

How to Cite:

Mahmoud, N. F., Moneim, E. F. A.-E., El-Sayed, H. F., & Said, D. S. (2022). Knowledge and attitudes of pregnant women regarding folic acid supplementation. *International Journal of Health Sciences*, 6(S8), 5431–5445.
<https://doi.org/10.53730/ijhs.v6nS8.13472>

Knowledge and attitudes of pregnant women regarding folic acid supplementation

Nourhan Fathi Mahmoud

Demonstrator of Maternity and Neonate Health Nursing -Faculty of Nursing- Modern University of Technology and Information, Egypt

Entesar Fatouh Abd-El Moneim

Professor of Maternal and Newborn Health Nursing- Faculty of Nursing- Helwan University, Egypt

Hanan Fawzy El-Sayed

Assistant Professor of Maternal and Newborn Health- Faculty of Nursing- Helwan University, Egypt

Doaa Shehta Said

Assistant Professor of Maternal and Newborn Health- Faculty of Nursing- Helwan University, Egypt

Abstract---Background: Folic acid (FA) supplementation is an important intervention to avoid complications during pregnancy on the women and fetus. Aim of the study: To assess knowledge and attitudes of pregnant women regarding folic acid supplementation. Design: A descriptive design was used. Setting: The study was conducted at antenatal clinical at Badr University Hospital, Cairo, Egypt. Sample: A Convenience sample was utilized to recruit 120 pregnant women. Tools: Three tools for data collection were used. First tool: A structured interviewing questionnaire to assess demographic data, obstetric and menstrual history. Second tool: Pregnant women's knowledge regarding folic acid supplementation. Third tool: Pregnant women's attitudes regarding folic acid supplementation. Results: The current study showed about the majority of pregnant women having low level of knowledge regarding folic acid supplementation, while the half of pregnant women had negative attitudes regarding folic acid supplementation during pregnancy. Conclusion: the study pregnant women had unsatisfactory level of knowledge and negative attitudes regarding folic acid supplementation. Recommendation: Developing program to increase awareness regarding folic acid supplementation among pregnant women.

Keywords---knowledge, attitudes, pregnant women, folic acid supplementation.

Introduction

Pregnancy is the term used to describe the period in which a fetus develops inside a woman's uterus. Pregnancy usually lasts about forty weeks, or just over nine months, as measured from the last menstrual period to delivery. Health care providers refer to three segments of pregnancy, called trimesters. Best care during pregnancy is important for the health of pregnant women and the development of the unborn fetus. Affecting the healthy growing of fetus mother's healthy fetus and awareness regarding supplementation of folic acid especially in the first trimester of pregnancy (Riesterberg et al., 2022).

Folic acid (vitamin B9) is one of the important vitamins required for embryonic growth and development, as well as preventing the occurrence of congenital malformations, a major health concern in developing countries and around the world because have a direct impact on the affected pregnant women and fetus. Folic acid requirements rise during intervals of rapid growth and cell partitioning throughout life, folic acid aids neural tube formation during early evolution, low folic acid consumption during pregnancy was result in poor pregnancy outcomes, during pregnancy, a well-balanced diet rich in carbohydrates, vitamins, proteins, and minerals is essential (Sadiq & Hussein ., 2022).

The importance of assessment knowledge and attitudes of pregnant women regarding folic acid supplementation is for determining the level pregnant women awareness; including knowledge of natural sources, usefulness in preventing neural tube defects and preconception intake recommendation. As well as assessing attitudes regarding compliance with folic acid supplementation (Sabi et al., 2022).

Role of maternity nurse towards a pregnant woman in the early pregnancy is very effective to promote and maintain the health of women and unborn children. Also, maternity nurses play a central role in educating expectant parents about the importance of ongoing early prenatal care. Health outcomes improve notably among infants whose mothers receive prenatal folic acid supplementation. Prenatal care is the best practice for promoting health in newborn children. Prenatal nurses help mothers who are expecting to avoid and recognize health problems might present before, during, or after birth (Linnell et al., 2022).

Significance of the study

According to the world health organization; indicates more than 40% of pregnant women worldwide suffer from folic acid deficiency during pregnancy. In Egypt the prevalence of folic acid deficiency showed is accounted for 13.7% of the whole population; pregnant women and fetus recorded slightly higher percentages (14.7% and 14.9%, respectively) than adolescents (12.6%). The World Health Organization (WHO) declared about 303,000 newborns die yearly all over the world within 30 days from birth because of congenital anomalies (Shalaby & EL-Gazzar., 2021).

