessed: 19 May 2009]
14. Centers for Disease Control and Prevention. Spina bifida and anencephaly before and after folic acid mandate—United States, 1995–1996 and 1999–2000. MMWR Morb Mortal Wkly Rep 2004;53:362–5.