

Drug Utilization Pattern during Pregnancy in Nekemte Referral Hospital: A Cross Sectional Study

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Abstract: Pregnancy is a period of great physiological changes to the mother and fetus in which every malfunction of the body as the result of drug use may lead to serious consequences in both. It is a period that demands special care to the health care service providers. Therefore, the objective of this project is to conduct cross sectional study on drug utilization pattern during pregnancy in Nekemte referral hospital, Ethiopia was assessed from 2012-2013 that could lay base for the maternal care programs. A purposive sampling was used to draw 100 pregnant women from the source population. Data were collected from the documented drug administration record of Nekemte referral hospital for all stages of pregnancy, types of drugs, routes of administration and dosage forms for all the pregnant female who were admitted to the hospital. Results: Among the pregnant women who visited Nekemte referral hospital during the study period, the majority (96%) had a record for drug (s) and almost similar pattern of records were found in all wards for drug use. Of all the pregnant women, there was a high record for drug utilization of the women in the first trimester. Unemployed and uneducated pregnant females make the highest proportion. There was also a prescription of potentially dangerous drugs during pregnancy in Nekemte referral hospital. In conclusions: Many pregnant women were found using drugs during pregnancy in Nekemte referral hospital, including potentially harmful drugs. Therefore, there should be intensive assessment of pregnant women treatment in line with the US food and drug administration agency (FDA) risk category and locally operating regulations by considering risks and benefits to both mothers and the fetus in drug prescription and administration.

Key words: Drug • Pregnancy • Prescription • Hospital • Female

INTRODUCTION

Diseases occurring during pregnancy are more dangerous because of the difficulties in their treatment strategy. These days, pregnancy care is one of the great challenges in health care systems since drug therapy protocols may affect the life of the mother and her baby too [1]. Pregnancy management using medications has a teratogen effects and the potential for fetal harm. This has increased the burden of risk assessment for health care providers [2, 3].

Most people in the developing world are unaware of their drug and chemical exposure. Many are uninformed about the potential harmful effect of drug on the fetus

even if there are some concerned groups. In the modern society, many individuals are overly concerned with their own comfort and seek pharmacological solution to the many systems that may affect pregnant women. Absence of enough information about safety of many medications when they are taken by pregnant women is the first factor for hazardous effects which has been evidenced by the thalidomide crisis that has occurred so far [2].

Being a pregnant is a special physiological condition where there must be a precaution in administration of drugs to avoid teratogenic effect and undesired effect on the mother [4, 5]. Rational drug use in pregnancy requires the balancing of benefits and potential risks associated with the use of the drug. The benefits of rational drug use

during pregnancy are not only restricted to the recovery of maternal health, but are also helpful in the development of the fetus appropriate treatment of conditions like diabetes mellitus and infectious disease of genital organs, embryopathies and preterm births [5, 6]. Per-conception folic-acid supplements can prevent most neural tube defects and other congenital abnormalities of the cardiovascular system, urinary tract and limb deficiencies [7-10]. Moreover, folic- acid supplementations in pregnancy complications like placental abruption and preeclampsia [4, 15].

Iron and vitamin supplementation are the most frequently used drugs followed by analgesics, colytic agents and drugs for chronic conditions and common pregnancy symptoms [11]. Of all the medications, about (70%) folate, (38%) iron and (27%) multivitamins are the drugs taken by pregnant women along with herbal drugs like, ginger (20%) and raspberry leaf (9%) [12]. A similar trend for use of herbal drugs like cannabis ginger and raspberry leaf during pregnancy is also reported [12, 13]. Data on herbal drug use by pregnant women and factor like prior use of herbs, high knowledge about herbal drugs and age between 26 and 35 years, showed associations [16]. Usually, herbal preparations are classified as dietary supplements and are not regulated like conventional drugs [17].