Subjects & Methods

Aim of the study

The aim of study was to assess knowledge and attitudes of pregnant women regarding folic acid supplementation.

Research questions

1. What is the level of knowledge of the studied pregnant women regarding folic acid Supplementation?
2. What are the attitudes of the studied pregnant women regarding folic acid Supplementation?

Research design

A descriptive design was utilized to fulfill the aim of the study.

Setting

Antenatal clinic at Badr Hospital, Helwan University Hospital in Egypt.

Subject

- Type of sample:
A Convenient sample was used in the current study.
- Sample size:
Total number of pregnant women (120) was selected according to inclusion criteria of the pregnant women.
 - Inclusion criteria:
- Age range from 18 to 35 years.
 - Exclusion criteria:
-Women who have medical or psychiatric disorders.

Three tools were used based on the study aim and review of literature on related studies :

Tool I: A structured interviewing questionnaire

Part one: Demographic data including (age, level of education, residence).

Part two: Medical and surgical history including (Diabetes Mellitus, Hypertension, Cholecystectomy).

Part Three: Obstetric and menstrual history including (number of abortion, time of current pregnancy, duration of menses).

Tool II: Pregnant women's Knowledge regarding folic acid supplementation assessment sheet

Adapted from (Bernardo.,2022) was including the following items such as (the importance of folic acid supplementation, the effects of folic acid on both the pregnant women and fetus, source of foods rich in folic acid and signs and

symptoms of folic acid deficiency) was multiple choice question consisted of 9 questions, with total 18 degree.

Scoring system

All variable was weighted according to items included from question, the correct complete answer as score (2), correct, incomplete answer gives score (1) and incorrect and don't known answer give score (0).

Total knowledge score was divided into

- Satisfactory knowledge: $\geq 60\%$. (n): 14 pregnant women.
- Unsatisfactory knowledge: $< 60\%$. (n):106 pregnant women.

Tool III: Pregnant women's attitudes regarding folic acid supplementation

Adapted from (Mida et al.,2021) was used to assess the pregnant women attitudes about folic acid supplementation by using three-point Likert scale in order to rate the extent to which have the attitudes toward intake folic acid supplementation during pregnancy agree, sometime and disagree, consists of 10 statements about folic acid supplementation (Ahamed Nadia et al.,2018).

Scoring system

All variable was weighted according to items, to assess attitudes as ranged from (positive) when correct answer gives to each correct answer score (3), sometimes answer score(2) when (negative) answer consider as uncorrected answer give score (1). Total attitudes level was scored as.

Total attitudes score was divided into:

- Positive attitudes: $\geq 60\%$ (n):52 pregnant women.
- Negative attitudes: $< 60\%$ (n):68 pregnant women.

Pilot study

A pilot study was conducted on 10% of the sample to test availability of study sample and clarity of study tools and then necessary modification was done and was not counted in sample.

Field work

- The process of data collection started at the beginning of October 2021, completed by the end of December 2022.
- The researcher attended at the hospital waiting area of the antenatal clinic Wednesday and Thursday of each week from 9:00 a.m to 1:00 p.m.
- The researcher explained the research aim to gain confidence, trust to participate in the study and obtained the pregnant women verbal consent to establish a study.

- Interviewing questionnaire tool consumed about 30 minutes for each sample to clarify study aim, explain the content and exchange confidence. Number of samples was about 5 pregnant women per day. So every week samples collected were about 10 pregnant women.
- The researcher used the first tool to assess general characteristics according to the individual interviewing questionnaire during pregnant women's waiting area.
- The researcher met pregnant women and explained purpose of study. After the consent of each pregnant woman selected in study of knowledge and attitudes of pregnant women regarding folic acid supplementation.
- Every pregnant woman was individually interviewed to collect the required data and to assess the pregnant woman through questionnaire. Assessment of pregnant women who attended the antenatal clinic was based on the inclusion criteria of pregnant women.
- After completing the questionnaire, the researcher provided health education with details for every pregnant woman about knowledge of folic acid supplementation such as what is folic acid, sources of food content on folic acid, importance of folic acid for pregnant women and fetus during pregnancy, causes of folic acid deficiency during pregnancy, proper dose of folic acid and when to take the dose according to world health organization, complication of folic acid deficiency during pregnancy on women and fetus and how to manage.
- After completing the questionnaire, the researcher provided health education with details for every pregnant woman about positive attitudes regarding folic acid supplementation such as latest guidelines for folic acid supplementation during pregnancy.

