Assessment of Pregnant Women Knowledge Attending Maternal and Child Health Care Centers at El Minia City About Teratogenicity of Drugs During Pregnancy

Om El Hana A. Mohammed[1], Sawat A. Mohammed [2], Azza M. Hafez [1], and Amal F. Arief [3]

[1] Department of Obstetrics and Gynecological Nursing, Faculty of Nursing, Minia University
[2] Obstetrics & Gynecological Medicine Dept., Faculty of Medicine, Assiut University.
[3]Department of Obstetrics and Gynecological Nursing, Faculty of Nursing, Assiut University

Abstract: Drugs intake during pregnancy may adversely affect developing embryo or fetus. These drugs are known as teratogen. So to be safe, only drugs that are absolutely necessary should be used with permission of knowledgeable practitioner. **Aim:** to assess level of women's knowledge about teratogenicity of drugs used during pregnancy. **Research design**: a cross sectional study. **Material & methods:** this study was conducted in Maternal and Child Health care Centers at Minia city. The study included 300 pregnant women, an interview sheet was used by the researcher to assess socio-demographic characteristics, obstetrical characteristics, and knowledge about drug intake during pregnancy. **Results:** the main finding of the study were exploring that more than half of the study sample had inadequate and poor knowledge regarding drug intake during pregnancy and only 28.7% of sample had adequate knowledge especially in relation to the risk time for taking drugs. The most common reasons for taking drugs was common cold 26.9%, drugs,18.3%to relieve headache and 45.2% of sample take drugs for heartburn. in this study, it was also found that certain factors seemed to affect women's knowledge regarding drug intake during pregnancy such as illiteracy, being housewife, and young age. **Conclusion:** women lack essential knowledge regarding drugs intake during pregnancy. These findings indicate need to inform pregnant women about dangers of drugs use during pregnancy especially during the first 12 weeks of pregnancy. Physician and nurses should play a key role in communicating theses risks.

[Om El Hana A. Mohammed, Sawat A. Mohammed , Azza M. Hafez, and Amal F. Arief. **Assessment of Pregnant Women Knowledge Attending Maternal and Child Health Care Centers at El Minia City About Teratogenicity of Drugs During Pregnancy.** *J Am Sci* 2012;8(12):844-850]. (ISSN: 1545-1003). http://www.americanscience.org. 117

Key Words: drugs teratogenicity, pregnant women, women knowledge.

1. Introduction

Women ingest variety of medication during pregnancy, prevalence of medication use varied from less than 10% of pregnant women to more than 95%. Frequently more than one medication was used. (***Polifka and Friedman, 2002***).

Treatment of common illnesses in early pregnancy is complicated due to the risk of teratogenic effects of drugs on the fetus. The period of greatest risk is between the first and eighth weeks of pregnancy. Since much of this period occurs before diagnosis of pregnancy is made, care must be given when treatment for common illness for every women susceptible to becoming pregnant. (***Gupta,et al., 2003***)

How much the drug will be affecting the fetus? Its depends on the fetal stage of development, strength and dose of drug. Certain drugs taken early in pregnancy (within 20 days after fertilization) may act in an all-or-nothing fashion, killing the fetus or not affecting the fetus at all. During this early stage, the fetus is highly resistant to birth defects (***kacew, 2008***).

The utero-development is divided into three time periods of development: (preimplantation-period of embryo-time of fetus).exposure to drugs during pregnancy must be separated into these time periods because the conceptus responds differently in each of three stages of development. **(Castilla,*et al., 2001*).**

In pre-implantation period No physiologic interface between the mother and conceptus exists at conception. Traditionally, the first week post conception (until the blastocyst attaches to the wall of uterus forming chorionic villi) was considered protected from drugs or medication that may be in the maternal circulation because there is no formal biological interface between the blastocyst and mother. However, recent evidence indicates that the preimplantation embryo may not be as protected as previously thought. **(*Headely et al 2004*).**

The most critical stage of development for induction of birth defects is the period of the embryo. The period of the embryo extends the time of implantation until 58-60 days post conception. The organs and tissues of the unborn baby are being formed (i.e. organogenesis) during this period, mistakes which occur during embryo stage may result in malformation and are called birth defects. Teratogens are agent that causes abnormal embryonic physical or physiological development by acting during the period of the embryo, or organogenesis. **(*Jones*&Lopez, *2006*)**