There are reports of use of potentially harm full drugs 1.5% to 4.8% during pregnancy from developed and under developed countries of the world [3, 18, 19- 20]. In a retrospective register-based cohort study, it was found that 20.4% women purchase at least one drug classified as clearly harmful [21]. Many women can be exposed to drugs (mainly non steroidal anti inflammatory drugs) that can leads to some risk during pregnancy [22]. A vast majority of these prescribed drugs during pregnancy, belonged to over the counter (OTC) medications (Ibuprofen) that are contra indicated in pregnancy. This is used at unexpectedly at high rates during pregnancy. These uses of common OTC drugs during pregnancy can lead to risks that ranges from a small to extremely high risk to both mother and the fetus [23].

Only a few studies have instigated the pattern of drug use particularly focusing on the drug safety of the pregnant females in the study area in Ethiopia [24]. There is no enough information on drug use pattern, which has importance in determining drug utilization during pregnancy and sensitize policy makers to know the magnitude of teratogenicity in the study area so far.

Hence, this study underscores on the need to understand drug utilization patterns for pregnant women and investigate safety of drugs taken by the target population through the identification of the type of drugs prescribed and the pattern of drug prescription to pregnant females in Nekemte referral hospital.

MATERIALS AND METHODS

Study Design and Population: A cross-sectional study was conducted by using health records book of inpatient and outpatient departments in Nekemte referral hospital in West Oromia, Ethiopia from March 2013 to April 2013 to assess drug utilization pattern among pregnant women. Pregnant women who visited Nekemte referral hospital in past one year (2012-2013 G.C). were the target population. The number of study population was 100 individuals who were purposely (pregnant woman only) selected to represent the study population. Data were collected from their records of drug administered for pregnant women study population using a designed data collection sheet that included the class of pregnancy, types of drugs, roots of administration, dosage forms and sociodemographic information.

Data Analysis: The collected data were checked manually for completeness, recorded in excel and analyzed using table and graphs for nonparametric analysis. SPSS version 16 was used for one way ANOVA and $\alpha < 0.05$ was considered significant.

Ethical Consideration: A formal letter was obtained from pharmacy program and medical director of the hospital. Ethical clearance was obtained from ethical clearance committee of the faculty of medicine and health sciences, Nekemte referral hospital. The issue of assuring privacy and confidentiality was given attention in the study.

RESULTS

A total of 100 pregnant women who were admitted to Nekemte referral hospital were considered for this study. The registration book in each ward and outpatient department was used to sample the number of pregnant women who visited the hospital. Gynecology (GYN) (32) antenatal care (ANC) (45) and Obstetric surgery (OBS) (23) women were identified. The highest number of women visited the ANC ward. Of 100 gravid who attended the

hospital 96 of them had records that showed prescription for medication of which 44, 22 and 30 were from ANC, OBS and GYN respectively (Table 1). Out of 96 pregnant women who received at least a prescription for medication during their visit, 32 (33.3%) were in the first trimester; 30 (31.3%) were in the second trimester and 34 (35.4%) were in the third trimester (Table 1).

A total of 183 drugs with an average of 1.83 drugs per individual woman were prescribed to pregnant women in the hospital. In ANC alone, on average 0.8 drugs /woman was prescribed. Among 81 drugs prescribed during ANC follow up, the majority 54(62.8%) were prescribed in capsule form. Tablets 14(16.4%), injection 12(13.9%) Ccx 1 (0.1%) and no prescription were made for syrup and pessary. About 58 drugs with an average of 1.8 drugs per pregnant woman were prescribed to women who attended GYN ward. About 18, 16, 18, 4 and 2 drugs in the form of injection, tablet, capsule, syrup and pessary were prescribed respectively and no prescription was made for Ccx form in this ward. On average in OBS ward, a woman received 1.9 prescription for the drug forms with the highest (54.5%) being injection form (parenteral). The majority of the prescription in GYN and ANC were capsule forms and injection forms are used mostly in OBS ward and majority of the prescription were from ANC ward with no significant difference. But significantly ($p < 0.05$) high amount of capsule forms were prescribed in the three wards of the hospital when compared to other forms of drugs (Table 2A).

