

# **MEDICINES USAGE IN PREGNANCY**

**By**

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**A Thesis submitted to the Department of Clinical and Social  
Pharmacy,**

**Kwame Nkrumah University of Science and Technology  
in partial fulfilment of the requirement for the degree of**

**MASTER OF SCIENCE**

**Faculty of Pharmacy and pharmaceutical sciences,  
College of Health Science**

**February 2010**

**CERTIFICATION**

I hereby declare that this submission is my own work towards the award of MSc clinical pharmacy and that to the best of my knowledge it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the university, except where due acknowledgement has been made in the text.

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## **ABSTRACT**

Medication usage in pregnancy requires a lot of caution because every medicine can pose a risk and not all risks are known, Medicines are thought to account for 1-3% of maternal mortality.

This research seeks to determine the extent, safety, and effectiveness of medication use in pregnancy, to reduce the incidents of maternal mortality attributed to medication use, so that healthcare professional and pregnant women could make informed decisions.

Six hundred (600) pregnant women attending antenatal care and three hundred (300) pregnant women attending outpatient department (OPD) at Dormaa Presbyterian hospital were randomly sampled and interviewed. Their responses were collated and analyzed.

The result indicates that both manufactured orthodox medicines and alternate herbal medicines were widely used among pregnant women of all ages, pregnant women who used herbal medicine alone or in combination were characterized by very young and very old age, little or no education, increased parity, chronic diseases and receipt of social assistance. A total of 43.5% of pregnant women were found to have had exposure to medications in FDA safety category C, D, and X, the most common of these being misoprostol, egometrine, and diclofenac. The average number of drugs prescribed per person was found to be 4.5, Over 90% of expectant mothers take four to five drugs at some stage of pregnancy, and a significant number of pregnant women were taking medications at the time their pregnancies were detected.

## **ACKNOWLEDGEMENT**

I thank the Almighty God for bringing me this far in my pursuit of academic excellence. I thank my wife Mrs. Vera Omane-Adjekum and children Nicole and Nigel for their love, support and prayers throughout my studies.

I also wish to thank my head of department, Dr Mrs. F.T. Owusu Daaku and supervisor Mrs. Afia Frimpomaa Marfo for their guidance and support in writing this project.

In addition, I thank the management and staff of Dormaa Presbyterian hospital especially the General Manager, Mr. Fred Effah Yeboah for allowing me to carry out this research in the hospital and Mr. Prosper Apati-Gyimah for his special support and encouragement.

Finally, I want to thank my mother, Mary Akotey Mensah, my siblings Philip, Eben, Augustina and Alberta for their love and care.

God richly bless you all.

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**APPENDIX I**

**Usage of medicines among pregnant women attending Antenatal clinic at Dormaa Presbyterian Hospital**

Please, I am going to ask you some questions so that we can improve on our services to you. Your responses therefore will be treated as purely confidential.

- 1) Age: How old are you .....
- 2) Educational level   None     JHS         SHS         TERTIARY
- 3) Occupational status   Trader       Farmer     Beautician     formal Sector
- 4) Gestational age: How old is your pregnancy?  
 1<sup>st</sup> trimester (0-3 MONTHS)         
 2<sup>nd</sup> trimester (4 – 6 MONTHS)         
 3<sup>rd</sup> trimester ((7-9MONTHS)
- 5) Why did you come to the clinic today?   Routine visit         Specific complaints
- 6) What medication are you currently on and why are you on these medicines (both Orthodox and Herbal O= Orthodox H= Herbal

O/H	NAME OF MEDICINE	DOSAGE AND FREQUENCY	REASONS FOR USE

- 7) Have you taken some medications previously since you became pregnant. YES  NO
- 8) If yes what type of medicine and why did you take them, O = Orthodox   H = Herbal

O/H	NAME OF MEDICINE	DOSAGE AND FREQUENCY	REASONS FOR USE


9) Did you experience any side –effect with your medication? YES  NO

10) If yes what type of side-effect

#	PREVIOUS SIDE-EFFECTS	CURRENT SIDE -EFFECTS
1		
2		
3		
4		
5		
6		
7		

11) Where did you obtain the medicine from?

Hospital

Pharmacy shop

Chemical Store

Friend /Relative

SelfMedication

Herbalist

12) Gravidity: How many times have you been pregnant?.....

13) Do you have any children? YES  NO

14) If yes how many? .....

Thank you and best of luck.

## APPENDIX II

### Analysis of patient folders at OPD for prescribed medications

- (1) Age.....
- (2) Diagnosis/reasons for visit.....
- (3) Body weight / kg.....
- (4) Gestational Age?  
 1<sup>st</sup> trimester (0-3 MONTHS)  
 2<sup>nd</sup> trimester (4- 6 MONTHS)        
 3<sup>rd</sup> trimester 7-9MONTHS)

(5) Medicines prescribed and reason for use O= Orthodox    H= Herbal

O/H	NAME OF MEDICINE	DOSAGE AND FREQUENCY	REASONS FOR USE /DIAGNOSIS

(6)

	Pregnancy related problem if stated	Drug related problem if (stated)	Causes of previous morbidity (if any)
1			
2			
3			
4			
5			

## CHAPTER ONE

### 1.1 INTRODUCTION

When a woman becomes pregnant, it is very important for her to lead a healthy life, to eat plenty of nourishing food, get plenty of rest, exercise regularly and avoid unnecessary use of medications.<sup>(1)</sup>

Following numerous reports of severe anatomical birth defect in children born to mothers who had taken the hypnotic drug thalidomide in early pregnancy, it was realized that drugs have the potential to cross the placenta and harm the developing foetus. There is now a greater appreciation of the risk of drug therapy during pregnancy and the realization that drug therapy during pregnancy should be avoided or minimized. The need for a risk and benefit assessment of medicines to both the developing foetus and the mother cannot therefore be overlooked in pregnancy.<sup>(2)</sup>

It has been estimated that over 90% of expectant mothers take between three to four drugs at some stage of pregnancy.<sup>(3)</sup> Approximately 2-5% of all live births are associated with a congenital birth defect and it has been estimated that about 1-3% of birth defect are thought to be caused by medication use in pregnancy.<sup>(3,4)</sup> These averages may be higher among Ghanaian women due to our numerous cultural beliefs and high level of illiteracy.

Indications for drug use during pregnancy range from chronic illness such as epilepsy, depression and rheumatoid arthritis to those commonly associated with pregnancy such as hypertension, urinary tract infection and gastrointestinal disorders.<sup>(5)</sup> In Ghana, both orthodox and herbal medicines are used during pregnancy for various conditions including maintaining the general good health of the expectant mother.<sup>(6)</sup>

Some drugs may be harmful when used at any time during pregnancy, while others are particularly damaging at specific stages. The foetus susceptibility to injury depends on its period of development, different organs have different critical periods though the span from gestational day 15 to day 60 is critical for many organs.<sup>(6,7)</sup> The heart is most sensitive during the third and fourth weeks of gestation, whereas the external genitalia is most sensitive during the eighth and ninth weeks. The brain and skeleton are sensitive from the beginning of the third week to the end of pregnancy.<sup>(8)</sup> Drug exposure during the organ formation stage of pregnancy may cause malformation of such parts of the developing foetus as the heart, the limbs and the facial features.<sup>(9)</sup>

The capacity of the foetus or the neonate to eliminate drugs is minimal, and this can result in significant accumulation of some drugs leading to toxicity.<sup>(10)</sup>

There are few drugs for which safety in pregnancy can be absolutely assured, however, only a handful of drugs in current use have been conclusively found to be teratogenic.  
(2,10,11)

Because any medication can present risks in pregnancy, and because not all risks are known, pregnant women and those intending to become pregnant should consult their doctor or pharmacist before taking any drug, including over the counter medicines.<sup>(12)</sup>

As a general principle the dose of a drug given at any stage during pregnancy should be kept as low as possible to minimize toxic effects to the foetus. However due to increases in clearance and volume of distribution, certain drugs may require increased loading doses to achieve the desired effect.<sup>(13)</sup> Also, the benefit of drug treatment to the mother should outweigh any possible risk to the foetus.<sup>(4,14)</sup>

The Millennium Development Goal 5 (MDG-5) set out by UN, UNICEF, UNFPA and WHO is aimed at reducing maternal mortality by three fourth by the year 2015.<sup>(8,14)</sup> About half a million maternal deaths occurs annually, of this 80% is thought to occur in Africa and South Asia.<sup>(15,56)</sup> Maternal mortality in Africa is estimated as 920 deaths per 100,000 live births as against 8 deaths per 100,000 live births in the Industrialized world<sup>(15)</sup>. In Ghana, maternal mortality is estimated to be 201 deaths per 100,000 live births,<sup>(17)</sup> whereas in Dormaa Presbyterian hospital the figure is estimated as 208 deaths per 100,000 live births in 2008, which is slightly above the national figure.<sup>(16)</sup>

Postpartum haemorrhage, anaemia, eclampsia, unsafe abortion and obstructed labour are the major causes of maternal mortality in Ghana.<sup>(17,56)</sup>

Records at Dormaa Presbyterian Hospital indicates that there were one thousand five hundred and eight (1,518) deliveries in 2008, one thousand two hundred and forty two (1,242) in 2007, and one thousand one hundred and ninety nine (1,199) in 2006, whereas antenatal visits were two thousand one hundred and four (2,104), one thousand nine hundred and seventy (1,970), and one thousand five hundred and sixty nine (1,569) respectively. Indicating an increasing trend in supervised hospital deliveries and antenatal visits<sup>(16)</sup>

Maternal mortality on the other hand exhibited a decreasing trend from 250 deaths per 100,000 live births, 241 deaths per 100,000 live births and 208 deaths per 100,000 live births for 2006, 2007, and 2008 respectively.<sup>(16)</sup>

The Pharmaceutical Society of Ghana (PSG) and the Ghana Health Service (GHS) have recently launched a campaign to actively involve pharmacist in the fight against

maternal mortality.<sup>(17)</sup> It has been found that the rational use of safe and effective medicines during pregnancy and improved level of awareness among pregnant mothers will help improve on maternal mortality.<sup>(17)</sup>

The human gestation period is 38 weeks and is conventionally divided into the first, second and third trimesters, each lasting 3 calendar months.<sup>(18)</sup> The stages of development are: pre-embryonic, embryonic and fetal. The pre-embryonic stage is when the fertilized ovum consolidates; this lasts for 17 days postconception. The major organ systems are formed during the embryonic stage (18-56 days), with maturation, development and growth continuing during the fetal stage (8-38 weeks).<sup>(18,19)</sup> It is common practice to describe drug exposure at any stage during pregnancy as fetal exposure, and for simplicity this convention is followed in this research.