Administrative item

Written approval letter was obtained from the dean faculty of Nursing Helwan University to antenatal clinic at Helwan university hospital (Badr Hospital) for conducting study; the approval letter was including the aim of the study.

Ethical consideration

- Researcher approval was obtained from scientific research ethical committee in Faculty of Nursing at Helwan University before starting study.
- Researcher clarified study's aim to pregnant women included in the study.
- Researcher assured maintaining anonymity and confidentiality of pregnant women.
- Informed allowed to choose to participate or not in study and have the right to withdraw from study at any time .

Statistical item

Data was analyzed using statistical package for social Science (SPSS) version 22. Qualitative data was presented as numbers and percentages. Relations between different qualitative variables were tested using Chi-square test (χ^2). Relation between quantitative variables was tested using Pearson correlation

coefficient (r). Probability (p-value) < 0.05 was considered significant and < 0.01 was considered highly significant.

Results

Part (I): Demographic data of the studied sample

Table (1): Distribution of the studied sample according to demographic data (n = 120)

Demographic data	No.	%
Age (years)		
< 20	14	11.7
20-24	66	55
25-29	28	23.3
30-35	12	10
Mean \pm SD	24.1 \pm 4.90	
Range	18-34	
Age at marriage		
< 20	22	18.3
20-24	78	65
25-29	15	12.5
30-35	5	4.2
Mean \pm SD	22.5 \pm 3.47	
Range	18-31	
Educational level		
Illiterate	11	9.2
Read and write	24	20
Secondary school	70	58.3
High education	15	12.5
Working status		
Working	35	29.2
Housewife	85	70.8
Residence		
Urban	92	76.7
Rural	28	23.3
Information about folic acid		
Yes	42	35
No	78	65

Table (1): Shows that, more than half of the studied sample (55%) their age is 20-24 years, the mean \pm SD of age is 24.1 \pm 4.90 years. As regard to age at marriage, less than two thirds of the studied samples (65%) are married at the age of 20-24 years, the mean \pm SD of age at marriage is 22.5 \pm 3.47 years. Also, more than half of the studied sample (58.3%) have secondary school education, also, more than two-thirds of sample (women) (70.8%) housewife. Moreover, more than three-quarters (76.7%) of them residing at urban areas. Likewise, more than one-thirds of the studied sample (35%) have information about folic acid, more than half of them (52.4%) have information form health team.

Figure (1): Percentage distribution of the studied sample according to sources of information about folic acid (n=120).

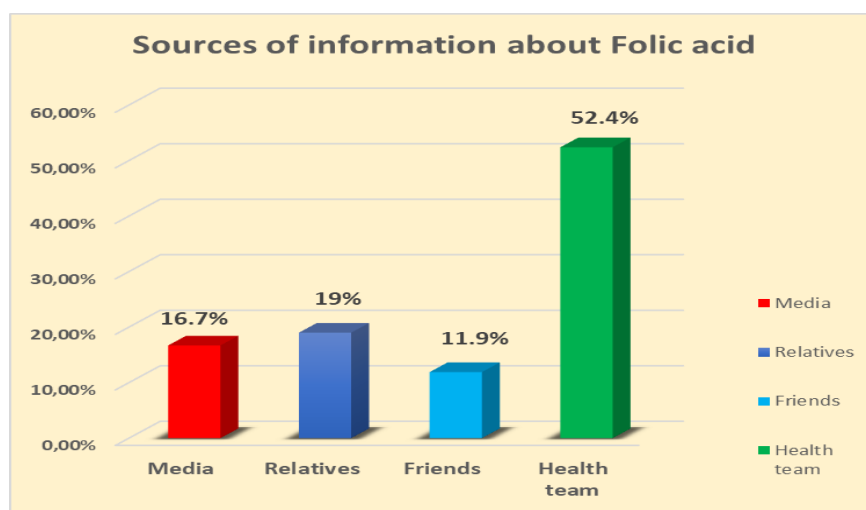


Figure (1): shows that, more than half of the studied sample (52.4%) has their information about folic acid from their health team.

