Knowledge and awareness of folic acid usage in Saudi pregnant women in Riyadh city from 2019-2020

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ABSTRACT

Background: Folic acid (FA) supplementation is an important intervention to avoid nutritional deficiencies during pregnancy and later on will have an effect on mother and fetus. Inadequate dietary intake will lead to nutritional deficiency which further requires to depend on supplementation. FA is one of the vital nutrients which is mandatory for improving pregnancy outcomes. Previous studies have documented the pregnant women who know about supplementation of FA but not consuming during pregnancy will lead to complications in their neonates. This study aimed to inspect the knowledge and awareness about supplementation of FA in Saudi pregnant women and to compare present study results with other prior studies carried out in the Saudi population. Methods: In this study, we have opted 406 Saudi pregnant women with the age range of 18-65 years of age through questionnaire-based research, was further assessed for FA supplementation usage during the pregnancy. Involved pregnant women have filled questionnaire and signed the consent form. Results: The results of this study showed 38% of women were pregnant during 31-40 years of the age range. Almost 96% of pregnant women have awareness about FA supplementation during pregnancies, and 5.9% of women had histories for not using FA supplementation and had abnormal offspring. The current study questionnaire survey confirms 55.7% of pregnant women have information about FA supplementations. Nearly 89% of women have used FA in their previous pregnancies. Conclusion: Saudi pregnant women has good knowledge and awareness about the usage of FA supplementation during pregnancy. Limited efforts should be implemented national wide in all the hospitals and clinics to improve the awareness about maternal nutrition during pregnancy. Nutritional counselling should be conducted in remote areas to get a perception in Saudi Arabia.

Keywords: Folic acid supplementation, nutrition deficiencies, Saudi pregnant women, Riyadh

Introduction

Maternal nutrition during pregnancy plays a vital factor and the World Health Organization (WHO) has recommended the folic acid (FA) supplementation usage towards the pregnant women to prevent the anemia and fetal complications.¹²³ A mixture of a balanced diet includes carbohydrates, vitamins, proteins, and minerals are essential during pregnancy.¹⁴⁻⁵ Supplementation of various micronutrient consists of vitamins and minerals which will fill a gap during pregnancy.⁶ The synthetic form of folate is defined as FA, mainly visible in supplements and enriched foods. Folate and FA are different forms of vitamin B9 and the natural form of vitamin B9 is folate and FA is defined as a synthetic form known as pteroylmonoglutamic acid. Both (folic acid and folate) have similar chemical structure but known to be unidentical.⁸⁻⁹ Globally, two billion individuals were affected by deficiencies of vitamins and minerals known as hidden hunger; negatively impact on health and economic improvement.³⁰ During the time of earlier pregnancies, maternal folate inefficiency is allied with increased risks of anemia, pregnancy complications...
with offspring birth-defects.[11] The enlarged maternal folate deficiencies are abortion, toxaemia of pregnancy, retarded fetal growth, abortion-placenta, fetal malformation, late pregnancy bleeding, and maternal anemia.[12,13] FA deficiencies compromise most common vitamin deficiencies among females and during the pregnancy, it can result in megaloblastic anemia in mother and neural tube defects (NTDs) in fetus.[14] Inadequate amount of FA during the time of pregnancy will lead to NTDs. Maternal folate status is intricate with NTDs; which are common congenital malformations consequences from the failure of neural tube closure during embryogenesis. NTD are multiform disorder with environmental and genetic predispositions. Maternal periconceptional folate intake is most significant exposure connected with NTDs. It is inter-related with the development of neural tube, which affects both brain and spinal cord is related by morbidity, fetal mortality, disability, maladjustment, and economic crisis. However, spina-bifida and anencephaly are commonly documented birth defects.[15-17] Consumption of low levels of FA during pregnancy will leads to poor pregnancy outcomes.[18-20] Regular usage of FA beforehand or through pregnancy will decrease the probabilities of NTDs and other congenital anomalies.[21] Center for Maternal and Child Enquiry jointly with Royal College of Obstetrics and Gynecology recommends overweight (29.9 kg/m²) women should consume 5 mg of FA in the regular diet.[22] Evidence shows undernutrition women before or during pregnancy increases the risk of metabolic disorders; mainly GDM and specific complications occur during labor and birth. Maternity nutrition deficiency will disturb emerging fetus. Weight gain in pregnancy is connected with healthier nutrition.[23] Pre-eclampsia (PE) or gestational hypertension are known to be common hypertensive disorders in pregnancies.[24] PE has documented the significant elevation of serum or plasma homocysteine; which could be the independent risk factors in the PE pregnant women.[25] Li et al.[26] studies confirmed as daily consumption of 0.4g of FA in pregnancy premises will reduce the prevention and occurrence of PE.