Important changes occur during the embryonic development that can also be damaged outside the period of embryo. Traditionally, things that happened to fetus were not considered a teratogenic effect, but some authorities have begun lumping fetal effects into this category. Changes in cellular structures such as brain cell arrangement during neuronal migration occur during the fetal period. However, the predominant fetal event is hyper plastic growth (increase in cell number) with organ and other tissue becoming larger through cellular proliferation, and only secondarily through hypertrophy. An important example is the thyroid, which appears early in the fetal period, as does fetal endocrine function. **(*Hutching, 2006*)**

The nurse as health educator, motivator and counselor, can play vital role in the preventive intervention measures especially in relation to drug intake during pregnancy and its bad consequences. She should meet the needs of expectant women to promote their optimal health. She should be able to correct and counteract their misinformation and misperception and misbelieves about drug intake during pregnancy.(***Hernandez, et al 2002***)

Ideally, all counseling regarding drug or medication use during pregnancy should occur before conception, because the opportunity to prevent possible adverse effects is then optimal. Preconceptioal counseling should include all component of consultation during pregnancy, with one exception. Recommendation regarding medication or drug use during pregnancy will be prospective for preventive purpose, and only medically indicated drugs and medication known to be safe will be recommended for continued use while attempting to conceive. (***Shepared, 2004***)

Adequate knowledge is very important in order to prevent and control the teratogenic effect, or the complication and danger of drugs which are taken during pregnancy. In general, some of pregnant women lacked the basic and essential knowledge regarding drug intake during pregnancy, and noticed that most of pregnant women took drugs without doctor order**. *(Lacroix, et al 2005)***

Available information about level of knowledge among pregnant women about safety of drugs in pregnancy is extremely limited and because of the differences in pattern of drug used and knowledge level in different countries a further research needed to establish level of knowledge about safety of drugs in pregnancy. So a lot of Questions about safety of medication use during pregnancy are major concern for health care provider and also for pregnant women**. (*Benegbi, 2007*)**

The sample chosen according to the following criteria:

Adequate knowledge is very important in order to prevent and control the teratogenic effect, or the complication and danger of drugs which are taken during pregnancy. In general, some of pregnant women lacked the basic and essential knowledge regarding drug intake during pregnancy, and noticed that most of pregnant women took drugs without doctor order**. (*Heikkila,et al 2002*)**

Available information about level of knowledge among pregnant women about safety of drugs in pregnancy is extremely limited and because of the differences in pattern of drug used and knowledge level in different countries a further research needed to establish level of knowledge about safety of drugs in pregnancy. So a lot of Questions about safety of medication use during pregnancy are major concern for health care provider and also for pregnant women. (**Irl , *et al 2007***)

Significance of the study:

Prevalence of medication used by pregnant women varied from less than 10% to more than 95% of pregnant women. Frequently more than one medication use. In one comprehensive study in U.S of 10 thousand of pregnant women received average 3.1 prescription of medication. Similar prevalence was observed in Brazil, New Zealand and Egypt (***Polifka and Friedman, 2002***), a further research needed to establish the level of knowledge among pregnant women about the safety of drugs in pregnancy. So this study conducted to identify the level of mothers' knowledge about drug safety.

Aim of the study:

The aims of this study were to assess knowledge of pregnant women regarding drug intake during pregnancy, assess prevalence and most common types of drugs taken without prescription, and identify factors that affecting drug intake during pregnancy.

Subject and methods

Research Design

This study was a cross sectional study.

Setting:

The study was conducted in Maternal and Child Health Care centers in Minia city. Western Medical Care Center and East Medical Care Center. These centers provides free services to women who resident in Minia city and neighboring villages.

Participants:

300 women were included in the study collected during three days per week; all cases were taken according to inclusion criteria, sometimes some cases that enter the clinic while interviewing another woman the researcher was waiting this cases until return from laboratory investigation then interviewing her and obtain the necessary data.

Inclusion criteria:

1. Primigravida.

2. Women during first and second trimester
3. Single fetus

Exclusion criteria:

1. Pregnant women in third trimester
2. Women have medical problems (cardiac disease, hypertension, liver disease, diabetes mellitus, etc)
3. Multiple pregnancy
4. Multigravida and grand multipara.

