COLLEGE OF HEALTH SCIENCES

SCHOOL OF NURSING & MIDWIFERY

POST GRADUATE PROGRAM

FOLIC ACID SUPPLEMENTS PRESCRIBING PRACTICE DURING PROTECTIVE PERIOD AND ITS ASSOCIATED FACTORS AMONG HEALTH PROFESSIONALS IN SELECTED GOVERNMENTAL HEALTH CENTERS IN ADDIS ABABA, ETHIOPIA, 2023.

BY: YASCHALEW MENGIST (BSc.)

A RESEARCH THESIS TO BE SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, SCHOOL OF NURSING AND MIDWIFERY IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER IN MATERNITY AND REPRODUCTIVE HEALTH NURSING

JUNE, 2023
ADDIS ABABA, ETHIOPIA

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THESIS SUBMITED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS SCIENCE DEGREE IN MATERNITY AND REPRODUCTIVE HEALTH NURSING.

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APPROVAL BY THE BOARD OF EXAMINATION

This thesis by Yaschalew Mengist is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of masters in maternity and reproductive health nursing.

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DECLARATION

Letter of declaration

By my signature below, I declare and affirm that this is entirely that this thesis is my original work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis, and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis. This thesis has been accepted as a partial fulfillment of the requirement for graduate degree from the Addis Ababa University, College of Health Sciences, School of Allied Health Sciences, Department of Nursing and Midwifery. It has never been presented and submitted in a whole or in part, in this or any other university for the award of degree, diploma or other qualification certificates.

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ABREVATION AND ACRONYMS

ANC-Antenatal care

CDC-communicable disease controlling

ETB- Ethiopian birr

FA-folic acids

FAS-folic acid supplement

HCPs-health care professionals

KAP- knowledge attitude and practice

MCH- maternal child health

NTDs-neural tube defects

STI & RH OPD-Sexual transmitted infection& reproductive health outpatient department

SPSS- Statistical Package for Social Science

WHO- world health organizations

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ABSTRACT

Background; supplementing folic acid (FA) before and in the 1st month of the conception is an essential preventive factor especially for neural tube defects (NTDs) and other congenital anomalies. However, in Ethiopia it is not given attention by policy makers, poorly administered at the right time by healthcare professionals, less utilized by pregnant women and/or women planning conceive. As a result, FA deficiency and insufficiency are a major public health issue in Ethiopia.

Objectives: a goal of a research was to assess folic acid supplement (FAS) prescribing practice during protective period and its associated factors among health professionals in selected governmental health centers in Addis Ababa, Ethiopia, 2023.

Methods; Institutionalized cross-sectional survey was carried out in Addis Ababa public health centers with a total sample size 396 from February20-May22/2023**.** To choose the respondents systematic random sampling methods was used and after each respondent's signed consent, a row data was gathered using a pretested self-administered questionnaires. The data was coded, interred to Epi data 4.6.0.6 and transferred to Statistical package for social sciences (SPSS) 27 software. Then binary and multivariable logistic regression analysis method was used to show the associated variables with FA prescribing practice using a confidence interval of 95% and significance value<0.05).

Result: The total prevalence of folic acid prescribing practice during periconception period was 64.4% [95% CI (59.68-69.12]. But those prescribed during protective period was 26.7%. Ever not attended birth of neonate with NTD, not prescribing dose of 4mg folic acid (FA) for women with NTD, type of women whom FA was prescribed were associated with FA prescribing practice during protective period.

Conclusion and recommendations; the healthcare professional's prescribing practice during protective period was still very low, needs more attention in order to FA strengthen FAS.

Key words; Folic acid supplements, prescribing practice, Periconception period, Neural tube defects.

1. INTRODUCTION

1.1 Background

Folic acid or vitamin B9 is B group vitamin that is not produced in the body, rather able to obtained either from dietary sources (naturally exist in foods such as leafy green vegetables, legumes, egg yolk, liver, and citrus fruit) or supplementation. FA is a fabricated dietary supplement found in pharmaceutical vitamins and artificially enhanced foods(1).

Because folic acid is necessary for the fetus' growth and development, demand for it rises during pregnancy and folic acid supplementation (FAS) during the period of conception have long been known to decrease the risk of neural tube defects (NTDs) in the offspring. FA deficiency has been linked to abnormalities in both mothers (anemia, peripheral neuropathy) and fetuses (congenital abnormalities, including neural tube defects)(2).

In addition to this, FAS prevents from fetal structural anomalies like congenital heart defects, renal, oro-facial and limb anomalies and it may also protect pregnancy related complications such as preterm births, low birth weight, small for gestational age(SGA),antepartum hemorrhage and perinatal mortality(1). NTDs, including spinal bifida, anencephaly and encephalocoele, occurs when part of the neural tube, which forms the spine, spinal cord, skull and brain, unable to close between 21 and 28 days after conception before women know as they are pregnant and it causes abortion, still birth, nerve damage, learning disabilities, paralysis, and death(3,4). Increased periconception folic acid use during protective period, is a possible approach to reduce NTDs in the community(5,6).

The Medical Research Council Vitamin Study Research Group reported that the periconception use of FA (especially during protective period) prevents the recurrence of NTD and reduces the incidence of NTD by 72% in offspring(7). Those women who used FAS before conception and in the first month of conception were 60% less likely to have newborns with NTDs(8). However, a recent systematic review reported variable prevalence estimates of folic acid supplementation among different countries worldwide were highest within North America (32–51%) and Europe (9–78%), and lowest in parts of Africa(0%)(6). In Ethiopia about 48.4% of women used FAS in

different time of periconception; but, only 1.92% of women used FA at a protective period because it is poorly ordered in the right time of function by healthcare professionals(9).

This leads FA deficiency and insufficiency are widespread, prevalent and a public health problem in a nation(8). As a result, the goal of this research is to evaluate folic acid supplements prescribing practice during protective period and its associated factors among healthcare professionals in governmental healthcare centers in Addis Ababa city, Ethiopia, 2022/23

1.2 Statement of Problem

Low folic acid prescribing practice of health professionals is correlated with Low consumption of folic acid(10). Insufficient folic acid intake is by far the largest contributor to neural tube defect occurrence globally and there are more than 300,000 babies born with neural tube defects each year(3,(12) . Particularly due to low levels of folic acid in women's body before and during early pregnancy (13).

The overall prevalence of common form of NTD (Anencephaly) was high with 5.1 per 10, 000 births which results the incidence and death were 8.3 and 5.5 per 10, 000 births respectively in the globe (3). While in Africa, the pooled prevalence of NTDs was 50.71 per 10,000 births and 40% of this were likely due to poor FAS(8).

Neural tube defects are widespread in Ethiopia. According to systematically reviewed and meta-analyzed finding in 2020, the estimated prevalence of NTDs among children in Ethiopia was 63.3 cases per 10,000 children (14). A research studied in Addis Ababa teaching hospitals also revealed as birth prevalence with NTDs after 28 weeks of gestation was 63.4 per 10,000 births and after 12 weeks of gestation, the total prevalence of NTDs was 126 per 10,000 births (15).However, FA utilization during the right time interval among Ethiopian women is very low as a result of poor practice of FA prescribing at protective period periconception(7,8).

The Communicable Disease Control (CDC), Institute of Medicine, and American Academy of Pediatrics, recommend that all childbearing age women, capable of becoming pregnant, and women with no prior history of birth with NTDs should take 400 μg (0.4 mg) of FA and women with a prior conception with NTDs or high risk women should take 4,000 μg (4 mg) of FA per

day starting from at least one month before they have conception and for the first 3 months of conception, which is termed as the protective period(16).