Methods

In this study, we have opted 504 pregnant women from Saudi Arabia and we have excluded 98 women due to non-eligibility criteria and finally, we have recruited 406 pregnant women; based on sample size calculation or Al-Akash et al.[28] to involve in our research from the capital city of Saudi Arabia. The enrollment of pregnant women has filled questionnaire and signed the consent form. Simultaneously, an ethical grant (19–620) of this study was received from the institutional review board of KFMC Riyadh Ethical approval was obtained from Institutional Review Board from King Fahd Medical city was obtained at 11 Dec 2019. The questionnaire was elaborated with demographic information of pregnant women and awareness of FA and its uses during pregnancy. The inclusion criteria of our study subjects were previous and pregnant women with written consent and filled questionnaires from Saudi Arabia. The exclusion criteria were non-pregnant Saudi women, pregnant non-Saudi women, and unfilled survey or unsigned consent form. A questionnaire was made visible online to recruit pregnant women. Data were adapted through a questionnaire, which was filled in Arabic and English. The complete details of the questionnaire, validity, and pilot study were changed from Alreshidi et al.[29] studies. The questionnaire consists of 21 questions, of which six questions are related to demographic details [Table 1], and the other 15 questions are connected with the study objectives [Tables 2-4].

The collected data was drafted into the excel, and Openepi software[28] was used to perform the descriptive statistics. The characteristics of study participants were reported as frequencies

| Table 1: Clinical details of participants involved in this study |
|----------------------|----------------------|----------------------|
| **Baseline** | **Characteristics (mean±SD)** | **Frequency (Percentages)** |
| Age (Years) | 18-20 | 19.81±0.44 | 05 (1.2%) |
| | 21-30 | 26.96±2.55 | 120 (29.5%) |
| | 31-40 | 36.15±2.93 | 154 (38%) |
| | 41-50 | 46.25±2.78 | 82 (20.2%) |
| | 51-60 | 56.05±3.06 | 39 (9.7%) |
| | 61-65 | 63.16±0.98 | 06 (1.4%) |
| | 18-65 (Total) | 37.58±10.17 | 406 (100%) |
| Education status | Illiterate | N/A | 02 (0.5%) |
| | High school | N/A | 86 (21.2%) |
| | Bachelor | N/A | 278 (68.5%) |
| | Master | N/A | 28 (6.9%) |
| | PhD | N/A | 12 (2.9%) |
| Parity | 0 | N/A | 34 (8.4%) |
| | 1-2 | N/A | 137 (33.7%) |
| | 3-4 | N/A | 126 (31%) |
| | 5 and 5+ | N/A | 109 (26.9%) |
| Nationality | Saudi | N/A | 406 (100%) |
| | Non-Saudi | N/A | 00 (0%) |
| Employment status | Employment | N/A | 197 (48.5%) |
| | Unemployment | N/A | 209 (51.5%) |
| Smoking status | Smoking | N/A | 08 (1.9%) |
| | Non-smoking | N/A | 398 (98.1%) |
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**Results**

In this study, 406 Saudi women were joined, and 48.5% of women are currently in employment. The mean age of the study participants involved was 37.58 ± 10.17, with the age range of 18–65 years. The involved participants have been categorized into the age range 18–20, 21–30, 31–40, 41–50, 51–60, and 61–65 years and mean ages are followed as 19.8 ± 0.44, 26.9 ± 2.55, 36.1 ± 2.93, 46.2 ± 2.78, 56 ± 3.06, and 63.1 ± 0.98. The complete baseline characteristics details are present in Table 1. The maximum women involved were 38% with the age range of 31–40 years and then 29.5% with 21–30 years of the age range. Lowest age ranges were in between 61–65 years for 1.5% and 18–20 years for 1.2%. The education status has been categorized into illiterates (0.5%), high schools for 21.2%, bachelors (68.5%), masters (6.9%), and PhDs for 2.9%, respectively. In this study, 8.4% of women were documented as smoking in the involved subjects.

