

# **A Study on Awareness of Warning Signs and Complications of Pregnancy in Sylhet and Chittagong in Bangladesh**

**A Dissertation submitted to the Department of Pharmacy, East West University, Bangladesh, in partial fulfillment of the requirements for the Degree of Bachelor of Pharmacy**

**Submitted by  
Israt Jarin Shanta  
ID: 2012-3-70-046**



**Department of Pharmacy  
East West University**

## **Declaration by the Research Candidate**

I, Israt Jarin Shanta ID: 2012-3-70-046, hereby declare that the dissertation entitled “A Study on awareness of warning signs and complications of pregnancy in Sylhet and Chittagong” submitted by me to the Department of Pharmacy, East West University in partial fulfillment of the requirement for the award of the degree Bachelor of Pharmacy is a trustworthy record of original and genuine research work carried out by me.

-----  
Israt Jain Shanta  
ID: 2012-3-70-046  
Department of Pharmacy,  
East West University

## **Certificate by the Supervisor**

This is to certify that the thesis entitled " A Study on awareness of Warning signs and Complications of pregnancy in Sylhet and Chittagong" submitted to the Department of Pharmacy, East West University for the partial fulfillment of the requirement for the award of the degree Bachelor of Pharmacy is a trustworthy record of original and genuine research work carried out by Israt Jarin Shanta, ID: 2012-3-70-046 under our supervision and guidance.

---

Nigar Sultana Tithi  
Senior Lecturer and Supervisor  
Department of Pharmacy  
East West University

---

Nishat Nasrin  
Senior Lecturer and co-Supervisor  
Department of Pharmacy  
East West University

## **Certificate by the Chairperson**

This is to certify that the thesis entitled “A Study on awareness of Warning Signs and Complications of pregnancy in Sylhet and Chittagong” submitted to the Department of Pharmacy, East West University for the partial fulfillment of the requirement for the award of the degree Bachelor of Pharmacy is a trustworthy record of original and genuine research work carried out by Israt Jarin Shanta, ID: 2012-3-70-046.

-----  
Dr. Shamsun Nahar Khan

Associate Professor & Chairperson

Department of Pharmacy

East West University

## Acknowledgement

At first, I would like to thank the almighty “ALLAH” the most gracious and merciful for enabling me to successfully complete my research work soundly and orderly.

I would like to express my deepest gratitude to my research supervisor, **Ms. Nigar Sultana Tithi**, Senior Lecturer, Department of Pharmacy, East West University, who has always been optimistic and full of passion and ideas. Her generous advice, constant supervision, intense support, enthusiastic encouragements and reminders during the research work not only helped shape this study but also helped me into being a better researcher. A special thanks to my co-supervisor **Ms. Nishat Nasrin**, her in-depth thinking, motivation, timely advice and encouragement have made it possible for me to complete this research.

I put forward my most sincere regards and profound gratitude to Chairperson **Dr. Shamsun Nahar Khan**, Associate Professor, Department of Pharmacy, East West University, for her inspiration in my study. She also paid attention for the purpose of my research work and extending the facilities to work.

I want to give special thanks to **Farzana Akter** and **Md. Zahid Hasan**, who helped me a lot providing guidance. A special thanks to **Nahida Akter, my all Friends and Batchmates**, who provided mental support throughout the research period. I also would like to thank my research partner **Afruja Nuri** for helping me throughout the session.

I express my sincere thankfulness to my family for guiding me all through my life, including that for my research project.

I also want to remember all of the staffs of Pharmacy Department with a thankful heart who helped me a lot to complete this research work successfully.

During the course of this research work, a lot of experiences I have received in which is of inestimable value for my life.

## **Dedication**

My beloved parents ; MD. Abdul Hakim and Kazi Asma Akter  
and my Siblings

## Table of Contents

Serial No	Topic	Page No
	List of tables	I
	List of figures	I-II
	List of abbreviation	III
	Abstract	IV
	Key words	IV
	<b>Chapter 1 : Introduction</b>	1-30
1.1	Pregnancy	2
1.1.1	Multiple pregnancy	2
1.1.2	Initiation	2-3
1.1.3	Development of embryo and fetus	3-4
1.1.4	Timing of childbirth	6-7
1.1.5	Maternal change	5-6
1.1.6	Timing of childbirth	6-7
1.17	Symptoms and Discomfort	7-8
1.2	Diagnosis	8-9
1.2.1	Physical signs	8-9
1.2.2	Biomarkers	9