Tools for Data Collection

A designed interview sheet developed by researcher that aimed to identifying knowledge of pregnant women about teratogenicity of drugs used in pregnancy, the most common drug used & the main reason for this use. It based on review of related literature and reviewed by experts from nursing, Obstetrics and Gynecological nursing and medical related specialists, it contains five sections that include the following:-

1) Socio-demographic data
2) Obstetrical data
3) Menstrual history
4) History of taking certain drugs
5) Information about drugs, include information about drugs, its safety, source of information regarding drug safety during pregnancy and mother experience with drugs**.**

This study was carried out in period from January 2011 to the end of June 2011.

Scoring system was adopted and total knowledge scores were classified as adequate that is more than 75% correct answers or as inadequate that is from 50% to less than 75% correct answers or as poor that is less than 50% correct answers.

Pilot study:

Pilot study was done on 30 women (10%) of the studied sample to evaluate the clarity and understanding of the tools. It also helped in the estimation of the time needed to fill the form. According to the results of the pilot, tool was modified. The women who were tested in the pilot study were not included in the main study sample.

Ethical consideration

Before conducting the study an official permission was taken from the director of Maternal and Child Health Care Centers in Minia city. A Clear explanation of the nature and the aim of the study were given to the women who agree to participate in the study to obtain their informed verbal consent which includes the rights for privacy and confidentiality.

Procedure

The researcher introduces her self to the mother greeting her then explains the nature of the study & its aim. After taken the consent from mother then giving mother full explanation of the study, and rights for privacy and confidentiality, then start to collect data related to the socio-demographic characteristics by asking women about menstrual, obstetrical data, and information about drugs safety during pregnancy, women knowledge about effect of drugs and who was prescribed this drugs.

Each interview took about 30 minutes. Explaining to the women each part of the interview sheet and clarifying any none understand point. Then waiting with mother until return from laboratory investigation, waiting her until physician performing the ultrasonography assisted her for answering any question about the ultrasound by asking clarifying from the physician, listening with mother the health education provided from physician about pregnancy if he prescribed any medication finally ask mother if she have any question and leaving mother go.

Statistical analysis

Data were analyzed using the statistical package for social science (SPSS) version 11.5 (Windows Microsoft). Continuous data were expressed as frequency, percentage, mean and SD. discrete data were expressed as frequency and percentage. Comparison between variables was done using chi-square test. Probability (p-value) less than 0.05 was considered significant and less than 0.001 was considered highly significant

3. Results:

Table (1) show distribution of the sample according to socio-demographic characteristics. regarding mother age more than two third of sample (71%) age range between 20-30 years, while 18.4% of sample were less than 20 years and 10.6 of sample were more than 30 years. Regarding women education 46.7% were secondary educated, while more than one quarter of the sample(25.3%) were university education, and near one quarter of the sample (23.3%) were illiterate. As regard occupation the majority of the sample 83.3% were housewife. Regarding residence more than half of the sample (60.7%) was living in urban area, while 39.3% were live in urban area. According to socio-demographic characteristic of husband it was observed from the table that near half of husbands sample 49.6 % were secondary educated, while only 22% of husbands were illiterate, and 24% of husbands were university education. Regarding husband occupation majority of the sample 82.7% were employed.

Table (2) shows distribution of the sample according to drugs used. It was observed that more than half of the sample (61.7%) didn't take any type of drug during pregnancy, while more than one third of the sample 38.3% had history of taking at list one type of drug. As regarding source of drug prescription it was observed that more than three quarter of the sample (78.3%) taking drugs that only prescribed by physician. On the other hand 20.3% and 1.4% of the

sample respectively were used drug prescribed by themselves or family member.

Figer (1) shows that 38.7% from sample believed that the drugs used during pregnancy are safe only for mother. While 33.7% of sample thought that the drugs are safe only for fetus, also 20.3% thought that drugs were safe for mother and fetus, and only 7.3% of sample believed that drugs during pregnancy not safe at all.

Table (3) illustrated the women's knowledge about time harmful for drugs taking it was observed that more than half of sample (55%) didn't have knowledge about which trimester that considered the most harmful to take drugs, while 43.6% from sample thought that the first trimester considered the most harmful period to take drugs, and only 1.4% from sample thought that the second and the third trimester are the most harmful period.

