1. INTRODUCTION

A pharmacist is directly involved as a member of health care team in totality of patients care (ASAHR issue in pharmacy profession 2001). Pharmacists working in the field of clinical pharmacy (CP), pharmaceutical care (PC) and medication therapy management (MTM) do have direct contact with the individual patients. Pharmaceutical care is a philosophy of practice in which the primary beneficially action of pharmacist is the patients. Pharmaceutical care mainly focuses on the attitude, commitment, behavior, knowledge, and skills of pharmacist towards provision of drug therapy that improves patient's quality of life (Hepler and Strand 1990; AACP, 1991). It can also be define as careful provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life, (Hepler CD et al, 1989). Pharmaceutical care involves a practice in which the practitioner takes accountability of patient's drug-related needs for the purpose of achieving positive outcomes (Cipolle RJ et al, 1998). Pharmacist's interventions are method of solving the drug therapy problems found in pharmaceutical care system. Pharmaceutical care requires direct relationship between a pharmacist and an individual patient (Ezeudo et.al-2013). Pharmacists' responsibility is to improve patient's medication therapy, in order to achieve that, they should have the knowledge to enlighten patients about the importance of continued therapy and compliance while at home, also their knowledge should be able to settle any uncertainties that a patients may encounter during the time of their medication (Sanii Y et al, 2016).

For over two decades there have been consequences that are associated with inappropriate medication use both humanely and economically and this has been a subject of discourse (Manasse HR Jr 1989). In other to improve patient's quality of life and reduce drug misuse

problems, pharmacists should participate in counselling of patients (Hatoum HT et al, 1993). Patient counseling and education is one of the important roles a pharmacist can play in other to reduce medication-related problem (Rantucci, 2007). It has been proven that it helps to promote rational use of medicines and thus improves therapeutic outcomes (Hussain et al, 2012) also promotes medication compliance (Taitel et al., 2012).

Patient counseling is defined as provision of drug information orally or in written form to the patients or their care giver on directions of drug use, its side effects, precautions to be taken, adequate storage, diet and life style modifications" (Subish Palaian, 2006).

Counselling of pregnant woman by a pharmacist has a great improvement on health care system. Evaluation of prescribing patterns for women of childbearing age indicates that the use of teratogenic medications occurs mainly due to lack of counselling during pregnancy (Zhao X et al 2014). Pharmacist care through patient education and medication counseling made a positive influence in medication adherence and glycemic control in patients with diabetes mellitus (Shareef j et al, 2016). Pharmacist can offer life style modification, self-monitoring of blood glucose, and drug therapy, by combining with a clinician providing obstetric care (US Pharm 2014). Community pharmacists are in a good position to act as information resources on lifestyle changes which can improve health outcomes (Lenz TL et al. 2005).

This study is focused on knowing whether pharmacists in Turkish Republic of Northern Cyprus (TRNC) give appropriate counselling for common ailment during pregnancy and to know the impact of education among pharmacist.

1.1. PATIENT **COUNSELLING BY A PHARMACIST**

Traditionally, pharmacist played a vital role in the health care system, but improving the pharmacist's efficiency was the real challenge (WHO Consultative Group, 1997). According to Cruthirds et al, hospital pharmacists provide drug monitoring, disease management, consultation on drug utilization, patient counseling and education, formulary management, provision of drug information in addition to being a part of multidisciplinary healthcare teams (Cruthirds et al., 2013). In other to improve patient's quality of life and reduce drug misuse problems pharmacists should participate in counselling of patients (Hatoum HT et al, 1993). Patient counseling and education is one of the important roles a pharmacist can play in other to reduce medication-related problem (Rantucci, 2007). It has been proven that it helps to promote rational use of medicines and thus improves therapeutic outcomes (Hussain et al., 2012). also promotes medication compliance (Taitel et al., 2012).