<b>1.2.3</b>	<b>Ultrasound</b>	<b>9</b>
<b>1.2.4</b>	Antenatal care	9-11
<b>1.3</b>	Nutrition	11-12
<b>1.3.1</b>	Abortifacient food	12-14
<b>1.3.2</b>	Weight Gain	14
<b>1.3.3</b>	Exercise	15
<b>1.3.4</b>	Sleep	15
<b>1.3.5</b>	Environmental Toxins	15
<b>1.4</b>	Medications	16-17
<b>1.4.1</b>	Recreational products	16-17
<b>1.6</b>	Major complications	17-28
<b>1.6.1</b>	Gestational Diabetes	17-20
<b>1.6.2</b>	Gestational Hypertension	20-21
<b>1.6.3</b>	Preeclampsia in pregnancy	21-23
<b>1.6.4</b>	Thyroid Disorder	23-26
<b>1.6.5</b>	Anemia in pregnancy	26-28
<b>1.7</b>	Other complications	28
<b>1.8</b>	Mortality Rate of mother and fetus	29-30
	<b>Chapter2:Literature Review</b>	32-38
	<b>Significance of the study</b>	39-40
	<b>Aims and objectives</b>	40
	<b>Chapter3: Methodology</b>	42-43
<b>3.1</b>	Type of the study	42
<b>3.2</b>	Study population	42
<b>3.3</b>	Inclusion Criteria	42
<b>3.4</b>	Exclusion Criteria	42
<b>3.5</b>	Data Collection Method	42



<b>3.6</b>	Development of the Questionnaire	42
<b>3.7</b>	Sampling Technique	42
<b>3.8</b>	Data collecting period	42
<b>3.9</b>	Data analysis	43
	Chapter 4: Results	45-58
<b>4.1</b>	Graphical representation of age distribution	45
<b>4.2</b>	Graphical representation of educational status	45-46
<b>4.3.1</b>	Graphical representation of Obstetric History	46
<b>4.3.2</b>	Graphical representation of Abnormalities	47
<b>4.4</b>	Graphical representation of LMP	47
<b>4.5</b>	Graphical representation of consultation	48
<b>4.6</b>	Graphical representation of vitamin intake	48
<b>4.7</b>	Graphical representation of occupational status	49
<b>4.8</b>	Graphical representation of occupational chemical	49
<b>4.9</b>	Graphical representation of Information of rubella virus	50
<b>4.10</b>	Graphical representation Awareness about warning signs	50
<b>4.11</b>	Graphical representation Knowledge of warning signs	51
<b>4.12</b>	Graphical representation of danger sign	52
<b>4.13</b>	Graphical representation of getting information	53
<b>4.14</b>	Graphical representation of antenatal care visiting	53
<b>4.15</b>	Graphical representation of getting information from health care provider	54
<b>4.16</b>	Graphical representation of communication with	55

	doctor	
<b>4.17</b>	Graphical representation of abortifacient food	56
<b>4.18</b>	Graphical representation of various complication	57
<b>4.19</b>	Graphical representation of complication in before and current pregnancy	57
<b>4.20</b>	Graphical representation of current pregnancy	58
<b>4.21</b>	Graphical representation of growth of baby	58
<b>4.22</b>	Medication during pregnancy	59
	<b>Chapter 5: Discussion</b>	62-64
	<b>Chapter6: Conclusion</b>	66
	<b>Chapter 7: References</b>	68-74

## List of Tables

Serial no	Title	Page no
1.1	Timing of childbirth	6
4.1	Medication during and after pregnancy	59-60

## List of figures

<b>Fig 4.1</b>	<b>Graphical representation of age distribution</b>	<b>45</b>
<b>Fig 4.2</b>	Graphical representation of educational status	45-46
<b>Fig 4.3.1</b>	Graphical representation of Obstetric History	46
<b>Fig 4.3.2</b>	Graphical representation of Abnormalities	47
<b>Fig 4.4</b>	Graphical representation of LMP	47
<b>Fig 4.5</b>	Graphical representation of consultation	48
<b>Fig 4.6</b>	Graphical representation of vitamin intake	48
<b>Fig 4.7</b>	Graphical representation of occupational status	49
<b>Fig 4.8</b>	Graphical representation of occupational chemical	49
<b>Fig 4.9</b>	Graphical representation of Information of rubella virus	50
<b>Fig 4.10</b>	Graphical representation Awareness about warning signs	50
<b>Fig 4.11</b>	Graphical representation Knowledge of warning signs	51
<b>Fig 4.12</b>	Graphical representation of danger sign	52
<b>Fig 4.13</b>	Graphical representation of getting information	53
<b>Fig 4.14</b>	Graphical representation of antenatal care visiting	53
<b>Fig 4.15</b>	Graphical representation of getting information	54