Table 2 is documented with the information involved with pregnancy and folic acid nutrition. The present study confirms 11.8% of women were pregnant. Almost 97% of women were established as previous pregnancies, and 5.9% of them had histories for abnormal offspring. A total of 96.1% of pregnant women were overheard about the information about folic acid usage during pregnancy, and 3.9% of women were unaware of this issue. Of the 406 women, only 86.9% of them having information about folic acid supplementation, and 55.7% of women distinguish folic acid as vitamins. Moreover, 87.9% of women having information about the role of folic acid during pregnancy, and 73.4% of women recognize about preconception use of folic acid. At last, 88.7% of women were having a history of using folic acid in the previous pregnancies, and 79.8% of them having the information regarding supplementation of folic acid during pregnancy.

Altogether, 86.7% for folic acid, 56.9% for vitamins, 79.8% for iron, and 66.7% for calcium were having the history for using supplementation in the previous pregnancies, and 5.2% of the women were not having any past regarding the usage of supplementation during pregnancies. In this study, 0.5% with CVD, 6.4% with DM, 7.1% with HTN, 6.7% with obesity, and 4.7% infertility delay were affected with comorbidity diseases, and 80.5% of women were not concerned with any of the conditions including cancers. The complete details have been described and percentages. *P* value (<.05) will be considered as statistically significant.
Table 4: List of pregnancy complications

| Pregnancy Complications          | Frequency (Percentages) |
|----------------------------------|-------------------------|
| Gestational Diabetes Mellitus    | 60 (14.7%)              |
| Pre-eclampsia                    | 14 (3.4%)               |
| Oligohydramnios                  | 09 (2.2%)               |
| Fetal Growth Restriction <10th percentile | 02 (0.5%)   |
| Preterm labor (<34 weeks)        | 31 (7.6%)               |
| Intra-partum fever               | 08 (02%)                |
| None                             | 296 (72.9%)             |
| Other complications              |                        |
| Placental previa                 | 02 (0.5%)               |
| Abortion                         | 02 (0.5%)               |
| Urinary tract infection          | 02 (0.5%)               |
| Vaginal bleeding                 | 02 (0.5%)               |
| Still birth                      | 0.1 (0.2%)              |
| Increased amniotic fluid         | 0.1 (0.2%)              |

in Table 3. Moreover, 81.5% of women were prevented from birth-defects, 12.6% from anemia and 41.1% for proper growth in the fetus are prohibited with the advantage of obtained information on folic acid, and only 6.7% of them had not received any information. Majorly, 64.3% of them have obtained the information source through the physician, 29.8% from hospitals, 27.8% through family/friends, 22.4% from the source of social media, 15.5% through books, 10.6% by awareness campaigns, and 1.5% through the nurses.

Table 4 describes the list of pregnancy complications effected through pregnancies. Almost 72% of women were not affected by any difficulties during pregnancies. Majorly, 14.7% of women were concerned with GDM and then with the preterm labor in 7.6% of women. PE, oligohydramnios, fetal growth restriction, and intra-pyterm fever were obtained for 3.4%, 2.2%, 0.5%, and 2%, respectively. Other complications were recorded as minorly with abortion, UTI, placental previa; vaginal bleeding was documented for 2% of each and stillbirth and increased amniotic fluid as 1% of each in both.

Discussion

The present study aims to explore the association between knowledge and awareness about the supplementation of FA in Saudi pregnant women and also to compare extant study results with other studies implemented in the Saudi population. The current study results have confirmed maternal knowledge towards the usage of supplementation during pregnancy, nominal awareness about the FA supplementation, complications associated with FA supplementations, the role of FA during pregnancy, lack of FA in the prior pregnancies affected by comorbidities as well as the fetal complications and how information was obtained about the supplementations. Right now, pregnancy women in Saudi Arabia have adequate information regarding FA supplementations. An earlier study carried out in Saudi Arabia in 2008 by Kari et al. in female college students regarding the FA supplementation during pregnancy is known to be only in 12% of them.