Patient counseling is defined as provision of drug information orally or in written form to the patients or their caregiver on directions of use, its side effects, precautions to be taken, adequate storage, diet and life style modifications" (Subish Palaian, 2006) Lack of patient counseling and education, is associated with medication non-adherence, a higher rate of medication errors and in turn results to higher medical expenses and more frequent hospitalizations. (Ngoh, 2009). Effective patient counseling is affected by various barriers (Kathy Lococo, 2010) which can be seen as barriers to counseling (Kolasa and Rickett, 2010). Physical challenges like dumbness, blindness, and deafness are three major barriers to patient counseling, because they might require special communication skills that a pharmacist may not know (Khan et al, 2011; Beardsley et al., 2012). Patient counseling requires the pharmacist to allocate enough time for this task, factors

such as large numbers of patients per pharmacist or the patient's willingness for fast discharge can be a major barrier to adequate counseling (O'Donnell, 2006). Wrong perception of pharmacist's role as well as lack of proper attitude and conduct by the pharmacist (Wilbur, 2010), can affect good counselling. Poor educational level of patient can also affect adequate counseling because it can affect medication knowledge (Raehl et al., 2006; Alkatheri and Albekairy, 2013). Again, the education level of patients can also act as a barrier for continued patient counseling. We have reported earlier that non educated patients tend to have a significantly lower rate of previous counseling compared to more educated patients (Alkatheri and Albekairy, 2013). Finally, compromised privacy during counseling sessions can be a barrier for continued patient counseling (O'Donnell, 2006).

1.2. Pharmacist knowledge and skills

In addition to a current knowledge of pharmacotherapy, pharmacists need to have the knowledge, skills and technical know-how to provide effective and adequate patient education and counseling. They should be aware of their patients' cultures, especially health and illness beliefs, attitudes, and practices. They should know about their patients' feelings toward the health system and views of their own roles and responsibilities for decision-making and for managing their care (Herrier and Boyce 1995). Effective, open-ended questioning and good listening are vital skills for getting information and sharing information with patients. Pharmacists need to adapt messages to fit patients' language skills and primary languages, through the use of teaching aids, interpreters, or cultural guides if necessary. Pharmacists also need to observe and interpret the nonverbal messages (e.g., facial expressions, eye contact, body movements, and vocal characteristics) patients give during education and counseling sessions,

(Foster SL et al, 1995). Assessing a patient's cognitive abilities, learning style and sensory and physical status enables the pharmacist to adapt information and educational methods to meet the patient's needs. A patient may learn best by hearing spoken instructions; by seeing a diagram, picture, or model; or by directly handling medications and administration devices (Felkey BG 1995). A patient may lack the visual acuity to read labels on prescription containers, markings on syringes, or written handout material. The pharmacist needs to determine whether a patient is willing to use a medication and whether he or she intends to do so (Bond WS,1991).

Pharmacists' intervention improves blood pressure control in patients with uncontrolled hypertension (Mehos et al,2000). In Hawkins et al in the management of Hypertensions/Diabetes pharmacist counselling increases patients' satisfaction and compliance with treatment regimen (Hawkins et al, 1979). It was also observed that in the management of Diabetes, pharmacist interventions and counselling resulted in better glycemic control and improves patents' quality of life (Rasheed et al 2002). Also pharmacists' interventions on patients who suffers Diabetes and receives diabetic education, medication counselling and home glucose monitoring from pharmacist showed a better results when compared to other group who took standard medication care given by the physician (Jaber et al 1996). Patients should be encouraged to increase their intake of dietary fibers, which can reduce the fat content in the blood. Pharmacists should stress both non-pharmacological as well as pharmacological management in this illness (Ginsberg and Goldberg, 2001).

1.3. Pharmacists counselling of pregnant women

Pregnancy is a normal physiological state, but then many pregnant women experience pregnancy associated symptoms like headaches, nausea, vomiting and constipation, which sometimes

require use of medicines, dietary supplements, or life style changes to treat. A recent literature has shown that the use of prescribed medicines during pregnancy ranged from 27% in Canada to 93% in France.(Daw et al 2011) In a recent study, about 69% and 79% of women in Serbia and Norway, respectively, used over-the -counter (OTC) medicine during pregnancy (luppatelli et al, 2014). Also, pregnant women often increase use of dietary supplements. A study has shown that prevalence of herbal dietary supplements use in pregnancy ranged from 4.3% in Sweden to 69% in Russia (kennedy et al 2015).