Table 1: Pregnant women attended Nekemte referral hospital

Ward	Without prescribed drugs	With prescribed drugs	Total
ANC	1	44(97.8%)	45
OBS	1	22(95.6%)	23
GYN	2	30(93.75%)	32
Total	4	96(96%)	100
Trimester	1 st	2 nd	3 rd
Frequency	32	30	34

Table 2A: Dosage form of drugs prescribed to pregnant women in Nekemte referral hospital

Dosage form	ANC	GYN	OBS	Total
Injection	12(13.9%)	18(31%)	24(54.5%)	54
Tablet	14(16.4%)	16(27.6%)	6(13.6%)	36
Capsule	54(62.8%)	18(31%)	12(27.4%)	84
Syrup	0	4(6.9%)	0	4
Pessary	0	2(3.44%)	2(4.5%)	4
Ccx	1	0	0	1
Total	81	58	44	183

The majority of prescription was made in first trimester. About 64 drugs with an average of 2.2 drugs per pregnant woman were prescribed in the first trimester. These drugs were prescribed for upper respiratory tract infection in the first, second and third trimester. An average of 1.9 drugs per pregnant woman in second trimester; and 58 drugs with an average of 1.7 drugs per pregnant woman in third trimester were prescribed. Mainly, the drugs were administered in PO rout and the least being virginal rout (Table 2b).

The data presented in Table (3) reveal that antibiotics for treating infections were the most frequently prescribed drug followed by iron folates iron supplement. Anti-acids, Chlorpromazine and IV fluids were still the third, fourth and fifth respectively. Potentially harmful drugs, oxytocin and paracetamol (FDA category X and B respectively) were prescribed 12 times each. The frequency of antibiotics prescription was significantly high ($p < 0.05$) when compared to other prescriptions. Majority of the drug prescription (70(40%)) was in the 1st and 54 (30%)) for each of 2nd and 3rd trimester.

The socio-demographic status of the patients is depicted in Table 4. Among the 100 pregnant women visited Nekemte referral hospital during the study period, 15% were under age of 20 and 76% and 9% of them are 20-35years and >35 years old respectively with 85% married and the rest 15% single, 39% primi gravid and 61% multi gravid woman. Multigravida and married woman are the dominant group of the pregnant female attended the hospital. Most 76% of the woman were in the regular periods of high fertility rate ages. Most of them were uneducated and unemployed house wives. The highest group are protestant and followed by orthodox and Muslims respectively.

DISCUSSION

Women received prescription for many drugs in ANC ward in the study subjects. Most of the drugs in OBS ward were given by parenteral administration. The patients admitted to OBS ward for labor and they underwent cesarean section for delivery in which they took different IV fluids and anesthetics parenterally. The high value for the injectable prescribed in GYN ward may be due to the nature of the diagnosis observed i.e., hyper emesis gravid arum in which the patient can't take drugs orally [25].

Table 2B: Route of administration of prescribed drugs for pregnant women in Nekemte referral hospital

Route of administration	ANC			GYN/OBS			Total
	1 st trimester	2 nd trimester	3 rd trimester	1 st trimester	2 nd trimester	3 rd trimester	
PO	42	16	16	0	36	16	126
IV	0	0	0	6	0	20	26
IMr54e3	12	0	0	4	4	4	24
Vaginal	0	0	0	0	2	2	4
Total	54	16	16	10	42	42	280

IM = intramuscular, IV= intravenous, PO= oral route and

Table 3: Drugs prescription frequency for pregnant women in Nekent Referral Hospital