The folic acid supplement prescribing practice was varied from country to country across the world. In China, 77.2% Obstetricians and specialists routinely prescribed FA tablets and (50%-65%) of health care providers addressed folic acid or multivitamins during well-woman visits in United States of America(17,18).While in Canada, only one third of health professionals in fact prescribe a supplement in line with the recommendations of 400 μg-folic acid(FA)(19).

In Ethiopia, where women given care by gynecologists and general practitioners in tertiary hospitals, FA was prescribed for them to prevent recurrent of birth with NTDs while seldom prescribed FA to prevent the occurrence of NTDs (10).

Even though, Folic acid usage during the protective period among pregnant women in Addis Ababa Ethiopia is 38.6%,which was very low (12,18), as to the investigator's knowledge, there none of existing published research in the area of survey which determines the folic acid supplement prescribing practice during protective period via identifying the associated factors. Therefore, this study was conducted to assess the folic acid supplement prescribing practice during protective period and its associated factors among healthcare professionals at public healthcare centers in Addis Ababa city, 2022/23.

1.3 Significance of the study

Congenital anomalies typically neural tube defects were highly prevalent problems, on the other hand, FA utilization during the protective time interval among pregnant women in Addis Ababa is very low(12,20). Even though FAS essential to prevent serious birth abnormalities,(notably NTDs), in Ethiopia, it is not given attention by policy makers, poorly prescribed at the protective time interval by healthcare professionals, underutilized by conceived women and/or women planning conception(9). Therefore, assessing the FA supplement prescribing practice during protective period and its associated factors is offer the following significance:

- The finding of this study will be used by health policy maker and other stake holders as a baseline data to design health care plan to improve folic acid supplement utilization in the societies.

- This research finding will be used by ministry of health to develop training package in order to increase folic acid prescribing practice during protective period among health care providers in health centers.
- The finding of this study will be utilized by Addis Ababa health beaureu to do more on improving folic acid supplement prescribing practice during protective period.
- Research will alert the health care provider in order to strengthening counseling and advice about folic acid supplement before and during pregnancy.
- The findings from this study might contribute in the improvement of newborns health
- This research will be used as a source for further researches

2. LITERATURE REVIEW

2.1 Introduction

Folic acid can prevent and treat folic acid deficiency problems, birth defects and pregnancy complications (including spinal bifida, anencephaly and preeclampsia**),** treating mental health conditions and used to treat different disease. In Ethiopia neural tube defect is highly prevalent birth defect majorly caused by folic acid deficiency. Folic acid supplementation during protective period prevents NTDs. But as studies shown, FA utilization during the right time interval to prevent NTDs among women is very low and needs health care plan to improve it. Therefore, assessing the health professional's folic acid prescribing practice is very crucial.

2.2 Folic acid supplementation

Folic acid, which is actually better absorbed than folate which found from natural food sources—85% vs. 50%, respectively(21). Folic acid is a synthetic version of the vitamin B folate(naturally occurs in leafy greens, eggs, and citrus fruits among other foods)(22). Both folic acid and folate are used in supplements and treat the same conditions; but they are metabolized differently in the body and essential to different important function to the body.

Folic acid is essential during times of rapid growth, such as during pregnancy and foetal development, as well as for the production of healthy red blood cells, protein metabolism, DNA, and RNA, and red blood cell formation (21). Folic acid deficiency complications such anemia, problems with fetal development, dementia, decreased immunological function, and depression can be prevented by taking folic acid or folate supplements. Additionally, FA protects from obstetric complications like spinal bifida, anencephaly, and preeclampsia. And also Not only these, can folic acid supplement prevent but also treating mental health conditions such as postpartum depression, schizophrenia, and bipolar disorder and reducing heart disease risk factors, used to treat diabetes, fertility issue, inflammation and kidney disease (22).

All women of reproductive age should get 400 mcg of folic acid every day to get enough folic acid that prevent some birth defects because most pregnancies are unplanned, and major birth defects of the baby's brain or spine occur very early in pregnancy (3-4 weeks after conception) and before most women know they are pregnant. Taking folic acid, higher dose than 400 mcg of

folic acid each day does not necessarily prevent neural tube defects, unless a doctor recommends taking more due to other health conditions. But women who already have a pregnancy affected by a neural tube defect should consult with their healthcare provider and consume 4,000 mcg of folic acid each day at least one month before becoming pregnant and through the first 3 months of pregnancy(16). However, folic acid supplement utilization among women is different across world. In Japan only 20·5 % of pregnant women took folic acid supplements periconceptionally even though 70·4 % knew about the protective effect of folic acid(7). In Iran community health centers, the prevalence of folic acid supplementation both before and during pregnancy was 54.5%.In Ethiopia about 48.4% of women used FAS in different time of periconception; but, only 1.92% of women used FA at a protective period because it is poorly ordered in the right time of function by healthcare professionals(9).

2.3. Folic Acid Supplement Prescribing Practice

The Communicable Disease Control (CDC), Institute of Medicine, and American Academy of Pediatrics, recommend that all childbearing age women, capable of becoming pregnant, and women with no prior history of birth with NTDs should take 400 µg (0.4 mg) of FA and women with a prior conception with NTDs or high risk women should take 4,000 µg (4 mg) of FA per day starting from at least one month before they have conception and for the first 3 months of conception, which is termed as the protective period(16). However, the folic acid supplement prescribing practice was varied from country to country across the world.

A study in china during 2009 reveals that the vast majority of Obstetricians and specialists had willingness to discuss the importance of FA with women of childbearing age and 77.2% routinely prescribed FA tablets. But, lack of knowledge such as "which women should take FA supplements" and the "correct time to take FA" had seen during prescription(23). Another cross-sectional survey administered to physicians from August 2018 to May 2019, in Canada's National Capital Region resulted physicians' had relatively low rate of correct practicing behaviors. Because, more than half believed that they followed the guidelines, which were aligned with most available perinatal vitamin supplement (PVS) folic acid content, more than one-third simply did not know whether their practice was in line with recommendations and available PVS on the market. However, only one third in fact recommend a supplement in line with the recommendations of 400 µg-folic acid(FA), more than half recommend a PVS

containing ≥ 1 000 µg-FA and almost half of physicians most often recommended that "for no particular reason" while a quarter of them based their decision on women's preference(19).

A study in United States of America (USA), on HCPs knowledge and practices regarding folic acid, from 2002-2003, among HCPs working in either obstetrical/gynecology (ob/gyn) practice settings or family/general (fam/gen) practice settings revealed as they regularly prescribe FA during well-woman visits (65% and 50%, respectively)(17).

In Ethiopia, a research conducted in bahir dar during 2017 reveals that healthcare providers who had prescribed folic acid to women during periconception period was 9.7%. From them, 78.9% were general practitioners. Nevertheless, only 12(31.6%) respondents had prescribed the correct dose of FA for a woman to prevent recurrence of NTD. However, no one gave FAS for a woman with no previous pregnancy with NTD during protective period(10). Furthermore the other study conducted in selected hospital in Addis Ababa during 2021, approximately a quarter (23.5%) of the HCPs prescribed or ordered FA at least once and (75.1%) of the respondents reported that 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, inconclusively periconception folic acid supplementation counseling practice was 51% (24).

2.4 Factors of folic acid prescribing practice

2.4.1 Socio demographic factors

Differences in age, level of education, job title and professional working experience, had led different rates in the practice of prescribing FA tablets to women planning to become pregnant while working. A Study in china stated, higher job title, longer professional working experience (participants with more than five years of working experience than those with less than five years of experience),(being gynecologists/obstetricians than specialists in women's health), resulted in a greater likelihood of routinely prescribing FA tablets to women planning to become pregnant (OR < 1) (18).