Irrespective of high level of medicine use during pregnancy, it has been shown that women tend to overestimate the teratogenic risk of medications during pregnancy (luppatelli et al, 2014). Pregnant women are in need of adequate information from health care professionals. In a recent study, 57% of the women reported a need for information about medicines during pregnancy, citing physicians (73%), the internet (60%) and pharmacy personnel (46%) as the three most commonly used information sources (Hameen-Anttila et al, 2013). However, very few studies have investigated pharmacists counselling of pregnant women. The findings showed that pharmacists did not always give appropriate information to pregnant women (Damasel-Michel et al, 2004). They often referred women to a physician or recommended homoeopathy (Damasel-Michel et al, 2004). More than 90% of pharmacists refer pregnant women to physician (Schrempp et al 2001). Information given by the pharmacists was not consistent with existing evidence-based literature in the majority of cases like depression, nausea (Lyszkiewicz et al 2001). Pharmacists felt uncertain if disagreeing with the physician and they needed additional education (Grinceviciene et al, 2015). In spite of such findings, the International Pharmaceutical Federation (FIP) proposed a policy statement in 2013 which declares certain interventions where pharmacists can make a significant contribution in improvement of maternal health. The

following interventions were among several suggested by FIP: evaluation of potential teratogenic medicines and advice on the alternative medicine regime, education of mothers about vitamins and nutritional supplements, promotion of alcohol and smoking cessation among pregnant women (FIP,2011). Consequently, it is of public interest to evaluate pharmacists' knowledge and practices related to counselling of pregnant women. Pharmacist though they did not receive sufficient training in pharmacy schools about drug therapy in pregnancy and lactating women so is important to expressed need for continuing education. (Damasel-Michel et al, 2004) Bringing the subjects together so that they can be presented to the students as meaningful whole was described by Harden et al as a model which could be useful in improvement of the educational effectiveness of teaching (Harden and Laidlaw, 2012). Clinical pharmacy courses are the pioneers of such integration; however there is great need for more advanced integration and structure. Pharmacist in Serbia and Norway is not familiar enough to give non-pharmacological recommendations on common ailments during pregnancy like nausea , constipation, back pain, venous insufficiency; pharmacist scope of knowledge in this issue should be improved by continuing education (Ministry of Health, Republic of Serbia (MHRS),2005) and (Norwegian Directorate of Health (NDH),2005).So many inappropriate recommendations were noticed among pharmacist in Serbia on the use of metoclopramide as third line therapy after dietary modification and antihistamine in the treatment of allergy reactions.(Quinlan 2015). It was also observed that the pharmacist in Serbia recommended Ibuprofen during third trimester of pregnancy; non-steroidal anti-inflammatory drugs can increase risk for premature closure of ductus arteriosus when used in the third trimester, and are contraindicated for use near delivery (Briggs et al, 2011). The need for improvement of pharmacists' knowledge related to adequate medical treatment of common ailments in pregnancy is necessary.

Pregnancy is associated with some complications like gestational diabetes, hypertension, nausea and vomiting, heartburn etc. Heartburn is a common complaint during pregnancy; it can be treated by pharmacological and non-pharmacological methods. Pharmacists should advise that lifestyle changes, including avoiding known triggers, like caffeine, garlic, fatty foods, spicy foods (Go, et al 2013), are complementary to pharmaceutical treatments for gastro-oesophageal reflux and may increase the likelihood of treatment success (Katz PO et al, 2013)

Cimetidine, ranitidine, famotidine, and nizatidine are the H_2RAs approved for use in Canada for treatment of heartburn (Ali RA et al 2007). Pharmacist should remind the patients that H_2RAs are mainly for inhibition of gastric acid secretion (Schubert ML, 2010).