Part (V): Pregnant women's Knowledge regarding folic acid supplementation.

Table (6): Distribution of the studied sample according to knowledge about folic acid supplementation (n = 120).

Items	Complete Correct answer		Incomplete correct answer		Don't Know or Wrong answer	
	No.	%	No.	%	No.	%
Definition of folic acid.	24	20	50	41.7	46	38.3
Benefits of folic acid during pregnancy.	12	10	18	15	90	75
Food sources of folic acid.	20	16.7	20	16.7	80	66.7
The importance of folic acid for the fetus.	18	15	22	18.3	80	66.7
Signs and symptoms of folic acid deficiency during pregnancy.	16	13.3	18	15	86	71.6
Causes of deficiency of folic acid in the blood.	15	12.5	20	16.7	85	70.8
Correct dosage of folic acid during pregnancy.	4	3.3	8	6.7	108	90
The correct time to use folic acid during pregnancy.	0	0.0	25	20.8	95	79.2
Normal level of folic acid in	15	12.5	15	12.5	90	75

the blood.						
------------	--	--	--	--	--	--

Table (6): Illustrates that, three-quarters of the studied sample (75%) don't know the benefits of folic acid during pregnancy and normal level of folic acid in the blood, respectively. While from 71.6% to 90% of them don't know the signs and symptoms of folic acid deficiency during pregnancy and correct dosage of folic acid during pregnancy respectively. Also more than three-quarters of the studied sample (79.2%) don't know answers about the correct time to use folic acid during pregnancy.

Figure (2): Percentage distribution of the studied sample according to total knowledge about folic acid supplementation (n = 120).

Figure (2): Total knowledge about folic acid supplementation

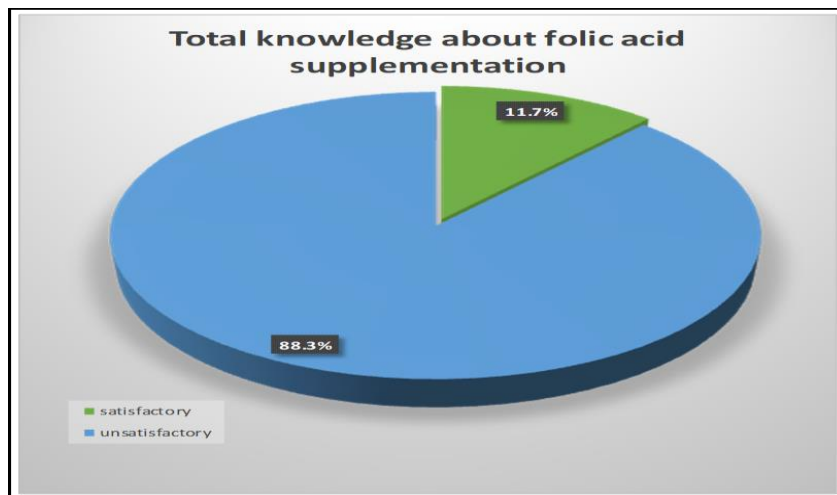


Figure (2): shows that, the majority of the studied samples (88.3%) has unsatisfactory level of total knowledge about folic acid supplementation. While the minority of them (11.7%) has satisfactory level.

Part (VI): Pregnant women's attitudes regarding folic acid supplementation.

Table (7): Distribution of the studied sample according to attitudes regarding folic acid supplementation (n = 120).

Items	Agree		Sometimes		Disagree	
	No.	%	No.	%	No.	%
Folic acid supplementation can prevent anemia during pregnancy.	25	20.8	64	53.3	31	25.9
Taking folic acid supplements during pregnancy.	35	29.2	55	45.8	30	25
Taking folic acid supplements	28	23.3	62	51.7	30	25

improves the health of the fetus.						
Taking folic acid supplements affects the mother during pregnancy.	25	20.8	42	35	53	44.2
Taking folic acid supplements is harmful to the fetus.	30	25	56	45.7	34	28.3
Aware about the latest guidelines for the use of folic acid supplements during pregnancy.	10	8.3	22	18.3	88	73.3
Satisfaction during my pregnancy recommending a vitamin/mineral supplement that is not in line with the guidelines.	28	23.3	30	25	62	51.7
Recommendations are in line with the latest guidelines for folic acid supplementation during pregnancy.	22	18.3	28	23.3	70	58.3
Possible adverse effects due to high intake of folic acid during pregnancy.	23	19.2	39	32.5	58	48.3
There can be potentially harmful effects due to a high intake of folic acid during pregnancy.	35	29.2	60	50	25	20.8