Figer (2) shows that more than half of sample (61.6%) didn't take any drugs during pregnancy, while 16.7% of sample take antacids, also 12% of sample take analgesics and only 9.7% of sample take antibiotics.

Table (4) shows that near half of the sample 45.7% had inadequate knowledge about teratogenicity of drugs used during pregnancy. While 25.6% of sample had poor knowledge. And 28.7% of them had adequate knowledge.

Regarding women age table (5) show statistical significant difference between mother age and level of knowledge. It was observed that only 8.1% of women whose age was less than 20 years were more likely to have adequate knowledge regarding drug intake during pregnancy compared with 18.2% of this group had poor knowledge. On the other hand it was observed that women whose age more than thirty years only 5.8% of women had adequate knowledge compared with 14.3% of these women had poor knowledge regarding drug intake during pregnancy.

Regarding women education table show high statistical significant difference between mother education and level of knowledge. It was observed that more than half of illiterate women 57.1% had poor knowledge compared with only 2.6% of university educated women had poor knowledge regarding drug intake during pregnancy.

According to women occupation table show high statistical significant difference between mother occupation and level of women knowledge regarding drug intake during pregnancy. It was observed that more than half of working women 65.1% had adequate knowledge compared with 34.9% of housewife. while majority of house wife women 98.7% had poor knowledge compared with only1.3% of working women.

Regarding place of residence table show high statistical significant difference between level of women knowledge and place of residence. It was observed that more than three quarter of women 88.4% living in urban area had adequate knowledge regarding drug intake during pregnancy compared with 11.6 of women living in rural areas. while more than three quarter of sample 76.6% of women living in rural area had poor knowledge compared with 23.4% of women living in urban areas.

4. Discussion:

Drugs intake during pregnancy may adversely affect developing embryo or fetus. These drugs are known as teratogen. So to be safe, only drugs that are absolutely necessary should be used with permission of knowledgeable practitioner. Adequate knowledge is ver important in order to prevent and control teratogenic effect, or complications and dangers of drugs which are taken during pregnancy. In general some of study sample lacked the basic and essential knowledge regarding drug intake during pregnancy (***Bakker,et al 2006***).

Table (1): Distribution of the sample according to socio-demographic characteristics**:**

General characteristics	***No.=300***	***%***
Mother age		
• ***<20***	55	18.3
• ***20-30***	213	71
• ***>30***	32	10.7
Mother educational level		
• Illiterate	70	23.3
• Preparatory	14	4.7
• Secondary	140	46.7
• University	76	25.3
Mother occupation		
• Housewife	250	83.3
• Employed	50	16.7
Residence		
• Urban	182	60.7
• Rural	118	39.3
Husband education		
• Illiterate	66	22
• preparatory	12	4
• Secondary	149	49.7
• university	73	24.3
Husband occupation		
• Not working	52	17.3
• employed	248	82.7

Table (2): Distribution of the sample according to drugs used during pregnancy

Variable	*No.=300*	*%*
1-History of taking drugs		
• yes	115	38.3
• No	185	61.7
2-Source of drug prescription		
• By physician	235	78.3
• women her selves	61	20.3
• family member & friend	4	1.4

Table (3): Distribution of the sample according to maternal knowledge as regard safety of drugs used during pregnancy

Variable	**No.=300**	**%**
Knowledge about time harmful		
• First trimester	131	43.6
• Second and third trimester	4	1.4
• I don't know	165	55

Table (4): Distribution of women according to their level of knowledge about teratogenicity of drugs used during pregnancy

Level of knowledge	*No.=300*	*%*
• Adequate	86	28.7
• In adequate	137	45.7
• Poor	77	25.6

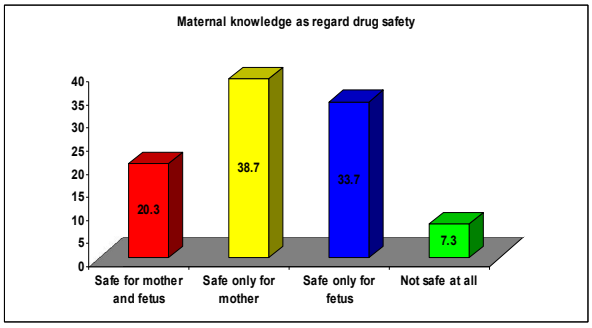

Figure (1): Distribution of the sample according to maternal knowledge as regard safety of drugs used during pregnancy

