

# Drug usage pattern and potential teratogenesis risk among pregnant women attending maternal and child health clinic of Mettu Karl Referral Hospital, South Western, Ethiopia: a cross sectional study, 2021

## Abstract

**Introduction:** Physiological alterations during pregnancy as well as the bio- conversion of compounds can significantly influence the teratogenic effects of drugs and chemicals by affecting absorption, body distribution, the active form(s), and excretion of the compound. Certain medications may cause harm to the foetus due to their potential teratogenic effects and the physiological adjustments occurring in the mother during pregnancy. Prescription of drug used by pregnant women should be viewed as one of a public health issue. This study aware health care workers on harmful drugs prescription to pregnant women and helps in understanding the type of medication used during pregnancy and safety of drugs used during pregnancy, thereupon this study was ascertain drug usage pattern and potential teratogenicity risk among pregnant women attending maternal and child health clinic of Mettu Karl Referral Hospital.

**Methods:** A hospital-based cross-sectional study design was carried out from April 13/2021 to June 15/2021. Data was collected through employing semi-structured questioner, and then the collected data was cleared, coded and analyzed by statistical packages for social sciences 25.0 version statistical software. Descriptive statistics were used to describe the data. P value <0.05 was considered as a cut point for statistical significance in the final model.

**Results:** A total of 156 participants were interviewed of whom, 81(51.9%) pregnant women were age between 20-35 years old and a majority 113(72.4%) of them were married. Among medical condition majority 40(25.6%) of the participants had peptic ulcer disease and 26(16.7%) urinary tract infections followed by 20(12.8%) acute illness and 12(7.7%) hyperemesis. Among the total drug prescribed for pregnant women 30(19.2%) FDA category C was the common followed by 29 (18.6%) FDA category B and 26(16.7%) FDA category D. Only 10(6.4%) of prescribed drug were FDA category X. Pregnant women whose age >35 years (AOR=4.05, 95%CI:1.274-1.903; p=0.001), urban residents (AOR=2.72, 95%CI:2.524-3.927; p=0.035), and pregnant women during second trimester (AOR=1.79, 95%CI:3.926-9.406; p=0.013) were significantly associated with MCH follow up.

**Conclusion and recommendation:** From the drug prescribed, majority of pregnant women were taken antibiotics followed by 18(11.5%) NSAID, iron sulfate, and proton pump inhibitors. Among the dosage form, above half of the participants were taken the tablet dosage form followed by capsule and gels dosage form. Health care workers should have to brought good care for pregnant women, since they perhaps vulnerable to drug teratogenesis.

**Keywords:** pregnancy, teratogenicity, ante natal clinic, mettukarl referral hospital, Ethiopia

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**Gudisa Bereda, Gemechis Bereda**

Department of pharmacy, Negelle health science college, Ethiopia

**Correspondence:** Gudisa Bereda, Department of pharmacy, Negelle health science college, Guji, Ethiopia, Tel +251919622717, Email gudisabareda95@gmail.com

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**Abbreviations:** ANC, antenatal care; AOR, adjusted odd ratio; CA, congenital abnormalities; DNA, deoxyribo nucleic acid; ETB, Ethiopia birr; FDA, food and drug administration; HIV/AIDS, human immune virus/acquired immunodeficiency syndrome; MCH, maternal child care; MKRH, mettukarl referral hospital; NSAIDs, non steroidal anti inflammatory drugs; POM, prescription only medicine; USA, United State of America; USFDA, United States food and drug administration; WHO, World health organization