Table (7): Demonstrates that, more than half of the studied sample (53.3% and 51.7%) agree that, folic acid supplementation can prevent anemia during pregnancy and taking folic acid supplements improves the health of the fetus, respectively. While, more than three-quarters and more than half of them (73.3% and 58.3%) disagree that, aware about the latest guidelines for the use of folic acid supplements during pregnancy and recommendations are in line with the latest guidelines for folic acid supplementation during pregnancy, respectively.

Figure (3): Percentage distribution of the studied sample according to their total attitudes regarding folic acid supplementation (n = 120).

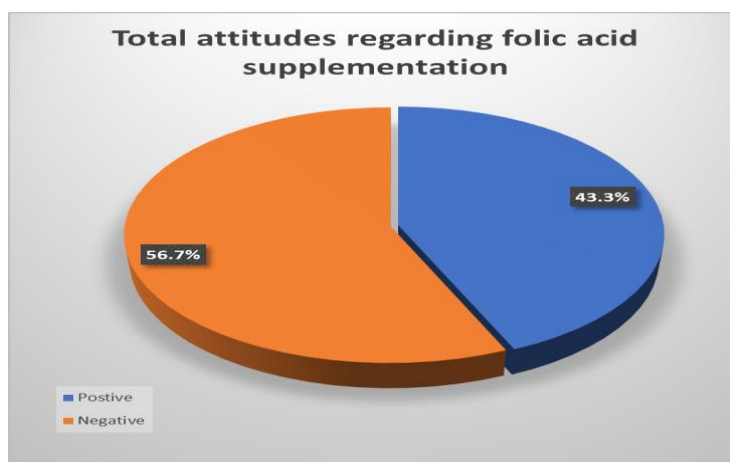


Figure (3) shows that, more than half of the studied samples (56.7%) have negative attitudes regarding folic acid supplementation. While, less than half of them (43.3%) have positive attitudes.

Table (9): Relationship between obstetric history of the studied sample and total knowledge about folic acid supplementation (n=120).

Items		Total knowledge about folic acid supplementation				X2	P-Value
		Satisfactory (n=14)		Unsatisfactory (n=106)			
		No.	%	No.	%		
Number of gravity	Primigravida	0	0.0	68	82.9	14.61	0.001**
	2 -3	23	60.5	14	17.1		
	>3	15	39.5	0	0.0		
Number of parity	Nullipara	0	0.0	75	91.5	13.91	0.005**
	Primipara	23	60.5	7	8.5		
	2-3	10	26.3	0	0.0		
	>3	5	13.2	0	0.0		
Number of abortions	Zero	37	97.4	76	92.6	10.67	0.021*
	1-2	1	2.6	3	3.7		
	>2	0	0.0	3	3.7		

X²=chi-square test.

*Significant at p < 0.05.

** Highly significant at p < 0.01.

Table (9): Displays that, there is a highly statistically significant relation between the studied sample' knowledge about folic acid supplementation and their obstetric history as number of gravity and number of parity (P<0.01). Also, there is statistically significant relation with their number of abortions (P< 0.05).

Table (10): Relationship between demographic data of the studied sample and total attitudes regarding folic acid supplementation (n=120)

Demographic data		Total attitudes regarding folic acid supplementation				X2	P-Value
		Positive (n=52)		Negative (n=68)			
		No.	%	No.	%		
Age (years)	< 20	0	0.0	14	20.6	13.52	0.005**
	20-24	15	28.8	51	75		
	25-29	25	48.1	3	4.4		
	30-35	12	23.1	0	0.0		
Age at marriage (years)	< 20	7	13.5	15	22.1	11.52	0.01*
	20-24	25	48.1	53	77.9		
	25-30	15	28.8	0	0.0		
	30-35	5	9.6	0	0.0		
Education	Illiterate	0	0.0	11	16.2	15.41	0.000**

level	Read and write	0	0.0	24	35.3		
	Secondary school	37	71.2	33	48.5		
	High education	15	28.8	0	0.0		
Working status	Working	35	67.3	0	0.0	14.77	0.001**
	Housewife	17	32.7	68	100		
Residence	Urban	30	57.7	62	91.2	4.114	0.141
	Rural	22	42.3	6	8.8		
Information about folic acid	Yes	40	76.9	2	2.9	14.62	0.001**
	No	12	23.1	66	97.1		

X^2 =chi-square test.