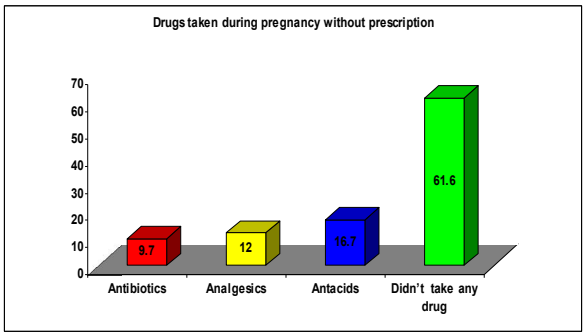

Figure (2): Distribution of sample according to the most common drugs used & its reason for use

Table (5): Relationship between socio-demographic characteristics of the sample & level of women knowledge

	Level of knowledge						
Sociodemographic characteristics	***Adequate***		***Inadequate***		***Poor***		***p.value***
	No.	***%***	***No.***	***%***	***No.***	***%***	
1-Women age							
• <20	7	8.1	34	24.8	14	18.2	
• 20-30	74	86.0	87	63.5	52	76.5	*P<0.005
• >30	5	5.8	16	11.7	11	14.3	
2-Level of education							
• Illiterate	5	5.8	21	15.3	44	57.1	
• Preparatory	3	3.5	5	3.6	6	7.8	*P<0.0001
• Secondary	78	56.9	37	43	25	32.5	
• university	51	59.3	23	16.8	2	2.6	
3-Women occupation							
• Housewife	30	34.9	118	86.1	76	98.7	*P<0.0001
• Employed	56	65.1	19	13.9	1	1.3	
4-Place of residence							
• Urban	76	88.4	88	64.2	18	23.4	*P<0.0001
• Rural	10	11.6	49	35.8	59	76.6	

While some medications are considered safe to take during pregnancy, the effects of other medications on unborn fetus are unknown. Therefore, it is very important to pay special attention to medications taken with pregnancy, especially during the first trimester, a crucial time of development for the fetus. ***(Passmore, et al 2003***)

Regarding socio-demographic characteristics of the sample the result of present study show that near three quarter of the sample (71%) age between 20-30years. As regarding education (23.3%) of sample were illiterate, (46.7%) secondary education, and quarter of sample (25.3) were university education. it was also shown that more than three quarter of sample (83.3%) house wife women and more than half of them (60.7%) were living in urban areas.

The present study show that more than one quarter of sample (28.7%)had adequate knowledge regarding drug intake during pregnancy, while nearly one half of sample 45.7% had inadequate knowledge, and more than one quarter of the sample (25.6%) had poor knowledge regarding drug intake during pregnancy. The present study was different from the study that was reported by ***Glover, et al (2003)*** in India who founded that (49.7%) of women were found to have poor knowledge, (39.7%) had inadequate knowledge and (10.6%) had adequate knowledge regarding drug use in pregnancy.

The results of the present study indicated that (38.3%) of sample had taken drugs without doctor order these drugs were classified to (16.7%) antacids, (9.7%) antibiotics, and (12%) analgesics. This finding agrred with the study conducted by ***Mashayekhio, et al (2009***) in Iran it was found that (18.8%) of sample reported using medication during pregnancy. These drugs were (10.2%) used antacid, (3.8%)used antibiotics, and (4.8%) used analgesics. Our results similar to those of ***Wilcox et al. (2005)*** in Turkey who reported that antibiotics formed a large proportion of prescribed drugs (22.5%) followed by analgesics(22.1%) with small proportion of antacid.

Our results differ from those finding which reported by ***Vroom et al. (2008)*** who reported that 86% of pregnant women used non prescription drugs to be (last trimester of pregnancy) comprising vitamins and general tonics (78.8%), antacids (66.5%), analgesics (41.8%) and antiemetics (35.5%) and 7.5% of sample took antibiotics.

The present study was different from study reported by ***Laurence, et al (2006*)** in Ethiopia who reported that (78.6%) of the pregnant women responded that they usually took NSAIDS. (55.7%), (24.4%) and (13.6%) of those pregnant women, said that they took acetaminophens, diclofenac and aspirin to relieve different types of pain. A total of 16.5% of the pregnant women had a counsel from community pharmacy about NSAIDs use. (43.2%) of the pregnant women said that they used mainly diclofenac from community pharmacy.

