

# Counseling Practice towards Folic Acid use among Health Care Provider's in Selected Public Hospitals in Addis Ababa, Ethiopia

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## ABSTRACT

**Background:** Periconceptional folic acid supplementation is an effective way to prevent neural tube defects (NTDs) and other congenital anomalies. It is shown that 9.7% of healthcare providers practiced periconceptional folic acid supplements in Ethiopia. Fewer than 50% of women receive information on folic acid before or only during pregnancy. This study was conducted to assess folic acid supplementation counseling practices among health care providers.

**Methods:** This institution-based cross-sectional study was conducted on 421 healthcare providers in selected public hospitals, Addis Ababa, Ethiopia. The hospitals were selected using a lottery sampling method, and a systematic random method was used to enroll participants. A structured self-administered instrument was used to gather information from participants. Data were checked for completeness and entered into Epi-Data software (version 3.1) and exported to SPSS software (version 25) for analysis. Descriptive statistics were used to describe participants' characteristics, and logistic regression, such as bivariate and multivariable analysis, were tested for associations. The level of significance was determined at a p-value of <0.05 and a 95% CI.

**Results:** In this study, periconceptional folic acid supplementation counseling practice was found in 51% of participants. Profession, salary, work load, patient flow, and assisted birth of a neonate with NTD were the factors associated with counseling practice (adjusted odds ratio [AOR]=3.215, 95% CI:1.085-9.523, AOR=0.213, 95% CI:0.95-0.487, AOR=0.427 95% CI:0.213-0.859, AOR=0.223, 95% CI: 0.1-0.498, and AOR=15.107 95% CI:8.157-27.979, respectively).

**Conclusion:** Health care providers demonstrated a good level of knowledge and counseling practice about the folic acid supplement in this study. Medical doctor, salary, workload, patient flow, assisted birth of a neonate with NTD were found predictors for counseling practice.

**Keywords:** Folic acid supplement, Healthcare provider, Practice

## Introduction

Folic acid is the synthetic and most stable form of folate (a water-soluble B vitamin), with approximately 70% higher bioavailability than that of folate naturally contained in foods (1). The natural sources of this vitamin include dark leafy greens, orange juice, nuts, peas, beans, and beef liver. Since folate is water-soluble that cannot be stored in the body, a synthetic form of folic acid consumption is often necessary.

Women are especially susceptible to folate deficiency during pregnancy, which is a period

of rapid fetal growth, differentiation of organs, and high rates of cell division. The increase in folate requirement during pregnancy is due to the growth of the fetus and uteroplacental organs (2). The provision of folic acid supplements to a woman before and during early pregnancy is a gold standard measure to protect neural tube defects (NTDs) and other congenital anomalies. Moreover, preconception folic acid use is important to prevent several other birth defects, such as cardiac, oro-facial,

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limb, and renal anomalies. Additionally, folic acid consumption lessens pregnancy-related complications, such as small for gestational age, low birth weight, antepartum hemorrhage, and perinatal mortality (3).

Supplementation of 0.4mg folic acid to women lacking a history of pregnancy of a fetus with NTD can reduce the risk of NTD by about 62%, and up to 72% for women with a previous pregnancy of a fetus with NTD during the protective period(4, 5). Furthermore, folic acid consumption that begins at least three months prior to conception has the optimal effect on reducing the risk for NTDs. Consequently, if all women of reproductive age took 400 mcg of folic acid daily, up to 70% of NTDs could be prevented. As a significant cause of morbidity and infant mortality, NTDs, such as spina bifida and anencephaly, represent a worldwide public health concern.

In Ethiopia, the provision of folic acid supplementation during the periconception period is highly low. Folic acid supplementation during the protective period has been practiced only in tertiary healthcare facilities. The majority of Ethiopian women(76.4%) had poor awareness about the benefits of early initiation of folic acid supplementation. The provision of counseling services on the benefit of folic acid, in turn, depends on the knowledge and counseling practices of healthcare professionals (6-8). According to the results of studies, healthcare providers' (HCPs) knowledge of folic acid and counseling practice vary from country to country. In the United States, HCPs had knowledge about the benefits of folic acid in the prevention of birth defects, the time of starting taking folic acid, and the amounts of folic acid supplementation needed beyond available levels in the diet. However, the majority of the HCPsin developing countries had insufficient knowledge about the benefits and onset time of folic acid supplements to prevent NTDs(9).In Italy, the percentage of interviewed women who received information on folic acid before or only during pregnancy was reported to be 42.0% and 46.3%, respectively (10).

