

## Maternal knowledge and use of Folic Acid among Saudi women attending antenatal care clinic at Security Forces Hospital, Riyadh, Saudi Arabia.

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**Abstract: Background:** Folic acid is a B-complex vitamin, the body cannot produce it, so it should be administered in food. It has an essential role in the normal embryonic development, and its deficiency represents one of the most common vitamin deficiencies among females. Folic acid deficiency during pregnancy results in several anomalies including neural tube defects in the fetus. The knowledge about folic acid is necessary among women, especially pregnant ones to avoid the harmful consequences of its deficiency. **Aim:** To find out the prevalence of the periconceptional use of folic acid and to explore the level of knowledge about its importance among pregnant Saudi women attending antenatal care clinic at Security Forces Hospital, Riyadh, 2018 **Method:** This study is a cross-sectional study that was conducted on pregnant Saudi women whom attended antenatal care clinics at Security Forces Hospital, Riyadh. The study was done by using a structured and developed questionnaire to investigate the demographics of females and required data. **Results:** In this study, 304(80%) of pregnant women knew about folic acid, and the main source of their information was their treating doctors 286(75.3%). Women with younger age tended to have more knowledge ( $P$ -value $<0.001$ ). Also, educational level, parity and history of having a previous baby with anomalies were associated with more or less knowledge. The majority of women 204(53.7%) used folic acid in their first three months of pregnancy. **Conclusion:** There was high knowledge about FA among Saudi pregnant women in Riyadh. The main source of their knowledge was doctors. However, a low percentage of women used folic acid before pregnancy, and the majority used it in the first trimester of pregnancy.

**Keywords:** FA deficiency, NTDs, Pregnant women.03.

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### I. List Of Abbreviation:

Abbreviation	Definition
(FA)	Folic acid
(NTDS)	neural tube defects
N	sample size
Z	level of confidence
P	expected prevalence
D	Precision
SFH	Security Forces Hospital
SCFHS	Saudi Commission for Health Specialties

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نبذة عن الدراسة :

حمض الفوليك عبارة عن فيتامين ب المركب، ولا يستطيع الجسم إنتاجه، لذلك يجب أن يتم أخذه من الطعام. حمض الفوليك له دور أساسي في نمو الجنين، ويمثل أحد أكثر الفيتامينات نقصاً بين الإناث، وينتج عن نقصه أثناء الحمل العديد من المشاكل بما في ذلك مشاكل الجهاز العصبي.

الهدف:

مدى المعرفة والإدراك لدى السيدات السعوديات بالنسبة لاستخدام حمض الفوليك في عيادة رعاية ما قبل الولادة في مستشفى قوى الأمن، الرياض، المملكة العربية السعودية.

الطريقة:

أجريت دراسة استعراضية بشكل عشوائي على 380 امرأة تتراوح أعمارهن بين 18 – 45 عام في عيادة ما قبل الولادة، باستخدام استبيان يتكون من 12 بند.

النتائج:

في هذه الدراسة، كان 304 (80%) من النساء الحوامل لديهن معرفة حول حمض الفوليك، وكان المصدر الرئيسي لمعلوماتهن هو الأطباء المعالجين 286 (75.3%)

تميل النساء الأصغر سناً إلى الإدراك والمعرفة بشكل أوسع من النساء الأكبر سناً. بجانب ذلك ارتبط المستوى التعليمي، والحمل ووجود طفل سابق ذو تشوهات خلقية بمعرفة أكثر أو أقل. استخدمت أغلبية النساء 204 (53.7%) حمض الفوليك في الأشهر الثلاثة الأولى من الحمل.

خاتمة:

كان هناك معرفة وإدراك عالي حول حمض الفوليك في السعودية بين النساء الحوامل في الرياض. المصدر الرئيسي لمعرفتهم كان الأطباء. ومع ذلك، استخدمت نسبة مئوية منخفضة من النساء حمض الفوليك قبل الحمل، واستخدمته الأغلبية في الثلث الأول من الحمل

## I. Introduction

Pregnant women need a balanced diet which consists of carbohydrates, proteins, minerals and vitamins [1]. Folic acid (FA) is a B-complex vitamin that can't be produced by the body, so its administration in food is mandatory [2]. FA has a role in normal embryonic development [3], as it acts as a constituent of preventive intervention which is crucial for the development of the skull, brain and spinal column of the fetus [4].