A teratogen is an agent that interferes with the normal growth and development of the fetus, and the term is used to describe drugs or chemical that cause major or gross birth defects.<sup>(20)</sup> A congenital anomaly is a non-reversible birth defect caused by genetic predisposition or other factors. Such as drug exposure, that may adversely affect the development of the fetus. Congenital anomalies such as spina bifida and hydrocephalus are obvious at birth, but some defects may take many years to develop or be identified.<sup>(20,21)</sup> Examples of delayed anomalies are behavioral and intellectual disorders associated with in utero alcohol exposure and the development of vaginal cancer in young women following maternal intake of diethylstilbestrol for the prevention of miscarriage. Approximately 2% of all live births are associated with a congenital

anomaly, and it has been estimated that about 5% of these (0.1% of all live births) are caused by drugs.<sup>(22)</sup>

More than 90% of pregnant women take prescription and non-prescription drugs or use social drugs at some time during pregnancy. 2-3% of all birth defects result from drug use during pregnancy.<sup>(29)</sup> Effect of drugs may:

- Directly affect the foetus causing damage and abnormal development.
- Affect the function of the placenta, usually by causing blood vessels to narrow and thus reduce the supply of oxygen and nutrients to the foetus from the mother.
- Cause muscles of the uterus to contract forcefully, indirectly injuring the foetus by reducing blood supply or triggering preterm labour and delivery.

Most drugs diffuse easily across the placenta and thus enter the fetal circulation to some extent, but for drugs with a large molecular weight such as heparin, transfer is negligible. Lipophilic, unionized drugs cross the placenta more easily than polar drugs, and weakly basic drugs become 'trapped' in the fetal circulation due to the slightly lower pH compared with maternal plasma.<sup>(23)</sup> Some drugs are metabolized by the placenta or fetus, but these effects are usually negligible. Occasionally, drugs are administered to pregnant women to treat fetal disorders. Flecainide, for example, has been used to resolve fetal tachycardia.<sup>(24)</sup> The extent of placental drug transfer as predicted by physicochemical properties is seldom employed to evaluate the safety of a drug when given during pregnancy. Knowledge of the pharmacology, toxicity and experience of use of the drug in pregnancy are much more important.<sup>(24,25)</sup>

Drugs crossing the placenta may exert a direct pharmacological effect on the foetus, for example high doses of corticosteroids taken during pregnancy can cause fetal adrenal suppression. The fetus may also be indirectly affected by pharmacological effects on the maternal circulation. This is seen with some antihypertensive drugs that can cause fetal hypoxia secondary to maternal hypotension. Pharmacological effects are usually dose related and to some extent predictable.<sup>(2,26)</sup>

The effects of some drugs on the fetus are less predictable and seemingly unrelated to the dose.<sup>(27)</sup> These idiosyncratic effects are caused by complex mechanisms usually involving fetal genetic predisposition. For some drugs there may be an unknown threshold dose above which drug-induced dysmorphogenicity is more likely to occur, this theory further justifies the use of the lowest effective dose during pregnancy.<sup>(27,28)</sup> Pharmacological effects on the fetus are by far the most common drug effects during pregnancy, and the consequences are often minor and reversible. Conversely, idiosyncratic effects usually lead to major irreversible congenital anomalies.<sup>(28)</sup>

The stage of pregnancy at which a drug is administered can determine the likelihood, severity or nature of any adverse effect on the fetus. Drug effects on the fetus are usually described in terms of the trimester of risk, and some drugs can present a different risk according to the trimester of exposure.<sup>(29)</sup> An example is Phenobarbital, which can cause congenital anomalies if given in the first trimester and neonatal bleeding if given in the third trimester.

Drug exposure during the pre-embryonic stage is understood to elicit an all-or-nothing response leading to either death of the embryo or complete recovery and normal development.<sup>(30)</sup> Organogenesis occurs predominantly during the embryonic stage, and, with the exception of the central nervous system, eyes, teeth, external genitalia and ears, formation is complete by the end of the 10<sup>th</sup> week of pregnancy. Exposure to drugs during this period represents the greatest risk of major birth defects by interfering with organ formation.<sup>(5,19,31)</sup>

The general principle, whenever possible, is to avoid or minimize all drug use in the first trimester. In the second and third trimester, organ systems continue to develop and mature, and there is continued susceptibility to some drug effects. This is especially the case with the central nervous system, which can be damaged by exposure to some drugs if given at any stage of pregnancy.<sup>(32)</sup> The external genitalia continue to form from the seventh week until term, and consequently danazol, which has weak androgenic properties, can cause virilization of a female fetus if given in any trimester.<sup>(33)</sup>

The pharmacological effects of angiotensin-converting enzyme (ACE) inhibitors given in the second and third trimesters can result in fetal renal dysfunction and oligohydramnios, sulphonamides and thiazides can cause neonatal haemolysis and thrombocytopenia, respectively, when given in the trimester.<sup>(35)</sup> Another important group of drugs that can cause problems specifically in the third trimester are the non-steroidal anti-inflammatory drugs (NSAIDs). These drugs inhibit prostaglandin synthesis in a dose-related fashion, and when given late in pregnancy can cause closure of the fetal ductus arteriosus, fetal renal impairment, bleeding disorders and delay labour

and birth. Regular use of NSAIDs should therefore be avoided during the third trimester.<sup>(2,28,35,36)</sup>

Again as a general principle, the dose of a drug given at any stage during pregnancy should be kept as low as possible to minimize toxic effects to the fetus. Drug therapy that is considered essential during pregnancy can be tapered to the lowest effective dose either before conception or during the first trimester. The doses of drugs that have the potential to cause neonatal withdrawal effects such as antidepressants and antipsychotics can be reduced as term approaches.<sup>(37)</sup> However, pharmacokinetic changes are common in pregnancy, and these may dictate a dosage increase. Pregnancy itself can cause a temporary worsening or amelioration to some diseases and thus influence drug dosages and clearance.<sup>(38)</sup>

Within the first few weeks of pregnancy the glomerular filtration rate increases by approximately 50% and remains raised until after delivery. Consequently, the clearance of drugs that are excreted unchanged mainly by the kidneys are increased, and higher maintenance doses may be required.<sup>(39)</sup>

The hepatic metabolism of many drugs is increased during pregnancy, possibly due to enzyme induction by endogenous progesterone, but the effects on individual drugs are inconsistent and difficult to predict. The metabolism of methadone and phenytoin are often significantly increased in the third trimester, requiring higher maintenance doses. Contrary, in some women, metabolism of theophylline is reduced, and a reduction in the maintenance dose is required.<sup>(40)</sup>

The weight gain of pregnancy is significant and consists of the fetus and increases in total body water and fat. These factors increase the volume of distribution of many drugs such that increased loading doses may be required. This may be important when a rapid drug effect is required or if the magnitude of the effect is proportional to the peak plasma concentration.<sup>(41)</sup>

Albumin is the main plasma protein responsible for binding acidic drugs such as phenytoin and salicylates and  $\alpha$ -acid glycoprotein (AAG) predominantly binds basic drugs including B-blockers and opioid analgesics. Plasma albumin concentrations falls significantly in pregnancy, and this leads to an increase in the fraction of unbound drug.<sup>(42)</sup> Clinical effects is related to the concentration of unbound drug, which usually remains unchanged even though the total plasma concentration is decreased. Thus, a fall in the total plasma concentration does not always require an increase in dose, but the situation is further complicated by increased hepatic metabolism or worsening seizure control that may necessitate a dose increase. Hence, therapy can only be reliably guided by clinical assessment or measurement of unbound rather than total plasma concentration.<sup>(2,43)</sup>

The neonate can be adversely affected by maternal drug therapy. It is only at birth that signs of fetal distress due to in utero drug exposure or the effects of abrupt discontinuation of the maternal drug supply are observed. The capacity of the fetus or neonate to eliminate drugs is minimal, and this can result in significant accumulation of some drugs, leading to toxicity.<sup>(44)</sup> The doses of antidepressants and narcoleptics should be slowly reduced close to parturition to minimize neurological disturbances due to

direct toxicity in the neonate and to minimize drug withdrawal effects. Tapering off the dose is not always practical with some drugs such as methadone and lithium, which may actually need to be increased in dose to maintain symptom control in the mother.<sup>(45)</sup>

Neonatal withdrawal effects can be very distressing, and symptoms often require treatment with sedatives or drug replacement. Morphine oral solution is used to wean babies off methadone, and its use can often be anticipated before birth. Idiosyncratic drug effects in the fetus and neonate are possible but occur rarely compared with pharmacological effects.<sup>(46)</sup>

There are few, if any, drugs for which safe use in pregnancy can be absolutely assured, but only a handful of drugs in current clinical use have been conclusively shown to be teratogenic. These include diuretics, androgens, benzodiazepines, anti-neoplastics and tetracyclines, as well as specific agents such as carbimazole, lithium, warfarin, isotretinoin, danazole, finasteride, ephedrine, atorvastatin and acetohydroxamic acid. Animal studies are not necessarily predictive of drug safety in human pregnancy, and there are species differences in the sensitivity to dysmorphogenic effects.<sup>(47)</sup>

In general, drugs which have been used extensively in pregnant women without apparent problems should be selected in preference to new drugs for which there is less experience of use. A frequent recommendation is that the benefits of drug treatment should outweigh any possible risk to the fetus, but this analysis is sometimes difficult to perform with certainty. Some countries use pregnancy risk categories, which can be

helpful in summarizing the available information on a particular drug. These categories are referred to in major specialized texts and drug information databases.<sup>(48)</sup>

The British National Formulary provides limited information on drug safety, but specialist advice should be sought if more details are required. The food and drugs administration (FDA) of USA provides the most widely used system to grade the teratogenic effect of medications. The FDA assigns a safety category for medications by using a five-letter system :A,B,C,D and X.<sup>(49)</sup>

Category A:

Adequate and well-controlled studies in pregnant women have failed to demonstrate a risk to the fetus in the first trimester of pregnancy, they are safe with a history of long use.

Category B:

Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.

Category C:

Animal reproduction studies have shown an adverse effect on the fetus, there are no adequate and well-controlled studies in humans, and the benefits from the use of the drug in pregnant women may be acceptable despite its potential risks.

Category D:

Positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but the potential benefits from the use of the drug in pregnant women may be acceptable despite its potential risks

#### Category X:

Studies in animals or humans have demonstrated fetal abnormalities or there is positive evidence of fetal risk based on adverse reaction reports from investigational or marketing experience, or both, and the risk of the use of the drug in pregnant woman clearly outweighs any possible benefit.<sup>(49)</sup>

The Australian Drug Evaluation Committee (ADEC) splits FDA category B into B1, B2 and B3.<sup>(50)</sup> These categories may be helpful with respect to counseling individual patients.

#### Category B1:

Drugs which have been taken by only limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effects on the human fetus having been observed and studies in animals have not shown evidence of an increased occurrence of fetal damage.

#### Category B2:

Drugs which have been taken by only limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or

indirect harmful effects on the human fetus having been observed and studies in animals are inadequate or may be lacking, but available data show no evidence of an increase occurrence of fetal damage.

Category B3:

Drugs which have been taken by only limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effects on the human fetus having been observed and studies in animals have shown evidence of an increased occurrence of fetal damage, the significance of which is considered uncertain in human.<sup>(50)</sup>

Much of the data on the risks associated with drug use in pregnancy are based on retrospective studies or voluntary reporting databases where the rate of anomalies may be erroneously elevated as normal outcomes may be under-reported. Individual case reports are also difficult to interpret as the denominator of drug exposure is unknown.<sup>(51)</sup>

More recently, prospective controlled trials have been utilized where the pregnancy outcomes of a defined cohort of women exposed to the drug are compared with outcomes in a matched control group. Complete follow-up of each pregnancy and postnatal monitoring is an essential feature of this type of investigation.