A study in Bahir Dar, using in-depth interview, where women given care by gynecologists and general practitioners in tertiary hospitals, FA was prescribed for the women to prevent recurrent

birth with NTDs, that means, with counseling of the benefit, 4mg dose of FA was given to all women who gave birth of a neonate with NTD(10).

Additionally, as a report of conducted research in governmental hospitals in capital city of Ethiopia, profession and monthly salary has significantly associated with periconception folic acid supplement counseling practice and in turn may associated with folic acid prescribing practice. Medical doctors were 3.2 times more likely compared to other health professionals and health care providers who earned a salary of ≤ 4,600 Ethiopian birrs monthly were 0.21 times less likely to practice folic acid use counseling, compared to their counterpart but denied their association with folic acid prescribing since the it was not the objective of researcher(24).

2.4.2 Knowledge of health care professionals on folic acid supplement

Health professionals lacking knowledge regarding periconception folic acid (FA) is associated with their prescribing practice. A study in Canada, more than one-third physicians simply did not know whether their practice was in line with recommendations, available perinatal vitamin supplement (PVS) on the market and reasoning behind the supplement. because, only one third physicians recommend a supplement in line with the recommendations of 400 µg-FA, more than half prescribed a PVS containing ≥ 1 000 µg-FA, and almost half of physicians responded that they most often prescribed “for no particular reason” while a quarter of them based their decision on women’s preference(23).

Health care providers have variable level of knowledge from one profession to another towards folic acid supplement to prevent NTDs in different countries. A result of Florida health care providers’ knowledge of FA for the prevention of NTDs after a nationally educational program shown that some health care providers who have regular contact with women of reproductive age (35% of family physicians and pediatricians still could not identify the right folic acid dose to prevent occurrences of NTD and approximately 50% of these two groups fail to prescribe folic acid routinely to women of childbearing age (25).

According to a study conducted in China, obstetricians and women's health specialists who received 60% or more correct answers on a test of knowledge about NTDs, folic acid, and taking supplements were more likely to routinely prescribe FA tablets to women who were trying to get pregnant than those who received correct answers lower than 60% (OR > 1), (all $p < 0.05$).

As a result, obstetricians and women's health specialists were less likely to prescribe FA because they lacked understanding about "which women should take FA supplements (34.1%)", "the correct time to take FA (34.3%) and correct dose of FA for women at risk of having an infant with NTD (48%).” While who know main dietary source(72%), correct dose of FA for typical women of childbearing age(79.7%),benefit of FA(89.5%) and NTD as congenital anomaly were more likely routinely prescribing FA. However, the reality is that only 77.2% routinely prescribed FA tablets (18). Lack of understanding of the value of FAS to prevent NTDs due to its importance not being incorporated into the health education curriculum and teachers having not taught it during university stay, was cited in a study from Bahir Dar in Ethiopia as a reason not to prescribe FA during protective period in health centers and clinics.(10).

2.4.3 Institutional and service related factors of FA Supplement

A comparative study in united states of America (USA) revealed that, more providers in obstetrics/gynecology unit than in family/general physician unit reported as they regularly prescribed FA during well-woman visits (65% vs. 50%, respectively (17).

Research in china also resulted; doctors in higher level hospitals were more likely to receive training, making them more likely to prescribe FA supplements to women. Moreover, participants in higher positions tended to routinely prescribe FA tablets to women planning to become pregnant, which might be related to their greater amount of knowledge and working experience and also stricter working conditions also resulted in a higher rate of correct behaviors with regarding to prescribing folic acid(18).

A study from Bahir Dar in Ethiopia, in tertiary hospitals explored as, “high work load or patient flow and carelessness was a reason of not prescribed FA for a woman with no prior pregnancy with NTD” and “Lack of guideline’’ to use as a reference like anemia prevention guideline is the main reason for them not to FA during protective period. Though, health professionals have the awareness about the advantage of FAS during the periconception period, they need to have clear direction from the local health bureau or to be prepared as a guideline to use as a reference (26).

In Ethiopia also a study from Addis Ababa in 2021, work load (patient flow) showed a significant association with folic acid counseling practice, simultaneously with prescribing practice. Those HCPs who cared for ≤ 10 patients per day were 77.9% times more likely to

practice counseling and prescribing, compared to those HCPs managing >20 patients per day. Folic acid supplementation availability was one determinant factor for HCPs counseling and prescribing practices of folic acid use. Thus, the limited supplies of folic acids accounted for 2.6 times more likely, compared to other barriers (24).

2.5 Conceptual Framework

The conceptual framework which constructed from literature review through critical analysis of existing studies(16, 23,25 ,27,29) about folic acid supplement prescribing practice.