No significant at $p > 0.05$.

*Significant at $p < 0.05$.

** Highly significant at $p < 0.01$.

Table (10): Shows that, there is a highly statistically significant relation between the studied sample' attitudes regarding folic acid supplementation and their demographic data as age, education level, working status and information about folic acid at ($P= < 0.01$). Also, there is statistically significant relation with their marriage age at ($P= < 0.05$). While, there is no statistically significant relation with their residence at ($P= > 0.05$).

Discussion

Concerning to pregnant women's age, findings of present study revealed more than half of the studied pregnant women were in age group 20-24years and more than one quarter of were in age group 25- 29with mean age 24.1 ± 4.90 . This result was in agreement with Kamau et al.,(2020), in a study entitled "maternal knowledge on iron and folic acid supplementation and associated factors among pregnant women in a rural county in Kenya" who found more than two thirds of pregnant women were in age group 20-29 years. On the other hand, this result was contradicted with Jamil et al., (2020) in a study entitled "knowledge attitude & practice of folic acid consumption in pregnant women" who found more than three fifths of pregnant women were in age group 28-37 years. In relation to pregnant women's source of information about folic acid, the findings of the present study revealed more than half of have information from health team.

This result was in accordance with Albader et al.,(2021) in a study entitled " knowledge and practice of folic acid supplementation and impact of income level on awareness among women of child-bearing age in Saudi Arabia" who found majority of pregnant women had heard about folic acid and more than half of reported doctor and nurses were main source of knowledge about folic acid. This result was inconsistent with Begashaw et al.,(2022) "preconception of folic acid supplementation knowledge among Ethiopian women reproductive age group in areas with high burden of neural tube defects" who found source of information about folic acid, the findings of the present study revealed more than half of have information from the media and teachers in the school.

The findings of the present study revealed majority of the studied sample have incorrect answer regarding definition of folic acid, the benefits of folic acid during pregnancy and normal level of folic acid in the blood. Also, more than three-quarters of them have incorrect answer regarding signs and symptoms of folic acid deficiency during pregnancy and more than two thirds of have incorrect answer regarding food sources of folic acid. This result was supported by Oleiwi et al.,(2021) in a study entitled "assessment of awareness of folic acid use among pregnant women in primary health care center in Iraq " who found more than three quarters of participants didn't know the definition of folic acid and about one third of didn't know the food source of folic acid.

On the other hand, this results was contradicted by Al-Duraibi and Al-Mutawa (2020) in a study entitled "Knowledge and awareness of folic acid usage in Saudi pregnant women in Riyadh city from 2019-2020" who found that majority of studied pregnant women know the benefits of folic acid during pregnancy and more than half of them know the definition of folic acid. Concerning to pregnant women's knowledge about folic acid supplementation, findings of the present study revealed of the studied sample have don't answer regarding correct dosage and correct time to use folic acid during pregnancy, respectively. This result was in agreement with Al-Zahrani & Al-Marwani (2022) in a study entitled "The effectiveness of an educational session about folic acid on pregnant women's knowledge in Yanbu City, Saudi Arabia. Who found revealed more than most of the studied samples have don't answer regarding correct dosage and correct time to use folic acid during pregnancy.

This result was disagree with Sun et al.,(2020) in a study entitled " A cross-sectional study on the knowledge, attitude and practice of folic acid supplement status in women of childbearing age in Dongguan city" who found majority of studied women knew the correct frequency of folic acid and about half of knew the correct dosage of folic acid, more than three quarters of know the best time for folic acid supplementation. In relation to total knowledge about folic acid supplementation, the findings of the present study revealed the majority of the studied sample has unsatisfactory level of knowledge about folic acid supplementation.

These results similar with the results of study performed by (Khan, et al.,2021) in a study entitled " Awareness of folic acid intake among women of childbearing age in hail region, Saudi Arabia" who found revealed more than two-thirds of the pregnant women has unsatisfactory level of knowledge about folic acid supplementation. On the other hand, result was in disagreement with Al-Duraibi and Al-Mutawa(2020) in a study entitled "knowledge and awareness of folic acid usage in Saudi pregnant women in Riyadh city from 2019-2020" who found majority of pregnant women had adequate knowledge.