Research is increasingly addressing the role of paternal exposure to medications before conception or during his partner's pregnancy. Certain exposures may alter the size, shape, performance, and production of sperm. This observation suggests that drug exposure in the male may put the fetus at risk. Animal studies have shown that

paternal teratogenic exposure may lead to pregnancy loss or failure of the embryo to develop.<sup>(53)</sup>

However, unlike teratogenic agents affecting pregnant woman, teratogenic agents affecting the father do not seem to directly interfere with normal fetal development.

Animal studies show that paternal teratogenic exposure may lead to pregnancy loss or embryonic failure.<sup>(54)</sup>

At present, no evidence shows that paternal exposure directly increases the risk of birth defects. However, agents such as recreational drugs do affect sperm quality and, to a limited degree, indirectly expose the developing fetus to the substance. Rather than affecting the developing fetus, teratogens like drug and alcohol seem to lower the likelihood of a woman's becoming pregnant.<sup>(55)</sup>

## **1.2 AIM**

The aim of this research is to determine the extent of medicine usage among pregnant women who visit Dormaa Presbyterian hospital for care.

## **1.3 OBJECTIVES:**

- To determine the frequency and average number of drugs used in pregnancy
- To determine the commonest reasons for drug usage in pregnancy
- To determine the safety of medicines used in pregnancy
- To determine the commonest classes of medicines used in pregnancy

#### **1.4 PROBLEM STATEMENT AND JUSTIFICATION FOR RESEARCH**

Maternal mortality of 201 per 100,000 live birth in Ghana is high and presents a great challenge to the nation. More than 2-3% of this figure have been attributed to medicine usage in pregnancy hence the need for a further research on the subject. The purpose of this research is to encourage the safe use of medicines in pregnancy, in order to reduce the incidence of maternal mortality associated with medicine usage.

Published information on the use of medicines during pregnancy in developing countries is scarce. The research is also intended to advance knowledge currently available on medicine usage among pregnant women and provide information and feedback to healthcare workers, pregnant women and women desirous of becoming pregnant about the dangers associated with medicine usage in pregnancy.

## **CHAPTER TWO**

### **2.0 METHODOLOGY**

#### **2.1 STUDY POPULATION & SITE**

The study population consisted of pregnant women attending antenatal clinic (ANC) and Out Patient Department (OPD) at Dormaa Presby hospital.

Pregnant women visit the Dormaa Presby Hospital on Mondays, Wednesdays and Fridays for antenatal services. Mondays are specially reserved for new registrants, Wednesdays for Sub-districts and Fridays for Dormaa Ahenkro township. A health talk is normally given on each antenatal clinic day to educate the expectant mothers on nutrition and other important pregnancy related matters. However, pregnant women attend clinic for other health conditions on any day.

A study of 600 pregnant women attending antenatal clinic and 300 folders of pregnant women attending OPD were undertaken, by stratified and simple random sampling techniques respectively. From available records at the ANC, the mean monthly attendance was found to be 800 with Standard Deviation (SD) of 50, using a Confidence Interval (CI) of 95% and 2.5% Standard Error (SE), the sample size of 600 was derived. The same computation was used to arrive at the sample size of 300 obtained for pregnant women attending OPD.

Data was collected in the form of interviews from May to July, 2009, to enable as many pregnant women as possible to be interviewed. Data was collected using a questionnaire (Appendix 1)

## **2.2 INCLUSION CRITERIA**

- Pregnant women attending Antenatal clinic
- Pregnant women attending OPD.

## **2.3 EXCLUSION CRITERIA**

- Women who were not pregnant

## **2.4. Ethical consideration**

The concept of the research was discussed with the General Manager of the hospital and the hospital's Internal Management Committee and it was accepted as an area worth researching into.

The study protocol was followed and permission was sought from the Medical Administrator of Dormaa Presbyterian Hospital to allow for the interview of pregnant women at the Antenatal clinic and analysis of folders of pregnant women at the OPD. The Midwives and Nurses at the Antenatal clinic were trained to assist with the questionnaire Administration. Respondents were made aware that their responses were for academic purposes only and confidentiality will be maintained at all times, and should therefore feel free to answer questions asked.

## **2.5 Data collection methods**

### **2.5.1. Data collection from pregnant women at ANC**

Structure questionnaires were used to collect data from pregnant women at the Antenatal clinic.

### **2.5.1.1 Piloting of the data**

The questionnaire was piloted with pregnant women who came to the Antenatal clinic during the first Monday, Wednesday and Friday of May, 2009 based on the inclusion criteria, to obtain opinions on :

- The understanding of the questionnaire,
- The perceived importance of the research
- The length of the questionnaire

The questionnaires were analysed and modified, based on the results obtained from the pilot.

### **2.5.1.2 Variables**

Data were obtained on the underlisted variables:

1. Age of pregnant woman
2. Educational level
3. Occupational status
4. Gestation age
5. Current medication
6. Previous medication
7. Adherence to prescription
8. Reason for medicine use
9. Side-effects of medication
10. Source of medication
11. Induced and spontaneous abortion.

### 2.5.1.3 Sampling and administration of the questionnaire

The Antenatal record books were used as a suitable sampling frame to select 25% of new registrants (Mondays), 45% of pregnant women from Sub-districts (Wednesday) and 30% of pregnant women from Dormaa Township (Fridays) by Stratified sampling method. i.e. the sub-sample had sizes in ratio 25: 45 : 30. This sampling method was more appropriate since the population under study was already in different groupings. (I.e. new registrants on Mondays, pregnant women from Sub-districts on Wednesdays and pregnant women from Dormaa township on Fridays). These groups were in different sizes and questionnaires were administered in proportion to the group sizes. In addition, there were record books to be used as sampling frame.

The sample size for the study was 600.

**Table 2.1: Number of cases selected by stratum**

<b>Stratum</b>	<b>Percentage for each stratum</b>	<b>Sample of pregnant women interviewed from each stratum</b>
<b>New registrants (mondays)</b>	25%	150
<b>Sub-district (wednesday)</b>	45%	270
<b>Dormaa town (fridays)</b>	30%	180
<b>Total</b>	<b>100%</b>	<b>600</b>

### **2.5.2 Data collection from patient folders at the Out Patient Department**

Pregnant women apart from their Antenatal days may also report to the Out Patient Department for ill health during pregnancy. Their treatments are recorded in the patient folder and in the consulting room record books.

The information contained in the consulting room record books were:

1. The patient folder number
2. The date of the visit
3. The name of the patient
4. The address of the patient
5. Age
6. Sex
7. New or old case
8. Patient diagnosis
9. Insured or Non-insured

Health information Department of the hospital at the end of each day enters the above information into a database system. The database system could be used to retrieve OPD numbers of pregnant women who reported to the hospital during the month.

Based on this, 300 folders were sampled and the following variables needed for the study were recorded:

- Age
- Diagnosis
- Body weight

- Gestation Age
- Medicines prescribed
- Dosages prescribed
- Previous medication
- Reasons for use of medicine

#### **2.5.2.1 Sampling Technique**

The OPD numbers of pregnant women who visited the hospital during the three months period (January to March 2009) was a the sampling frame from which the 300 folders were selected by Simple random sampling.

#### **2.5.2.2 Pre-testing and review of the data collection tool**

The first twenty (20) folder numbers which were retrieved were used to pre-test the data collection tool. Based on the feedback from the pre-testing the framework for data collection was modified and finalised.

### **2.6 Data processing and analysis**

For easy analysis the questionnaires were coded and entered into SPSS version 16.0 for windows software. The coded data was checked for accuracy and completeness. The data from ANC and OPD were analyzed separately, data from ANC was analysed by combining the three strata to obtain overall results. The processed data were presented as summarized results in frequency tables, percentages and charts.

## CHAPTER THREE

### 3.0 RESULTS

#### 3.1 PREGNANT WOMEN AT ANC

##### Section 3.1.1 Demographic Characteristics

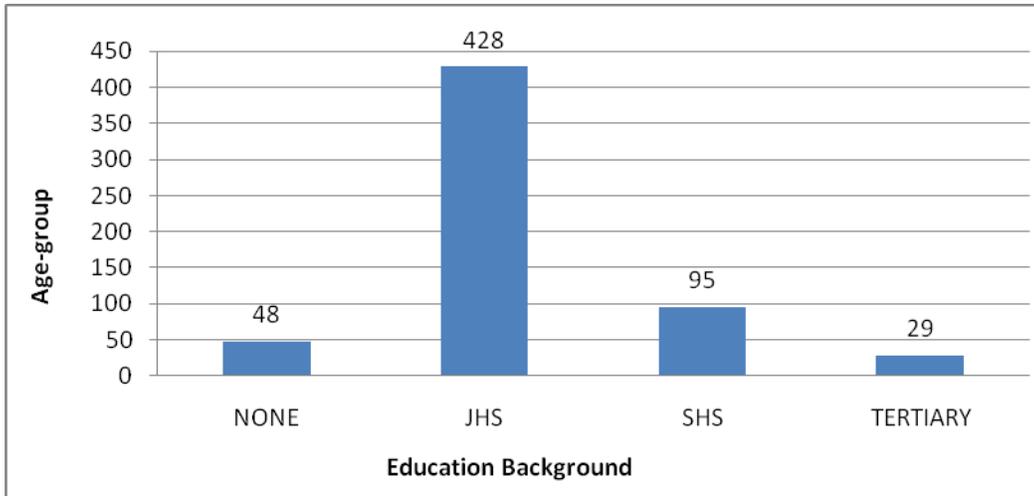
Six hundred (600) pregnant women attending the antenatal clinic were interviewed. Their ages were collated in a grouped data as shown below with frequencies of occurrence.

The dominant age-group was women between 26 to 30 years, which represents 31% of pregnant women interviewed.

**Table 3.1 Age-group of pregnant women interviewed**

<b>Age-group</b>	<b>Frequency</b>	<b>Percentage</b>
<b>11 - 15</b>	8	1.3
<b>16 - 20</b>	61	10.2
<b>21 - 25</b>	153	25.5
<b>26 - 30</b>	186	31.0
<b>31 - 35</b>	107	17.8
<b>36 - 40</b>	65	10.9
<b>41 - 45</b>	18	3.0
<b>46 - 50</b>	2	0.3
<b>TOTAL</b>	<b>600</b>	<b>100</b>

Majority of the pregnant women interviewed had Basic education (428) as their highest level education. These represent 71.3% of the respondent.



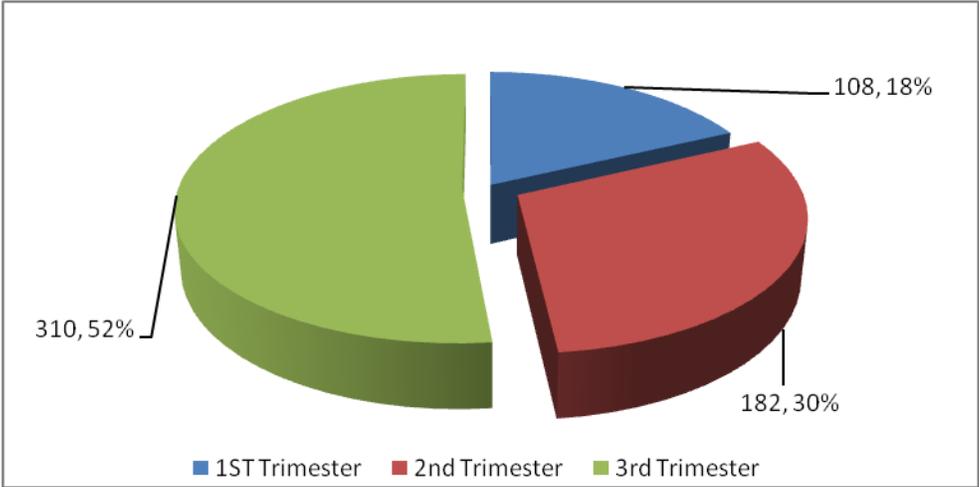
**Fig. 3.1 Educational background of pregnant women attending antenatal clinic (ANC) and frequencies of occurrence.**

Sixty-four percent of the pregnant women interviewed were farmers and traders.