	from health care provider	
<b>Fig 4.16</b>	Graphical representation of communication with doctor	55
<b>Fig 4.17</b>	Graphical representation of abortifacient food	56
<b>Fig 4.18</b>	Graphical representation of various complication	57
<b>Fig 4.19</b>	Graphical representation of complication in before and current pregnancy	57
<b>Fig 4.20</b>	Graphical representation of current pregnancy	58
<b>Fig 4.21</b>	Graphical representation of growth of baby	58

### **List of Abbreviation**

CDC- Centers for Disease Control and Prevention

WHO - World Health Organization

PIH - Pregnancy Induced Hypertension

ACOG - American Congress of Obstetricians and Gynecologists

UNICEF - United Nations Children's Fund

IUGR - Intra Uterine Growth Retardation

NIH- National Institutes of Health

NCBI- National Center for Biotechnology Information

NICHD- Eunice Kennedy Shriver National Institute of Child Health

GTD- Gestational Trophoblastic Disease

GDM- Gestational Diabetes Mellitus

SCH- Subclinical Hypothyroidism

TSH -Thyroid Stimulating Hormone

APA- American Pregnancy Association

AACE- American Association of Clinical Endocrinologists

ATA- American Thyroid Association

## Abstract

This study was aimed to assess womens' awareness about danger signs and warning signs as well as complications of pregnancy. It was a survey based study where 154 pregnant women from different area of Sylhet and Chittagong were interviewed with a questionnaire. All the respondent were in second and third trimester. From the study about 54.55% respondents were found with various complication during pregnancy mainly urinary incontinence and uterine abnormalities. In this study a satisfactory level (98.05%) of the respondent knew at least one warning sign and 100% of the respondents knew about at least one danger sign. They have good knowledge about water break (98.05%) and child movement (97.40%). Most of the respondent knew vomiting as a indicative danger sign (75.97%). But they have little knowledge about some warning and danger signs that is quiet dangerous during pregnancy such as prolonged labor (0%), sepsis (1.30%), loss of consciousness(0%) severe headache (9.09%), drainage of liquor (1.95%) and early labor(0.65%). Apparently most of the respondent knew about abortifacient food pineapple(90.91%) and raw papaya (79.87%) and they didn't know about smoked seafood. They have few knowledge about fish containing mercury (2.60%) and soft cheese (0.65%). All the respondent knew information during pregnancy and most information they came to know from doctor and their family members. Among the respondents 98.05% received antenatal care. Since the respondent number was very poor, to conclude it can be said that it is important to increase the awareness level about complication among the women and therefore further research work should be carried out with more number of respondents.

**Key Words** *Pregnancy Awareness, Warning and Danger Signs, Antenatal Care, complications*

**CHAPTER 1**  
**INTRODUCTION**

## **1.1 Pregnancy**

Pregnancy, also known as gravidity or gestation, is the time during which one or more offspring develops inside a woman (Nihd.nih.gov, 2016). Pregnancy can occur by sexual intercourse or assisted reproductive technology. It usually lasts around 40 weeks from the last menstrual period (LMP) and ends in childbirth. This is just over nine lunar months, where each month is about 29½ days. When measured from conception it is about 38 weeks. An embryo is the developing offspring during the first eight weeks following conception, after which, the term fetus is used until birth. Symptoms of early pregnancy may include missed periods, tender breasts, nausea and vomiting, hunger, and frequent urination (Nihd.nih.gov, 2016).

### **1.1.1 Multiple pregnancy:**

The term "multiple births" refers to the delivery of twins and higher-order multiples (ie, triplets, quadruplets, etc). Multiple births occur when multiple fetuses are carried during a pregnancy with the subsequent delivery of multiple neonates. Pregnancies complicated by multiple births are associated with a higher rate of neonatal morbidity and mortality, paralleling the increased risk of preterm delivery, low birth weight, and other associated high-risk morbidities.

Maternal morbidity and mortality are also increased in pregnancies complicated by multiple gestations and multiple births (Emedicine.medscape.com, 2016).