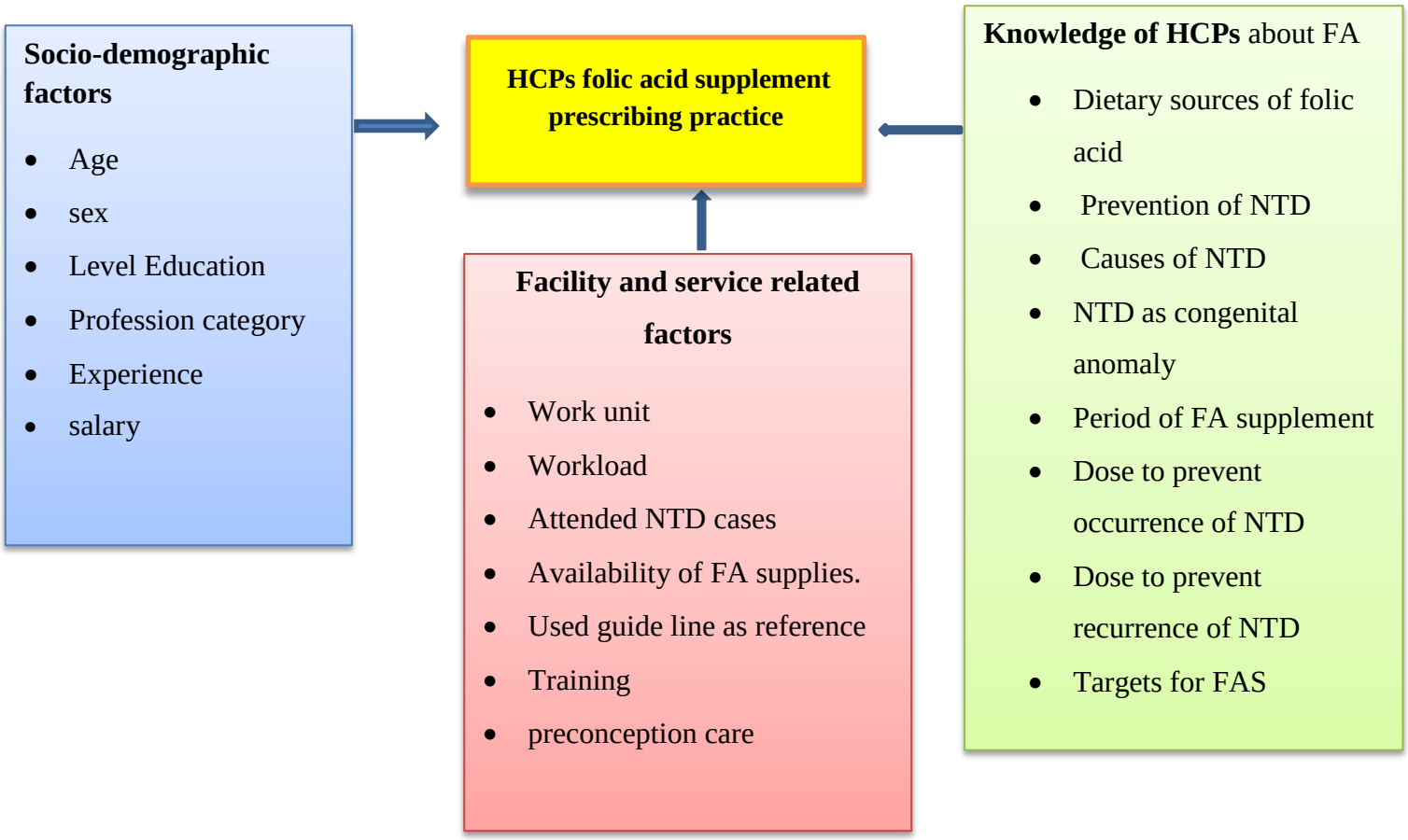

Figure 1. A conceptual framework on folic acid supplement prescribing practice during protective period and its associated factors among healthcare professionals at governmental healthcare centers in Addis Ababa city, Ethiopia, 2023.

3. OBJECTIVE

3.1 .General Objective

- To assess the prevalence of folic acid supplement prescribing practice during protective period and its associated factors among healthcare professionals in selected public healthcare centers in Addis Ababa city, Ethiopia, 2023

3.2 .Specific Objective

- To determine folic acid prescribing practice among health professionals
- To identify factors associated with folic acid supplement prescribing practice during protective period among health professionals

4. METHODS AND MATERIALS

4.1 .Study Area and Study Period

The study was done in Addis Ababa governmental healthcare centers from February 20 to may22/ 2023. Ethiopia's capital city, Addis Ababa, also serves as the headquarters of the African Union. The city has a 527 km2 space, and there are 11 sub cities within it, each of which has 116 woredas. According to demographic projections for 2022 based on the 2007 census, Addis Ababa's total population is 3,859,999 (males: 1,822,000 and females: 2,037,999), with a population density of 7,324/km2.(27). Addis Ababa has public 13 Hospitals, 98 Health Centers(28). According to data from the Ethiopian Minister of Health's 2020 HRIS (human resource information system) system and that of the Addis Ababa Administration Health Bureau's human resource database, there are 5690 mid-level professionals working in public healthcare centers in Addis Ababa, with midwives accounting for 1226, health officers for 1518, and nurses for 2946.(29).

In Ethiopia health centers deliver preventive, promotive and curative health care for the communities. Family planning, antenatal care (ANC), labour and deliver care, post natal care, immunization and fewer than 15 children OPD, abortion care, reproductive health care and others are the services given under the maternity, and child health (MCH) department in health centers. These services are delivered through skilled professionals that are midwives, nurses, public health officers and general practitioners who have the opportunity to prescribe folic acid supplement simultaneously for any reproductive age women.

4.2 Study Design

Institutionalized based cross-sectional survey was employed.

4.3 Target Population

Any health care professionals those were worked in public health center of Addis Ababa.

4.4 Source Population

All healthcare professionals who were worked in selected public health center of Addis Ababa during study period.

4.5 Study Population

All selected healthcare professionals was working in maternity and child health and outpatient departments in selected public health center of Addis Ababa

4.6 Sampling Method

Simple random sampling method was used to include public health centers in the eleven sub-cities of Addis Ababa and systematic random sampling method to select the health professionals who fulfill the inclusion criteria.

4.7. Sampling Procedure

From the total of 98 public health centers in 11 sub cities of Addis Ababa, 33 health centers were selected. The selected health centers were proportionally allocated for each sub cities based on the total number of public health centers each sub city has, and then the number of health professionals also allocated proportionally based on the selected health centers total number of health professionals working in MCH and outpatient department where non pregnant women use service before conception in health centers. Finally health professionals were taken by systematic random sampling method.

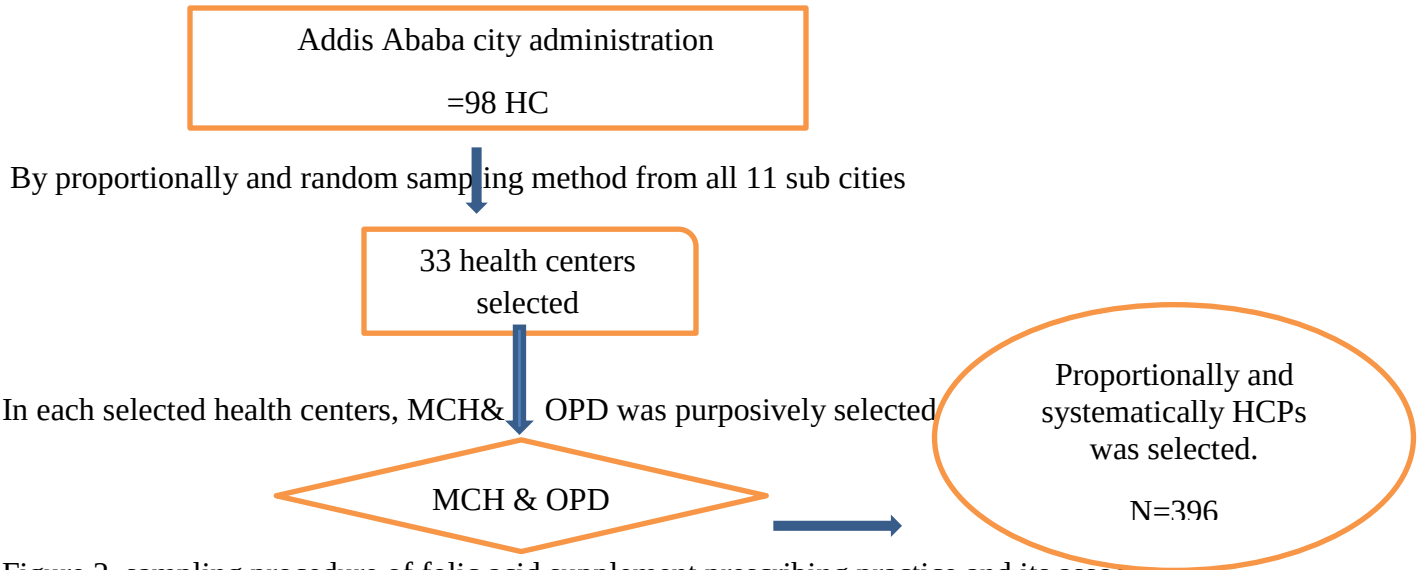

Figure 2 sampling procedure of folic acid supplement prescribing practice and its associated factors among health care professionals in healthcare centers in Addis Ababa city administration, Ethiopia, 2023

4.8 Sample Size calculation

A single population proportion formula was used to calculate the sample size. The highest value of proportion was taken from different related studies to maximize the sample size. Counseling practice towards folic acid use among HCPs was (51%) and FA prescribing practice was 23.5% from a study performed in Addis Ababa city and from Bahir Dar city, HCPs knowledge of FA and prescribing practice was 47.7% and 9.7% respectively(24),25). For this study, the percentage of HCPs that receive folic acid counseling (51%) was selected for this study's sample size calculation in order to obtain a sufficient sample. Using $Z_{a/2}$ of 95% and 0.05 errors, 384 samples calculated. Finally sample size of **396** subjects was determined after adding 10% for the nonresponse rate.