## Introduction

Pregnancy care imposes a great challenge to both the health care providers and pregnant women because drug utilization during pregnancy may adversely affect the lives of the mothers and the growing fetus.<sup>1</sup> Medication use during pregnancy has always created a challenge in antenatal care due to the potential foetal risk associated with the use. Drug utilization studies reveal that most women use medications during pregnancy with estimations varying from 44%

to 99%.<sup>2</sup> The concern for drug utilization for pregnant women has been given after the teratogenic incidence of thalidomide and diethylstilbestrol in the 1960s and 1971 respectively.<sup>3</sup> Among the most notorious examples is Thalidomide use for anxiety, insomnia and as an anti-emetic, and the use of which resulted in phocomelia and other congenital anomalies in thousands of children exposed in utero. According to the USFDA risk classification of medicines during pregnancy, medicines under category A show no risks in controlled studies and those medicines in category B have no evidence of human risk in controlled studies. Medicines in category C may have potential risks to the fetus. The risks cannot be ruled out but the medicines under category C should be used only if the potential benefits justify the potential risks to the fetus. Medicines in category D have positive evidence of human fetal risk, and those in category X are totally contraindicated in pregnancy because they have proven fetal risks.<sup>4</sup> The teratogenic outcome of a drug depend on the dose taken, the timing of exposure, maternal disease and abnormality, and drug characteristics (metabolic activity half life and lipid solubility.<sup>5</sup> Human teratogenic drugs cannot induce CA in the first month of gestation because the specific activation of DNA in the stem cells and the so called differentiation of specific cells, organs and body forms starts on the 29th day of gestation (or on the 15th post-conception day). Only the second and third months represent the critical period of most major CAs.<sup>6</sup> Frequent maternal use of paracetamol during pregnancy may be associated with wheezing and asthma in early childhood and an increase in fetal death or spontaneous abortion may be seen following maternal overdose of paracetamol if treatment is delayed.<sup>7</sup> A substantial number of medical drugs are suspected to induce birth defects through various mechanisms, including folate antagonism, vascular disruption and oxidant stress.<sup>8</sup> The presence of the undesired effects of drugs is a result of the wide range of changes in physiological, pharmacokinetics, and physiological functions of pregnant women.<sup>9</sup> On the other hand, presence of chronic illnesses such as hypertension, diabetes or other medical conditions lead to exposure to potentially harmful medication due a failure to balance the risk of not treating pregnant women with chronic conditions against exposing the foetus to unknown harm.<sup>10</sup> The use of OTC medications was reported to be higher among urban women in the first trimester and those from the high-income group. Drugs such as iron and vitamins supplementation are the most frequently used drugs followed by analgesics, tocolytic agents and drugs for chronic conditions and common pregnancy symptoms.<sup>11</sup> Pharmacological treatment should be avoided in pregnancy, unless absolutely necessary, because most drugs are potentially harmful to the fetus. However, treatment becomes inevitable when a woman with a chronic medical condition becomes pregnant.<sup>12</sup>

Drinking alcohol during pregnancy can cause miscarriage, premature birth, stillbirth, low birth weight, and a range of lifelong disorders, known as fetal alcohol spectrum disorders. The most known, fetal alcohol syndrome is one of the leading known preventable causes of mental retardation and birth defects.<sup>13</sup> Maternal and child health is one of the major priority agendas of the government of Ethiopia. Even though there is a remarkable achievement observed in the reduction of under-five mortality rates. The reduction in mortality and morbidity in neonatal age groups however is not impressive. Prematurity is the most common cause of neonatal mortality.<sup>14</sup> A study conducted among pregnant women in Ethiopia showed that over 55% of women had used at least one prescription and over 52% had used OTC medications during pregnancy. The use of OTC medications was reported to be higher among urban women in the