### **1.1.2 Initiation**

#### **Fertilization and implantation in humans**

There are multiple definitions of the beginning of a pregnancy. Healthcare providers normally count the initiation of pregnancy from the first day of the woman's last menstrual period. Using this date, the resulting fetal age is called the gestational age. . In in vitro fertilization, gestational age is calculated by days from oocyte retrieval + 14 days (the 14 days before the known time of conception) (Tunon *et al.* 2000).

Through an interplay of hormones that includes follicle stimulating hormone that stimulates folliculogenesis and oogenesis creates a mature egg cell, the female gamete. Fertilization is the event where the egg cell fuses with the male gamete, spermatozoon.



After the point of fertilization, the fused product of the female and male gamete is referred to as a zygote or fertilized egg. The fusion of male and female gametes usually occurs following the act of sexual intercourse. Fertilization can also occur by assisted reproductive technology such as artificial insemination and *in vitro* fertilization.

Fertilization (conception) is sometimes used as the initiation of pregnancy, with the derived age being termed fertilization age. Fertilization usually occurs about two weeks before the *next* expected menstrual period. A third point in time is also considered by some people to be the true beginning of a pregnancy: This is time of implantation, when the future fetus attaches to the lining of the uterus. This is about a week to ten days after fertilization. In this model, during the time between conception and implantation, the future fetus exists, but the woman is not considered pregnant (Womens-health.co.uk, 2016).

### **1.1.3 Development of embryo and fetus**

Cell division begins approximately 24 to 36 hours after the male and female cells unite. Cell division continues at a rapid rate and the cells then develop into what is known as a blastocyst. The blastocyst arrives at the uterus and attaches to the uterine wall, a process known as implantation. The development of the mass of cells that will become the infant is called embryogenesis during the first approximately ten weeks of gestation. During this time, cells begin to differentiate into the various body systems.

The basic outlines of the organ, body, and nervous systems are established. By the end of the embryonic stage, the beginnings of features such as fingers, eyes, mouth, and ears become visible with placenta and umbilical cord. The placenta connects the developing embryo to the uterine wall to allow nutrient uptake, waste elimination, and gas exchange via the mother's blood supply. The umbilical cord is the connecting cord from the embryo or fetus to the placenta. After about ten weeks of gestational age, the embryo becomes known as a fetus. At the beginning of the fetal stage, the risk of miscarriage decreases sharply (Womens-health.co.uk, 2016).

During continued fetal development, the early body systems, and structures that were established in the embryonic stage continue to develop. Sex organs begin to appear during the third month of gestation. The fetus continues to grow in both weight and length,

although the majority of the physical growth occurs in the last weeks of pregnancy (Womens-health.co.uk, 2016).

#### **1.1.4 Determining gestational age**

The mean pregnancy length has been estimated to be 283.4 days of gestational age as timed from the first day of the last menstrual period and 280.6 days when retrospectively estimated by obstetric ultrasound measurement of the fetal biparietal diameter (BPD) in the second trimester. (Kieler *et al.*, 1995) Other algorithms take into account other variables, such as whether this is the first or subsequent child, the mother's race, age, length of menstrual cycle, and menstrual regularity. In order to have a standard reference point, the normal pregnancy duration is assumed by medical professionals to be 280 days (or 40 weeks) of gestational age.

The best method of determining gestational age is ultrasound during the first trimester of pregnancy. This is typically accurate within seven days (Acog.org, 2016). This means that fewer than 5 percent of births occur on the day of being 40 weeks of gestational age; 50 percent of births are within a week of this duration, and about 80 percent are within 2 weeks. For the estimation of due date, mobile apps essentially always give consistent estimations compared to each other and correct for leap year, while pregnancy wheels made of paper can differ from each other by 7 days and generally do not correct for leap year.(Chambliss and Clark, 2014). Once the estimated due date (EDD) is established, it should rarely be changed, as the determination of gestational age is most accurate earlier in the pregnancy.

The most common system used among healthcare professionals is Naegele's rule, which was developed in the early 19th century. This calculates the expected due date from the first day of the last normal menstrual period (LMP or LNMP) such as a shorter or longer menstrual cycle length. Pregnancy most commonly lasts for 40 weeks according to this LNMP-based method, assuming that the woman has a predictable menstrual cycle length of close to and conceives on the 14th day of that cycle.

