

KNOWLEDGE AND PRACTICES OF MOTHERS REGARDING THE USE OF FOLIC ACID, IRON, AND CALCIUM DURING PREGNANCY

Shabana Nazir^{*1}, Raja², Muhammad Shafiq³, Muhammad Yousuf Bhatti⁴,
Farhana Talpur⁵, Suhail Ahmed Solangi⁶

^{*1}Principal College of Nursing NICH, Karachi.

²Staff Nurse, Department of Plastic and Reconstructive Surgery, Dr. Ruth K.M. Pfau, Civil Hospital, Karachi

³Lecturer, Indus College of Nursing and Midwifery, Indus University of Health Sciences, Karachi

⁴Assistant Professor, Indus College of Nursing and Midwifery, Indus University of Health Sciences, Karachi

⁵Nursing Instructor, College of Nursing NICH, Karachi.

⁶Senior Lecturer, Department English Faculty of Social Sciences and Humanities, Hamdard University, Main Campus, Karachi, Sindh, Pakistan

^{*1}shabanawazir74@gmail.com

ABSTRACT

Objective: To assess the knowledge and practices of pregnant women regarding supplementation of folic acid, iron, and calcium

Methodology: This cross-sectional descriptive study was conducted at Jinnah Postgraduate Medical Center, Karachi, for a period of 6 months from June 05 to November 08, 2019. The study was carried out at the Outpatient Department of Gynaecology and Obstetrics. The calculated sample size of this study was 380 pregnant women. A self-administered study questionnaire was used for this study. Collected data was entered and analyzed by the Statistical Package for Social Sciences version 20. Frequency and percentage were calculated for categorical variables.

Results: Out of 380 women, 138 (36.3%) had enough knowledge about folic acid, and 91 (24%) out of all respondents took folic acid during the preconception period. Regarding iron, 137 (36.1%) of respondents were aware of the uses of iron supplements, and only 211 (55.5%) of these respondents were taking iron supplements. Regarding calcium supplements, only 121 (31.8%) knew about it, and out of 380 women, only 149 (39.2%) were taking calcium during pregnancy. Overall, poor knowledge and practices of pregnant women were observed regarding supplements.

Conclusion: Poor knowledge and inappropriate practices of pregnant women regarding the supplementation of folic acid, iron, and calcium demand from healthcare experts to arrange educational programs on adequate nutritional supplements during pregnancy for enhancing the knowledge and practices of pregnant women.

Keywords: Calcium, folic acid, iron, pregnancy

INTRODUCTION

Pregnant women need large amount of nutrients for physical growth and developmental maturation. Foetal growth and development are directly associated with appropriate food supply containing adequate nutrients, as it decreases the risk of congenital abnormalities¹. Similarly, inadequate nutritional supply can increase the

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risk of congenital abnormalities including intrauterine growth restriction, low birth weight, preterm birth, prenatal and infant morbidity and mortality². Vitamins and minerals play an important role during pregnancy. This study is focused on folic acid, iron, and calcium.

Folic acid plays a vital role during pregnancy, especially during the early stages when the baby's brain and spinal cord are developing, because it encourages rapid cell proliferation and tissue growth of the uterus and placenta, erythropoiesis, neuronal development, and maternal blood volume expansion³. Lack of folic acid impacts the growth of the spinal cord and cranium. The subsequent deformities are named neural tube defects (NTD); which incorporate spina bifida and anencephaly. The danger of labour with neural tube defects can be surveyed by maternal red cell folate level in pregnancy⁴. It has been proved that maintaining plasma folate levels at >15.9 nmol/l and erythrocyte folate levels >906 nmol/l significantly decrease the occurrence of NTD⁵. The overall occurrence of NTDs ranges from 1 to 10 for every 1,000 births with practically break even with frequencies between two known classes: anencephaly and spina bifida SB⁶. As per research done in Swat city of Pakistan, the predominance of anencephaly was 11.33/1000 births and that of spina bifida was 0.72/1000 births⁷.