first trimester and those from the high-income group.<sup>15</sup> Another study found that a significant proportion of pregnant women were also on antibiotics and analgesics, with a significant number of medications prescribed from category D and X.<sup>16</sup> Medications use by pregnant women should be viewed as a public health issue due to numerous gaps in knowledge about deleterious consequences of medications on the fetus. Inappropriate use of medications by pregnant women has been widely reported in different countries.<sup>17</sup> Despite the lack of adequate studies on safety of prescription drugs for pregnant women, available evidence has shown that healthcare professionals prescribe and pregnant women take a surprisingly large number of drugs. Furthermore, 86% of the women had taken at least one prescription medication during their pregnancies. Despite several physiologic -al, Pharmacokinetic and Pharmacodynamic changes occurring during pregnancy, pregnant women are still considered therapeutic orphans, since the majority of available drugs were not adequately studied in pregnancy.<sup>18</sup> A study conducted in Addis Ababa Ethiopia concluded that a considerable proportion of pregnant women were exposed to drugs, including those with potential harm to the fetus. Furthermore, pregnant women take POM or OTC or traditional herbs. Healthcare providers should thus weigh the therapeutic benefits of the drug to the mother against its potential risk to the developing fetus before prescribing. In addition, it is essential to routinely inquire about the woman's take medication practice and provide the appropriate advice to the pregnant women.<sup>19</sup> Maternal and child health is one of the major priority agendas of the government of Ethiopia. even though there is a remarkable achievement observed in the reduction of under-five mortality rates. The reduction in mortality and morbidity in neonatal age groups however is not impressive. Prematurity is the most common cause of neonatal mortality.<sup>20</sup> This study aware health care workers on harmful drugs prescription to pregnant women and helps in understanding the type of medication used during pregnancy and safety of drugs used during pregnancy.

## Methodology

### Study setting

The study was conducted in MKRH, found in Mettu town, mettu which is located 600 km away from Addis Ababa to the south west, Ethiopia. Mettu, located in the Illubabor Zone of the Oromia Region along the Sor River, this town has a latitude and longitude of 8°18'N 35°35'E and an altitude of 1605m. The hospital can give service for around 1.4 million clients. There are different wards and clinics within MKRH; those include internal medicine ward, surgery ward, pediatric ward, anti- retroviral therapy clinic and gynecology, obstetrics ward, Ante natal clinic, dental clinics, tuberculosis clinic, and ophthalmologic clinic. Regarding the delivery information, the average annual number of delivering mothers is estimated to be 3602.

### Study participants, design, and sampling

A hospital-based cross-sectional study was conducted from April 13/2021 to June 15/2021, on three month follow up of pregnant women attending maternal and child health clinic of the hospital. All pregnant women who attended MCH clinic of MKRH during the data collection period & that fulfilled the inclusion criteria were the target population. All pregnant women, who visited MCH clinic greater than or equal two times in their gestational period. The prescribed drugs are clearly corresponds with the trimester were included in the study. Clients with less than 2 times visit in 270 days of pregnancy, self-medication drugs by pregnant women, i.e. drugs taken without

documented order sheet on patient card, Pregnant women whose medical charts were incomplete were excluded. The sample size was determined by using the single population proportion formula: The sample size was determined based on "P" value which was taken from,

northern Ethiopia,  $P=0.877$ , or  $87.7\%$ .  $n = \frac{(Za/2)^2 P(1-P)}{d^2}$ ,  $n$ =sample size,

$P$ =prevalence of potential teratogenicity risk,  $d$ =margin of sampling error tolerate  $d$ ,  $z$ =the standard normal value at confidence interval of  $95\%$ .  $n = (1.96)^2 (1-0.877) \times (0.877) / (0.05)^2 = 166$ . Since the total number of pregnant women visited MCH clinic was less than 10,000, reduction formula (correction formula) was applied as follow;  $n_f = n / (1 + (n / N))$ ,  $n_f = 166 / (1 + (166 / 987)) = 142$ . When 10% contingency is added to minimize non response rate, then final sample size was found to be 156. A systematic random sampling technique was applied to select the pregnant women's follow up MCH by determining the sampling interval. Then, the first pregnant women was selected by the lottery method from the pregnant women's follow up MCH.