The average time to birth has been estimated to be 268 days (38 weeks and two days) from ovulation, with a standard deviation of 10 days (Jukic *et al.*, 2013).

### **1.1.5 Maternal changes**

Breast changes as seen during pregnancy. The areolae are larger and darker. During pregnancy, the woman undergoes many physiological changes, which are entirely normal, including cardiovascular, hematologic, metabolic, renal, and respiratory changes. Increases in blood sugar, breathing, and cardiac output are all required. Levels of progesterone and oestrogens rise continually throughout pregnancy, suppressing the hypothalamic axis and therefore also the menstrual cycle. Pregnancy is typically broken into three periods, or trimesters, each of about three months (TheFreeDictionary.com, 2016; Collinsdictionary.com, 2016).

#### **First Trimester**

The events that lead to pregnancy begin with conception, in which the sperm penetrates the egg produced by an ovary. The zygote (fertilized egg) then travels through the woman's fallopian tube to the uterus, where it implants itself in the uterine wall. The zygote is made up of a cluster of cells formed from the egg and sperm. These cells form the fetus and the placenta. The placenta provides nutrients and oxygen to the fetus. Minute ventilation increases by 40% in the first trimester (Patient Medicine, 2016). The womb will grow to the size of a lemon by eight weeks. Many symptoms and discomforts of pregnancy like nausea and tender breasts appear in the first trimester (Nhs.uk, 2016a).

#### **Second trimester**

Weeks 13 to 28 of the pregnancy are called the second trimester. Most women feel more energized in this period. and begin to put on weight as the symptoms of morning sickness. The uterus, the muscular organ that holds the developing fetus, can expand up to 20 times its normal size during pregnancy. Although the fetus begins to move during the first trimester, it is not until the second trimester that movement, often referred to as "quickenings", can be felt. This typically happens in the fourth month, more specifically in the 20th to 21st week, or by the 19th week if the woman has been pregnant before. It is common for some women not to feel the fetus move until much later. During the second trimester, most women begin to wear maternity clothes (Nhs.uk, 2016a).

### **Third trimester**

The uterus expands making up a larger and larger portion of the woman's abdomen. During the final stages of gestation before childbirth the fetus and uterus will drop to a lower position. Final weight gain takes place, which is the most weight gain throughout the pregnancy. The woman's abdomen will transform in shape as it drops due to the fetus turning in a downward position ready for birth. During the third trimester it will drop down low. The fetus moves regularly, and is felt by the woman.

Fetal movement can become strong and be disruptive to the woman. Head engagement, where the fetal head descends into cephalic presentation, relieves pressure on the upper abdomen with renewed ease in breathing. It also severely reduces bladder capacity, and increases pressure on the pelvic floor and the rectum. It is also during the third trimester that maternal activity and sleep positions may affect fetal development due to restricted blood flow. For instance, the enlarged uterus may impede blood flow by compressing the vena cava when lying flat, which is relieved by lying on the left side (Stacey et al., 2011)

#### **1.1.6 Timing of childbirth**

<b>stage</b>	<b>starts</b>	<b>ends</b>
preterm	-	37weeks
Early term	37 week	39 weeks
Full term	39 weeks	41 weeks
Late term	41 weeks	42 weeks
Post term	42 weeks	-

In the ideal childbirth labor begins on its own when a woman is "at term"(Choosingly, 2016).Pregnancy is considered at term when gestation has lasted between 37 and 42 weeks. Events before completion of 37 weeks are considered preterm (World health organization). Preterm birth is associated with a range of complications and should be avoided if possible. Sometimes if a woman's water breaks or she has contractions before 39 weeks, birth is unavoidable. (Acog.org, 2016)

However, spontaneous birth after 37 weeks is considered term and is not associated with the same risks of a pre-term birth. Planned birth before 39 weeks by Caesarean section or labor induction, although "at term", results in an increased risk of complications. This is from factors including underdeveloped lungs of newborns, infection due to underdeveloped immune system, feeding problems due to underdeveloped brain, and jaundice from underdeveloped liver (NPR.org, 2011).

Babies born between 39 and 41 weeks gestation have better outcomes than babies born either before or after this range. This special time period is called "full term"(Acog.org, 2016). Whenever possible, waiting for labor to begin on its own in this time period is best for the health of the mother and baby (Choosingwisely, 2016). The decision to perform an induction must be made after weighing the risks and benefits, but is safer after 39 weeks (Choosingwisely, 2016). Events after 42 weeks are considered post term. When a pregnancy exceeds 42 weeks, the risk of complications for both the woman and the fetus increases significantly (Choosingwisely, 2016).