Antacids which contain aluminum, calcium, and magnesium were not teratogenic in animal studies and are recommended as first-line treatment of heartburn and acid reflux during pregnancy (Mahadevan U et al 2006). A High-dose and prolonged use of magnesium trisilicate is associated with nephrolithiasis, hypotonia, and respiratory distress in the fetus, and its use is not advised during pregnancy,(Mahadevan U, 2007). Antacids which also contain bicarbonates are also not recommended due to the risk of maternal and fetal metabolic acidosis and fluid overload, (Mahadevan U, 2007). Milk-alkali syndrome has also been reported in pregnant women who used daily doses higher than 1.4 g of elemental calcium gotten from calcium carbonate. (Gordon MV et al, 2005). Pharmacists should remind patients that Antacid agents are mainly for local treatment of reflux symptoms (Schubert ML, 2010)

Proton pump inhibitors approved by Health Canada include omeprazole, pantoprazole, lansoprazole, esomeprazole, and rabeprazole. Safety of omeprazole, pantoprazole, esomeprazole, and lansoprazole use during pregnancy was reported elsewhere. (Nava-Ocampo AA 2006). With

pharmacists' extensive knowledge of OTC drugs and their familiarity with their patients, they are ideally situated to assist in the selection of appropriate medication (Haag S et al, 2009). It is expected that rabeprazole would be safe for use in pregnancy (Richter JE, 2005).

1.4. DRUG EFFECT CHANGES DURING PREGNANCY

1.4.1. Pharmacokinetic changes

Pharmacokinetics (PK) it is the study of time course of drug absorption, distribution, metabolism, elimination, and transport, and their relationship with its therapeutic and toxic effect of drug (Brahmankar et al 2009).

Drug absorption

Drug absorption is the movement of drug from the site of administration into the systemic circulation. Drug absorption is associated with bioavailability, the fraction or percentage of active drug medication that reaches the systemic circulation intact by any route (LZ B, 1992). Series of gastrointestinal changes that occur during pregnancy can affect the bioavailability of oral medications. Gastric emptying remains unchanged during pregnancy before the onset of labor, and thus, absorption time should not be changed after oral administration (Wong CA et al, 2007). Nausea and vomiting in early pregnancy may decrease the amount of drug available for absorption following oral administration. Gastric acid production is also decreased during pregnancy, whereas mucus secretion is increased, leading to an increase in gastric PH. (Waldum HL et al, 1980). These changes can increase ionization of weak acids (e.g., aspirin) and reduce their absorption, and weak bases (e.g., caffeine) will diffuse more readily since they will be primarily unionized (Waldum HL et al, 1980). Due to the effect of progesterone, gastric

emptying time is decreased mainly in the third trimester thus delaying the onset of effect of the drug (Yankowitz J et al, 2001).

Drug distribution

Pregnancy increases the size of women. Larger people need larger doses of drugs, because they have larger volumes of distribution and greater clearance (Qasqas SA et al, 2004). Plasma protein binding of drugs decreases in pregnancy because of reduced concentrations of both albumin and alpha 1-acid glycoprotein (Hayashi M et al, 2002). Decreased protein binding leads to higher concentrations of free drug (for drugs that have limited clearance) and favors more distribution to tissues. These changes can be clinically significant for certain drugs. For example, for phenytoin and tacrolimus, its efficacy and toxicity are due to unbound drug concentration in plasma during pregnancy, both the drugs show an increased unbound fraction as a result of lower albumin concentrations and increased clearance (Hebert MF et al, 2005).

Drug metabolism

Drug metabolism is chemical modification of a drug through specialized enzymatic systems. For medications which were administered as inactive pro-drugs, metabolism is necessary to convert the drug into an active compound. The actions of CYP3A4 (50–100%), CYP2A6 (54%), CYP2D6 (50%), and CYP2C9 (20%) are all increased during pregnancy (Hebert MF et al, 2008). Changes in CYP3A4 activity lead to increased metabolism of some drugs such as nifedipine glyburide, and indinavir. Also some CYP isoforms demonstrate decreased activity during pregnancy (Tsutsumi K et al, 2001). CYP1A2 and CYP2C19 undergo a gradual decrease in activity as gestation advances (Grosso LM et al 2005). The effects of pregnancy on enzyme activity also vary with genotype of the mother. Study on the PK of nifedipine, used for tocolysis,

showed differences in drug clearance due to genetic variability in a specific allele of the CYP3A5 coding gene (Haas DM et al 2013). Similarly, methadone metabolism varied with the specific genotype of CYP2B6 (Bogen DL et al, 2013).