## Study variables

### Data collection procedure

The structured questionnaire incorporating basic socio-demographic characteristics of pregnant women such as (age, gravidity and resident, pregnancy status), pregnant women characteristics such as (trimester, time of first ANC visit, total numbers of ANC visit, parity, gestational age), clinical and drug related characteristics of the pregnant women such as (disease condition or medical conditions diagnosed during pregnancy, drug name, dosage form, route of administration, the trimester during drug administration) were taken from clients, and medical records. From the data collected, the drugs were further classified into category A, B, C, D and X based on Food and Drug Administration of the United State of America categorization. According to US FDA, category-A includes drugs that have shown no risk to the foetus after adequate, well controlled studies in pregnant women. For drugs in the category B, animal studies have revealed no evidence of harm to the foetus or any adverse effect, but adequate and well controlled studies in pregnant women have failed to demonstrate a risk to the foetus. The category C includes the drugs, which have shown an adverse effect in animal studies or no animal studies have been conducted and there are no adequate and well controlled studies in pregnant women. For drugs in the category D, there is positive evidence of human foetal risk, but the benefits from use in pregnant women may be acceptable despite the risk (e.g., in a life-threatening situation). However, drugs with classification X are "contraindicated in pregnancy. Those drugs that are yet to be classified into any FDA categories in pregnancy were categorized as N. Before data entry, the collected data carefully examined for completeness by the principal investigator.

### Data processing and analysis

Data was encoded and analyzed by using statistical packages for social sciences 25.0 version statistical software. Descriptive statistics were used to explain the study participants in relation to study variables. Bivariable and multivariable logistic regression analyses were used to identify associated factors. Those variables with  $p$ -value less than 0.25 in bivariable analysis were entered into multivariable analysis. Adjusted odds ratios along with the 95% confidence intervals were used to show the strength of associations and  $P$  value of less than 0.05 was considered as statistically significant.

## Operational definitions

**ANC follow up:** ANC visit of greater than one time in full pregnancy period.

**Teratogens:** Drugs administered during pregnancy, which can cause an intended effect on the fetus either before or after the delivery.

**Parity:** A condition of having carried a pregnancy to a point viability (a term used to indicate the number of pregnancies as woman has had resulted in birth).

**Gravidity:** Refers to total numbers of pregnancies.

**Pregnancy risk drug:** Category D or Category X drug according to Food and Drug Administration (FDA) pregnancy risk classification.

**FDA category C/D:** Categorized as D above 30weeks of pregnancy and category C otherwise.

**Non FDA category medications:** Drugs that are either in fixed dose of different category or single drugs that are not in clear category.

## Results

### Socio-demographic and socio-economic characteristics of the respondents

A total of 156 participants were interviewed; of whom, 81(51.9%) pregnant women were age between 20-35 years and a majority 113(72.4%) of them were married. A majority 92(59.0%) of patients were lived in rural area and 77(49.4%) were earn monthly income <1000 ETB. Above half 93(59.6%) of participants were uneducated (Table 1).

**Table 1** Socio-demographic and socio-economic characteristics of pregnant women attending MCH, MKRH, Southwestern, Ethiopia (n=156)

Variables	Category	Frequency	Percent
Age	<20 years	44	28.2
	20-35 years	81	51.9
	>35 years	31	19.9
Residency	Urban	92	59
	Rural	64	41
Monthly income	<1000 ETB	77	49.4
	1000-1500 ETB	59	37.8
	>1500 ETB	20	12.8
Marital status	Married	113	72.4
	Unmarried	43	27.6
Educational status	Educated	63	40.4
	Uneducated	93	59.6

### Pregnancy status of respondents

A majority 107(68.6%) of participants were multi gravidae and 66(42.3%) were have 1-3 children. Majority 57(36.5%) of respondents were second trimester, 7(44.9%) respondents were attend first ANC visit in second trimester, 59(37.8%) participants were have >5 times total numbers of ANC visit, 7(36.5%) were take medication during the second trimester. A majority 42(26.9%) of participants whose taken birth control pills followed by 39(25.0%) depoprovera/implant (Table 2).