**Table 3.2 Frequency distribution of occupational status of pregnant women.**

Occupation	Frequency	Percentage
Trader	185	30.8
Farmer	198	33
Beautician	168	28
Formal sector	49	8.2
TOTAL	600	100

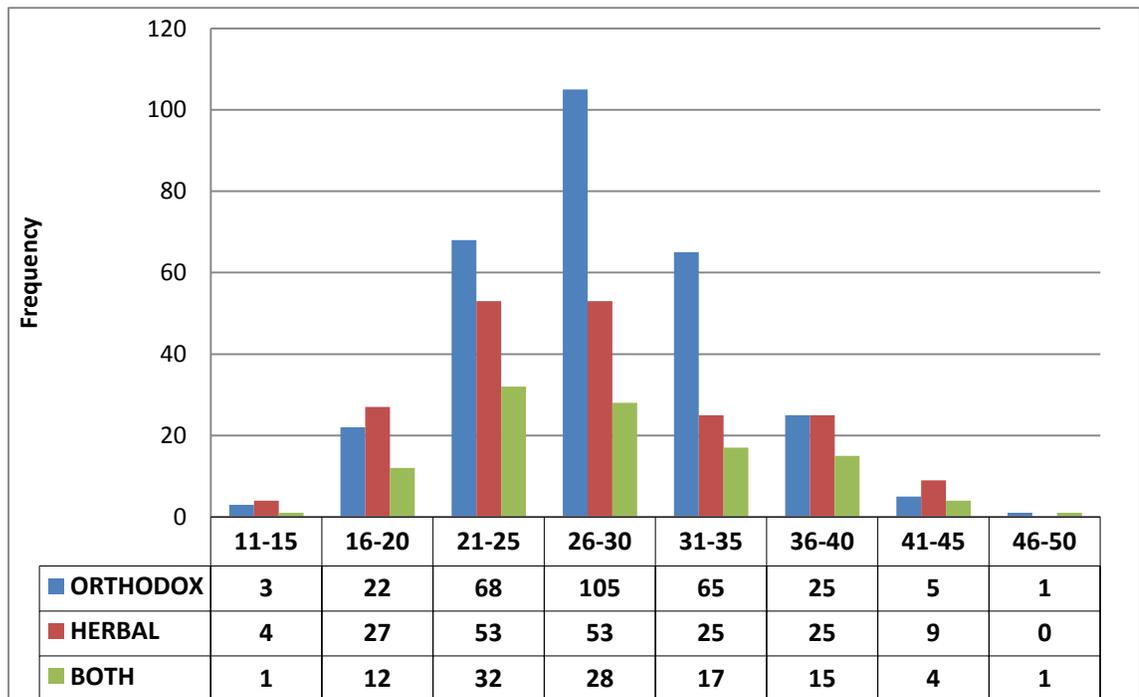
Most of the pregnant women interviewed were in their third trimester of pregnancy, these represent 52% of the respondents.



**Fig. 3.2 Gestational Age of pregnant women at ANC and percentages of occurrence**

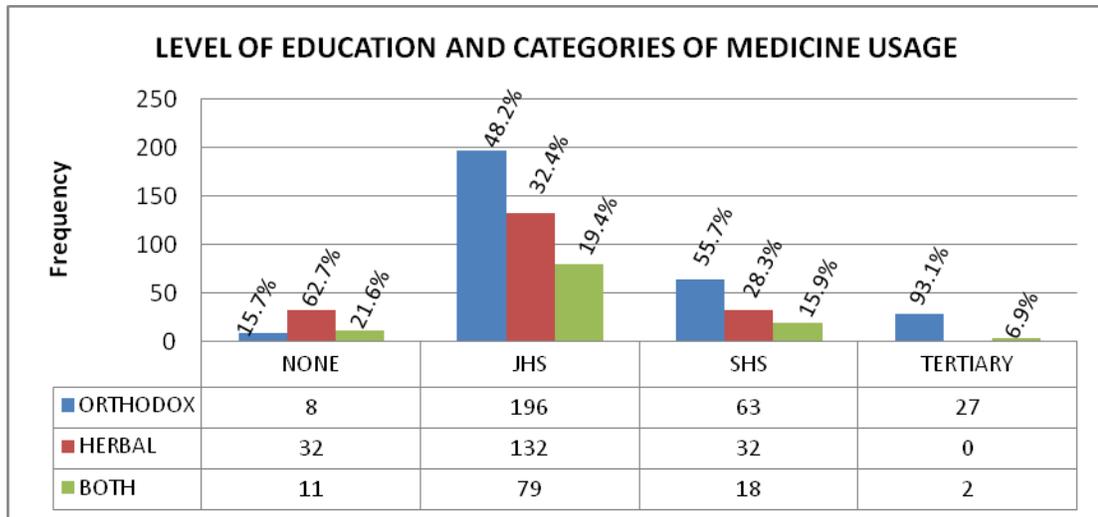
**Section 3.1.2 Relationships between medicine usage and demographic characteristics**

Use of herbal medicines were relatively higher among the very young and older age-groups (11-15 and 46-50) while orthodox medicine usage was common among the middle age-group.(26-30)



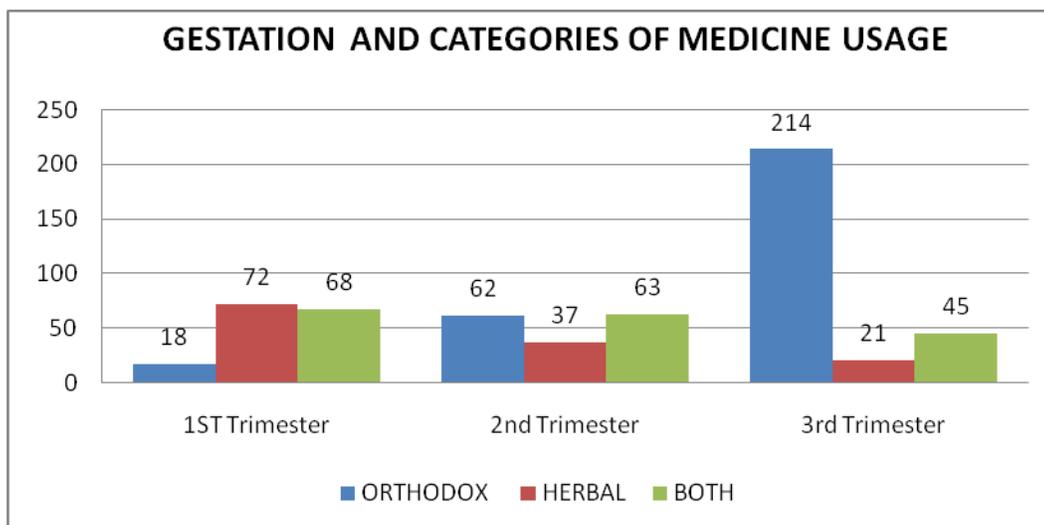
**Fig. 3.3 Relationship between categories of medicine and age-group of pregnant Women**

Pregnant women with higher level of education used more orthodox medicine than herbal medicine.



**Fig. 3.4** The relationship between educational background and categories of medicines usage.

Herbal medicine usage was high among pregnant women in their 1<sup>st</sup> trimester. Usage of orthodox medicine was however higher among those in the 3<sup>rd</sup> trimester.



**Fig. 3.5** Relationship between Gestational Age and the categories of medicines usage

**Section 3.1.3 commonly prescribed medicines and reported side-effect**

**Table 3.3 List of orthodox medicines prescribed at ANC and reported side effects**

<b>Orthodox medication used</b>	<b>Frequency of usage</b>	<b>Percentage who received drug</b>	<b>Reported side-effect(s)</b>	<b>Percentage who reported side-effects</b>
<b>Folic Acid</b>	600	100	-	
<b>Ferrous Sulphate (Fersolate)</b>	600	100	Diarrhoea, Dark stool	8.5%
<b>Multivite</b>	600	100	-	-
<b>Ascorbic Acid (Vitamin C)</b>	441	73	-	-
<b>Sulfadoxime + Pyrimethamine</b>	420	70	Restlessness/Insomnia	7.6%
<b>Acetamenophine (Paracetamol)</b>	378	63	-	-
<b>Simple Linctus BPC</b>	185	31	-	-
<b>Zincofer</b>	146	24	Diarrhoea	3.4%
<b>Clotrimazole vaginal pessaries</b>	129	22	-	-
<b>Mist Magnesium Trisilicate</b>	101	17	-	-
<b>Promethazine theoclate (Avomine)</b>	96	16	-	-
<b>Amoxicillin</b>	68	11	-	-
<b>Ibuprofen sodium</b>	51	8	-	-
<b>Artesunate</b>	66	5	Dizziness, Headache	1.5%
<b>Salbutamol</b>	24	4	-	-
<b>Diclofenac Sodium</b>	21	3	-	-

**Table 3.4 Common Classes of orthodox drugs prescribed at ANC showing frequency and percentages**

<b>Classes of drugs</b>	<b>Name of drug</b>	<b>Freq</b>	<b>%</b>
<b>Haematinics</b>	Folic acid, ferrous sulphate, multivite, Zincofer	600	100
<b>Analgesics</b>	Paracetamol, ibuprofen, diclofenac	450	75
<b>Anti-fungal</b>	Clotrimazole vaginal pess	129	22
<b>Anti-malaria</b>	Sulfadoxime+Pyrimethamine, Artesunate	66	11
<b>Antacid</b>	Mist Magnesium Trisilicate	49	8
<b>Anti-biotics</b>	Amoxicillin	45	8
<b>Anti-tussive</b>	Simple Linctus BPC	39	7

**Table 3.5 List of herbal medicines used by pregnant women and reported side-effects with frequencies and percentages.**

<b>Herbal medication used</b>	<b>Frequency</b>	<b>Percentage who received drug</b>	<b>Reported side-effect(s)</b>	<b>Percentage who reported side-effects</b>
<b>Living bitters</b>	82	26.8	Weakness, Diarrhoea	6.1
<b>Yafo pioneer mixture</b>	64	21.0	Severe waist pain	7.8
<b>Pomaa bitters</b>	54	17.6	-	-
<b>Yafo tonic</b>	33	10.8	-	-
<b>Adutwumwaa bitters</b>	32	10.5	Palpitation	6.3
<b>Tree bark-enema</b>	17	5.5	Severe contraction	11.7