Drug Elimination

Renal drug excretion depends on glomerular filtration rate (GFR), tubular secretion, and reabsorption. GFR increases by up to 50% at first trimester and increases continuously until the last week of pregnancy (Davison JM et al, 1980). If a drug is completely excreted by glomerular filtration, its renal clearance is simultaneously expected to changes during pregnancy. For example, cefazolin and clindamycin show increased renal elimination during pregnancy (Chamberlain A et al, 1993). Although there is a uniform increase in GFR during pregnancy, differences in renal tubular transport (secretion or reabsorption) can result in differing effects on drugs that is cleared through renal means (Allegaert K et al, 2009) for example, the clearance of lithium is doubled in the third trimester when compared to preconception stage (Anderson GD et al, 2005). By comparison, the clearance of digoxin which is 80% is merely 20–30% higher during the third trimester compared to postpartum (Syme MR et al 2004). Furthermore, the clearance of atenolol is just 12% higher across pregnancy (Hebert MF et al, 2008). Estrogen and progesterone alter hepatic enzyme activity; which can increase drug accumulation or decrease elimination of some drugs (Hansen W et al, 2002).

Drug Transport

Fetal development occurs due to transport of nutrients from the placenta toward the fetal side and that of products of fetal metabolism for elimination by the mother (Hebert MF et al, 2005). The placenta produces and secretes hormones that affect the maternal physiology and endocrine state, (Syme MR et al, 2004). A number of placental drug transporters have been identified, including the family of multi-drug resistance protein (MRPs). Phosphoglycoprotein (P-gp) and breast cancer resistance protein (BCRP) are the most studied. Those of P-gp include endogenous compounds such as cortisol, aldosterone, and bilirubin as well as various drugs such as antibiotics, antiretroviral, and steroids (Yeboah D et al, 2006). Substrates of BCRP include antibiotics, antiretroviral, calcium channel blockers, estrogen, and porphyrin, (Lee YJ et al 2005). Both estrogen and progesterone increase expression of P-gp and BCRP in trophoblast cell lines (Yeboah D et al, 2006). Selective serotonin reuptake inhibitors (SSRIs) including fluoxetine, sertraline, and paroxetine inhibit P-gp in vitro (Mason CW et al, 2011).

1.4.2. Pharmacodynamic changes

Pharmacodynamics is the study of the biochemical, physiologic, and molecular effects of drugs on the body and involves receptor including; receptor sensitivity, post-receptor effects, and chemical interactions (Hughes G, 2016). Although the current knowledge of pharmacodynamics in pregnancy is quite limited, there is evidence of changes in drug sensitivity for some drugs in comparison with the non-pregnant state. Jusko and coworkers described the components of newer pharmacokinetic-pharmacodynamics models (Jusko WJ et al 1995). Several steps need to be considered depending on the mechanisms of drug action between changes in drug plasma concentrations and measured effects. Pharmacodynamics (pk-pd) model

estimates the signal transduction process that produces the drug effect or response. Wyska and Jusko have recently applied these pk-pd models to data available in the literature (Wyska EB et al, 2001). There is also experimental evidence of specific receptors alterations during pregnancy (Smiley RM et al 1996). A paradoxical relationship between pharmacokinetics and pharmacodynamics response to vecuronium was recently reported. The effect of the drug increased 78% during pregnancy, whereas its half-life was considerable decreased (Guay J et al 1998). A pk-pd correlation study of metoprolol during pregnancy revealed a minimal difference in response: changes in blood pressure coincided with a fourfold decrease in the plasma drug concentration (Hagstedt S, Rane A 1993).