Drug prescribed	1 st trimester	2 nd trimester	3 rd trimester	Total	FDA category
Vitamins	0	0	2	2	A
Iron sulfate	4	4	4	12	N
Folic acid	4	0	0	4	A
Iron folate	22	4	2	28	A/C
Antibiotics	6	20	22	48	B/C/D
Paracetamol	2	10	0	12	B
NSAID (diclofenac)	0	2	0	2	B/C/D
Oxytocin	0	0	12	12	X
Antacids	10	2	0	12	B
PPIs/H2blocker	4	2	4	10	C
Methyl DOPA	0	4	2	6	B
IV fluid	2	0	6	8	C
Cotrimoxazole	0	2	0	2	N
Anti protozoa	2	4	0	6	N
Chlorpromazine	14	0	0	14	N
Total	70	54	54	178	-

Note: Antibiotics (amoxicillin, ampicillin, ceftriaxone); IV fluids (dextrose, ringer lactate, normal saline, glucose); NSAIDs (diclofenac); PPIs/antihistamines H2 blocker (omeprazole /cimetidine); Anti protozoa (tinidazole) N= FDA uncategorized.

Table 4: Socio-demographic characteristics of pregnant women attending Nekemte referral hospital

Socio- Demographic characteristics	Number	Percentage (%)	
Age	<20	15	15%
	20-35	76	76%
	>35	9	9%
Marital status	Married	85	85%
	Singe	15	15%
Educational Status	1-8	25	25%
	9-12	48	48%
	>12	27	27%
Occupation	Employed	24	24%
	Unemployed	76	76%
Gravida	Primi gravid	39	39%
	Multi gravid	61	61%
Religion	Protestant	41	41%
	Orthodox	37	37%
	Muslim	22	22%
	Other	0	0

From the results of this study, diclofenac FDA category X (pregnancy contraindicated) was used in third trimester for pregnant women in labor; however, this can cause early closure and constriction of ductus arteriosus

with subsequent neonatal pulmonary hypertension and transient right-sided hypertrophic cardiomyopathy [18]. Therefore, it is very important to search for other alternatives that could alleviate pain during labor than using this drugs without prior risk assessment methods. Among the total drugs prescribed during ANC, on average 2.2 drug per woman was antibiotics. This prescription is against FDA (US) as the drugs can cross the placenta and their use late in pregnancy causes permanent discoloration of teeth, enamel hyperplasia and impaired fetal skeletal growth [9, , 26-27]. Folate supplementation stands second to antibiotics 44 (out of 178 drugs prescribed) which is common in pregnancy. Increased use of antibiotics is appearing global phenomena in all medications [28]. Nearly all women are to some degree iron deficient and more than half of pregnant women in developing countries suffer from iron deficiency anemia [10, 12]. Our result have shown that higher dose of histamine H2 blocker prescribed for the patients with dyspepsia [17]. Category D drugs (tetracycline, doxycycline and others) and category C (cimetidine) drugs were prescribed to some of the patients

[29, 30]. These drugs should not be prescribed without assessing its risk and benefits. Their use may be acceptable if the benefit outweighs the associated risk. To minimize the risk, either safe alternatives should be used or close monitoring of the patient using modern technology is required [31, 32].

Most of the patients who attend Nekemte referral hospital were uneducated and unemployed. This may indicate bias by the mothers for being safe when treated in a referral hospital which may be linked to their socio-economic background. Majority of the woman who attended the hospital were multi gravida which may be due to persisted outcome of their family management burden and level of depression they might have faced during successive pregnancies [33].

CONCLUSIONS AND RECOMMENDATIONS

Among the pregnant women who visited Nekemte referral hospital, 96% had a record for drug (s) with the first trimester accounting for 33.3 % being the highest drug utilization recorded in the hospital. In the study FDA category X, C and D which are pregnancy contraindicated were used. Uses of this drugs, would rather impair the health of the mother and the new born, it is important to search for other alternatives that could alleviate pain during labor and treat infections during pregnancy period other than these drugs. Some drugs were prescribed against local and international guidelines for drug use to some of the patients. Such a prescription of drugs should not be underestimated because it definitely affects the life of both the mother and the fetus.