One of the widespread public health problems of women during pregnancy in developing countries is iron deficiency anaemia. Appropriate iron intake helps to build up and maintain iron stores which are reduced due to increased iron demands during pregnancy. Low iron level especially in the second half of pregnancy increases the risk of maternal bleeding, ante-partum and postpartum blood loss⁸. It is reported that 1.62 billion people are anaemic in this world, which is a fourth of the worldwide populace. Around 42% women get anaemia during pregnancy, over all; while this commonest of causes is even higher among Pakistani pregnant women with 51% of them iron deficient at any phase during pregnancy.

Calcium serves as a permanent source for many body functions; including bone formation, muscle contraction, enzyme, and hormone functioning⁹. Pregnant women may face several bad effects due to inadequate calcium intake which may lead to osteopenia, tremors, paresthesia, muscle cramping, and tetany. It also has adverse perinatal outcomes including delayed foetal growth, low birth weight, and poor foetal mineralization¹⁰.

Rapid development of foetal skeleton occurs during the third trimester which requires 80% of calcium as an essential mineral for the developing foetus¹¹. The average calcium transfer to the foetus during pregnancy is 50 mg/day during the second trimester and 250 mg/day during the third trimester¹². Similarly, deficiency of calcium in pregnant women increases the risk of hypertension, pre-eclampsia, and eclampsia¹¹. The risk of preterm birth and hypertensive disorders are reduced during pregnancy by calcium supplements, therefore WHO (2016) has recommended daily elemental calcium intake of 1.5 g during the second and third trimesters. Hence, this study was conducted to determine the knowledge and practices of using folic acid, iron, and calcium supplements among pregnant women.

METHODOLOGY

Cross-sectional descriptive research study was performed at the antenatal clinic of Gynecology and Obstetrics department of Jinnah Post Graduate Medical Center (JPMC), a tertiary care hospital of Karachi, during working days in timings of 8 am to 1 pm. Participants from the age of 16 to 45 years were included in the research study. Sample size was calculated through OpenEpi version 3.0 online software with proportion formula by taking 57% knowledge deficit regarding folic acid and its importance during pregnancy³, 5% margin of error, and 95% confidence level. The calculated sample size was 380 (n=380) pregnant women. Non-probability convenience sampling technique was used to recruit the study participants. Self-administered questionnaire was developed by primary investigator with the help of literature and experts of obstetrics and gynecology. Validation of the instrument was conducted through a pilot study on 10% of the total sample size. The Cronbach's alpha level was (r = 0.70). Questionnaire consisted of four sections. Section-I included the demographic data of the participants. Section-II comprised the knowledge and practices related questions about folic acid supplementation. Section-III comprised questions related to the knowledge and practices about iron supplementation. Section-IV comprised the knowledge and practices assessment questions about calcium supplementation. Before data collection, approval was received from

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Ethical Review Committee (ERB) of the University of Health Sciences, Lahore. In addition, permission was also taken from the Head of JPMC and the in charge of Obstetrics and Gynaecology Department of JPMC, Karachi. Subjects' participation was voluntary. After gaining responses from the participants, the data was then entered into the computer software Statistical Package for the Social Sciences (SPSS) version 20 for storage and analysis.

RESULTS

Table-I exhibits the demographic characteristics of study participants. In this study, total 380 pregnant women were included. Nearly half 179 (47.1%) of the study subjects, age range was 16-24 years and only 76 (20%) of them were between 35 and 45 years. A total of 181 (47.6%) study participants were preliterate. The majority 315 (82.9%) were homemakers. Three-fourths 292 (76.8%) of the study participants lived in joint families and few 88 (23.2%) of them were living in nuclear families. Almost half 171 (45.1%) of the study participants' economic status was lower middle-income group.