### **Section 3.1.4 Reasons for medicine usage in pregnancy**

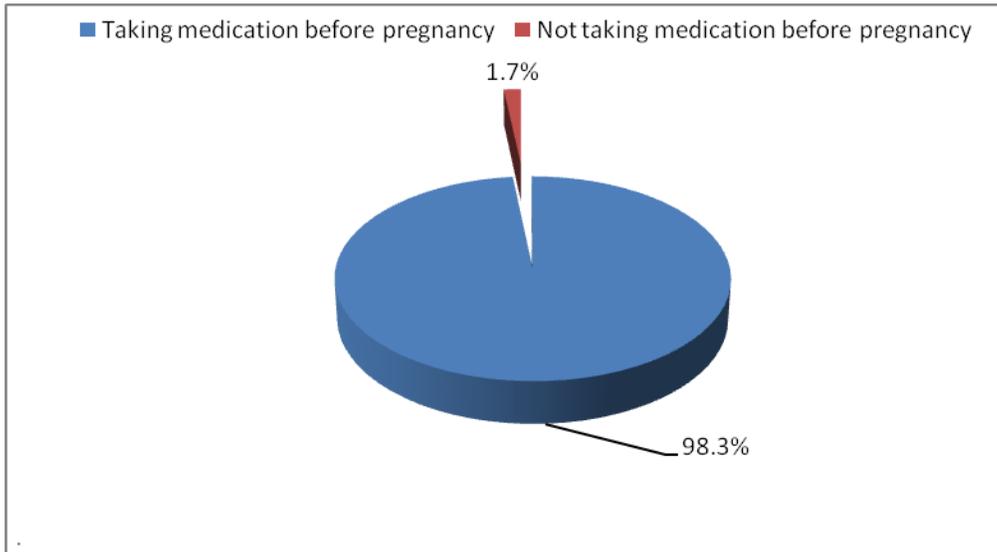
**Table 3.6 Common reasons for usage of orthodox medicine at ANC**

<b><u>Orthodox Medicine</u></b>	<b><u>Frequency</u></b>	<b><u>Percentages</u></b>
To prevent anaemia and vitamin deficiency in pregnancy	600	100
To prevent malaria in pregnancy	420	70
As pain killer	378	63
To relief cough	105	31
To treat vaginal candidiasis	129	22
To manage GIT disturbances	101	17
To suppress Nausea and vomiting	96	16
To manage lower abdominal pain	51	9
To treat malaria	66	5
To treat vaginal bleeding	24	4

**Table 3.7 Common reasons for use of herbal medicine recorded at ANC**

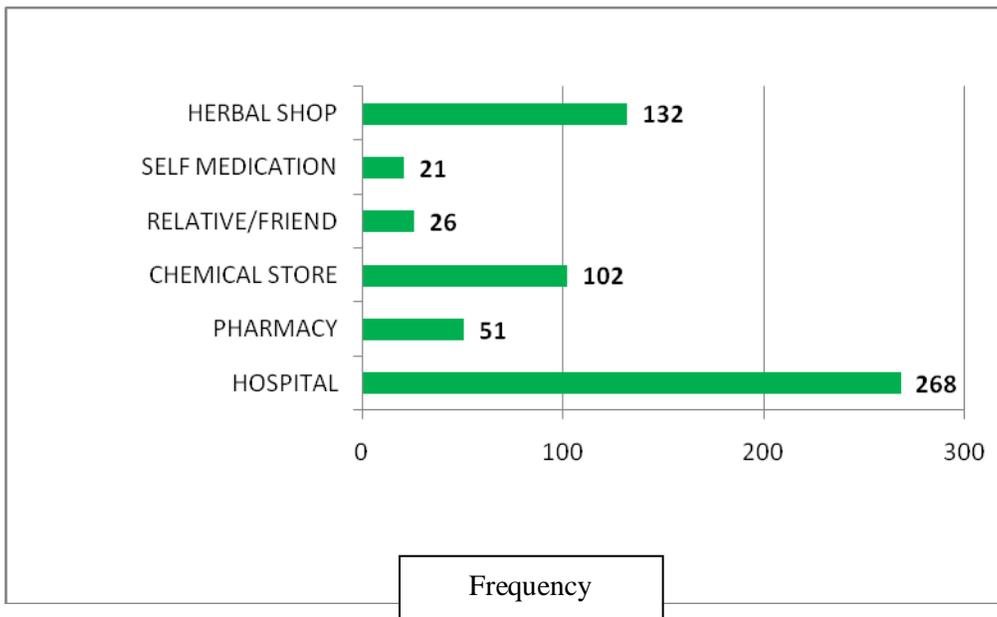
<b>Herbal medicine</b>	<b>Frequency</b>	<b>Percentages</b>
To treat malaria	88	28.7
For abdominal pain	55	18.1
To abort pregnancy	42	13.7
To protect pregnancy	39	12.7
For smooth delivery	32	10.5
To keep baby kicking	20	6.5
For breast milk	16	5.2
For free bowels	7	2.3
To manage vaginal bleeding	5	1.6
To keep baby healthy in uterus	2	0.7

98.3% of women were taking medications before their pregnancies were detected.



**Fig. 3.6 Women on medication before they became pregnant**

Majority of pregnant women obtained their medications from hospital.(268)



**Fig 3.7 The sources of previous medication of pregnant women at ANC.**

**TABLE 3.9 List of medicines previously used by pregnant women prior to attending ANC, their frequency, reason for use and other levels of risk and safety in pregnancy.**

<b>Previous medicine use</b>	<b>Freq</b>	<b>%</b>	<b>Reason for use</b>	<b>Trimester of risk</b>	<b>Category of safety</b>
<b>Ampicillin capsules</b>	83	13.8	Stomach ache	-	A
<b>Multivite</b>	453	75	For healthy baby	-	A
<b>Metronidazole (Flagyl)</b>	45	7.5	Stomach ache	-	A
<b>Diclofenac Sodium</b>	26	4.3	Severe bodily pains	3	C
<b>Dexamethasone</b>	64	10.6	To gain weight	1	C
<b>Indomethacin (indocid)</b>	55	9.2	Bodily pain	3	C
<b>Aspirin + paracetamol (Efpac)</b>	21	3.5	Bodily pains	1,2,3	D
<b>Ciprofloxacin</b>	45	7.5	Stomach ache	1,2,3	D
<b>Paracetamol</b>	212	35.3	For bodily pains		
<b>Misoprostol (Cytotec)</b>	72	12	To induce abortion	1,2,3	X
<b>Ergometrine</b>	39	6.5	To induce abortion	1,2,3	X
<b>Gynaecoside</b>	22	3.6	To induce abortion	1,2,3	X
<b>Menstrogen</b>	17	2.8	To induce abortion	1,2,3	X
<b>Tree bark/Herbal concoction</b>	17	2.8	To induce abortion, Sustain pregnancy		
<b>Yafo tonic</b>	33	5.5	Sustain pregnancy		
<b>Yafo pioneer mixture</b>	64	10.6	Sustain pregnancy		
<b>Pomaa bitters</b>	54	9.0	Sustain pregnancy		
<b>Anomadec concoction</b>	24	4.0	To induce abortion,		
<b>Adutwumwaa bitters</b>	32	5.3	Sustain pregnancy		
<b>Living bitters</b>	82	13.6	GIT disturbances		

**Table 3.9 A frequency table showing the number of drugs per pregnant woman at ANC prescribed by doctors and midwives**

The average number of drugs prescribed per person was four(4) with standard deviation (SD) of 1.626

<b>Number of Drugs (x)</b>	<b>Frequency (f)</b>	<b>Percentages</b>
<b>1</b>	<b>2</b>	<b>0.3</b>
<b>2</b>	<b>20</b>	<b>3.3</b>
<b>3</b>	<b>109</b>	<b>18.2</b>
<b>4</b>	<b>163</b>	<b>27.2</b>
<b>5</b>	<b>202</b>	<b>33.7</b>
<b>6</b>	<b>96</b>	<b>16.0</b>
<b>7</b>	<b>5</b>	<b>0.8</b>
<b>8</b>	<b>3</b>	<b>0.5</b>
<b>36</b>	<b>600</b>	<b>100</b>

### **3.2 ANALYSIS OF PATIENT FOLDERS AT OPD**

#### **Section 3.2.1 Demographic characteristics**

The modal age-group of pregnant women attending OPD was 36-40 years

**Table 3.10 Age-group of pregnant women recorded at OPD**

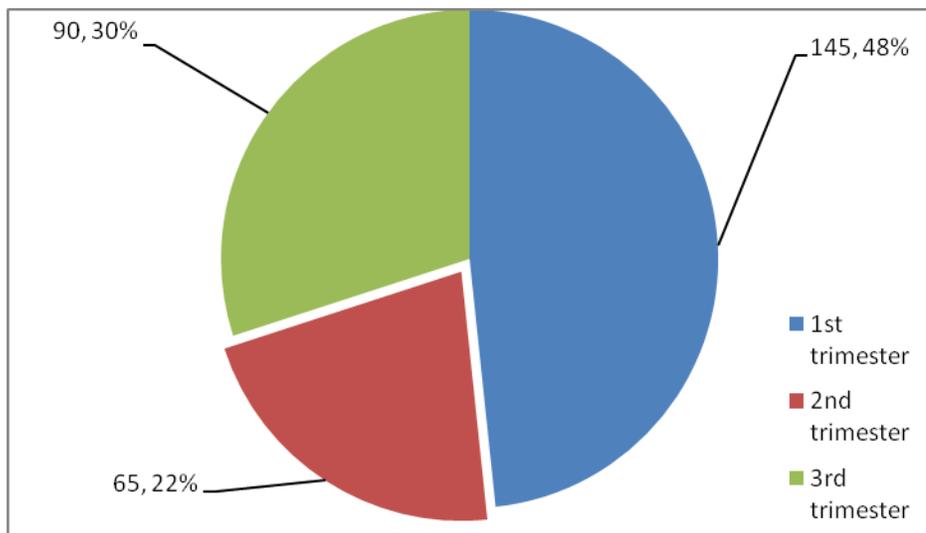
<b>Age-group</b>	<b>Frequency</b>	<b>Percentage</b>
<b>11 - 15</b>	<b>1</b>	<b>0.4</b>
<b>16 – 20</b>	<b>4</b>	<b>1.3</b>
<b>21 – 25</b>	<b>49</b>	<b>16.3</b>
<b>26 – 30</b>	<b>65</b>	<b>21.7</b>
<b>31 – 35</b>	<b>69</b>	<b>23.0</b>
<b>36 – 40</b>	<b>88</b>	<b>29.3</b>
<b>41 - 45</b>	<b>19</b>	<b>6.3</b>
<b>46 - 50</b>	<b>5</b>	<b>1.7</b>
<b>TOTAL</b>	<b>300</b>	<b>100</b>

**Table. 3.11 Frequency and percentages of weights of pregnant women at OPD. The weights ranges from 42kg to 88kg.**

The mean weight of pregnant women attending OPD was 59kg

Weight(kg)	Frequency	Percentage
42 – 48	30	10.0
49 – 55	75	25.0
56 – 62	97	32.3
63 – 69	47	15.7
70 – 76	43	14.4
77 – 83	4	1.3
84 - 90	4	1.3
TOTAL	300	100

Majority of pregnant women attending OPD were in their 1<sup>st</sup> trimester (48%)