1.5. DRUG USE IN PREGNANCY

Drugs play a vital role in promoting human health and improving well-being. Nevertheless to produce the desired effect, they have to be safe, efficacious and must be used rationally (Sharma R et al 2006). In general, drugs unless very necessary should not be used in pregnancy because drugs taken by a pregnant woman by crossing the placenta can reach the fetus and cause harm (Porter RS et al, 2004). Pregnancy is associated with many medical problems like headache nausea, morning sickness; failure to treat this adequately can exacerbate and cause harm to both the fetus and mother (Andrade SE et al, 2004). Also drugs like minerals, vitamins, iron and dietary supplements are essential during pregnancy. Study also reported that about 8% of pregnant women need drug treatment due to various chronic diseases and pregnancy related complications (Sharma R et al 2006). Many pregnant women take medications in the early weeks of pregnancy before realizing that they are pregnant. About 59% of pregnant women were given a medication other than a vitamin or mineral supplement. About 13% of pregnant women took a dietary herbal supplement (Andrade SE et al, 2004). Drugs are used for treatment of symptoms associated with pregnancy such as pains, aches, nausea, vomiting, and edema (Pangle BL 2006). So it becomes necessary to examine the pattern of drug use in pregnancy to know the extent there might be need for improvement in the light of current knowledge (De Jong LT et al, 1990). Drugs that a pregnant woman takes can affect the fetus in several ways. They may act directly on the fetus and cause damage or induce abnormal development of the baby or even cause death. They also induce change in the function of the placenta mainly by constricting the blood vessels thus decreasing the blood supply of oxygen and nutrients to the fetus from the mother, which results to a baby that is underdeveloped and underweight (Porter RS, 2004).

1.6. CATEGORIES OF DRUG USE IN PREGNANCY

In 1979, the Food and Drug Administration developed a system determining the teratogenic risk of drugs by considering the quality of data from animal and human studies. It provides therapeutic guidance for the clinician. Category A is considered the safest category but some drugs from categories B, C and D are also used during pregnancy. Category X is the only rating that denotes a drug is absolutely contraindicated for use during pregnancy. Some of the drugs commonly used during pregnancy and their categories (as per FDA categorization) are mentioned below (table 1). Some of the drugs have been proved to be harmful to the fetus and so their use during pregnancy is contraindicated (Pangle BL, 2006).

1.6.1. Principles of Medication Use in Pregnancy (Pangle BL, 2006).

- Chronic medications should be viewed to assess safety and efficacy.

- The risk of not treating should be weighed against the risk of treating when disease is identified, both chronic and acute.

- All medications used in pregnancy require a clear identification for use, treatment duration, outcomes, and signs or symptoms that may require early termination of use

Table 1.   FDA categories for drug use in pregnancy.

(Pangle BL. Drugs in Pregnancy and Lactation 2006)

Category	Description
A	Controlled studies showed no risk to humans. Adequate, well-controlled studies in pregnant women have not shown an increased risk of fetal abnormalities
B	No evidence of risk in humans. Animal studies have revealed no evidence of harm to the fetus. However, there is no authentic or well controlled study done in pregnant women. Animal studies have shown an adverse effect, but adequate and well-controlled studies in pregnant women have failed to demonstrate a risk to the fetus.
C	Risks cannot be ruled out in humans. Animal studies have shown an adverse effect, and there are no adequate and well-controlled studies in pregnant women. or there is no animal studies that have been conducted, and also no adequate and well-controlled studies done in pregnant women
D	Clear evidence of risk in humans. Studies, adequate well-controlled or observational, in pregnant women have showed great risk to the fetus. Nevertheless, the benefits of therapy can outweigh the risk.
X	Drugs contraindicated in human pregnancy. Studies, adequate well-controlled or observational, in animals or pregnant women have shown teratogenic evidence on fetal abnormalities. The use of the product is contraindicated in women who are, or may become pregnant

1.6.2. Commonly used drugs during pregnancy

Some of the drugs commonly used during pregnancy and their categories (as per FDA categorization) are shown below (Table 2). (Nanavati MS 1994).