Where $n = (Z_{a/2})^2 \, p \, (1-p) / d^2 = (1.96)2 \; 0.51 \; (1-0.51) / (0.05)^2 = 384$

Hence, healthcare professional's total number in public health centers of the city were **5690** which less than 10,000, correctional formula was employed as

NF= **n0**/**1+ ((n0-1)/N)** = **384**/(**1+((384-1)/5690))**

= 384/1.067=**360** and 10% of corrected sample size is =**36**

Finally, 360 + 36 = **396**

Where,

Nf =corrected sample size

n0=single population proportion sample size which is 5690

N= total numbers of health professionals working in public health centers.

4.9 Operational Definition.

Health care professionals-are midwives, nurses, public health officers and general practitioner working in maternity and child health (MCH) ward and outpatient departments.

Health center- a health institution where providing promotive, preventive, curative and rehabilitative outpatient care including basic laboratory and pharmacy services within the primary health care system.

prescribing practice: Healthcare professionals who give supplement or treatment dose of folic acid to a woman during protective period with in las one year (10).

Protective period: Is a time starting from at least one month before conception and for three months duration after conception(10).

High risk women: Women with prior history of pregnancy NTDs, having a close relative with an NTD, having diabetes mellitus, receiving treatment of valproic acid or carbamazepine for a seizure disorder, and having an NTD, or having a partner with an NTD(16)

Knowledge of HCPs about folic acid supplement was categorized as who "had sufficient knowledge"-HCPs answered the 8 knowledge measuring questions having 'yes'=1 and 'no'=0 above the mean (0.8133) and "insufficient knowledge"-for those answered below the mean level.

4.10 Criteria of Eligibility

4.10.1 Inclusion criteria

- All health care professionals (midwives, nurses, public health officers) working in the maternity and outpatient departments and who has at least six months working experience and present and giving consent.

4.10 Data Collection Tools and Procedures

Self-administered structured English version closed ended questionnaires that were modified and adapted from related literature were used to gather the data(24,10). Pretest was done before data collection to check inconsistency and unclear words & some clarification on questionnaires' was added. The questionnaires' has four parts, part1. Socio demographic characteristics, part 2.Facility and service related questions, part 3. Knowledge related questions. Part4. FA Prescribing practice related questions. Data was collected through four (4) trained data collectors (BSc) midwives and nurses) and two (2) supervisor (MSc) who have experience of data collection.

4.11 Data Quality Control

To assure the quality of data, one day training on data collection technique was given for data collectors. Pretest was done with 10 % of sample size among professionals working in unselected health centers to maintain the reliability of study. The gathered data was checked and mistakes given to data collectors & supervisors for correction every day. Supervisors and researchers closely supervised data collection technique.

4.12 Variables

4.13.1 Independent variables

- Includes socio-demographic factors, knowledge of health care professionals, institution and service related factors.

4.13.2 Dependent variables

- Folic acid prescribing practice of health professionals

4.14 Method of Data Analysis

The gathered information was verified, coded, and input into Epi data version 4.6.0.6.Data was exported to SPSS version 27 after entry and cleaned up before analysis. Descriptive statistics was used to calculate frequencies, percentages, mean and standard deviations of the variables. The relationship, satistical significance and strength of the association between independent variables and outcome variables were measured by using a logistic regression model. In order to control intermediary variables, assess associations, and create crude and adjusted odds ratio along with

their accompanying confidence limits (95% CI), factors with COR<0.25 during binary regression were candidated for a multivariable logistics regression model. A variable was deemed statistically significant if the p-value was less than 0.05, and the findings were presented as tables, figures, and text descriptions.

4.15 Ethical Consideration

After receiving complete approval and ethical clearance from the AAU, College of Health Sciences, School of Nursing, and School of Midwifery and written letter of permission to conduct the study was obtained from Addis Ababa Public Health Research and Emergency Management Directorate and made to Addis Ababa health bureau and to governmental health center. Before participants sign the consent form, the researcher was ensured that participants to understand the problem, objective and significance of study. Consent forms requesting their voluntary involvement in the study were provided to the study participants and throughout the course of the study, anonymity and confidentiality were guaranteed.

4.16 Dissemination of study finding

- The findings of this study will be submitted to Addis Ababa University College of Health Science School of Nursing and Midwifery at Addis Ababa University's College of Health Sciences.
- Hard and soft copy will available in the library of Addis Ababa University for graduate students as well as for other concerned readers.

5. RESULT

5.1 Socio-demographic characteristics

In this study 396 participants were self- administered and had a response rate of 100%. More than half of participants were within the age group of 25-29 years with mean and standard deviation of 28.94 and ±4.31 years respectively. More than 50% were females and 71.2% were midwives in profession. Participants had degree level education were 329(83.1%).

Table 1. The socio-demographic characteristics of health professionals in the selected public health centers of Addis Ababa city, Ethiopia, 2023.

Variables	Frequency(N=396)	Percentage (%)
Age		
≤24	29	7.9
25-29	214	54
30-34	112	28.3
35-39	28	7.1
±40	13	3.3
Sex		
Male	171	43.2
Female	225	56.8
Profession		
Midwife	282	71.2
Nurse	15	3.8
Public health officer	70	17.7
General practionaire	29	7.3
Level of education		
Diploma	43	10.9
Degree	329	83.1
Master	24	6.1
Salary In birr		
<6193	121	31
6194-8017	205	52.6
Work experience in year		
<=5	215	54.7
6-9	125	31.8
>=10	53	13.5

Table 2 service and facility related characteristics of folic acid prescribing practice among health professionals in selected health center in Addis Ababa, 2023.

variables	Frequency(n=396)	Percentage (%)
Work unit		
Antenatal care & Labor/delivery	225	56.8
FP , PNC, Immunization, STI &RH OPD	102	25.5
Adult OPD,	69	17.4
Total observed patient/day individually		
<21	250	63.7
≥21	142	36.2
Ever worked in antenatal care		
Yes	299	75.5
No	97	24.5
Ever worked in labour/ delivery ward		
Yes	313	79
No	83	21
Ever got in service training on Folic acid supplementation		
Yes	142	35.9
No	254	64.1
Ever attended birth of neonate with NTD		
Yes	191	48.2
No	205	51.8
Presence of reference guideline for FA prescribing in institution		
Yes	255	64.6
No	140	35.4
Ever used FA guideline to prescribe FA supplement		
Yes	162	63.5
No	93	36.5
Ever had given supervision/direction of folic acid supplement in institution		
Yes	169	42.9
No	394	57.1
From whom supervision/direction was given		
Health Service manager	45	26.8
Health AA beaureu	56	33.3
Both	61	36.3
Don’t know	6	3.6
Availability of folic acid containing drugs/vitamins		
Yes	310	78.3
No	64	16,2
Don’t know	22	5.6
Type of FA containing drugs available in your institution		
Folic acid only	31	10
Iron with folic acid	206	66.5
Both	73	23.5
Delivery of preconception care in a health center		
Yes	220	55.7
No	175	44.3

5.3 Health Professional's Response to Knowledge of FA

Even though 384(9.2) of participants knew as folic acid prevents NTDs, only 67.3% and77.4% of participants knew the right dose of FA for women with prior birth of NTD and without prior birth history of NTDs respectively. Over all more than half participants had insufficient knowledge as compared from the mean level of knowledge (81.33%).

Table3. Health professional's response to knowledge measuring questions in selected public health centers in Addis Ababa, 2023.