In Ethiopia, the results of the literature review showed that limited similar studies investigated the benefits of providing counseling practice for folic acid supplementation in the prevention of NTDs and other fetal defects. Therefore, this study was conducted to assess HCP's counseling practice regarding periconception folic acid supplementation in selected public hospitals in Addis Ababa, Ethiopia.

## Methods

This hospital-based study was conducted in four hospitals, namely Tikur Anbessa Teaching Specialized Hospital, Saint Peter's Specialized Hospital, Yekatit 12 Hospital Medical College, and Gandhi Memorial Hospital, in Addis Ababa, the capital city of Ethiopia and headquarter for the African Union, within March-June, 2020. The city covers an area of 527 km<sup>2</sup> and has 10 sub-cities. According to the United Nations' world population prospects in 2020, the estimated total population of the city was 4,974,000(11). There are 52 hospitals in the metropolis, among which, 6, 5, 3, 3 and hospitals are administered by the Addis Ababa regional health bureau, the Federal Ministry of Health, non-governmental organizations, and Defense Forces and Police, respectively, and the remaining ones are private owned (12). The hospitals were selected using the lottery sampling method. Healthcare providers working in the maternity and reproductive wards and gynaecology outpatient departments were randomly selected based on proportional allocation.

### Sampling Procedure

The sample size was determined using single population proportion formula with the proportion of HCPs prescribing practice of folic acid among HCPs (47.7%) based on a study performed in Bahir Dar, Ethiopia (13). The researchers of the present study decided to pick the higher proportion to maximize the sample with a 95% confidence level (CI) and 5% margin of error, rendering for the sample of 383 cases. However, the final sample size was determined at 421 subjects after adding 10% for the non-response rate.

$$\text{Where } n = \frac{(Z \alpha / 2)^2 p (1-p)}{d^2}$$

$$(1.96)^2 0.477 (1-0.477) = 383$$

$$0.05^2$$

$$\text{Finally, } 383 + 38 = 421$$

### Inclusion criteria

The eligible HCPs were medical doctors, nurses, midwives, health officers, and pharmacists working in the study hospitals for more than 6 months.

### Data quality assurance

To assure data quality, an adapted and modified data collection instrument was used. The instrument was pre-tested in 5% of the total

sample in St. Paul's hospital, Addis Ababa, Ethiopia. A half-day training was provided to the data collector and the process was supervised daily.

### Data processing and analysis

The collected data were entered into Epi-Data software (version 3.10) and exported to the SPSS software (version 25) to be analyzed. Descriptive statistics were used to describe socio-demographic characteristics of study participants and logistic regression, including bivariate and multivariable analysis, was employed to identify factors associated with HCP's counseling practice. Variables with p-values of  $\leq 0.2$  were considered for multivariable logistic regression models. The level of significance was determined at a p-value of  $< 0.05$  and 95% CI.

### Ethics approval and consent

Ethical clearance to conduct this research was sought from the Research and Ethical Review Committee of the School of Nursing and

Midwifery, College of Health Sciences, Addis Ababa University, Addis Ababa, Ethiopia. Permission to conduct the study was obtained from the concerned offices. The participants of the study were informed about the objective of the study and asked to provide informed voluntary consent. They were also assured of confidentiality and anonymity in this study.

## Results

### Socio-demographic characteristics

The mean score of participants (n=421) was estimated at  $28.99 \pm 4.3$  years. More than half (56.6%) of participants were female and about half (50.4%) of them were married. Regarding the occupation, 160 (38%) participants were nurses, and about two-thirds (67.5%) of the participants had less than 5 years of work experience. Regarding the level of education, two-third (66.7%) of the subjects had a BSc degree, and 42% of the HCPs worked in the obstetrics/gynecology department (Table 1).