### **1.1.7 Symptoms and discomfort**

The symptoms and discomforts of pregnancy are those conditions that result from pregnancy but do not significantly interfere with activities of daily living or pose a threat to the health of the mother or baby. This is in contrast to pregnancy complications. Sometimes a symptom that is considered a discomfort can be considered a complication when it is more severe.

Common symptoms and discomforts of pregnancy include:

- Tiredness.
- Constipation
- Pelvic girdle pain
- Back pain
- Braxton Hicks contractions. Occasional, irregular, and often painless contractions that occur several times per day.
- Edema (swelling). Common complaint in advancing pregnancy. Caused by compression of the inferior vena cava (IVC) and pelvic veins by the uterus leads to increased hydrostatic pressure in lower extremities.

- Increased urinary frequency. A common complaint referred by the gravida, caused by increased intravascular volume, elevated GFR (glomerular filtration rate), and compression of the bladder by the expanding uterus. Urinary tract infection ((Merck Manuals Consumer Version, 2016)
- Varicose veins. Common complaint caused by relaxation of the venous smooth muscle and increased intravascular pressure. Haemorrhoids (piles). Swollen veins at or inside the anal area. Caused by impaired venous return, straining associated with constipation, or increased intra-abdominal pressure in later pregnancy (Vazquez, 2010).
- Regurgitation, heartburn, and nausea.
- Striae gravidarum, pregnancy-related stretch marks
- Breast tenderness is common during the first trimester, and is more common in women who are pregnant at a young age( John A. D, 2016)

## **.1.2 Diagnosis**

### **1.2.1 Physical signs**

Symptoms and discomforts of pregnancy

Most pregnant women experience a number of symptoms (Pregnancy Association American, 2012), which can signify pregnancy. A number of early medical signs are associated with pregnancy (Mayoclinic.org, 2016). These signs include:

- the presence of human chorionic gonadotropin (hCG) in the blood and urine
- missed menstrual period
- implantation bleeding that occurs at implantation of the embryo in the uterus during the third or fourth week after last menstrual period
- increased basal body temperature sustained for over 2 weeks after ovulation
- Chadwick's sign (darkening of the cervix, vagina, and vulva)
- Goodell's sign (softening of the vaginal portion of the cervix)
- Hegar's sign (softening of the uterus isthmus)
- Pigmentation of linea alba – Linea nigra, (darkening of the skin in a midline of the abdomen, caused by hyperpigmentation resulting from hormonal changes, usually appearing around the middle of pregnancy) (Mayoclinic.org, 2016).

- Darkening of the nipples and areolas due to an increase in hormones.

### **1.2.2 Biomarkers**

Pregnancy detection can be accomplished using one or more various pregnancy tests (Nhs.uk, 2016), which detect hormones generated by the newly formed placenta, serving as biomarkers of pregnancy (Cole L.A, 2016). Blood and urine tests can detect pregnancy 12 days after implantation (Qasim *et al.*, 1996). Blood pregnancy tests are more sensitive than urine tests (giving fewer false negatives). Home pregnancy tests are urine tests, and normally detect a pregnancy 12 to 15 days after fertilization. A quantitative blood test can determine approximately the date the embryo was conceived because HCG doubles every 36 to 48 hours. A single test of progesterone levels can also help determine how likely a fetus will survive in those with a threatened miscarriage (bleeding in early pregnancy) (Verhaegen *et al.*, 2012).

### **1.2.3 Ultrasound**

Obstetric ultrasonography can detect some congenital diseases at an early stage, estimate the due date, and detect multiple pregnancies (Whitworth *et al.*, 2010) :The resultant estimated gestational age and due date of the fetus are slightly more accurate than methods based on last menstrual period (Nguyen *et al.*, 1999). Ultrasound is used to measure the nuchal fold in order to screen for Down syndrome (Nguyen *et al.*, 1999) .