Variables	Frequency	Percentage (%)
Folic acid can be obtained from food staffs		
Yes	372	93.9
No	24	6.1
Folic acid prevents NTDs		
Yes	384	97.2
No	11	2.8
FA deficiency causes NTD		
Yes	372	93.9
No	24	6.1
NTD is congenital abnormality		
Yes	381	96.2
No	15	3.9
Pregnant &non pregnant are targets to FAS		
Yes	377	95.7
No	18	4.6
Prescribing FA during protective time prevents NTD		
Yes	378	95.7
No	17	4.3
Dose of FA to non-risk women is 0.4 mg		
Yes	305	77.4
No	89	22.6
Dose of FA to women with prior birth of NTD is 4mg		
Yes	264	67.3
No	128	32.7
Over all knowledge about folic acid supplement		
Sufficient	187	47.8
insufficient	204	52.2

5.4 Folic acid prescribing practice characteristics

Over all 255(64.4%) participants prescribed FA during periconception period and 73(28.6%) of participants prescribed FA during at least one month before conception. But only 68(26.7%) participants prescribed at least one month before conception and three month duration after conception.

Table 4. Folic acid supplement prescribing practice during periconception period among health professionals in selected health center in Addis Ababa, 2023.

Variable	Frequency	Percentage (%)
Have been Prescribing FA to women in periconception period in last one year		
Yes	255	64.4
No	141	35.6
For what type of women you prescribed Folic Acid supplement		
Reproductive age without risk	31	12.1
For women having risk of NTD	35	13.7
For both	189	73.8
When you started prescribing Folic Acid Supplement to women		
At least 1 month before conception	73	28.7
1 month to conception	10	3.9
Within 1 month after conception	13	5.1
1 to 3 month after conception	134	52.5
After 3 month	25	9.8
Type of folic acid drugs you prescribed		
Folic acid only	38	14.8
Iron with folic acid	137	53.3
Both	82	31.9
Duration of time you prescribed		
≤3 month	187	73.3%
≥4month	68	26.7%
Dose of FA you prescribed for non-risky women		
0.4 mg(recommended dose)	191	74.6
Not recommended dose	65	25.4
Dose of FA you prescribed to women with previous NTD and risky behaviors		
4mg (recommended dose)	169	67.3
Not recommended dose	82	32.7
Ever counseled women about FA supplement benefits		
Yes	345	88.2
No	46	11.8
Benefits of FA you counseled a woman		
Prevent NTD	75	21.7
Prevent anemia	16	4.6
Both	256	74.2

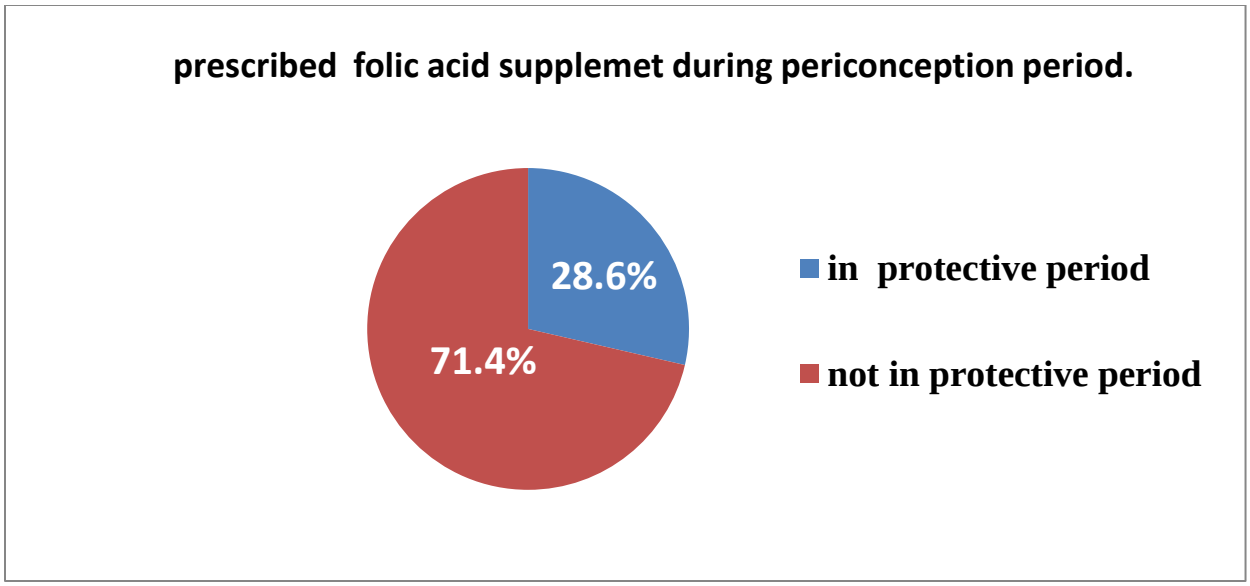

Figure 3.proportion of folic acid prescribing practice during protective period among health professionals in selected health centers in Addis Ababa, 2023.

5.5. Factors associated to folic acid prescribing practice

To determine the relationship between the independent and outcome variables, binary logistic regression was employed. The relationship between each independent variable was tested by using the variable inflation factor (VIF) and which is not severe. Using the Hosmer-Lemeshow goodness fit test, the model's fitness was also examined and it met. The association between each independent variable and the dependent variable was examined using bivariate logistic regression. In order to account for confounding variables, variables from bivariate logistic regression with a P value of less than 0.25 were entered into the multivariate logistic regression model. Variables with a P value of less than 0.05 were deemed statistically significant. Independent variables like; age, sex, profession, level of education, salary, work experience, working unit, patient flow, worked in ANC and LD ward, ever got training on folic acid supplement(FAS), availability of folic acid drugs and knowledge related to folic acid supplement were not associated with folic acid prescribing practice during protective period in bivariate analysis. Although as shown below (Table 5), Variables such as, never had attended birth of neonate with NTD, presence of reference guideline to prescribe FAS in institution, delivery of preconception care, dose of FA prescribed for a woman, and a type of woman whom FA was prescribed were associated with bivariate logistic regression.

In analysis of multivariable logistic regression, factors which had significant value associated with folic acid prescribing practice during protective period were; Never had attended birth of neonate with NTD, prescribed other than 4mg dose of FA for risky women, FA supplemented for only women with prior birth of NTD and FA supplemented for both women with prior birth of NTD and women without prior birth of NTD.

As the findings below on the table show, health professionals never had attended the birth of neonate with NTDs approximately [AOR=2.32; 95%CI (1.244-4.28)] times more likely to prescribe FA during protective period than those professionals had attended birth of neonate with NTDS. Similarly, the odds of prescribed FA other than dose of 4mg for risky women had approximately[AOR=2.38;95%CI(1.276-4.44)] times more prescribed at least one month before conception than those who prescribed dose 4mg FA to risky women.

Health professionals prescribed folic acid supplement for both risky and non-risky women during protective period approximately [AOR=5.333; 95%CI (2.204-12.906)] times more likely than those who prescribed FA supplement only for non- risky women. On the other hand health professionals prescribed for only risky women around [AOR=3.197; 95% CI (1.054-9.696)] times more likely during protective period compared to those who prescribe for only non- risky women.

Table 5.The factors associated with Folic acid prescribing practice during protective period among health professionals in the selected public health centers of Addis Ababa, Ethiopia, 2023.

Variables		Folic acid prescribing during PP		COR (95% CI)	Sign.	AOR(95%CI)
		Yes	No			
Ever attended birth of neonate with NTD	Yes	49	90	1	1	1
	No	24	92	2.087(1.182-3.684)	0.005	2.32[1.244-4.28]**
Presence of guideline to prescribe FA	Yes	42	128	1	1	
	No	31	54	0.572(0.326-1.000)	0.124	
Delivery of preconception care	Yes	52	103	1	1	
	No	21	78	1.875(1.044-3.369)	0.103	
Dose of folic acid prescribed for risky women	4mg	33	48	1	1	1
	Not 4mg	38	130	2.352(1.328-4.167)	0,009	2.38[1.276-4.44]**
Type of women FA was prescribed.	Non-Risky	18	13	1	1	1
	Risky	11	23	2.895(1.052-7.969)	0,041	3.197[1.054-9.696]**
	For both	43	145	4.669(2.118-10.292	0.001	5.333[2.204-12.906]**

Key: COR=crude odd ratio 1 = reference, AOR =Adjusted odds ratio, CI = confidence interval.