It is recommendable that there should be intensive assessment of pregnant women treatment including the US food and drug administration agency (FDA) and local operating guidelines risk category, the gestational period and the risk-benefit balance of a drug before its prescription. The use of teratogenic drugs should be avoided during pregnancy in less severe diseases unless other alternatives are totally impossible to use.

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REFERENCES

1. Wacha, J. and A. Szijarto, 2011. Probiotics and pregnancy. *Orv. Hetil.*, 152(11): 420- 426.

2. Lee E., M. Maenon, L. smith, S. Weiss, I. Zuckeraman, A. Wutoh and Z. Xue, 2006. National patterns of Medication use during pregnancy. *Pharmaco-epidemiology and Drug Safety*, 15: 537-545.

3. Oren, G.K., A.P. Astuszak and S. Ito, 1998. Drugs in pregnancy. *New England Journal of medicine*, 338(16): 1128-37.

4. Kumar, A.M., K. T. Ramand and C. Ramasamy, 2013. Cross Sectional Prospective Study on Drug Utilization in an Outpatient Pediatric Department of Tertiary Care Teaching Hospital. *Global Journal of Pharmacology*, 7(2): 99-102.

5. D'az, H., 2006. Prescription of Medications during pregnancy: accidents, compromises and uncertainties. *Pharmaco-epidemiology and Drug Safety*, 15: 61r3-7.

6. Andrade, S.E., J.H. Gurwitz, R.L., K.A. Chan, J.A. Finkelstein and K. Fortman, 2004. Prescription drug use in pregnancy. *American Journal of Obstetrics and Gynecology*, 191: 398-407.

7. Gagne, J.J., V. Maio, V. Berghella, D.Z. Louis and J.S. 2008. Gonnella. Prescription drug use during Pregnancy: a population- based study in Regione Emilia-Romagna, Italy. *Eur. Journal of clinical Pharmacology*, 64: 1125-32.

8. Anonymous. Reviewer Guidance Evaluating the Risks of Drug Exposure in Human pregnancies. US department of Health and Human services, FDA Center for Drug Evaluation and research (CDER), Center for Biologics Evaluation and Research (CBER) 2005.

9. Ferenc, B.R., L. Brain and E. Andrew, 2005. Risk and Benefit of Drug Use during pregnancy. *International Journal of Medical Sciences*, 2: 100-106.

10. HWO. Iron deficient anemia assessment, prevention and control. A guide for program managers. WHO information sheet. 2001;WHO/NHD/01.3:1-132.

11. Christian, P., C.P. Stewart, S.C. LeClerq, L. Wu, J. Kaz, P. Keith, J.R. West and S.K. Khattry, 2009. Antenatal and postnatal iron supplementation and childhood mortality in rural Nepal: A prospective follow-up in a Randomized, Controlled Community Trial. *American Journal of Epidemiology*, 170(9): 1127-1136.

12. Kalaivani, K., 2009. Prevalence and consequences of anemia in pregnancy. *Inian Journal of Medical Research*, 130: 627-633.

13. Leppee, M., J. Culig, M. Eric and S. Sijanovic, 2010. The effects of benzodiazepines in pregnancy. *Acta Neurol. Belg*, 110(2): 163-167.