Table-I: Demographic Characteristics (n=380)

S. No.	Variables	Frequency (n=380)	
		N	%
1	Age group		
	16-24 years	179	47.1
	25-34 years	125	32.9
	35-45 years	76	20.0
2	Education level		
	Preliterate	181	47.6
	Up to Matriculation	178	46.8
	Above Matriculation	21	5.5
3	Employment status		
	Homemaker	315	82.9
	Working	65	17.1
4	Type of family		
	Nuclear	88	23.2
	Joint	292	76.8
5	Social Status		
	Middle	54	14.2
	Lower middle	171	45.1
	Lower	155	40.6

Table-II displays the knowledge and practice regarding the use of folic acid in pregnant women. Two-thirds 242 (63.6%) of the study participants were unaware of folic acid. Moreover, the majority 358 (94.2%) of the study subjects were unsure about the benefits of folic acid. Additionally, 330 (86.9%) participants did not know which foods contain folic acid.

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Table-III: Knowledge and Practices of Participants Regarding Iron (n=380)

S. No.	Variables	Frequency (n=380)		
		N	%	Cumulative
1	Do you know what iron is?			
	No	156	41.1	243(63.9%)
	Don't know	87	22.9	
	Yes	137	36.1	137(36.1%)
2	Are you taking iron at present?			
	No	169	44.5	169(44.5%)
	Yes	211	55.5	211(55.5%)
3	Iron was prescribed by:			
	Obstetrician	198	52.1	198(52.1%)
	LHVs/ Nurse Midwife	57	15	182(47.9%)
	Others	125	32.9	
4	When did you start taking iron supplements?			
	Don't know	94	24.8	94(24.8%)
	During first trimester	44	11.6	286(75.2%)
	During second trimester	26	6.8	
	During third trimester	216	58.6	
5	How many time do you take iron supplements?			
	One tablet / month	94	24.7	164 (43.1%)
	One tablet / week	44	11.6	
	Two tablets / week	26	6.8	
	One tablet (60 mg) / day	216	56.9	216(56.9%)
6	What are the primary benefits of taking iron on the outcome of your pregnancy?			
	Don't know	239	62.9	272 (71.5%)
	Makes bones strong	13	3.4	
	Reduces risk of congenital anomalies	20	5.3	
	Reduces risk of anaemia and low birth weight	108	28.5	108(28.5%)
7	Which of the following foods is/are good sources of iron?			
	Don't know	219	57.6	232 (61.1%)
	Fruit and fruit juices	12	3.2	
	Bread and potato	1	0.3	
	Meat, dairy products and green leafy vegetables	148	38.9	148(38.9%)

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Table III shows the knowledge and practices regarding iron supplements among pregnant women. The majority 242 (63.6%) of the study participants were also unaware. of iron supplementation. Approximately half 211 (55.5%) of the participants were taking iron supplements. at the time of the study. As many as 286 (75.2%) of the study subjects were taking iron supplements from the first trimester. Most of the participants, 272 (71.5%), did not know about the benefits of iron supplements during pregnancy. Moreover, the majority 232 (61.1%) did not know which food is a good source of iron supplementation.

Table-IV: Knowledge and Practices of Participants Regarding Calcium (n=380)

S. No.	Variables	Frequency (n=380)		
		N	%	Cumulative
1	Do you know about calcium?			
	No	259	68.1	259(68.1%)
	Yes	121	31.9	121(31.9%)
2	Are you taking calcium?			
	No	231	60.8	231(60.8%)
	Yes	149	39.2	149(39.2%)
3	Calcium was prescribed by:			
	LHVs/ Nurse Midwife	39	10.2%	189(49.8%)
	Others	150	39.4%	
	Obstetrician	191	50.2	191(50.2%)
4	When did you start taking calcium supplements?			
	Don't know	183	48.2	183(48.2%)
	During first trimester	88	23.2	195(51.8%)
	During second trimester	88	23.2	
	During third trimester	21	5.4	
5	How many pills of calcium do you take?			
	Once daily (1000 mg)	191	50.3	191(50.3%)
	Twice daily	31	8.2	189(49.7%)
	Don't know	151	39.7	
	Others	7	1.8	
6	Reasons for the use of calcium supplements			
	To reduce blood pressure	15	3.9	337(88.6%)
	To overcome deficiencies	171	45.0	
	To build strong teeth and bones	151	39.7	
	All of the above	43	11.4	43(11.4%)
7	Which food is a good source of calcium?			
	Don't know	96	25.3	202(53.2%)
	Bread, potato	12	3.2	
	Fruit and fruit juices	94	24.7	
	Milk and other dairy products	178	46.8	178(46.8%)