Regarding to pregnant women's attitudes regarding folic acid supplementation, findings of the present study revealed demonstrates, more than half of the studied sample agreed, folic acid supplementation can prevent anemia during pregnancy and taking folic acid supplements improves the health of the fetus. This finding is similar with the results of study performed by Katushabe & Atukuuma (2022) "Knowledge, attitude and practices towards prevention of anemia among pregnant

women aged 18-45 years in Gulu regional referral hospital, Gulu District" a cross-sectional study, who found the most that, more than half of the pregnant women agreed, folic acid supplementation can prevent anemia during pregnancy and taking folic acid supplements improves health of the fetus. On the other hand, result was in disagreement with (Sendeku,etal.,2020)" in a study entitled Adherence to iron-folic acid (supplementation among pregnant women in Ethiopia "who found majority of pregnant women had disagreed, folic acid supplementation can prevent anemia during pregnancy.

In relation to total attitudes regarding folic acid supplementation, the findings of the present study revealed more than half of the studied samples have negative attitudes regarding folic acid supplementation. This result was in agreement with (Bernardo.,2022) in a study entitled "Assessment of knowledge, attitude and perceived practices on the importance of foliate among Filipino women of child-bearing age in the province of Batanga " who found more than three quarters of pregnant women had fair (negative) level of attitude towards folic acid tacking during pregnancy. On the other hand, result was in disagreement with Abdulmalek (2019) in a study entitled "knowledge, attitude and practice regarding folic acid among pregnant women in Benghazi, Libya" who found majority of the interviewed pregnant women have a positive attitudes towards taking folic acid supplements.

Conclusion

The higher percentage of the pregnant women had unsatisfactory level of knowledge regarding folic acid supplementation. Moreover most of the studied pregnant women had a negative attitudes regarding folic acid supplementation. Also there is a statistical significance relation between pregnant women knowledge and attitudes and demographic characteristics of the studied pregnant women. In addition to, there was a significant strong positive correlation between total knowledge & total attitudes of study pregnant women. The results of the current study supported the research questions.

Recommendations

- ◆ Periodic evaluation of pregnant women's knowledge and attitudes regarding folic acid supplementation during pregnancy.
- ◆ Developing a simplified and comprehensive booklet including basic information about folic acid supplementation during pregnancy.
- ◆ Learning resources such as articles, journals and electronic resources such as computers and internet should be made accessible in the outpatient clinical for pregnant women. Continouing professional development programs should include skills updates.
- ◆ The study should be replicated on large sample and in different hospitals setting in order to generalize the results.
- ◆ Further study to evaluate the reflection of educational program regarding pregnant women perception.