14. McElhatton, P., 1994. The effects of benzodiazepine use during pregnancy and lactation. *Reproductive Toxicology*, 8(6): 461-465.
15. Whitelaw, A.G.L., A.J. Cummings and I.R. Mcfadyen, 1981. Effect of maternal lorazepam on the neonate. *British Medical Journal*, 282: 1106-1108.
16. McMullen, G. R. and A.J. Van Herle, 1993. Hirsutism and the effectiveness of spironolactone in its management. *Journal of Endocrinological Investigation*, 16(11): 925-932.
17. Conover, E., 2002. Over-the-counter products: nonprescription medications, nutraceuticals and herbal agents. *Clin Obstet Gynecol.*, 45(1): 89-98.
18. Siu, K. and W. Lee, 2004. Maternal diclofenac sodium ingestion and severe neonatal pulmonary hypertension. *Journal of pediatrics and Child Health*, 40(3): 153-3.
19. Charles, F.L., L.A. Lora, P.G. Morton and L. Leonard 2007. *Drug information Handbook: A Comprehensive Resource for all Clinicians and Healthcare professionals*. Lexi-comp's drug reference handbooks 15th edn. Lexi-comp, Hudson, Ohio, pp: 160.
20. Andrade, S.E., J.H. Gurwitz, R.L. Davis, K.A. Chan, J.A. Kikelstein and K. Fortman, 2004. Prescription drug use in pregnancy. *Am. J. Obstet Gynecol.*, 191: 398-407.
21. Mohammed, M.A., J.H., A. Ahmed, W. Bushra and H.S. Aljadhey, 2013. Medications use among pregnant women in Ethiopia: A cross sectional study. *Journal of Applied Pharmaceutical Science*, 3: 116-123.
22. Marleen, M.H., J. Van-Gelder, N. Roeleveld and H. Nordeng, 2011. Exposure to non-steroidal anti-inflammatory drugs during pregnancy and the risk of selected birth defects: a prospective cohort study. *Plos One*, 6(7): e22174.
23. Lemlem, G.G. and P. Gomathi, 2014. Assessment of drug use and effect in pregnant women attending antenatal care in hospitals of Mekelle, Tigray, Ethiopia. *Journal of Drug Delivery & Therapeutics*, 4(6): 75-82.
24. Admasie, C., B. Wasie and G. Abeje, 2014. Determinants of prescribed drug use among pregnant women in Bahir Dar city administration, Northwest Ethiopia: a cross sectional study. *Admasie et al. BMC Pregnancy and Childbirth*, 14: 325.
25. Verma, P., A.S. Thakur, K. Deshmukh, A.K. Jha and S. Verma, 2013. Routes of drug administration. *International Journal of Pharmaceutical Studies and Research*, pp: 54-59.
26. Sabry, S.A., S.M. Sakr and M.A. Shahin, 2014. Histological and Ultrastructural Studies on the Effect of Diclofenac Sodium on the Renal Cortex of Fetuses of Albino Mice. *Global Journal of Pharmacology*, 8 (3): 369-377.27. FDA, 1982. Pregnancy categories for prescription drugs. *FDA Drug Bulletin*, 12: 24.
28. Mohan, J., K. M. Gopal, M. Meganathan, P. Sasikala, N. Gowdhaman, K. Balamurugan and S. Parvathavarthni, 2011. A Study on Utilization Pattern of Antibiotics for the Complicated Urinary Tract Infections in a Tertiary Care Centre. *Global Journal of Pharmacology*, 5(1): 01-03.
29. Bánhidý, R.F., B. Lowry and A.E. 2005. Czeizel, Risk and benefit of drug use during pregnancy. *International Journal of Medical Sciences*, 2(3): 100-106.
30. Teixeira-Mendonc, C. and T. Henriques-Coelho, 2013. Pathophysiology of pulmonary hypertension in newborns: Therapeutic indications. *Rev. Port. Cardiol* 32(12): 1005-1012.
31. Esmail, A., A. Snafi, M.H. Ráid, A. Salih and A.M. Abbas, 2013. Endocrine Reproductive Effects of Antiepileptic Drugs in Male Rats. *Global Journal of Pharmacology*, 7(1): 95-98.
32. Mirzaeian, R., M. Mobasheri and Z.M. Choobini, 2014. Study on Technology Future Studies in Iran's Health System. *Global Journal of Pharmacology*, 8(2): 256-260.
33. Duman, N.B., 2012. Socio-Demographic and obstetric factors associated with depression during in turkey. *American International Journal of Contemporary Research*, 2(11): 17-26.