**= p-value <0.05, PP=protective period

6. DISCUSSION

This study's objective was to evaluate folic acid prescribing practice throughout the protective period and identify the contributing factors in public health facilities in Addis Ababa City, Ethiopia, in 2023. From a total of 64.4% of health professionals who prescribed during periconception period, about 26.7% [95% CI (21.28-32.12] of them prescribed folic acid during protective period of periconception. This result is in line with institutional based study conducted in selected hospitals of Addis Ababa (23.5%)(24) .This consistency might be due to similar study setting even if the institution is different. But this result is higher than the study conducted in Bahiar Dar in 2017 (9.7%)(10). This might due to time gap of the study period. However this finding is lower than the study of Iran was 54.5%(30), in China 77.2% obstetrician and specialists routinely prescribed folic acid tablets(18) and the finding of comparative study in USA (50-65%)(17). Might be due to presence of socio- economy, infrastructure and technological difference between Ethiopia and these countries.

Over all 47.8% of health professionals had sufficient knowledge level about folic acid supplement which is almost similar with level of knowledge studied from Bahiar Dar (47.7%). Might due to similar health education curriculum in universities.

Participants who have been worked in ANC clinic and in labor/delivery were 75.5% & 79% respectively. This in line with a study from Bahiar Dar (64.3% and 63.8%) respectively(10) and only (35.3%) got in service training on FAS but higher than result of Bahirdar(11.5%). Participants had 54.7% of work experience less than five years, which was greater than from Bahir dar (43.4%) and in line with a study from Addis Ababa (67.5%). Might due to different study period results finding variation.

The delivery of preconception care (55.7%) were the crudely associated factors with prescribing practice of FA during protective period. Respondents who ever attended birth of neonate with NTD were (48.2%), which is higher than finding from Bahiar Dar and Addis Ababa (32.7%&45.5%) respectively. Might be due to different study setting and period. Health professionals had not ever attended the birth of neonate with NTDs approximately 2.3[AOR=2.32; 95%CI (1.244-4.28] times more likely to prescribe folic acid during protective period than those professionals had attended birth of neonate with NTDS. Might be due to most

HCPs were midwives who had more theoretical knowledge about NTDs and cause of NTDs. But no previous study shown the significant association of variables to compare with it.

HCPs prescribed folic acid other than dose of 4mg for women with prior birth of NTD had approximately 2.4[AOR=2.38;95%CI[1.276-4.44]*] times more likely to prescribe at least one month before conception than those women without prior birth of NTD. This might related to the respondents insufficient knowledge about the correct dose recommended for women with prior birth of NTD. Also health professionals were prescribed folic acid supplement for both women with birth of prior NTD and women without birth history of NTD during protective period approximately 5[AOR=5.333; 95%CI (2.204-12.906] times more likely than those only for women without prior birth of NTD.

On the other hand health professionals prescribed for only women with prior birth of NTD around 3.2[AOR=3.197; 95% CI [1.054-9.696] times more likely during protective period compared to those only women without prior birth of NTD. This might relate to thus even if respondents had knowledge as folic acid supplement is prescribed for any reproductive age women, they provided special attention to women with prior NTD and appointed them to come for folic acid supplement during protective period.

7. STRENGTHS AND LIMITATIONS OF THE STUDY

7.1 Strength of the study process

- ✓ It is the former facility based cross-sectional survey which assesses the prescribing practice in Addis Ababa.
- ✓ The study was incorporating the study participants from all the sub cities using the proportion of number of health centers under the sub cities to make representative study

7.2. Limitations of the study

- ✓ This study did not explore the reason behind not prescribing folic acid during protective period
- ✓ The other limitation of the study was related to the nature of the findings, which were based on self-reported prescribing practices, which might not reflect actual practice of health care professionals.
- ✓ The finding of this study enables to generalize the association of variables, but not show causation.
- ✓ The scarcity of similar studies in the literature also limited the researchers to compare and contrast the findings against previous studies.

6. CONCLUSIONS

In this study the prevalence of folic acid practice during protective period among health care professionals in selected health centers of Addis Ababa was 26.7%. This result was very low as compared to other foreign studies. However, it is higher as compared to previous studies in Ethiopia. Factors that were associated significantly with folic acid prescribing practice during protective period were; ever not attended the birth of neonate with NTD, prescribed FA other than 4 mg dose for women with prior birth of NTD, prescribed FA supplement for women with prior birth of NTD and prescribed FAS for both women with previous birth of NTDs and women without prior birth of NTDs.

7. RECOMMENDATION

9.1. For the health beaureu and Health Facilities

- Health center managers should be giving attention to deliver the recommended dose of folic acid supplement for any reproductive women during protective time.
- The health center managers also should give direction and supervise whether the recommended dose of folic acid supplemented or not.
- Health care professionals also should be updating themselves to prescribe the right dose of folic acid for the right women at the protective period.

9.2 For Researchers

- We recommended conducting a qualitative study design to explore the perceptions about folic acid supplement and the barriers to prescribe the FA supplement.
- There is limited research on the topic of folic acid supplement prescribing practice.

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ANNEXIS

Annex I: Information Sheet and Consent Form

Greetings,

Greetings, I'm **Yaschalew Mengist**. I'm currently a postgraduate student at the School of Nursing and Midwifery Department of Addis Ababa University's College of Health Sciences. In addition, I'm currently working on a study to evaluate how midwives, nurses, and health officials in government health facilities in Addis Ababa, Ethiopia, provide folic acid supplements to women during periconception period.

Title of the research: Folic acid supplements prescribing practice during protective period and its associated factors among health professionals in selected governmental health centers in Addis Ababa, Ethiopia, 2023.

Objectives: To assess folic acid supplements prescribing practice during periconception period and its associated factors among health professionals in selected governmental healthcare centers in Addis Ababa city, Ethiopia

Participants: Randomly selected midwives, nurses, health officers and general practitioner in study health centers working in maternity and child health department and outpatient departments.

Potential Risks: Taking part in this study has no anticipated risk.

Benefits: This study has no financial advantages. However, by participating in this study, you will help to lower infant and mother morbidity, mortality, and complications. I have a few queries for you. Your truthful response to the questions can help the study reach its goal. We will keep all of the information you provide private and confidential. The information will only be accessible to the main investigator and data gatherers. Please you can also decide not to take part at all, and you are free to exit the study at any point if you start to feel uncomfortable while answering. You are able to contact me at the following addresses if you have questions.

Yaschalew Mengist, phone number- 0900049655, yaschumenngist27@gmail,com

Annex II English Version Consent Form

1. Informed consent

Addis Ababa University College of Health Sciences School of Allied Health Sciences

Department of Nursing and Midwifery

I hereby declare that the following facts are true: The goals of this study have been clearly stated to me; The information on the consent form has been verified; I understand that participation in this study is entirely voluntary and that I may revoke my consent at any time without giving any explanation. I'm willing to take part in the study, provided that my privacy is protected. I agree to answer all reasonable questions honestly and not provide any false information or intentionally mislead the researcher in any other manner by signing.