Table IV highlights the knowledge and practices regarding calcium supplementation among pregnant women. The majority, 259 (68.1%), of the study participants did not know about calcium. Half of them 191 (50.2%) reported that obstetrician had prescribed calcium to them. The same 191 (50.3%) number of study

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participants were taking one tablet of calcium supplement per day. Out of the total, 202 (53.2%) participants did not know that food is a good source of calcium supplement and 178 (46.8%) knew which Food is the best source of calcium supplementation.

DISCUSSION

The current study assessed pregnant women's level of knowledge regarding folic acid and the findings show that only 36.4% had good knowledge about folic acid supplements. Another study conducted on the same topic showed similar results that less than half of the participants were found to be familiar with folic acid and its significance during pregnancy. A study conducted in Rawalpindi, Pakistan, showed similar results of 43% of participants having knowledge about folic acid⁶. Similarly, an Ethiopian study revealed 27% had knowledge about nutrition during pregnancy among participants who visited antenatal clinics¹³. In contrast, a study conducted in Taiwan showed that the majority (90%) of women had good knowledge about folic acid¹⁴. Our study showed poor knowledge of pregnant women regarding folic acid supplements.

Concerning the source of prescription for folic acid use, 59.4% of participants shared the obstetrician as their primary source. The same result was also found in another study that stated 63.4% reported physicians as the common source of prescription of folic acid.¹⁵

Inappropriate practices regarding the use of folic acid were also revealed in this study as only 24% of the participants took folic acid in the preconception period, and the rest had taken it at different weeks of pregnancy. Inappropriate practices seemed common, as one study conducted in India stated a percentage as low as 4.5% of those having good practices regarding the use of folic acid¹⁶. Participants had good knowledge of dosage as 52.9% of women were taking the correct dose recommended by WHO, which is 400 mg of folic acid supplementation per day for all women of child bearing age.

The respondents' knowledge about the outcome of taking folic acid and about rich sources of folic acid was found to be poor, as only 22 (5.8%) of women correctly responded that it reduces the occurrence of congenital anomalies, and only 13.1% appropriately cited green leafy vegetables, fruits, and fruit juices as prime sources of folic acid. In contrast to our study, a Korean study showed that 70% of pregnant women had knowledge that folic acid could prevent neural tube defects¹⁷.

Iron is an essential mineral for the production of hemoglobin and its deficiency results in iron deficiency anemia. Current study shows prevalence of anemia as 79.47% of pregnant women were anemic, of which 59.74% were with mild anemia and 17.1% with moderate anemia. The completely opposite result was found in a Tanzanian study that showed only 18% prevalence of anemia in pregnant women, out of whom 7.6% had mild, 8.1% had moderate, and 2.3% had severe anemia. The prevalence rate in our study is 79.47%. much higher than the prevalence rate of anemia among pregnant women 33.9% observed in Bangalore, South India, which highlights the burden of anemia in our city among the pregnant women availing antenatal care at public-sector hospitals. Various other studies have shown much lower prevalence of anemia as compared to our study. The dissimilarity in results may be due to better antenatal care programs, health education, awareness level, and social status of pregnant women¹⁹.

In the present study, we found that 36.1% of women had heard about iron, whereas 63.9% had no knowledge about iron. On the same lines, another study found that 40% of respondents were aware of the importance of iron during pregnancy²⁰. In connection with practices of iron supplementation, 55.5% of women in our study were found to be taking iron supplements. Different results were shown by an Iran-based study that indicated that 91% of participants were taking regular iron supplement²¹.

Like folic acid, the source of iron recommendation was also found to be obstetrician as reported by 52.1% participants while less than half cited others—nurses, LHV's and midwives—as the source of iron recommendation. Another Kenya-based study showed similar results that primary prescription sources of iron supplement during pregnancy were the family physicians²².