There are many natural sources for FA including eggs, meat, liver, and leafy vegetables [4]. FA deficiency comprises one of the most common vitamin deficiencies among females [5]. FA deficiency during pregnancy can result in megaloblastic anaemia in mother and neural tube defects (NTDs) in the fetus [6]. NTDs are serious congenital anomalies that contribute to severe disabilities and mortality of infant. They are the second commonest type of birth defects following congenital heart defects [7-9]. The most common NTDs are spina bifida and anencephaly, both of them are serious defects and occur in pregnancy during the early stages even before pregnancy detected [6].

They occur during 22-28 of fetal development [10]. Globally, NTDs are affecting 300,000 children each year [11], and 1500 babies suffer spina bifida in USA [12].

Both WHO and CDC recommended routine FA supplementation for pregnant women [13,14]. The dose varied according to the risk the female face [1].

## II. Literature review

NTDs varied among different regions in Saudi Arabia [6]. NTDs incidence was reported to be 0.85/1000 births in Southwestern Saudi Arabia, 0.78/1000 births in Asir region [15], and higher incidence 6.9/1000 births was found in Qassim region [16]. The incidence of NTDs was decreased from 1.9/1000 births to 0.76/1000 births during the periods 1997-2000 and 2001-2005 [17]. Several studies showed reported that FA supplementation during pregnancy was effective in preventing birth defects, and NTDs were reduced by 50-70% by administration of FA before conception and during the first trimester of pregnancy [18-23], and one study reported reduction by 78% [24].

Knowledge about the importance of FA for pregnant women is fundamental to decrease the occurrence of NTDs. However, knowledge about FA and administration of FA during pregnancy is low in many countries. In Saudi Arabia, it was found that 4.4% only of pregnant women were administering FA, although 88.4% of all women had knowledge of FA [6].

A study was done in Riyadh; Saudi Arabia found that 50% of women knew the reason for administering FA and 66% administered FA during their pregnancy, whereas 22% used it before conception [25]. Another study conducted on female college students showed that a high proportion of females was

unaware of the FA in NTDs prevention [26]. Higher level was reported from Almadinah, where 91% of participants knew about FA, and 81% knew its role in preventing NTDs [27]. Similar results were reported from Jeddah, where 91.8% and 85.6% heard about FA and had administered it respectively [10]. A study from Lebanon demonstrated that 60% and 14% of women heard about FA and knew its benefits to prevent NTDs respectively [20]. Another study from Qatar found that 53.7% of women had awareness about FA and 20.3% reported administration of it [28]. A study on Jordanian pregnant women showed that 58.3% of pregnant women heard about FA and 53.7% heard about FA role in preventing some birth defects [29]. McDonnell et al found significant improvements between the two years. Almost 76% of respondents had heard of folic acid in 1997 compared with 54% in 1996 ( $p < 0.01$ ), with a shift in the proportion of people hearing of folic acid from hospital doctors to general practitioners (GP). Almost 43% of respondents in 1997 knew that folic acid can prevent spina bifida compared with 21% in 1996 ( $p < 0.01$ ) [30].

### **III. Patients & Methods**

#### **Subjects and study design:**

This study is a cross-sectional study that was conducted on pregnant Saudi women who attended antenatal care clinics at Security Forces Hospital, Riyadh. The study included pregnant Saudi women whose age between 18-45 years old, while those who were non-Saudi, not pregnant older than 45 years or younger than 18 years old were excluded. Approval was obtained from the Ethical Research Committee (ERC). Participation was voluntary, and no one was forced to fill in and answer the questionnaire. Consent was obtained from the participants after explaining the aim of the study for them. The participants were informed that the information obtained from them would be kept with complete confidentiality and no access to it, only through investigator.

#### **Data Collection and measurements:**

The study was performed using a questionnaire that was structured and developed by the author to gather the required data from the study participants. It was validated by three consultants DR.Medhat Ghoraba a Family medicine consultant and two OBGYN consultants Dr.Rawda and DR.Elham. Also, they supervised the translation of the questionnaire from English to Arabic. The questionnaire was administered to randomly selected women, and this questionnaire contains questions that cover the following points: demographic data including age, educational level, occupation, and income, questions to investigate knowledge of females about folic acid as well as their use for folic acid and the history of having a child with neurological abnormalities.

#### **Sample size and statistical analysis:**

The sample size required = 345

The sample size was calculated by using the following formula

$$n = \frac{Z^2 * P(1 - P)}{d^2}$$

Where n = sample size

Z = level of confidence (2 sided 95% confidence interval = 1.96)

P = Prevalence of using folic acid among Saudi women from previous study = 66%

d = Precision (5%)

Data were analysed by using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). Continuous variables were expressed as a mean  $\pm$  standard deviation, and the categorical variables were expressed as percentages. The t-test was used for continuous variables, and the chi-square test was used for categorical variables. The Cronbach's alpha was used to assess the reliability and internal consistency of the items in the questionnaire. Multivariate logistic regression analysis model was used to assess the predictor variable(s). A p-value  $< 0.05$  was considered statistically significant.