**Table 2** Pregnancy status of pregnant women attending MCH, MKRH, Southwestern, Ethiopia (n=156)

Variables	Category	Frequency	Percent
Gravidae	Prime gravidae	49	31.4
	Multi gravidae	107	68.6
Trimester	Unknown	20	12.8
	First trimester	43	27.6
	Second trimester	57	36.5
	Third trimester	36	23.1
Time of first ANC visit	In first trimester	25	16
	In second trimester	70	44.9
	In third trimester	61	39.1
Total numbers of ANC visit	Two times	41	26.3
	3-5 times	56	35.9
	>5 times	59	37.8
The trimester during drug administration	First trimester	53	34
	Second trimester	57	36.5
	Third trimester	46	29.5
Parity	Nulli-para	58	37.2
	1-3 children	66	42.3
	>3 children	32	20.5
Family planning	Condoms	38	24.4
	Birth control pills	42	26.9
	Depo provera/Implant	39	25
	Others	37	23.7

### Medical conditions among pregnant women

Among medical condition majority 40(25.6%) of the participants had peptic ulcer disease and 26(16.7%) urinary tract infections

followed by 20(12.8%) acute febrile illness and 12(7.7%) had hyper-emesis. Less 6(3.8%) of the participants were have seizure followed by 4(2.6%) diarrhea and 3(1.9%) HIV/AIDS (Table 3).

**Table 3** Medical conditions among pregnant women attending MCH, MKRH, South western, Ethiopia (n=156)

Variables	Category	Frequency	Percent
Medical condition	PUD	40	25.6
	UTI	26	16.7
	Hyper-emesis	12	7.7
	Diarrhea	4	2.6
	CAP	11	7.1
	Asthma	9	5.8
	Acute illness	20	12.8
	Epilepsy	6	3.8
	HIV/AIDS	3	1.9
	Abdominal discomfort	9	5.8
	Others	16	10.3

## Commonly prescribed medication in pregnant women

From the drug prescribed, majority 21(13.5%) were take antibiotics followed by 18 (11.5%) NSAID, iron sulfate, and proton pump inhibitors. Only 9(58%) of the respondents have taken metronidazole followed by combined cough syrup 6(3.8%) and metochlopramide 3(1.9%) (Table 4).

**Table 4** Commonly prescribed medication among pregnant women attending MCH, MKRH, South western, Ethiopia (n=156)

Variables	Category	Frequency	Percent
Drug condition	NSAID	18	11.5
	Antibiotics	21	13.5
	Vitamins	12	7.7
	Folic acid	13	8.7
	Iron sulfate	18	11.5
	Paracetamol	17	10.9
	Metronidazole	9	6.0
	Antacids	18	11.5
	Metochlopramide	3	1.9
	Proton pump inhibitors	18	11.5
	Combined cough syrup	6	3.9
	Others	2	1.4

## Dosage form and route of administration in pregnant women

Among the dosage form, above half 80(51.3%) of the participants were take the tablet dosage form followed by 21(13.5%) capsule and 20(12.8%) gels dosage form .Least 3(1.9%) of respondents were have take vaginal cream followed by 2(1.3%) of the participants have taken solution. Among route of administration, 67 (42.9%) of the participants were most commonly used PO followed by 33(21.2%) of the participants have taken IM and 18(11.5%) IV route of administration. Only 5(3.2%) of the participants have taken rectal route of administration (Table 5).

**Table 5** Dosage form and route of administration among pregnant women attending MCH, MKRH, South western, Ethiopia (n=156)

Variables	Category	Frequency	Percent
Dosage form	Syrup	13	8.3
	Tablet	80	51.3
	Capsule	21	13.5
	Gels	20	12.8
	Vaginal cream	3	1.9
	Ointment	9	5.8
	Solution	2	1.3
	Suppositories	8	5.1

Table Continued...