Table 2. Commonly used drug during pregnancy

Drug	Category
Analgesics and Antipyretics	B & C
Acetaminophen	B
Phenacetin	B
Aspirin	C
Antiemetic	**B &C**
Doxylamine	B
Meclizine	B
Antibiotics	**B,C & D**
Penicillin, Ampicillin, Amoxycillin,	**B**
Gentamicin	**C**
Sulphonamides	**B/D**
Tetracycline, Streptomycin	**D**
Antimalarial	**C**
Antifungal	**C**
Vitamins	
B,C,D, E, Folic Acid	**A**

1.6.3. Medications contraindicated in pregnancy

Vitamin A and its derivatives

There is significant risk of spontaneous abortion and risk of many significant anomalies associated with use of Vitamin A during pregnancy (Briggs GG et al, 2002). Pregnancy dietary intakes of **vitamin A** greater than 7,000 micrograms may be teratogenic, leading to an increased risk of congenital malformations. Also due to the high levels of vitamin A contained in liver and liver products, e.g. cod liver oil, these foods should also be avoided in pregnancy (NICE, 2008). However use of other vitamins is recommended during pregnancy, some vitamins like folic acid can be used anytime during pregnancy. A daily supplement of 400 micrograms (400μg/0.4mg) of folic acid as recommended prior to conception and for the first 12 weeks of pregnancy has demonstrated to help stop neural tube defects (NTD"s) (FSAI, 2006). Women having a family history of NTDs or pre-existing diabetes should be given a higher dose of folic acid prior to conception through 12 weeks gestation (HSE 2010). This is because folic acid can help avert NTDs when given at high-dose levels but should not be more than 1000 micrograms per day.

ACE inhibitors

These drugs can cause kidney damage of the fetus when used during the first and second trimester; also there is decrease in the amount of amniotic fluid and deformities of lungs, limbs and face (Porter RS 2004).

Anticoagulants

Warfarin. Use, during first trimester is associated with nasal hypoplasia and nasal bridge also when use during the second and third trimester causes fetal malformations (Sorensan MK et al 2004).

Heparin. It is safe but when taken for long time cause osteoporosis and decrease number of platelet in pregnant woman (Porter RS 2004).

Anticonvulsants

Phenytoin, Phenobarbitone. It causes bleeding complications in newborn it is prevented when pregnant woman takes oral Vit. K every day for a period of one month before delivery or if the newborn baby is given an injection of Vit. K soon after birth (Porter RS 2004).

Sodium valproate. It increases risk of birth defect in fetus which includes cleft palate and abnormalities of the heart, face, skulls and abdominal organs (Porter RS 2004).

Antibiotics

Tetracycline. It causes slowed bone growth as well as permanent yellowing of teeth and grey baby syndrome is associated with chloramphenicol (porter RS 2004).

Herbal products

Despite the widespread, popular use of herbal remedies during pregnancy only few studies have been devoted to have specific clinical investigations. With the exception of ginger, there is no data to support the use of any other herbal supplement during pregnancy (Dante G et al, 2013). About 395,000 US births annually involve antenatal exposure to herbal products (Broussard et al 2010). Health care providers should inquire routinely about herbal use and educate patients about what little is known regarding risks of these products. Herbal product is not advisable to be taken during pregnancy because their safety is not guaranteed, some herbal product like aloe vera, black cohosh, gingko, garlic, and ginseng has proven to have some teratogenic affect (Braun L et al 2010). Some herbal product also contains pesticides in them.

Vaccines

Pharmacists are seen as vaccine advocate and also help to facilitate immunization around the community (Grabenstein JD, 1998). According to CDC guideline (CDC 2006) vaccines recommended before pregnancy includes human papilloma virus (HPV) and flu mist, and the vaccines recommended during pregnancy are Tdap or flu shot, Tdap vaccine is also recommended after pregnancy, whereas, Bacille Calmette Guerin (BCG) for tuberculosis, flu mist, meningococcal, MMR, typhoid, varicella, are contradicted during pregnancy (CDC 2016).