**Fig. 3.8 Gestational age of pregnant women at OPD**

### Section 3.2.2 Medicine usage at OPD

**Table 3.12 Drugs prescribed at OPD showing frequency of use, percentage, reasons for use and levels of risk or safety in pregnancy as recorded from patient folder**

<u>Medicine</u>	<u>Reason for use</u>	<u>Trimester of risk</u>	<u>Category of safety</u>
Ascorbic Acid	To aid iron absorption	-	A
Flucloxacillin	To treat Staph infection	-	A
Amoxicillin	GIT disturbance	-	A
Multivite	As food supplement	-	A
Ferrous Sulphate	To correct anaemia	-	A
Promethazine theoclate(Avomine)	To manage nausea and vomiting	-	A
Hyoscine Butylbromide	Abdominal cramps	-	A
Methyldopa	To manage HPT	-	A
Metronidazole	To treat GIT disturbance	-	A
Miconazole Vag pess/cream	Vulvo vaginal candidiasis	-	A
Paracetamol	Body pains/headache	-	A
Folic Acid	To prevent folate deficiency	-	A
Nugel	GIT disturbance	-	A
Erythromycin	For cough	-	A
Zincofer	To correct Anaemia	-	A
Cetirizine Hydrochloride	To manage Itching	-	A
Cefuroxime Axetil	To treat infection	-	A
Amoxicillin + clavulanic	To treat infection	-	A
Omeprazole	GIT disturbance	-	A
Aluminium Hydroxide	GIT disturbance	-	A
Oral Rehydration Salt	To prevent dehydration	-	A
Simple Linctus BPC	For cough	-	A
Clindamycin	To treat infection	-	A
Athemeter + Lumefantrine	To treat malaria	1	B
Quinine Dihydrochloride	To treat malaria	1	B
Amodiaquine	To treat malaria	1	B
Mebendazole	To treat worm infestation	-	C
Diazepam	To correct Insomnia	3	C
Nifedipine	To manage HPT	3	C
Ibuprofen Sodium	Bodily pains	3	D
Carbamazepine	To manage epilepsy	1,2,3	X
Phenobarbitone	To manage epilepsy	1,2,3	X

Haematinics were the commonly prescribed class of medicine at OPD.

**Table 3.13 Common classes of drugs prescribed at OPD**

<b>Classes of drugs</b>	<b>Name of drug</b>	<b>Freq</b>	<b>%</b>
<b>Haematinics</b>	Folic acid, ferrous sulphate, multivite, Zincofer	288	96.0
<b>Analgesics</b>	Paracetamol, ibuprofen, diclofenac	181	60.4
<b>Anti-Malaria</b>	Sulfadoxime+Pyrimethamine, Artesunate, Amodiaquine, Quinine, Artemeter+lumefantrine	112	37.4
<b>Anti-fungal</b>	Clotrimazole vaginal pess	101	33.7
<b>Anti-biotics</b>	Amoxicillin, Augmentin, Clindamycin	96	32.0
<b>Anti-Spasmodics</b>	Hyoscine Butylbromide	68	22.7
<b>Antacids</b>	Mist Magnesium Trisilicate, Nugel	45	15.0
<b>Anti-tussive</b>	Simple Linctus BPC	38	12.7
<b>Anti-Emetics</b>	Promethazine theoclate	14	4.6
<b>Anti-Hypertensives</b>	Methyldopa Nifedipine	6	2.6

Average number of drugs prescribed per person was 5 with standard deviation of 1.395

**Table 3.14 Number of drugs prescribed per person at OPD**

<b>Number of Drugs (x)</b>	<b>Frequency (f)</b>	<b>Percentage</b>
1	7	2.4
2	12	4.0
3	42	14.0
4	49	16.3
5	78	26.0
6	102	34.0
7	6	2.0
8	4	1.4
$\Sigma$	<b>300</b>	<b>100</b>

### **Section 3.2.3 Common diagnosis among pregnant women**

**Table 3.15 Top ten frequently diagnosed conditions in pregnant women at OPD  
as recorded from the patient folders showing frequency and percentages**

Malaria was the highest diagnosed condition among pregnant women at OPD (23.4%)

	<b>Condition</b>	<b>Frequency</b>	<b>Percentage</b>
<b>1</b>	Malaria	96	23.4
<b>2</b>	Epigastric/GIT disturbance	63	14.2
<b>3</b>	Vulvo vaginal candidiasis	48	11.3
<b>4</b>	Nausea and vomiting	21	5.0
<b>5</b>	Urinary Tract Infection	19	4.5
<b>6</b>	Lower abdominal pain	15	3.5
<b>7</b>	Anaebmia	10	2.4
<b>8</b>	Respiratory tract infection	9	2.1
<b>9</b>	Myalgia	9	2.1
<b>10</b>	Dysurea	7	1.7
	All others	126	29.8
		423	100

## **CHAPTER FOUR**

### **4.0 DISCUSSION & CONCLUSION**

The research was carried out to determine and evaluate the extent and safety of medicines used in pregnancy at Dormaa Presbyterian Hospital. The findings of this research have established that both orthodox medicines and herbal medicines were used to varying extent among pregnant women and that usage of medicines among pregnant women were found to be influenced by several factors such as age, educational background and gestational age of pregnancy. Over 90% of expectant mothers took four to five drugs at some stage of pregnancy, and a significant number of pregnant women (98.3%) were taking medications at the time their pregnancies were detected. <sup>(fig 3.6)</sup>

#### **4.1 Pregnant women at Antenatal clinic**

Antenatal care refers to care given to a pregnant woman to ensure that she goes through pregnancy, labour, and puerperium very healthy with the delivery of a healthy baby. <sup>(54)</sup>

It is required that a good history and examination is done on each visit to identify any problems that may arise to have an adverse effect on the pregnancy. Pregnant women are expected to visit the antenatal clinic on a monthly basis, midwives at the clinic keep accurate records of all visits and any problems (risk factors) identified are treated. During each visit, checks are made on some vital indicators, these include Anaemia (Hb), Weight gain (approximately 0.5kg/week), Blood pressure, Uterine size, Presentation and Position of the baby and Foetal heart sounds. Pregnant women are also given a health education on diet and exercise as well as medicines to keep both mother and baby healthy to ensure smooth delivery.

#### **4.1.1 Age group distribution and categories of medicines usage**

The age group of pregnant women was found to be related to the categories of medicines frequently used during pregnancy, the age group between 11-20 years representing a total of 11% of the study population and 36-50 years representing 14.1%, used 45% and 48.5% respectively of herbal medicines compared to 36% and 44% of orthodox medicines. This trend is indicative of the influence exerted on the younger generation by the older. Thus, herbal medicine usage is higher among the very young and very old pregnant women, and it may be reflective of the cultural practices of Ghanaian communities.

However, the age group from 21-35 years representing a total of 74.3% of the study population was found to use a lot more orthodox medicines than herbal medicines. Particularly, the age group between 26-30 years had the highest number of pregnant women using orthodox medicines (105) than herbal medicines (53), whereas age group 21-25 years was found to have the highest number of pregnant women using both herbal and orthodox medicines combined (32). <sup>(table 3.1)</sup>

This trend is quite encouraging since the use of orthodox medicines in which extensive clinical trials have been carried out in both humans and animals for safety in pregnancy, were found to have been used widely by the study population, especially pregnant women within the peak age-group (21-35 years). However, studies have shown that combination of medications rather than individual medicines are possibly associated with increased risk of birth defect and maternal mortality. <sup>(57)</sup> Therefore, the continual and extensive use of herbal medicines and combined herbal and orthodox medicines by pregnant women is a major problem that must be addressed through public education.

#### **4.1.2 Educational level and categories of medicine usage**

Education was found to be related to the category of medicines used by pregnant women. There was a direct relationship between higher education and the use of orthodox medicines, and an indirect relationship between higher education and the use of herbal medicines. <sup>(fig 3.6)</sup>

The use of orthodox medicine was found to be high among all groups of pregnant women. However, 93% of women with tertiary education were found to use orthodox medicine alone with the remaining 7% using both herbal and orthodox medicine. None was found to use herbal medicine alone. Two hundred and seventeen (217) pregnant women representing 51% of pregnant women with basic education (JHS) were found to use orthodox medicine alone whereas one hundred and thirty two (132) women representing 31% of pregnant women with basic education were found to use herbal medicine alone. Also 18% were found to use both herbal and orthodox medicines. Usage of orthodox medicines was again found to be higher among pregnant women with secondary education than basic education.

Sixty-six percent (66%) were found to use orthodox medicine alone, 24% were found to use herbal medicine alone and 10% were found to use both herbal and orthodox medicine together.

Pregnant women with no education were found to use more herbal medicines than orthodox medicine, 60% were found to have used herbal medicine alone on their visit to the antenatal clinic, 17% used orthodox medicine alone and 23% were found to use both herbal and orthodox medicines. <sup>(fig 3.1)</sup>

All the pregnant women who were found using herbal medicine alone were actually on their first visit to the antenatal clinic, representing 30% of the total study population. Also, 42% of pregnant women who were found using orthodox medicine alone were mainly on their routine visit to the clinic, while the remaining 28% found using both herbal and orthodox medicines were equally divided between those on first and routine visits.

Thus, 93% of pregnant women with tertiary education, 66% of pregnant women with secondary education, 51% of pregnant women with basic education and 17% of pregnant women with no formal education were found using orthodox medicines alone, indicating a direct relationship between education and the use of orthodox medicines. Conversely, 60% of pregnant women with no formal education, 31% of pregnant women with basic education, and 24% of pregnant women with secondary education were found using herbal medicine alone, indicating an inverse relationship between education and the usage of herbal medicines. Also, usage of combined herbal and orthodox medicines were not influenced by level of education.

It can be deduced from this trend that as women become more educated they tend to appreciate the risk associated with medication use in pregnancy and opt for orthodox medicine as a more safer option, and they also visit hospital more often for antenatal care. Lastly, pregnant women who used herbal medicine alone or in combination were characterized by very young and very old age, little or no education, increased parity, chronic diseases and receipt of social assistance.

#### **4.1.3 Gestational age and categories of medicine usage**

Orthodox medicine usage among pregnant increased from eighteen (18) women in the 1<sup>st</sup> trimester representing 6% to a maximum of two hundred and fourteen (214) women representing 81% in the 3<sup>rd</sup> trimester, usage of herbal medicine declined from seventy two (72) women in the 1<sup>st</sup> trimester representing 37% to a minimum of twenty one (21) women representing 10%. The number of pregnant women using both herbal and orthodox medicine combined also declined from a high of sixty three (63) women in the 1<sup>st</sup> trimester representing 48% to a low of forty five (45) women representing 35%. A total of one hundred and fifty eight (158) pregnant women representing 26.3% of the study population were found to have used medicines in the first trimester, 27% and 46.7% respectively had used medicines in the second and third trimesters of their pregnancies. Of the 1-3% of birth defect and maternal mortality attributed to medication usage, the greatest risks are thought to occur in the first trimester of pregnancy during which organogenesis occurs<sup>(2)</sup>. The challenge to health workers therefore is to intensify public education on medication use in pregnancy particularly in the first trimester, in order to reduce the high usage of medicines among pregnant women.<sup>(fig 3.2)</sup>

This trend indicates that, as pregnant women visits antenatal clinic and receives health education on their pregnancies, their preference for orthodox medicines as a safer option increases over herbal medicine. That notwithstanding, both categories of medicines were found to have been used throughout pregnancy. Thus, in spite of health education given at antenatal clinics, some pregnant women still stick to their preference for herbal medicines while others combine both herbal and orthodox medicines for varying reasons including gestational age, educational backgrounds and age of the pregnant woman.