Variables	Category	Frequency	Percent
Route of administration	PO	67	42.9
	IM	33	21.2
	IV	18	11.5
	Topical	14	9
	Vaginal	13	8.3
	SC	6	3.8
	Rectal	5	3.2

## FDA category in pregnant women

Among the total medication prescribed for pregnant women FDA category C was the commonly 30(19.2%) prescribed medication to pregnant women followed by 29(18.6%) FDA category B and 26(16.7%) FDA category D. 23(14.7%) medication prescribed were FDA category A. Only 10(6.4%) of participants have taken FDA category X and 5(3.2%) were take Non FDA category (Table 6).

**Table 6** FDA category among pregnant women attending MCH, MKRH, South western, Ethiopia (n=156)

Variables	Category	Frequency	Percent
FDA category	A	23	14.7
	A/C	9	5.8
	B	29	18.6
	C	30	19.2
	D	26	16.7
	C/D	24	15.4
	X	10	6.4
	Non FDA category	5	3.2

## FDA category of medications prescribed to pregnant women

According to US FDA drug category classifications, majority of minerals and vitamins such as Ferrous sulphate, magnesium sulfate injection, and folic acid, vitamin B 1/6 were prescribed to the pregnant women under FDA category A. Majority FDA category drugs were Amoxacillin, diphenhydramine, erythromycin, acetaminophen, NP H insulin, and regular insulin. Drugs prescribed under category C to the pregnant women were Cotrimoxazole, loratidine, cetirizine, gaufenesin, glyburide, tramadol, atropi ne, pneumococcal-vaccine, omeprazole. A majority of drugs prescribed under category D in pregnant women were Gentamycin, phenytoin, phenobarbital, lorazepam, doxycy cline, and diazepam. From category X drugs prescribed drugs misoprostol was the mostly prescribed to pregnant women. Five medications were not classified under US FDA dug category were Hydrogen peroxide, maintenance fluids, benzocaine, combined cough syrup, calcium iodide syrup (Table 7).

**Table 7** FDA category of drugs prescribed to pregnant women attending MCH, MKRH, South western, Ethiopia (n=156)

FDA drug category	n(%)	Representative medications
A	23(14.7)	Saline nasal spray, Ferrous sulphate, magnesium sulfate injection, levothyroxine, folic acid, vitamin B 1/6, liothyronine, dextromethrphan
A/C	9(5.8)	Vitamin B complex, Magnesium trisilicate
B	29(18.6)	Amoxacillin, diphenhydramine, erythromycin, acetaminophen, NPH insulin, Regular insulin, metformin, chlorpheniramine, clindamycin, metronidazole, cephalixin
C	30(19.2)	Cotrimoxazole, loratidine, cetirizine, gaufenesin, glyburide, tramadol, pneumococcal-vaccine, atropine, omeprazole, bisacodyl, Dexamethasone eye ointment, vitamin K
D	26(16.7)	Gentamycin, phenytoin, phenobarbital, lorazepam, doxycycline, diazepam
C/D	24(15.4)	Morphine, fentanyl, triamcinolone, codeine, Ibuprofen, aspirin
X	10(6.4)	Ergotamine, misoprostol, estrogens, atorvastatins, oral contraceptives
Non FDA category	5(3.2)	Hydrogen peroxide, maintenance fluids, benzocaine, combined cough syrup, calcium iodide syrup

### Factors associated with MCH follow up during pregnancy

Bivariate logistic regression analysis was conducted to identify women who were more likely to follow MCH during pregnancy. Pregnant women whose age > 35 years were 2.72 times more likely

to follow MCH (AOR=2.72, 95%CI=2.524-3.927, p=0.001) than their counter parts. Urban residents were 4.05 times more likely to follow MCH (AOR=4.05, 95%CI=3.926-9.406, p=0.035) than rural residents pregnant women. pregnant women during second trimester were 1.79 times more likely to follow MCH (AOR=1.79, 95%CI=1.537- 2.163, p=0.013) than first trimester (Table 8).