### **IV. Materials and Methods**

- **Study Area/Setting:**  
Family medicine antenatal care clinics at Security Forces Hospital, Riyadh, Kingdom of Saudi Arabia.
- **Study Duration:**  
From 1<sup>st</sup> May 2017 – 1<sup>st</sup> of November 2017.
- **Study Subjects:**  
Pregnant Saudi women

**Inclusion criteria were:**

- ✓ Pregnant
- ✓ Saudi
- ✓ Age: 18-45

**Exclusion criteria were:**

- ✓ Non pregnant
- ✓ Non Saudi
- ✓ Age <18 or > 45

**Sampling technique:**

Sampling technique: The Simple Random Sampling technique will be used to select the sample from females in SFH.

**Confidentiality of Study Data:**

The Study data was coded without the use of names, medical record numbers, National ID numbers, initials, or other identifiable personal information. A unique code number was generated for each study subject, and the data was stored at a secure location available only to the study investigators.

**Potential Conflict of Interest:**

None of the investigators has any proprietary interest in any portion of the study.

**Potential Risks:**

Patients did not incur any additional risk by participating in this study.

**Potential Benefits:**

Patients did not have any direct benefit from participating in this study.

**Alternative Therapies:**

No experimental studies were included in this study.

**Compensation to Subjects:**

Subjects were not eligible for any compensation as part of this study.

**Costs to Subjects:**

There were no costs on the subjects participating in this study

**V. Results**

The present study included 380 pregnant Saudi women, the age range of females was 18-45 years old, the most dominant age group was those with age of 26-30 years old who represented 39.5% of the participants (150 females), followed by those with age of 18-25 years old representing 18.4% (70 females). The majority had secondary education 152(40%) and were housewives 260(68.4%), most of the participants 180(47.4%) had income less than 5000 SR. There were 268 (70.5%) of females had 1-3 parity, and only 10(2.6%) reported having a previous baby with anomalies, and all the cases suffered NTDs. 204(53.7%) reported intake of FA at the first three months of pregnancy, while 86(22.6%), 54(14.2%) and 36(9.5%) reported administration of FA after three months of pregnancy, throughout pregnancy and before pregnancy respectively. Table1 summarises the demographics of participants and clinical characteristics.

**Table1: Demographics of participants and clinical characteristics.**

Characteristics	N(%)
	380
<b>Age</b>	
18-25	70(18.4%)
26-30	150(39.5%)
31-35	62(16.3%)
36-40	58(15.3%)
41-45	40(10.5%)
<b>Educational level</b>	
Illiterate	36(9.5%)
Primary	44(11.6%)

Intermediate	16(4.2%)
Secondary	152(40%)
University	92(24.2%)
Postgraduate	40(10.5%)
<b>Occupation</b>	
Worker	120(31.6%)
Housewife	260(68.4%)
<b>Income</b>	
<5000SR	180(47.4%)
5000-10000SR	130(34.2%)
>10000SR	70(18.4%)
<b>Parity</b>	
1-3	268(70.5%)
4-5	92(24.2%)
>6	20(5.3%)
<b>History of a previous baby with anomalies</b>	
Yes	10(2.6%)
No	370(97.4%)
<b>Type of anomalies (n=5)</b>	
Neural tube defects (NTDs)	5(100%)
Skeletal	0
Cardiac	0
Others	0
<b>Folic acid intake time</b>	
Before pregnancy	36(9.5%)
First 3 months	204(53.7%)
After 3 months	86(22.6%)
Throughout the pregnancy	54(14.2%)

Regarding knowledge about FA, there were 304(80%) reported hearing about FA, while 76(20%) reported that they did not know about it, figure 1. The most common source of knowledge about FA was doctors 286(75.3%) followed by media 50(13.1%) then family and friends 24(6.3%) as well as magazines 20(5.3%), figure 2.