Respondent's signature_____

If not, move on to the next person.

Date: _____

Data collector's Name_____Signature_____Date_____

Supervisor's name _____ signature _____

Annex III English-language questionnaire

English Questionnaire Code ---------- date ----------

Vocabulary:-

Protective period: Three months after conception and at least one month before to conception.

Acronyms:-

ANC- antenatal care

FA- folic acid

NTD-neural tube defect

STI &RH OPD-sexual transmitted infection and reproductive health outpatient department.

Instructions:-

1. Please do not write your name on the questionnaire.
2. Select the best suitable response and circle it.
3. If there is no response, kindly fill out the space provided.

Part I. Socio demographic related questions

S.no	Questions	Response	Remark
1.1	How old are you?	……..years old	
1.2	Sex	1. Male 2. Female	
1.3	What is your profession?	1. Midwives 2. Nurse 3. Public Health Officers 4. General Practionaire 5. Other Specify……	
1.4	What is your education level?	1. Diploma	

		2. Degree 3. Master 4. Others Specify….	
1.5	Your current monthly salary in birr?	……..……..birr	

Part II. Service and facility related questions.

S.no	Questions	Response	Remark
2.1	What is your working unit?	1. Antenatal care 2. Family planning 3. Pediatrics/immunization 4. Labour and delivery ward 5. Postnatal care 6. Abortion care 7. STI&RH OPD 8. Others specify……..	
2.2	How many patient you see per a day?	……per days	
2.3	Your work experience in years?	…….years	
2.4	Have you ever worked in antennal care?	1. Yes 2. No	
2.5	Have you ever worked labour and delivery ward?	1. Yes 2. No	
2.6	Have you ever got in-service training on vitamin (folic acid) supplement?	1. Yes 2. No	
2.7	Have you ever attended birth of a neonate with neural tube defects?	1. Yes 2. No	
2.8	Is there a guideline as a reference to prescribe folic acid in your health institution?	1. Yes 2. No	
2.9	**If Q 2.8 is'' Yes''**, have you ever used Folic Acid guideline to prescribe for a woman in last one year?	1. Yes 2. No	skipQ

2.10	Ever clear direction (supportive supervision) have provided about folic acid supplement provision in last one year?	1. Yes 2. No	
2.11	**If, Q 2.10 is ''yes''** from whom you got direction/supervision?	1. Health service managers 2. Health beauro 3. Both 4. I don't know	Skip Q
2.12	Is/are folic acid drugs/vitamins available in your health institution?	1. Yes 2. No 3. I don't know	
2.13	**If Q-2.12 answer is 'Yes',** which type of folic acid/ folic acid containing drugs available in your health institution?	1. Only Folic acid tablet 2. Iron with folic acid (fefol) 3. Both 4. Specify others……..	Skip Q
2.14	Is there delivery of preconception care in your health institution?	1. Yes 2. No	

Part III knowledge related questions

S.no	Questions	Response	Remark
3.1	Folic acid can be found from food staffs	1. Yes 2. No	
3.2	Folic acid is used to prevent NTDs	1. Yes 2. No	
3.3	Folic acid deficiency causes NTDs	1. Yes 2. No	
3.4	NTDs are congenital abnormality	1. Yes 2. No	
3.5	Pregnant and non-pregnant women are targets to folic acid supplement to decrease risk of NTDs	1. Yes 2. No	

3.6	To prevent NTDs, folic acid supplement should be taken during protective periconception period	1. Yes 2. No	
3.7	Correct dose of folic acid for a women had no previous pregnancy with NTD is 0.4mg	1. Yes 2. No	
3.8	Correct dose of folic acid for a women with a prior NTD affected pregnancy is 4mg	1. Yes 2. No	

Part IV. Folic acid prescribing practice measuring questions.

	Questions(Q)	Response	Remark
4.1	Have you been prescribing folic acid to a woman during periconception period with in last one year?	1. Yes 2. No	
4.2	**If your response for question number 4.1 is 'Yes' please answer the next 6(six) questions-(4.2.1-4.2.6)**		Skip Q
4.2.1	For what type of women you prescribe folic acid supplement?	1. For reproductive age women with no birth history of NTD 2. For women having birth history with NTDs and high risk conditions 3. For both 4. Specify others……..	
4.2.2	When you have started prescribing folic acid to women with in the last one year?	1. At least 1 month before conception 2. 3 month before conception 3. 1 month to conception 4. Within 1 month after conception 5. Within 1 to 3 months after conception.	

		6. After 3 months 7. Other specify	
4.2.3	What type of folic acid containing drugs you prescribed to women in last one year?	1. Folic acid only 2. Iron with folic acid 3. Both 4. Other specify……..	
4.2.4	For how many duration of time you prescribed folic acid supplement from the starting?	……..months	
4.2.5	What is the dose of folic acid you ever have prescribed for women **with no birth history** of neural tube defect?	1. 0.4mg/day 2. 0.5mg/day 3. 4mg/day 4. 5mg/day 5. Other specify……..	
4.2.6	What is the dose of folic acid you ever have prescribed for women **with birth history** of neural tube defect?	1. 0.4mg/day 2. 0.5 mg/day 3. 4mg/day 4. 5mg/day 5. Other specify…….	
4.3	**If Question 4.1 answer is ‘’No’** ’what is your reason of not prescribing folic acid to women in protective period?	1. Absence of folic acid supply 2. I don’t know the prescribing period of FA 3. I don’t know the dose of FA 4. Late women ANC visiting 5. Absence of preconception care. 6. I don’t know for what type of women FA is prescribed 7. Other specify…….	Skip Q
4.4	Have you ever counseled a woman on benefit of folic acid supplement with in last one year?	1. Yes 2. No	

4.5	If **"yes" for Question4.4 above,** what is the use of folic acid supplement?	1. Prevent NTD 2. Prevent anemia 3. Both 4. I don't know	Skip Q

THANK YOU SO MUCH!!!

Addis Ababa city administration (11- sub cities) healthcare centers sampling procedure

SUB CITIES	PROPORTIONALY SELECTED HC	Number Of HC Professionals In MCH&A,OPD	Respondents (n)
1.Addis ketema (7 HC)	1.Abyssinia HC	25	16
	2.abebe bikkela HC	20	13
2. Kolfe keranio(7 HC)	3.woreda 10 HC	25	16
	4.Kolfe HC	18	11
2.Akaki kality (9HC)	5.saris HC	20	13
	6. kality HC	19	12
	7. akaki HC	24	15
3. Arada (12 HC)	8.cherchil HC	15	9
	9.semen HC	21	13
	10. bata HC	17	11
	11. Arada hc	20	13
4. Gulelie(10 HC)	12.shero meda HC	21	13
	13.addis hiwot HC	19	12
	14.selam HC	18	11
	15.Shegolie HC	19	12
5.Kerkos(8)	16.Gotera HC	20	13
	17.hiwot amba	18	11
	18.kerkos HC	16	10
6.Lemi kura(9HC)	19.semet HC	18	11
	20.meri HC	16	10
	21.yeka HC	21	13
7. Nifas silk lafto(8HC)	22.woreda 2HC	20	13
	23.Woreda11	18	11
	24. kadisco	22	14
8.Yeka sub city(10HC)	25.koria zemach	17	11
	26.yeka	19	12
	27.woreda 12	18	11
	28.Kotebie HC	22	14
9.Lideta subcity(8HC)	29.teklehaimanot	18	11
	30.hidassie HC	14	8
	31.lideta HC	18	11
10.Bole subcity(	32. Bole 17	15	9
	33.bulbula HC	20	13
	SUB TOTAL	**632**	**N=396**