#### **4.1.4 Reported side-effects of orthodox medicine**

The World Health Organization (WHO) defines adverse drug reaction (side-effects) as a response to a medicine which is noxious and unintended, and which occurs at doses normally used in man for the prophylaxis, diagnosis or therapy of a disease, or for the modification of physiological function.<sup>(56)</sup>

Very few side-effects were reported to medicines used at ANC, 8.5% of pregnant women complained of dark stool diarrhoea to ferrous sulphate (Fersolate), 7.6% also reported of restlessness and insomnia to sulfa doxime + pyrimethamine (sp) combination and 1.5% reported of dizziness and headache to Artesunate. lastly, 3.4% reported of diarrhoeas to zincofer (Haematinic).<sup>(table 3.3)</sup> Generally, majority reported of no side-effect to orthodox drugs prescribed at ANC, which indicates that medications used were mostly tolerated and safe. The side-effects reported above were however found to be consistent with previously documented evidence of the various medicines involved and pregnant women admitted to having received appropriate counseling.

#### **4.1.5 Reported side-effects of herbal medicines**

Majority of pregnant women interviewed reported of side-effects to herbal medicines, 6.1% reported of weakness and diarrhoea to living bitters, 7.8% reported of severe waist pains to Yafoo Pioneer Mixture, while 11.7% reported of severe lower abdominal contractions upon enema with a tree-back concoction. Also, 12.5% reported of dizziness and abdominal pain on consumption of anomadec concoction. Palpation was the reported side-effect to Audutwumwaa Bitters, 6.3% reported of the side-effect.<sup>(table 3.5)</sup>

These side-effect were not documented and pregnant women were not cautioned against their use, which poses a great risk to both mother and foetus contrary to the general belief that herbal medicines are of natural origin and hence safer. The Food and Drugs Board must ensure that herbal medicines are labelled with appropriate precautions.

From the above findings, it is obvious that orthodox medicines which were predominantly used in antenatal clinics were relatively safer than alternate herbal medicines. However, this research is limited by the sample size of the population and the fact that only a very small fraction of herbal medicines available in Ghana were involved in the research. Also, these findings were subject to personal views of respondents hence the degree of bias could be high.

#### **4.1.6 Reasons for usage of orthodox medicines at ANC**

Folic Acid, Fersolate and Multivite were used to prevent anaemia and vitamin deficiency in pregnancy. Sulfadoxime + Pyrimethamine (SP) was used to prevent malaria in pregnancy. As a national policy pregnant women in their 16<sup>th</sup> week are to be given a first dose of SP, a 2<sup>nd</sup> dose is given after one month and a third dose is given one month after the 2<sup>nd</sup> dose to prevent malaria in pregnancy<sup>(38)</sup> Paracetamol was prescribed at ANC as a pain killer. Artesunate was prescribed to treat malaria while clotrimazole Vaginal Pessaries was given as treatment for vulvo vaginal candidiasis. Promethazine theodate, mist magnesium trisilicate and simple lienctus BPC were given respectively to prevent nausea and vomiting, to manage GIT disturbance and as a cough suppressant. Diclofenac sodium was prescribed to manage lower abdominal pains. <sup>(table 3.6)</sup> All medicines prescribed at ANC were found to be orthodox medicines and were also found

to be correctly indicated in pregnancy regarding safety. Indications were also found to be consistent with manufacturers recommendations based on documented evidence.

Medication use in pregnancy is often inevitable, reasons for medication usage were found to range from chronic illness to common complaints frequently associated with pregnancy. However, prescribing in pregnancy is a balancing act with benefits and risks, as a result each area of pharmacologic therapy intervention must be assessed separately and specifically for each person to reduce risk.

#### **4.1.7 Reasons for usage of herbal medicine in pregnancy**

Pregnant women using herbal medicine alone or as a complement to orthodox medicine attributed some of the following reasons for their usage, 28% used herbal medicine as treatment for malaria, 18.1% to manage abdominal pain, and 10.5% for smooth delivery. 13.7% used herbal medicine to abort pregnancies while 6.5% used it to keep baby kicking. 12.7% used it to protect the pregnancy and to prevent morning sickness, 5.2% for breast milks, 2.3% for free bowels and 1.6% and 0.7% respectively used it to prevent vaginal bleeding and to keep baby healthy in uterus. Some of these reasons could be attributed to the perceived safety of natural remedies over orthodox medicines. However the type of herbs used and reasons for usage may vary from location to location within Ghana. <sup>(table 3.7)</sup>

In a study performed at the United states San Francisco Women's Health Clinic, researchers determined that 13% of pregnant women surveyed were using herbal supplements during their pregnancy mainly for the relief of morning sickness. Further, a

survey of nurse-midwives in North Carolina revealed that 37% offer herbal medicine before considering conventional medications, and that 30% believed that herbal preparations were safer. <sup>(55)</sup> Comparing these two findings, it was observed that herbal medicines were widely used among pregnant women and for various reasons, and further confirms earlier results documented by researchers in US.

#### **4.1.8 Sources of previous medications.**

The source of medication is of utmost importance because factors such as storage conditions, and appropriate counseling ultimately affects the safety of medicines.

One hundred and thirty two (132) pregnant women representing 22% of the study populations obtained their medications from a herbal shop and twenty one (21) women representing 3.5% had engaged in self medication. Twenty six (26) women representing 4.3% obtained their medication from a friend/relative, one hundred and two (102) women representing 17% obtained their medication from a chemical store. Finally, fifty one (51) women and two hundred and sixty eight (268) women respectively representing 8.5% and 44.7% obtained their medications from a pharmacy and hospital. <sup>(fig 3.6)</sup>

This result is not too encouraging because a total of only 52% of pregnant women obtain their medications from sources where trained professionals were available to provide appropriate counseling, the remaining 48% obtained their medications from non approved sources or sources where service providers were not trained professionals. However, this observation may not be too different from what pertains in the general

population because the country is constrained with qualified health professionals and facilities.

#### **4.1.9 Previous medicine usage among pregnant women and indications.**

Medication usage prior to conception and before pregnancy is detected may have a lasting consequence on the outcome and safety of the pregnancy and other medications likely to be used during pregnancy.<sup>(fig 3.6)</sup>

Majority of the pregnant women interviewed admitted to have taken medicines previously, prior to attending antenatal clinic for care but could not recollect all the names, however they could provide information on the indications for use. For the treatment of bodily pains, Aspirin + Paracetamol (Efpac), Diclofenac sodium, paracetamol, and indomethacin, were used, for stomach ache, Ciprofloxacin, Metronidazole, living bitters and Ampicillin were used. To induce abortion, misoprostol (cytotec), Ergometrine, Gynaecoside, Menstrogen, a tree bark concoction and Anomadic concoction were used. To sustain the pregnancy and prevent morning sickness, yafo tonic, multivite, herbal concoctions, yafo pioneer mixture, pomaa bitters and Adutwumwaa bitters were used.<sup>(table 3.8)</sup> Most of these medicines were found to be contra-indicated in pregnancy and manufacturers caution against their use in pregnancy. Four percent of pregnant women were found to have used Efpac, the Aspirin component of this medicine is known to be associated with an increased risk of gastrochisis and therefore is contra-indicated throughout pregnancy<sup>(36)</sup>, 7.5% of pregnant women were found to have used ciprofloxacin, which is also contra-indicated throughout the three

trimesters of pregnancy, ciprofloxacin is known to cause bone atrophy in weight bearing joints of immature animals and should be avoided<sup>(28)</sup>

A total of 13% of pregnant women were also found to have used diclofenac sodium and indomethacin, both NSAID's, these group of drugs are known to cause closure of the fetal ductus arteriosus, fetal renal impairment, bleeding disorders and delayed labour when given in late pregnancy. Also, women who take these drugs during pregnancy or just before conception may have an 80 percent increased risk of miscarriage, according to a study in the August 16 2003 British Medical Journal. <sup>(1)</sup> They are better avoided in the 3<sup>rd</sup> trimester of pregnancy.

Furthermore, a total of 24.9% pregnant women were found to have used FDA pregnancy safety category X medications at least once during pregnancy. Women who had such exposure were more commonly characterized by younger age (11-20 years), increased parity (4-8 times) and students.

In summary a total of 43.5% of pregnant women were found to have had exposure to medications in FDA category C, D, and X, the most common of these being misoprostol, egometrine, and diclofenac. In a 2008 Canadian study, 19.4% of pregnant women were found to have used FDA category C, D, and X medications at least once during pregnancy, the most common of these being albuterol, co-trimoxazole, ibuprofen, naproxen, and oral contraceptives. <sup>(52)</sup>

Comparing these two study's, it was obvious that the pattern exhibited in this research was very alarming and poses a great challenge to the Nation, in its quest to meet MDG-5 which is to reduce maternal mortality by three fourth by the year 2015. Pharmacist and other healthcare professionals should take up the challenge of ensuring that these medications are not readily accessible to the general public.

#### **4.1.10 Number of drugs per person at ANC**

The number of drugs prescribed per person ranged from one to eight. 2 person's were prescribed just one drug at antenatal clinic representing 0.3% of the study population, 20 person's representing 3.3% were prescribed 2 drugs, 109 were prescribed 3 drugs representing 18.2% and 163 were prescribed 4 drugs representing 27.2%. Also 202 pregnant women were prescribed 5 drugs representing 33.7%, 96 were prescribed 6 drugs representing 16% while 5 and 3 persons respectively were prescribed 7 and 8 drugs. The most commonly prescribed medicines at ANC in conformity with national policy on antenatal care were folic acid, fersolate and multivite (routine drugs), and others, depending on a person's peculiar complaints or state of laboratory and scan findings. <sup>(table 3.9)</sup>

The average number of drugs prescribed per person was found to be 4, this high average is likely to discourage compliance to medication. Nonetheless, research estimates that over 90% of expectant mothers take three to four drugs at some stage of pregnancy.<sup>(2)</sup> The trend observed in this research therefore confirms other documented findings, however because any medication can present risk in pregnancy and not all risks are known, it is important to minimize drug usage in pregnancy.

#### **4.1.11 Common classes of drugs prescribed at ANC**

Haematinics were the commonest class of drugs prescribed at ANC, 100% of pregnant women received haematinic at ANC. This was in conformity with the national policy on antenatal care in Ghana. Analgesics were the second commonest class of drugs prescribed at ANC, 75% of pregnant women received them. The third commonest class of drugs were anti-fungals, 21.5% of women received them. Anti-malarials were the 4<sup>th</sup> commonest class of drugs prescribed at ANC representing 11%. Antacids, antibiotics and anti-fungals were the 5<sup>th</sup>, 6<sup>th</sup>, and 7<sup>th</sup> commonest classes of drugs prescribed at ANC respectively. The trend observed was found to be consistent with common complaints associated with pregnancy in general which includes anemia, backache, fatigue, heartburns and indigestion. <sup>(table 3.4)</sup>

### **4.2 Results from patient folders at OPD**

#### **4.2.1 Dosage regimen prescribed and corresponding weights**

All prescriptions analyzed at OPD were found to have dosages corresponding with the correct weights of pregnant women, which is very encouraging. However, in prescribing for pregnant women, the minimum effective dose of the drug and a risk benefit assessment are equally important in ensuring safety, also, pharmacokinetic changes are common in pregnancy and may dictate a dosage increase. Pregnancy itself can cause a temporary worsening or amelioration of some diseases and may influence drug doses. <sup>(2,21)</sup> It is therefore important for physicians and midwives to understand the effect of medications and know the point in foetal development when drugs are most toxic and when foetal organs are most susceptible in determining the dosage.