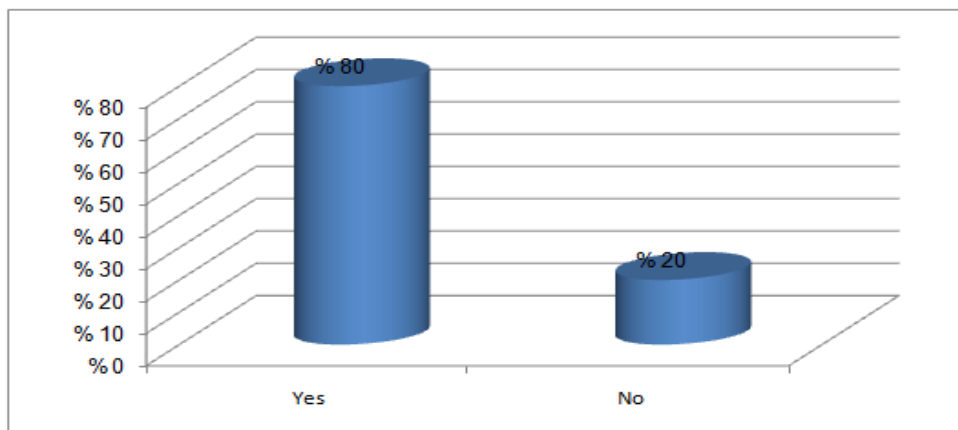
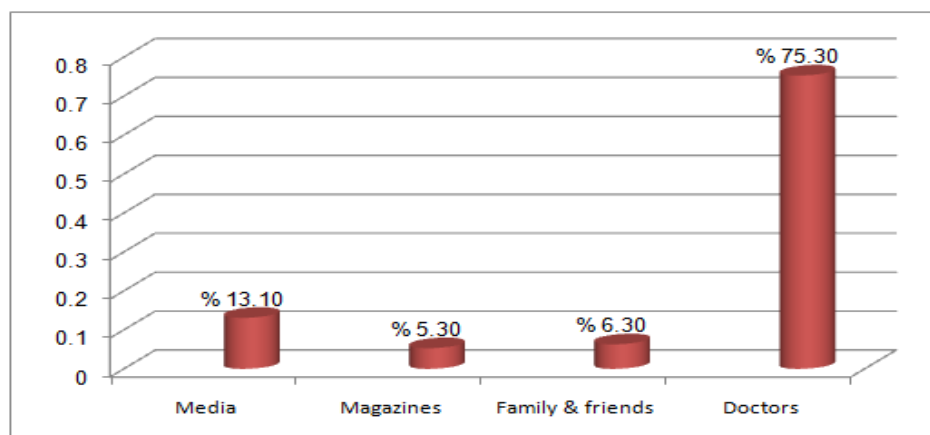


Figure 1: Knowledge about FA



**Figure2: Source of knowledge about FA**

The correlation between knowledge of FA and different variables were investigated (table2). Age was significantly affected hearing about FA (P-value=0.001), those with younger age tended to have knowledge about FA than older age females. The same was found regarding educational level, the women with higher educational level had better knowledge than those with lower educational level (P-value=0.02). Being a worker or housewife did not influence the knowledge about FA (P-value=0.4). Also, the income of women did not have any impact on their knowledge (P-value=0.06). The number of parity of women significantly affected the knowledge of women (P-value=0.003). Having baby with anomalies significantly associated with females' knowledge (P-value=0.04). Administration time of FA had no correlation with the knowledge of participants (P-value=0.4).

**Table2: Correlation between different variables and knowledge about FA**

Characteristics	Knowledge about FA N=380		P-value
	Yes 304	No 76	
<b>Age</b>			<b>0.001</b>
18-25	58(19.1%)	12(15.8%)	
26-30	144(47.4%)	6(7.9%)	
31-35	42(13.8%)	20(26.3%)	
36-40	40(13.1%)	18(23.7%)	
41-45	20(6.6%)	20(26.3%)	
<b>Educational level</b>			<b>0.02</b>
Illiterate	8(2.6%)	28(36.8%)	
Primary	20(6.6%)	24(31.6%)	
Intermediate	10(3.3%)	6(7.9%)	
Secondary	71(46.7%)	10(13.2%)	
University	142(28.3%)	6(7.9%)	
Postgraduate	38(12.5%)	2(2.6%)	
<b>Occupation</b>			<b>0.4</b>
Worker	80(26.3%)	40(52.6%)	
Housewife	224(73.7%)	36(47.4%)	
<b>Income</b>			<b>0.06</b>
<5000SR	144(47.4%)	36(47.4%)	
5000-10000SR	110(36.2%)	20(26.3%)	
>10000SR	50(16.4%)	20(26.3%)	
<b>Parity</b>			<b>0.003</b>
1-3	288(75%)	40(52.6%)	
4-5	60(19.7%)	32(42.1%)	
>6	16(5.3%)	4(5.3%)	
<b>History of a previous baby with anomalies</b>			<b>0.04</b>
Yes	10(3.3%)	0(0%)	
No	294(96.7%)	76(100%)	
<b>Folic acid intake time</b>			<b>0.4</b>
Before pregnancy	30(9.9%)	6(7.9%)	
First3months	164(53.9%)	40(52.6%)	
After3 months	66(21.7%)	20(26.3%)	
Throughout the pregnancy	44(14.5%)	10(13.2%)	