References

- Abdulmalek, L. (2019) : Knowledge, Attitude and Practice Regarding Folic Acid among Pregnant Women in Benghazi, Libya, *Ibnosina Journal of Medicine and Biomedical Sciences*,9(3):PP. 67-71.
- Ahamed Nadia H., Kotb Safaa A.M., Hassanen Rabaa. H, Faculty of Nursing, Assiut University, (2018): Tools for data collection, *IOSR Journal of Nursing and Health Science (IOSR-JNHS)* e- ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 7, Issue 3 Ver. VI (May-June .2018), PP 49-58.
- Albader, N., Negm, D., El Gabry, E., El-Sayed, M. and Arzoo, S. (2020): Knowledge and practice of folic acid supplementation and impact of income level on awareness among women of child-bearing age in Saudi Arabia, *Tropical Journal of Pharmaceutical Research*, 18 (6): PP.1323-1330.
- Al-Duraibi, S. and Al-Mutawa, J. (2020): Knowledge and awareness of folic acid usage in Saudi pregnant women in Riyadh city from 2019-2020, *Journal of Family Medicin and Primary Care*, 9(10): pp. 5158–5164.
- Al-Zahrani, A., & Al-Marwani, S. (2022): The effectiveness of an educational session about folic acid on pregnant women's knowledge in Yanbu City, Kingdom of Saudi Arabia. *AIMS Medical Science*, 9(3), 394-413.
- Begashaw, B., Tariku, Z., & Berhane, A. (2022): Preconception of folic acid supplementation knowledge among Ethiopian women reproductive age group in areas with high burden of neural tube defects: a community based cross-sectional study. *Journal of Nutritional Science*, 11.
- Bernardo, A. K. M. (2022): Assessment of Knowledge, Attitude and Perceived Practices on the Importance of Folate Among Filipino Women of Child-bearing Age in the Province of Batangas. *Acta Medica Philippina*, 56(5).
- Bernardo, A. K. M. (2022): Assessment of Knowledge, Attitude and Perceived Practices on the Importance of Folate Among Filipino Women of Child-bearing Age in the Province of Batangas. *Acta Medica Philippina*, 56(5).
- Jamil, S., Khan, S. and Sadia, H. (2020): Knowledge Attitude & Practice of Folic Acid Consumption in Pregnant Women, *International Journal of Pharma Sciences and Scientific Research*, 3(7),PP. 74-81.
- Kamau, M., Mirie, M. and Kimani, S. (2020): Maternal knowledge on iron and folic acid supplementation and associated factors among pregnant women in a rural county in Kenya, *International Journal of Africa Nursing Sciences*, 10(1), PP.74-80.
- Katushabe, M. C., & Atukuuma, C. (2022) : Knowledge, Attitude and Practices towards prevention of Anaemia among Pregnant Women aged 18-45 years in Gulu Regional Referral Hospital, Gulu District. A Cross-sectional Study. *Student's Journal of Health Research Africa*, 3(6), 17-17.
- Khan, F. H. K., Alahmed, S. K., Alsaad, W. S., & Alshammari, A. H. (2021): Awareness of Folic Acid Intake among Women of Childbearing Age in Ha'il region, Kingdom of Saudi Arabia. *Journal of Pharmaceutical Research International*, 42-54.
- Linnell, A., Murphy, N., Godwin, J., & Cremona, A. (2022): An evaluation of adherence to folic acid supplementation in pregnant women during early gestation for the prevention of Neural Tube Defects. *Public Health Nutrition*, 1-27.
- Mida LA. (2020) :Knowledge, attitude and practice of physicians regarding periconceptional folic acid. Université d'Ottawa/. University of Ottawa; 2020.

- Oleiwi, S., Mansoor, H., Musiub, Z. and Hussein, A. (2021): Assessment of awareness of folic acid use among pregnant women in primary health care center, *Journal of Systematic Reviews in Pharmacy*, 12(3):PP.291-295.
- Riestenberg, C., Jagasia, A., Markovic, D., Buyalos, R. P., & Azziz, R. (2022): Health care-related economic burden of polycystic ovary syndrome in the United States: pregnancy-related and long-term health consequences. *The Journal of Clinical Endocrinology & Metabolism*, 107(2), 575-585.
- Sabi, E. M., Mujamammi, A. H., Alturki, N., Alzaid, T., Almutairi, A., Algarni, R., ... & Sumaily, K. M. (2022): Level of Knowledge and Awareness of Female Undergraduate Students and Determinants of Knowledge of Folic Acid and Supplementation. *Medicina*, 58(8), 986.
- Sadiq, Z. A., & Hussein, H. K. (2022): Assessment of knowledge and attitudes among pregnant women's towards folic acid intake during pregnancy in a sample of women attending primary health care centers in Babylon province. *Medical Journal of Babylon*, 19(2), 142.
- Sendeku, F. W., Azeze, G. G., & Fenta, S. L. (2020): Adherence to iron-folic acid supplementation among pregnant women in Ethiopia: a systematic review and meta-analysis. *BMC pregnancy and childbirth*, 20(1), 1-9.
- Shalaby Amira M. and EL-Gazzar Amira F. (2021):Lecturer of Pediatrics, Faculty of Medicine, Assiut University, Egypt ,The Congenital Anomalies in a Tertiary Neonatal Intensive Care Unit". *Annals of Neonatology Journal* 2021; Volume 3, Issue 1, ch 3 (1): p24-45.
- Sun, X., Chen, P., Pu, Y., Chen, X. and Han, L. (2020): A Cross-Sectional Study on the Knowledge, Attitude and Practice of Folic Acid Supplement Status in Women of Childbearing Age in Dongguan City, *Biomedical Journal of Scientific & Technical Research*, 10(2), PP.7646-7651.