**Table 8** Factors associated with MCH follow up during pregnancy among women attending MCH, MKRH, South western, Ethiopia (n=156)

Variables	Category	n(%)	AOR (95% C.I)	P-value
Age	<20 years	44(28.2)	Ref	
	20-35 years	81(51.9)	1.45(1.274-1.903)	0.074
	>35 years	31(19.9)	2.72(2.524-3.927)	0.001
Residency	Rural	64(41.0)	Ref	
	Urban	92(59.0)	4.05(3.926-9.406)	0.035
Educational status	Educated	63(72.4)	Ref	
	Uneducated	93(27.6)	1.29(1.048-1.949)	0.096
Trimester	Unknown	20(12.8)	Ref	
	First trimester	43(27.6)	0.73(0.094-1.105)	0.46
	Second trimester	57(36.5)	1.79(1.537-2.163)	0.013
	Third trimester	36(23.1)	1.13(1.025-1.278)	0.45

### Discussion

Pregnant women have been often excluded from clinical trials and evidences generated from animal-based studies are not often suitable for extrapolation to indicate teratogenicity in humans. Hence, drug use by pregnant women is considered experimental in most clinical practices. However, the use of medications is sometimes mandatory in the treatment of women of reproductive age, breast feeding and during pregnancy.<sup>21</sup>

In our study a total of 168 participants were interviewed; of whom, 81(51.9%) patients were age between 20-35 years were higher than consistent with the study done at a tertiary care hospital in Puducherry<sup>22</sup> which revealed among 365 pregnant women attending antenatal clinic,

43% were in age group of 22 to 25 years which represents the normal reproductive age group. This difference was due to participants age classification category. Our study was consistent with the study employed in General Hospital, Abeokuta<sup>23</sup> which showed majority of the 369 pregnant women that participated in the study were between the ages of 20-39 with a mean age of 29.65. Because women can get pregnant and bear children from puberty when they start getting their menstrual period to menopause when they stop getting it. Based on our age category classifications 20-35 years were the most reproductive ages.

The present study revealed majority of respondents were have second trimester, first trimester, third trimester were 57(36.5%),

43(27.6%) and 36(23.1%) respectively were higher than the survey done in Ayder Referral Hospital<sup>24</sup> in which first, second and third trimester is 8.30%, 9.20% and 82.5% respectively. Because our study conducted at maternal and child care clinic so majority of respondents came at the 2<sup>nd</sup> trimester. Our study was in line with the study conducted in India<sup>25</sup> majority of patients in the study were in second trimester of gestation followed by third trimester and first trimester. This was due to during 2<sup>nd</sup> trimester pregnant women experienced dizziness and lightheadedness due to lower blood pressure, swelling of ankles or hands and skin changes, like darkening of the skin around the nipples.<sup>26</sup>

The current survey revealed 57(36.5%), 53(34.0%) and 46(29.5%) were take medication during the second trimester, first trimester, and third trimester respectively were somewhat consistent with the survey conducted in Hiwot Fana Specialized Teaching Hospital<sup>26</sup> revealed that drugs were prescribed in this study during all pregnancy trimesters. Accordingly, 24.1% were prescribed in first trimester and 29.1 and 31.6% were prescribed in second and third trimester, respectively; while, 15.2% were prescribed in unknown pregnancy trimesters. Because in 2<sup>nd</sup> trimester the pregnant women feel body aches, extreme swelling and rapid weight gain, which made the women visit the health centre.

In our study from the drug prescribed, majority 21(13.5%) were take antibiotics followed by 18(11.5%) were take NSAID, iron sulfate, and proton pump inhibitors were in line with the study conducted in tertiary hospital in eastern Ethiopia<sup>27</sup> showed that antibiotics were the most utilized medications from non-supplemental drugs. Because UTI was more common in pregnant women so antibiotics were prescribed to manage the infections cove bacterial infections.