## **VI. Discussion**

The present study included 380 pregnant Saudi women to investigate their knowledge and use of FA. Women with younger age were more dominant than those with older age. The majority of females had a low number of pregnancies (1-3), and only 10(2.6%) reported having a previous baby with NTDs. It was reported that NTDs decreased from 1.9 to 0.76 per 1000 live births during the periods from 1997-2000 to 2001-2005 [31]. The knowledge of pregnant women in this study was high. Eighty percent (80%) of participants have heard about FA. And the most common source of their knowledge was doctors (75.3%) followed by media (13.1%). However, this level of knowledge is lower than that reported in the study from Qassim region, where the knowledge about FA was 88% [6], and another Saudi study from Tabuk reported higher knowledge, where 94% of females reported that they heard about FA and the most common source of their knowledge was doctors (50%) followed by family members (25%) followed by social media (19%) [1]. A study from Jeddah [10] showed that 91.8% of childbearing women heard about FA, and the main source of this knowledge was doctors (71.2%), followed by friends and family (38.1%) then media (18.6%). Lower level of knowledge was reported from other Arabian studies, in Qatar the awareness level was 53.7% [28], in Lebanon it was 60% [20], similar findings were reported from Egypt, where 62.4% of pregnant women had knowledge of FA [32] and in UAE the knowledge was among 46.6% of participants only [33]. In Turkey, there were 46.3% of females aware of FA [26]. In the current study, regarding the use of FA, there were 53.7% of participants reported using of FA at the first months of pregnancy, while 22.6% used it after three months, 14.2% used it throughout pregnancy, and only 9.5% used it before pregnancy. Similar to our findings, it was found in a previous Saudi study that 57% of women administrated FA during the first trimester and 4.4% administrated it in the preconception period [6]. Another Saudi Arabian study [25] reported that 66% of females administrated FA when they knew about their pregnancy and 22 administrated it before conception [25]. Lower percentage was reported in another Saudi study [10], where 14% of participants administrated FA before pregnancy, the same was reported from a Turkish study, there were 12.2% only of females took FA before pregnancy [34]. A study from Qatar demonstrated that 20% of females administrated FA in the preconception period [28]. Other studies reported that 20-70% of females administrated FA [28,35]. It was shown in a European survey that 40% of participants administrated FA, although 70% of them heard about FA [8]. The present study revealed that age, educational level, parity, history of a previous baby with anomalies (NTDs) and the time of FA intake were significantly associated with their knowledge about FA. Participants with younger age have more knowledge than older ones. Also, participants with higher educational level tended to have more knowledge than those with lower education. Most of our participants had a fewer number of pr, and they had more knowledge about FA. All participants who had a previous baby with NTDs knew about FA, while those who didn't know about FA didn't report having baby with NTDs, this can be explained by that; women didn't know about FA until they had a baby with NTDs, so they knew about FA and its role in preventing NTDs. On the other hand, the occupational status of women, their income and the time at which they administrated FA had no association with knowledge about FA. A study from Jeddah was conducted on females college students, and it was found that 88% did not know the role of FA in preventing NTDs [26]. A study conducted in Tabuk, KSA on women during childbearing period revealed that younger age and occupation status were significantly associated with knowledge about FA, while education level and parity did not influence the knowledge of participants [1]. In Lebanese study it was found that younger age and higher educational level were associated with more awareness which was in agreement with our findings, on the contrary to our results, the previous study showed that sufficient and stable income was associated with more awareness about FA, such association wasn't found in our study [20]. In agreement with our findings, a study from Hail showed that monthly income was not associated with knowledge of FA [36].

## **VII. Conclusion**

There was a high level of knowledge about folic acid among pregnant women in this study. The majority of pregnant women administrated FA in the first three months of pregnancy. Age, educational level, parity and history of having a baby with NTDs were associated with the knowledge of participants. Although a high percentage of females knew about FA, few percentages used it before pregnancy. There was a gap between knowledge about FA and using it, as women should use FA before pregnancy as NTDs can affect the baby before the women even realise's that she is pregnant. Women should investigate if she had FA deficiency and start using it before being pregnant. Medical campaign should be hold to increase the perception of pregnant women about how to use folic acid through pregnancy .

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