#### **4.2.2 Common classes of medicines prescribed at OPD**

Because the use of medication is inevitable in pregnancy, it is recommended that drugs must be carefully selected from each class in order to ensure maximum benefit and reduce risk.

The haematinics, (Fersolate, multivite and Folic Acid) representing 96% were the most frequently prescribed medicines at OPD, Analgesics (Paracetamol) representing 60.4% was the next commonly prescribed medicine at OPD. The anti-malarials, Artesunate, Amodiaquine, Artemeter + Lumefantrine, and Quinine dihydrochloride representing 37.4% were the third commonly prescribed medicines at OPD. Anti-fungi's Clotrimazole Vaginal Pessaries used in the treatment of vulvo vaginal candidiasis was the fourth commonly prescribed medicine at OPD. Anti-biotics for the treatment of infections (Erythromycin, Flucloxacillin, Amoxicillin, Clarythromycin, Cefuroxime and Amoxicillin + Clavulanic acid) were the fifth commonly prescribed medicines at OPD. The anti-spasmodic's hyoscine butylbromide was the sixth commonly prescribed medicines at OPD. <sup>(table 3.13)</sup> All other medications used at OPD were prescribed to varying extent and were found to be consistent with complaints commonly associated with pregnancy, they were also in conformity with national policy on antenatal care.

#### **4.2.3 Safety of medicines used at OPD**

Prescribing medicines in pregnancy is a balancing act and that no risk free alternatives exist.<sup>(3)</sup> The safety of medicines used in pregnancy is paramount in determining the outcome of the pregnancy. Medications have been characterized according to FDA categorization using a 5-letter system, A, B, C, D, and X. Where A is the safest and X is

the least safe. Drugs belonging to categories D and X, are often contra-indicated in pregnancy. The British National Formulary (BNF), categorises medicines according to their trimester of risk, by denoting 1, 2, and 3, to mean first, second, and third trimesters respectively. Each numeral attached to a medicine denotes the trimester in which that medicine specifically poses a risk in pregnancy.

Generally majority of medicines used at OPD were found to be safe in all trimesters of pregnancy representing 65.7% of the thirty five drugs recorded at OPD. 14% of the drugs were found to be contra-indicated in the 1<sup>st</sup> trimester of pregnancy, a further 14% were found to be contra-indicated in the 3<sup>rd</sup> trimester of pregnancy. These drugs were however found to have been prescribed in the trimesters in which they are presumed to be safe. The anti-epileptic drugs carbamazepine and phenobarbitone belonging to FDA safety category X and contra-indicated in all (3) three trimesters of pregnancy were also found to have been prescribed at OPD. A total of 17.3% of drug prescribed at OPD were however found to belong to FDA safety category C and X for which usage in pregnancy is cautioned.

It must be stated that drugs found to have been used at OPD and belonging to FDA safety category C and X, were used in the management of chronic illness (epilepsy and psychiatric disorders). The above results further supports previously conducted research in which 19.4% of pregnant women were found to have used medications belonging to FDA category C, D, and X in Canada in 2008.

#### **4.2.4 Number of drugs prescribed per person at OPD**

Because any medication can present risk in pregnancy, and because not all risk are known, it is recommended that the safest pregnancy-related pharmacy is as little pharmacy as possible.

The number of drugs prescribed per person at OPD ranged from one to eight. the average number of drugs prescribed per person was found to be five (5).<sup>(table 3.14)</sup> It was observed that depending on the diagnosis the three routine drugs were prescribed in addition to other medications. In addition, there were more than one diagnosis per person hence the high average obtained. A research conducted in Dormaa Presbyterian Hospital in December 2008 by the quality assurance team indicated that the average number of drugs prescribed per person at general OPD was approximately four (4). Also, a further research conducted in UK among pregnant women was found to be four (4)<sup>(32)</sup>, hence the trend observed was higher and poses a challenge which needs to be reversed through dialogue with medical officers and midwives of the hospital.

#### **4.2.5 Frequently diagnosed conditions among pregnant women at OPD**

Malaria in pregnancy accounted for 23.4% of the study population and was the highest diagnosed conditions among pregnant women reporting to OPD. Epigastic discomfort or gastrointestinal disturbances was second commonest among pregnant women reporting to OPD, accounting for 14.2% of the population. Vaginal candidiasis was the third commonly diagnosed condition at OPD accounting for 11.3%. Nausea and vomiting was the fourth commonly diagnosed condition, lastly, Urinary tract infections

and lower abdominal pain were the fifth and sixth commonly diagnosed conditions respectively at OPD.

Anaemia was the 7<sup>th</sup> commonly diagnosed condition among pregnant women accounting for 2.4% of the population.

Respiratory tract infections, myalgia and dysurea were also common among pregnant women, accounting for a total of 5.9% of the study population. All other conditions that were diagnosed accounted for 29.8% of the study population. <sup>(table 3.15)</sup>

This pattern of morbidity or complaints observed was found to be quite consistent among pregnant women population in Ghana. However, comparing with previously documented evidence in USA, some similarities and differences emerged, nausea and vomiting was the most diagnosed condition among pregnant women in USA. Backache, hemorrhoids, indigestion, bleeding gums, and skin problems followed in that order. From the above observation, it can be inferred that malaria, vaginal candidiasis, and anaemia were not reported among the commonest conditions in pregnant women in USA, whereas, hemorrhoids and skin problems were also not reported among the commonest conditions diagnosed in pregnant women in Dormaa Presbyterian hospital . Furthermore, it was observed that the top three commonest conditions reported in both study's were different, thus, public education of Ghanaian pregnant women need to be focused particularly on the prevention of malaria, vaginal candidiasis, and anaemia during pregnancy since these have been found to be common among pregnant women of Ghana but not those of European origins.

#### **4.2.6 Limitations of research**

This research was limited by the size of the of the study population, a larger population size of about three thousand (3000) pregnant women or more taken from different sites and locations in Ghana, could give a better and more reliable outcomes which could be generalize for the entire population. Also, a prospective study of pregnant women undertaken throughout pregnancy will give a more convincing information about the safety of medicines rather than retrospective study's. Most research including this one, involving pregnant women are based on retrospective studies in humans and an extension of studies usually carried out in animals. Results are therefore often subjective and inconclusive as is the case in this research.

Subsequent research on this subject is necessary to continuously establish the safety and effectiveness of majority of medicines used in pregnancy which were not captured in this work and even those that are perceived to be safe in pregnancy, since it has been well established that any drug can present risk in pregnancy and not all risk are known. This will enable healthcare workers to be better informed to improve the life of pregnant women and reduce the incidence of birth-defect and maternal mortality associated with medication usage.

### **4.3 CONCLUSION**

The research on the usage of medicines among pregnant women at Dormaa Presbyterian hospital came out with the following findings;

That both orthodox medicines and herbal medicines were widely used among pregnant women, often in combination, and that the commonest reasons for herbal medicine usage were to treat malaria, to manage abdominal pain and to protect the pregnancy.

The safety and effectiveness of herbal medicines found to have been used in pregnancy could not be ascertained due to non existence of appropriate clinical trials and documented data. Conversely, majority of orthodox medicines were found to be relatively safe and effective in pregnancy.

The extent of medicine usage among pregnant women who visit Dormaa hospital was found to be high. An average of four (4) drugs per person were prescribed at ANC and five (5) drugs per person were prescribed at OPD , this high average is likely to discourage compliance and adherence to medication, coupled with enhanced risks.

In view of the fact that in pregnancy medication usage should be reduced to the barest minimum in order to reduce risk to both mother and foetus, every effort should be made to reduce these high averages recorded.

### **4.4 RECOMMENDATIONS**

The following recommendations could help improve on antenatal care and reduce the incidence of maternal mortality and medicine related birth defect based on the research findings.

1. Intensive education on the dangers of medicine usage during pregnancy should be carried out by the public health division of the ministry of health and all medicine outlets to create public awareness so as to reduce the incidence of medicine related birth defect and maternal mortality.
2. To reduce the pill burden on pregnant women and the average number of drugs per person, the Ministry of Health (MOH) should advocate for the use of a combined tablet of fersolate, folic acid, multivite, and ascorbic instead of the current separate drugs. This will also aid adherence and compliance for a healthy mother and ultimately baby.
3. Extensive research by the Centre for Scientific Research into Plant Medicines should be carried out on the safety of herbal medicines in pregnancy, to reduce any birth defect or maternal mortalities that may be associated with their use, since herbal medicine usage has been found to be extensive among pregnant women.
4. Health care professionals caring for pregnant women who require medication should take care in choosing dosages and types of drugs that maximize effectiveness while minimizing foetal risk, it is essential for health care professionals to understand the effect of medications and to know the point in foetal development when drugs are most toxic and when foetal organs are most susceptible.
5. The Food and Drugs Board must ensure that herbal medicines are labelled with appropriate precautions.
6. Risk-benefit assessment and counseling should involve the patient and her current state of health, physicians must consider the effect of drug exposure on

the developing foetus as balanced against the risk of worsening maternal illness in caring for pregnant women. The mothers health is ultimately important and must be considered at all times.

7. Herbal medicines should be properly researched and incorporated into the regular health care fleet of orthodox medicines, as it has been established by this research work that usage is on the increase
8. Pharmacist and other healthcare professionals should take up the challenge of ensuring that medications which are contra-indicated in pregnancy are not readily accessible to the general public.

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8) If yes what type of medicine and why did you take them, O = Orthodox H = Herbal

O/H	NAME OF MEDICINE	DOSAGE AND FREQUENCY	REASONS FOR USE

9) Did you experience any side –effect with your medication? YES  NO

10) If yes what type of side-effect

#	PREVIOUS SIDE-EFFECTS	CURRENT SIDE -EFFECTS
1		
2		
3		
4		
5		
6		
7		

11) Where did you obtain the medicine from?

- Hospital
- Pharmacy shop
- Chemical Store
- Friend /Relative
- SelfMedication
- Herbalist

12) Gravidity: How many times have you been pregnant?.....

13) Do you have any children? YES  NO

14) If yes how many? .....

## APPENDIX II

### Analysis of patient folders at OPD for prescribed medications

(1) Age.....

(2) Diagnosis/reasons for visit.....

(3) Body weight / kg.....

(4) Gestational Age?

1<sup>st</sup> trimester (0-3 MONTHS)

2<sup>nd</sup> trimester (4- 6 MONTHS)

3<sup>rd</sup> trimester 7-9 MONTHS

(5) Medicines prescribed and reason for use O= Orthodox H= Herbal

O/H	NAME OF MEDICINE	DOSAGE AND FREQUENCY	REASONS FOR USE /DIAGNOSIS

(6)

	Pregnancy related problem if stated	Drug related problem if (stated)	Causes of previous morbidity (if any)
1			
2			
3			
4			
5			