Lack of micronutrients and its deficiencies are commonly observed in women during pregnancy and supplements will be recommended to avoid the association of associated malabsorption diseases, high fertility rates, to avoid neural tube defects in the pregnancies, limited knowledge towards the intake of nutrition during pregnancy. One of the possible factors might be socioeconomic differences of these study settings, ethnicity, and time phrase. Our study had performed when the pregnant women were at 20 weeks of gestation and Kassa et al. have performed during the third semester. World Health Organization is also powerfully recommending to use the supplements for iron and FA orally during pregnancy to lowers the risks of micronutrient deficiencies. Consumption of supplementation of FA is one of the important involvements to avoid the nutritional deficiencies during the pregnancy in the women as well as complications occurs in the neonate offspring. The job of primary care physician's is to recommend the FA supplementation and pregnant women should have adequate knowledge towards the usage. Family physicians are known to be the primary care providers for one of the important of source for gathering the information and care for child-bearing women.

In this study, maximum information obtained about FA supplementation is through physicians (64.3%) and next from a various source in the hospital premises (29.8%). However, other studies have also conveyed similar results. Limited studies have been carried out in various regions in the kingdom and all the studies concluded maximum pregnant women have sufficient knowledge regarding supplementations of FA. Apart from FA, women are also using the vitamins, calcium, and iron supplementations during the time of pregnancy. In our study, during the pregnancy, almost 95% of women were using these supplementations to avoid maternal (anemia, peripheral neuropathy) and fetal (congenital abnormalities and NTD) complications. Though, other global countries have limited knowledge regarding supplementation of FA during pregnancy.

FA supplementation is an essential element in the human life required for replication of DNA and enzymatic reactions comprise amino-acid synthesis and vitamin metabolism. It is used during the pregnancy for growth and improvement of the fetus. In our study, women had developed the GDM, PE, oligohydramnios, FGR, pre-term labor, and intrapartum fever are limited complication developing during pregnancy. However, these complications may/not connect with the supplementations directly although other factors might be involved, such as obesity, maternal age, ethnicity, self, and family histories. However, other complications such as placental previa, abortions, UTI, PV, stillbirth, and increase in amniotic fluids are associated with a lower number and our study was in agreement within the prior studies.

Numerous questionnaire and hospital-based studies have been carried out in different locations in Saudi pregnant women in the national wide survey. Nzila et al. conducted a study in the
pregnant women affected with malaria and in their review; they concluded as preserving adequate folate levels will decrease the prevalence of NTDs. Alreshidi et al.[29] studies have conducted the survey from Riyadh city and confirms 42.2% of pregnant women knows about supplementation of FA. Almost 80% of were known about prevention of NTDs and 46.8% of pregnant women consumed FA during pregnancy. Alodan et al.[48] studies performed at Security forces hospitals in Riyadh city and concluded as pregnant women had 80% of knowledge about FA supplementation but 53% of women only consumed the FA during pregnancy. Al-Rakaf et al.[49] also performed a similar study in pregnant women from Prince Sultan Hospital in Riyadh and confirmed the same result from Alreshidi and Alodan et al.[14,29] studies. Our research is also found to be in accordance with the earlier studies. An earlier research by Albader et al.[14] carried out in Riyadh city and AbdRabou et al.[47] studies carried out in Sakaka city were also confirms the similar conclusions from the prior studies carried in Saudi Arabia. Ahmad et al.[48] from Taibah University in Madinah and Al-Holy et al.[49] in the University of Hail in Al-Hail performed a questionnaire-based study and concluded as women had limited knowledge about FA supplementations in married and unmarried women. Maximum studies implemented in different cities in Saudi Arabia has found the similar confirmation as pregnant women have knowledge about FA supplementation and almost 50% of women were not achieving and further effects the NTDs for their neonates.

The strength of this study is that it has been involved in completely 100% of Saudi nationality women. Another advantage of this study was a questionnaire-based study made simple to enroll the interested participants without any burden to participate in this study. The limitation of this study is with a low sample size.

In conclusion, this study confirms Saudi pregnant women have a good awareness about the usage of FA supplementation during pregnancy. However, in our study, 99.5% of women were found to be educated and high awareness was documented in our study. Nutritional counselling should be conducted in remote areas to get a perception in Saudi Arabia about the awareness of FA supplementation. Limited efforts should be implemented national wide in all the hospitals and clinics to improve the knowledge about maternal nutrition during pregnancy.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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