**Table 1.** Socio-demographic characteristics of health care providers in selected hospitals, Addis Ababa, Ethiopia, 2020

Variables	Category	Frequency (n=421)	Percent
Gender	Male	182	43.2%
	Female	239	56.8%
Age (years)	<30	316	75.1%
	30-40	97	23%
	>40	8	1.9%
Marital status	Single	207	49.2%
	Married	212	50.4%
	Divorced	2	0.5%
Profession	Medical doctor	88	20.9%
	Nurse	160	38%
	Midwife	105	24.9%
	Public health officer	17	4%
	Pharmacist	51	12.1%
Work experience (years)	$\leq 5$	284	67.5%
	6-9	105	24.9%
	>10	32	7.6%
Educational level	Diploma	3	0.7%
	BSc	281	66.7%
	M.Sc./MPH	52	12.4%
	MD (GP)	58	13.8%
	MD (specialty)	26	6.2%
Working unit/Department	PhD	1	0.5%
	Outpatient Department	49	11.6%
	Obstetrics/Gynecology	179	42%
	Pediatrics	130	30.9%
	Pharmacy	53	12.6%
Monthly salary (USD)	Other	10	2.6%
	$\leq 130$	91	21.6%
	131-175	113	26.8%
	175-200	103	24.5%
	>200	114	27.1%

Other: Emergency and intensive care uni

**Table 2.** Health care provider's knowledge towards periconception benefits of folic acid in selected hospitals in Addis Ababa

Knowledge about the benefits of folic acid	Frequency (n=421)	Percent
Knows folic acid use prevents neural tube defect	353	83.8%
Knows when to start folic acid	303	72%
Knows recommended doses of folic acid	245	58.2%
Identifies dietary sources of folic acid	302	72%
Identifies fortified food staff	339	80.5%
Knows correct doses of folic acid (n=104)	48	48.5
Knows neural tube defect is a congenital anomaly	387	92%

### Knowledge of health care providers about the benefits of the folic acid supplement

Based on the results, the majority (83.8%) of the respondents reported that they knew the benefit of folic acid, approximately three-quarters (72%) of them were aware of the correct time to commence folic acid, and more than half (58.2%) of them knew the recommended doses of folic acid. It was also revealed that near to three-quarters (72%) of the participants identified good sources of folic acid, the majority (80.5%) of them identified the correct fortified food staffs, and most (92%) of them indicated that NTD was a congenital anomaly (Table 2).

### Health care providers' counseling practice about folic acid consumption

It was found that three-quarters (75.1%) of the respondents reported that they counseled clients about the benefits of folic acid consumption, two-third (66.7%) of them used institutional guideline as a main source of information, approximately a quarter (23.5%) of the participants prescribed or administered folic acid at least once, among whom 48.5% reported they knew the correct dose of folic acid supplement for the prevention of neonatal birth defects, 45.5% reported they ever assisted a neonate with NTDs, and about 43% reported time constraint as the major barrier for not counseling their clients on the use of folic acid (Table 3).

### Factors associated with a counseling practice

Binary logistic regression was performed to assess the association of independent variables with knowledge and counseling practice towards folic acid supplementation. Variables with a p-value of  $\leq 0.2$  in the bivariate logistic regression model were considered for the multivariate regression model. Accordingly, profession and knowing NTD as a congenital anomaly were positively associated with counseling practice, while workload and monthly salary were negatively associated with HCPs counseling practice. It was revealed that medical doctors, compared to other HCPs, were more than three times likely to counsel clients about folic acid supplementation [AOR]=3.22, 95%CI: 1.09-9.52), and HCPs who attended or assisted the birth of a neonate with NTD were 15 times more likely to counsel clients about folic acid supplementation than their counterparts (AOR=15.107, 95% CI: 8.157-27.979). Furthermore, workload (patient flow) was another predictor for counseling practice among HCP, meaning that those HCPs who visited  $\leq 10$  clients per day were 0.22 times less likely to counsel clients about folic acid supplementation than HCPs managing  $> 20$  clients (AOR=0.223, 95% CI: 0.1-0.498), and HCPs with monthly salary income of  $\leq 4,600$  Ethiopian Birr were 0.21 times less likely to counsel clients about folic acid supplementation than HCPs with earning of  $\geq 7,120$  Ethiopian Birr (AOR=0.21, 95% CI: 0.095-0.49) (Table 4).