Regarding the time of iron supplementation initiation, in our study, 56.8% of women started iron supplements. intake during the third trimester, whereas 6.8% started during the second trimester, which is a crucial time for iron intake, and 11.6% started during the first trimester. Some other study findings showed

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that most of the pregnant women commenced iron supplementation during the second and third trimesters owing to the diagnosis of iron deficiency anemia. Whereas most of those who had other reasons for taking iron supplements, started in the first trimester²³. There may be two reasons for this difference: first is the prevalence rate of anemia and second may be due to digestive complications related to iron absorption²¹. With regards to knowledge-related benefits of iron intake and food sources of iron, the majority of respondents (71.5%) had poor knowledge about the benefits of iron and only 38.9% knew the correct sources citing meat, dairy products, and green leafy vegetables. The Malaysian study showed different results and revealed that 67.6% of pregnant women had correct knowledge regarding the benefits of taking iron supplements and more than 90% of study participants were aware of foods containing iron²⁴.

Regarding calcium practices, this study showed that only 39.2% of women were taking calcium supplements that disagreed with a study carried out in Saudi Arabia showing the compliance rate of calcium supplementation at 81%²⁵. Another study conducted in two hospitals in the Sao Paulo region of Brazil found that 10.4% of 250 pregnant women had received a recommendation. for calcium supplement and compliance rate was as high as 80.76% among them²⁶.

Concerning the sources of prescription for calcium, 50.2% reported calcium having been prescribed by their obstetricians, while 49.8% cited others—nurses, LHVs, and midwives—as the source. A study conducted in Brazil found that calcium was prescribed to 43.20% pregnant women by their physicians during prenatal visits²⁶. This contradiction may be owing to cultural preferences, social norms, and level of education in that region.

In the context of the time duration of calcium supplement initiation, 48.2% could not recall the exact time of initiation, while 23.2% had started during the first trimester; 23.2% of women had started calcium supplement intake during the second trimester and 5.5% of women had started calcium supplement intake. during the third trimester. Calcium utilization increases. during the third trimester of pregnancy when the fetus' skeleton is rapidly developing²⁷.

WHO's recommended dosage of calcium supplementation ranges from 500 mg per day to 1.5 g per day. The present study shows dosage intake of calcium. As many as 50.3% of women took one pill. (1000 mg) per day, while 8.2% took one pill twice a day, whereas 1.8% of women consumed calcium in other forms of dosage and a large number 39.7% of women did not recall calcium intake.

Regarding awareness of the beneficial outcomes of calcium, 39.7% of women in our study took calcium because of their belief that calcium is good for teeth and bones; 45% took calcium pills to overcome deficiencies; 3.9% knew the deficiency of calcium in Pregnancy increases the risk of high blood pressure. while only 11.3% of women mentioned that they knew the uses of calcium supplements as having good effects on teeth, bone, overcoming the deficiency and decreasing the risk of blood pressure-related disorders. A study was conducted in Egypt that showed the majority of pregnant women surveyed had incorrect knowledge about the beneficial effect of calcium for mother and fetus, and only 8.3% had good knowledge⁹.

Regarding knowledge about the sources of calcium, only 46.8% of women cited milk and dairy products as good sources of calcium. The results show lack of knowledge among mothers in Pakistan about this key factor in their health. The study conducted in Ethiopia showed better results, in which 71.1% of pregnant mothers had sufficient knowledge about sources of calcium intake. This is related to differences in the environment and the levels of education of the study participants².

Limitations Non-probability convenience sampling technique and the small sample size were vital limitations of this study. Therefore, it cannot be generalized to the whole population. Furthermore, this study was conducted only in Karachi which is a major city of the Sindh province. Results may not be representative of the pregnant women who are living outside of Karachi.

CONCLUSION

The study results showed that the majority of the participants had poor knowledge about folic acid, iron and satisfactory knowledge about calcium supplements. These findings of poor knowledge and practices might

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be due to certain demographic characteristics of the participants, as the majority were illiterate, belonged to low socioeconomic groups, and were of young age.

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