Our study was showed that more than half of the sample 55% didn't know which trimester that considered harmful to take drugs, while 43.6% of sample recognized that the first trimester the most harmful period. So our study was differ from the study results which conducted by ***Andrade, et al (2006)*** in Tanzania who reported that (20.5%) of sample didn't know which trimester considered the most harmful to take drugs. While (60.8%) of sample recognized the first trimester as the most critical period in which drugs can be more harmful for fetus, and (8.3%) of sample reported that the whole 9 months of pregnancy are susceptible period in fetus life which could be harmed by medication consumed by mother.

In this study, it was noticed that certain factors seemed to affect women knowledge regarding drug intake during pregnancy. age seemed to affect mothers knowledge. It was observed that only 8.1% of women whose age was less than 20 years were more likely to have adequate knowledge regarding drug intake during pregnancy compared with 18.2% of this group had poor knowledge. On the other hand it was observed from table that women whose age more than thirty years only 5.8% of women had adequate knowledge compared with 14.3% of these women had poor knowledge regarding drug intake during pregnancy. So women with high age group had adequate knowledge than young age group.

This results was differ from the results that reported by **Michel et al *(2009*)** in Iran who was reported that women whose age less than 30 years 39.2% of them had adequate knowledge about drugs intake during pregnancy, while 26.4% of the same group had poor knowledge. On the other hand it was observed that women whose age more than thirty years 58.9% had adequate knowledge compared with 14.5% of the same group had poor knowledge regarding drug intake during pregnancy. This is expected because younger women usually have limited experience in relation to child bearing, and this may influence their information and knowledge regarding pregnancy.

Another factor was seemed to affect women knowledge regarding drug intake during pregnancy, such as level of education It was observed that more than half of illiterate women (57.1%) had poor knowledge regarding drug intake during pregnancy, while 2.6% of university educated women had poor knowledge .on the other hand results was illustrated that only 5.8% of illiterate women had adequate knowledge compared with 59.3% of university educated women had adequate knowledge regarding drug intake during pregnancy.

This results was agree with the finding of the study which conducted by ***Foster et al (2006*)** in Palestine who reported that 47.4% of illiterate women had poor knowledge regarding drug intake during pregnancy, while 18.1% of illiterate women had adequate knowledge and 80.2% of university educated women had adequate knowledge regarding drug intake during pregnancy, as high educational level allow

women to have more reading about her pregnancy and thing permitted or contraindicated.

These results may be due to that the illiterate women tend to assign unrealistically high risk to medications not known to be teratogenic. This misperception may lead to termination of pregnancy. The illiterate women usually resist any change because they usually have their own customs, believes and ideas especially in relation to drug intake during pregnancy. So maternity nurse should be able to change the expectant women's believes, attitudes and ideas by conducting mother classes and health education.

Conclusion

Based on the findings of the present study, it was concluded that more than one half of sample had inadequate and poor knowledge regarding drug intake during pregnancy. It was also observed that large number of study sample took drugs to treat general weakness, antacid for heart burn and indigestion, analgesics to combat headache.

It can also be shown from the results of the present study that women with certain characteristics such as women age, level of education, women occupation, place of residence and family income were more likely to have poor knowledge regarding drug intake during pregnancy. The evidence discussed in this review suggests that few drugs have been shown definitely to be teratogenic in humans. However, it is equally true that no drug incompletely safe.

Recommendation

-Physicians and maternity nurses at different health care delivery setting should pay special attention to expectant women. They should provide them with basic and essential knowledge regarding ingestion of drugs and consequences of chemical substances such as drugs during pregnancy.

-The nurse as a key person in health team has crucial role in this respect. She should be able to correct misinformation and misbelieves about the potential teratogenic risk of drug intake during pregnancy, by implementing in service education programs to all expectant women in a simple, direct and effective manner

- Counsel pregnant women about the safety as well as the dangers of drug use in pregnancy especially in booking visit of antenatal care.