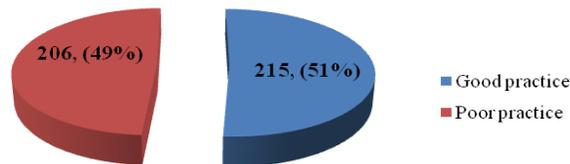
**Table 3.** Folic acid supplement counseling practice as an institutional guideline and its barriers among health care providers in selected hospitals in Addis Ababa, Ethiopia

Outcome assessed	Frequency (n=421)	Percent
Used institutional guideline to counsel clients	286	66.7
Ever counseled about the benefits of a folic acid supplement	316	75.1
Ever prescribed/administered folic acid supplement	99	23.5
Ever assisted neonate with neural tube defect	191	45.5
Major barrier to counseling practice		
Time constraint reported as the major barrier for counseling practice	183	43
Work load/average patients managed per day		
	<10	220
	10-20	125
	>20	76
		52%
		29%
		18.1%

**Table 4.** Factors associated with counseling practice about periconception folic acid among health care providers, Addis Ababa, Ethiopia

Variable	Counseling practices		COR (95%CI)	AOR (95% CI)	
	Yes	No			
Profession	Medical doctor	66(75%)	22(25%)	7.929(3.63-17.325)	3.215(1.085-9.523)*
	Nurse	69(43.1%)	91(56.9%)	2.01(1.005-3.995)	1.544(0.63-3.786)
	Midwife	61(56.1%)	44(41.9%)	3.667(1.771-7.58)	1.978(0.724-5.405)
	Public health officer	5(29.4%)	12(70.6%)	1.101(0.328-3.697)	1.846(0.429-7.941)
	Pharmacist	14(27.5%)	37(72.5%)	1	1
Working unit	Obstetrics/Gynecology/ Outpatient department	15(30.6%)	34(69.4%)	0.441(0.111-1.754)	
	OBS/Gynecology	126(70.4%)	53(29.6%)	2.377(0.661-8.554)	
	Pediatrics	55(42.3%)	75(57.7%)	0.733(0.202-2.657)	
	Pharmacy	14(26.4%)	39(73.9%)	0.359(0.090-1.430)	
	Other	5(50%)	5(50%)	1	
Monthly salary in (Birr)	≤4,600	25(27.5%)	66(72.5%)	0.197(0.108-0.359)	0.213(0.95-0.487)*
	4,601-6,193	54(47.8%)	59(52.2%)	0.476(0.279-0.812)	0.427(0.213-0.859)*
	6,194-7,119	61(59.2%)	42(40.8%)	0.755(0.435-1.311)	0.748(0.38-1.562)
	≥7,120	75(65.8%)	39(34.2%)	1	1
Work load	Patient flow <10	94(42.7%)	126(57.3%)	0.487(0.286-0.828)	0.223(0.1-0.498)*
	Patient flow 10-20	75(60%)	50(40%)	0.978(0.46-1.752)	0.492(0.218-1.111)
	Patient flow >20	46(60%)	30(39.5%)	1	1
Ever assisted birth of a neonate with NTD	Yes	154(80.6%)	37(19.4%)	11.531(7.26-18.32)	15.107(8.157-27.979)*
	No	61(26.5%)	169(73.5%)	1	1

AOR: Adjusted odds ratio, COR: Crude odds ratio, CI: Confidence interval, NTD: Neural tube defect, 1: References, Periconception: Preconception and intra-conception and post-conception counseling, Other: Delivery ward; \*P-value of < 0.05

**Figure 1.** Folic acid use counseling practice among healthcare providers in selected hospitals, Addis Ababa

## Discussion

The results of the present study showed that nearly half (49%) of HCPs had poor periconception folic acid counseling practice. Among the total 421 HCPs included in the study, 353 (83.8%) respondents reported that they knew about the benefits of folic acid supplement in the prevention of NTDs, 302 (71.7%) respondents identified at least one food source of folic acid, 245 (58.2%) reported they knew the recommended dose of folic acid supplement during periconception period, and 303 (72%) of them were aware of the onset time of folic acid supplementation. The findings in this study revealed higher results than those in the previous study performed in BahirDar, Amhara, Ethiopia (13), according to which, 56.1% of the HCPs reported they knew the benefits of folic acid in the prevention of NTD, 65.8% identified at least one food source of folic acid, 21.9% knew the correct

time to start folic acid supplementation, and only 5.1% knew the recommended dose of folic acid in the prevention of NTD. This discrepancy in the results is due to the differences in the study population, which in the current study there were more midwives and medical doctors than in the previous one.