Our study showed among medical condition majority 40(25.6%) of the participants had peptic ulcer disease and 26(16.7%) were have urinary tract infections followed by 20(12.8%) were have acute illness and 12(7.7%) had hyper-emesis were consistent with the study conducted in Fiche Hospital<sup>28</sup> revealed most common diseases recorded were hyperemesis gravidarum, urinary tract infection, peptic ulcer diseases, dyspepsia and abdominal discomfort. Due to pregnancy hormones can affect the digestive system. The progesterone, which causes smooth muscle relaxation, often causes relaxation and slowing digestion in the stomach, small and large intestines. This allows gas to build up, which in turn leads to bloating, burping and flatulence.

The current study showed among the total drugs prescribed for pregnant women 26(16.7%) FDA category D namely gentamycin, phenobarbital and doxycycline and 5(3.2%) FDA category X namely atorvastatins and misoprostol were higher than the survey employed in Ayder referral hospital<sup>29</sup> showed that among the total drugs prescribed during ANC, 2% were category D, namely tetracycline and doxycycline and categories X drugs (2%) prescribed in the second and third trimester. The drugs were misoprostol (to terminate pregnancy) and oxytocin (to induce labor). The difference were due to more medication prescribed to pregnant women with out identified pregnancy trimester.

According to the US-FDA risk classification of drugs, among the total drugs prescribed for pregnant women 30(19.2%)FDA category C was the common followed by 29(18.6%)FDA category B were inconsistent with the survey conducted in Adigrat general hospital<sup>30</sup> showed that the majority of the pregnant women in this study were provided with category A and category B drugs, which are considered relatively safe during pregnancy. Because the FDA risk classification

were not securely comprehend by the majority health care workers, so they prescribed medication of category B and C mostly.

Our study showed from route of administration, 67(42.9%) of the participants were most commonly used PO followed by 33(21.2%) of the participants have taken IM and 18(11.5%) have taken IV route of administration were consistent with the survey conducted in Fiche Hospital<sup>23</sup> showed oral dosage form was the main dosage form used across all trimesters (75.22%) as it is the simplest and easiest way for any patient to take a medication. Injectable products were also frequently used in all trimester gestation's, commonly administered via intravenous route. Due to during follow up majority medication were oral route of administration (tablet or syrup).

The current study showed that Among the dosage form, above half 80(51.3%) of the participants were take the tablet dosage form followed by 21(13.5%) have taken capsule dosage form and 20(12.8%) have taken gels were somewhat inline with the study employed in Nekemte Referral Hospital<sup>26</sup> showed that from the dosage forms prescribed for pregnant women tablets are highly used across all trimester, followed by solution, capsules, syrup, and ointment. Because oral route administration was common tablet dosage perhaps highly given to pregnant women.

Bivariate logistic regression analysis was conducted to identify women who were more likely to follow MCH during pregnancy. Pregnant women whose age > 35 years were (AOR=2.72, 95%CI=2.524-3.927, p=0.001) 2.72 times more likely to follow MCH than their counter parts. Urban residents were (AOR=4.05, 95%CI=3.926- 9.406, p=0.035) 4.05 times more likely to follow MCH than rural residents pregnant women, pregnant women during second trimester were (AOR=1.79, 95%CI=1.537- 2.163, p=0.013) 1.79 times more likely to follow MCH than left trimester.

## Conclusion and recommendations

A majority of respondents were have second trimester, respondents were have first ANC visit in second trimester, participants were have greater than five times total numbers of ANC visit, were take medication during the second trimester. Among the dosage form, above half of the participants were take the tablet dosage form followed by have taken capsule dosage form and have taken gels. Among the total drugs prescribed for pregnant women FDA category C was the common followed by FDA category B and FDA category D. Pregnant women whose age greater than thirty five years, Urban residents, and pregnant women during second trimester were significantly associated factors of MCH follow up among pregnant women. Health care workers should have to brought good care for pregnant women, since they perhaps vulnerable to drug teratogenesis.

## Ethical clearance

Prior to the commencement of the study, ethical clearance was obtained from SWAN diagnostic pharmaceutical importer. Behind the scenes was maintained by anonymous questionnaire or the patient's medical card was secured by not using their names during data collection.

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## Conflicts of interest

We have no conflict of interest in this article.

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