Corresponding author

Amal F. Arief

Department of Obstetrics and Gynecological Nursing, Faculty of Nursing, Assiut University

References:

Andrade SE, Raebel MA, Morse AN, Davis RL, Chan KA, Finkelstein JA. (2006): Use of prescription medications with a potential for fetal harm among pregnant women. Pharmacoepidemiol Drug Saf; 15:546–54.

Bakker MK, Jentink J, Vroom F, Van Den Berg PB, De Walle HE, De Jong-Van Den Berg LT.(2006): "Drug prescription patterns before, during and after pregnancy for chronic, occasional and pregnancy related problems ;113:559-568

Benegbi, M. (2007): Where do we stand?, The Canadian Journal of Clinical Pharmacology; 14 (1), 37–39.

Castilla EE, Ashton-Prolla P, Barreda-Mejia E. (2001): Thalidomide, a current teratogen in South America. Teratology; 54: 273.

Foster DA, Denning A, Wills G, Bolger M, McCarthy E. (2006): "Herbal medicine use during pregnancy in a group of Australian women". BMC Pregnancy Childbirth; 6:21-29

Glover DD, Amonkar M, Rybeck BF, Tracy TS.(2003): Prescription, over- thecounter, and herbal medicine use in a rural, obstetric population. Am J Obstet Gynecol; 188:1039–45.

Gupta, u, cook, J.c, tassinari, M.S&Hurt, M,E. (2003): comparison of developmental toxicology of aspirin birth defect research partB developmental and reproductive toxicology ;68(1) 27-37

Headley J, Northstone K, Simmons H, Golding J,(2004): ALSPAC Study Health Assoc; 68(5–6):567–591

Heikkila AM, Erkkola RU, Nummi SE. (2002): "Use of medication during pregnancy: a prospective cohort study on use and policy of prescribing".Ann Chir Gynaecol Suppl.; 208:80-83.

Hernandez-Diaz S, Werler MM, Louik C, Mitchell A. (2002): "Risk of gestational hypertension in relation to folic acid supplementation during pregnancy". Am J Epidem.;156(9):806-812

Hutchings, D.E. (2006): Prenatal Abuse of Licit and Illicit Drugs. Annals of the New York Academy of Sciences ;562:123-132

Irl C, Kipferler P, Hasford J. (2007): PEGASUS-project. "Drug use assessment and risk evaluation in pregnancy--the PEGASUS-project" Pharmacoepidemiol Drug Saf; (3):37-42

Jones, R.E &Lopez, K.H. (2006): Human reproductive biology 3rd ed. Sydeney: Elsevier.

Kacew S. (2008): Fetal consequences and risks attributed to the use of prescribed and over-the-counter (OTC) preparations during pregnancy. Int J Clin Pharmacol Ther ; 32:335-243

Lacroix I, Damase-Michel C, Lapeyre-Mestre M, Montastuc J L. (2005): "Prescription of drugs during pregnancy in France". The Lancet; 18(356):1735-1736

Laurence L, Brunton J, John S, Keit L. (2006): Non-steroidal anti-inflammatory drugs. Goodman and Gill's. The pharmacologic basis of therapeutics; 673–706.

Mashayekhio & Zahra Fardiazar.(2009): pregnant women awareness about effect of drugs on mother and her fetus;91:1 89-93

Michel C, Christaud J, Berrebi A, Lacroix I, Montastruc JL. (2009): What do pregnant women know about non-steroidal anti-inflammatory drugs? Pharmacoepidemiol Drug Saf; 18:1034–8.

Passmore CM, McElnay JC, D'Arcy PF. (2003): Drugs taken by patient safety: case studies in clinical pharmacology. J Clin Pediatr; 166:433–441 America.

Polifka JE, Friedman JM. (2002): Medical genetics. Clinical teratology in the age of genomics.CMAJ 167: 265–73.

Shepard TH. (2004): Catalog of Teratogenic Agents. 11th ed, Baltimore: Johns Hopkins University

Vroom F, van den Berg PB, de Jong-van den Berg LT. (2008): Prescribing of NSAIDS and ASA during pregnancy: Do we need to be more careful? Br J Clin Pharmacol; 65:275–6.

Wilcox CM, Cryer B, Triadafilopoulos G. (2005): Patterns of use and public perception of over-the counter pain relievers: Focus on non-steroidal anti-inflammatory drugs. J Rheumatol.; 32:2218–24.

08/12/2012