According to the current study, 316 (75.1%) HCPs had counseled about the benefits of folic acid supplement at least once (95% CI: 0.7071-0.7895), 99 (24.7%) ever prescribed and/or administered folic acid, of which 48 (48.5%) of participants reported they knew the recommended doses of folic acid, 286 (66.7%) used institutional guideline as to the main source of information in counseling clients, and 191 (45.5%) reported they have ever assisted neonate with NTD. This finding was higher than that in the study conducted in BahirDar, in which only 9.7% of HCPs counseled and prescribed folic acid (13). The results of the current study also showed that profession was significantly associated with periconception folic acid supplement counseling practice; regarding this, medical doctors and midwives demonstrated better counseling practices than healthcare officers. It was found that medical doctors were 3.2 times more likely to have counseling practice, compared to non-medical doctors. This finding was consistent with those of studies carried out in the United States

and Serbia(9,14). Monthly salary (income) was among the determinant factors significantly associated with HCPs counseling practice about periconception folic acid use. Health care providers who earned a salary of  $\leq 4,600$  Ethiopian Birrs monthly were 0.21 times less likely to practice folic acid use counseling, compared to their counterparts. This finding was not observed in other studies in the literature. The reason for the variation of results could be attributed to the lack of motivation in the HCPs. Knowledge about NTD as a congenital anomaly was significantly associated with folic acid counseling practice. The HCPs who knew that neural tube disease as a congenital anomaly were 15.1 times more likely to practice counseling than their counterparts. This finding was higher than that reported in the results of a study performed in BahirDar, which might be due to the difference in the professional composition of participants (13). In this study, patient flow showed a significant association with folic acid counseling practice. Those HCPs who cared for  $\leq 10$  patients per day were 77.9% times more likely to practice counseling, compared to those HCPs managing  $>20$  patients per day.

Health care providers who knew a dietary source of folic acid were significantly associated with counseling practice on preconception folic acid use. Those HCPs were 0.16 times less likely to provide counseling practices of folic acid use, compared to their counterparts. Folic acid supplementation availability was one determinant factor for HCPs counseling practices of folic acid use. In this study, the major barrier to the regular provision of information and advice about folic acid supplementation was the unavailability of folic acid in the work unit. The limited supplies of folic acids accounted for 2.6 times more likely, compared to other barriers. This finding was in line with that revealed in a study carried out in India (15).

### **Limitations and strengths**

This facility-based study was the first to assess HCPs' counseling practices towards periconception (pre- and post-conception) folic acid supplementation in Addis Ababa. However, the findings of this study could only be generalized to this cohort of people in the study setting. The other limitation of the study was related to the nature of the findings, which were based on self-reported counseling practices, which might not reflect HCPs' actual practice. As in all cross-sectional studies, it is possible to infer association, however, not causation. The

information obtained from study subjects could be subject to recall bias. The scarcity of similar studies in the literature also limited the researchers to compare and contrast the findings against previous studies. These conditions together may limit concluding the study setting.

### **Conclusion**

The results of the study showed that more than half of the HCPs had good folic acid counseling practice. The independent predictor for HCPs counseling practice included work unit, monthly salary, workload, and the profession of a medical doctor. In-service training of HCPs on the role of folic acid supplement and the provision of clear institutional guidelines to integrate folic acid supplementation into nationally harmonized curriculums may be necessary to reduce the incidence of NTD and other congenital neonatal defects.

### **Declarations**

#### **Ethics approval and consent**

Ethical clearance to conduct this research was sought from the Research and Ethical Review Committee of the School of Nursing and Midwifery, College of Health Sciences, Addis Ababa University. Permission to conduct the study was obtained from the concerned offices. Participants of the study were informed about the objective of the study and asked to provide informed voluntary written consent. They were also assured of confidentiality and anonymity in this study.

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### **Consent for publication**

Not applicable.

### **Availability of data and material**

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### **Authors' contributions**

FA, EG, and TG conceived the study. All authors were involved in the design, fieldwork, data analysis, interpretation, report writing, and manuscript preparation. All authors reviewed, read, and approved the final version of the

manuscript.

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## Conflicts of interest

The authors declare that there is no conflict of interest.

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