### **1.2.4 Antenatal care**

Many health problems in pregnant women can be prevented, detected and treated during antenatal care visits with trained health workers. WHO recommends a minimum of four antenatal visits, comprising interventions such as tetanus toxoid vaccination, screening and treatment for infections, and identification of warning signs during pregnancy. Globally, the proportion of women receiving antenatal care at least once during pregnancy was 83% for the period 2007–2014. However, only 64% of pregnant women received the recommended minimum of four antenatal care visits or more, suggesting that large expansions in antenatal care coverage are still needed (WHO, 2016). Antenatal care is necessary for

- How to recognize danger signs, what to do, and where to get help

- Good nutrition and its importance to the health of the mother and baby; how to get enough calories and essential macronutrients and micronutrients
- Good hygiene and infection prevention practices
- Risks of using tobacco, alcohol, medications, local drugs, and traditional remedies
- Rest and avoidance of heavy physical work
- Benefits of child spacing to mother and child; options for family planning services following the baby's birth
- Benefits (to mother and baby) of breastfeeding; importance of early and exclusive breastfeeding
- Protection against HIV and other sexually transmitted diseases through individualized risk reduction; availability and benefits of HIV testing; and specific issues related to mother-to-child transmission and living with AIDS (Gillespie, 1999).

Antenatal visits-area time-when women are particularly receptive to messages about pregnancy. Antenatal care can detect anemia, hypertensive disease, infections and other existing conditions and diseases that lead to high-risk pregnancy.

Antenatal visits should take place:

To 28th weeks gestation \_ every 4 weeks

28th-36th weeks \_ every 2 weeks

Thereafter \_ every week

In a normal pregnancy, with no complications, a minimum of three antenatal visits is acceptable in the first 20 weeks

### **Examination of the Pregnant Woman During Antenatal Care**

At each visit the following examinations should be done.

General- Blood pressure

Body weight

#### **Abdominal:**

Fundal level

Fetal lie



- Fetal presentation
  
- Fetal heart sounds (FHS)
- Record any new complaints
- Urine examination
  
- By dipstick for protein, glucose and ketones
  
- Assessment of fetal well-being
  
- Fetal size through assessment of fundal level (FL)
  
- Fetal kick count: at least 10 movements every 12 hours
  
- Fetal movements: absence precedes intrauterine fetal death (IUFD) by 48 hours
  
- Fetal heart sounds
  
- Ultrasound if it is available
  
- At 37 Weeks-Assessment of fetal size, lie, presentation (Gillespie , 1999).

### **1.3 Nutrition**

The single most important thing that pregnant women can do for her baby is to eat a healthy, well-balanced diet. A well-balanced diet is one that includes foods from all food groups in appropriate amounts, so as to ensure proper nutrition. Proper nutrition ensures that all essential nutrients (carbohydrates, fats, protein, vitamins, minerals and water) are supplied to the body to maintain optimal health and well-being.

Good nutrition is essential for normal organ development and functioning; normal reproduction, growth and maintenance; for optimum activity level and working efficiency; for resistance to infection and disease; and for the ability to repair bodily damage or injury.

All nutritional needs are increased in order to meet the needs of the pregnancy. Milk, eggs and other dairy products are inexpensive sources of calcium and protein. Dark green vegetables provide carbohydrates, water, bulk fiber, vitamins A, C, and B, calcium, iron, and magnesium; the darker green, the better. It is best to eat these vegetables raw

whenever possible, but steaming or baking will also retain most of the nutrients. Citrus and berry fruits provide a great deal of vitamin C, and yellow fruits and vegetables such as cantaloupe, sweet potato, carrots and mango are good sources of vitamin A. Both of these vitamins are important for fighting infection, boosting the immune system, cell structure development and preventing placental detachment (abruption).

Zinc is another important mineral for pregnant women, as it aids in supporting the immune system. According to the *Journal of the American Medical Association*, zinc also helps to improve birth weight and certain aspects of fetal development (Haas,2016).

Women are counseled to avoid certain foods, because of the possibility of contamination with bacteria or parasites that can cause illness. Careful washing of fruits and raw vegetables may remove these pathogens, as may thoroughly cooking leftovers, meat, or processed meat. Unpasteurized dairy and deli meats may contain *Listeria*, which can cause neonatal meningitis, stillbirth and miscarriage (Cdc.gov, 2016).

Pregnant women are also more prone to *Salmonella* infections, can be in eggs and poultry, which should be thoroughly cooked. Cat feces and undercooked meats may contain the parasite *Toxoplasma gondii* and can cause toxoplasmosis. Practicing good hygiene in the kitchen can reduce these risks. Women are also counseled to eat seafood in moderation and to eliminate seafood known to be high in mercury because of the risk of birth defects. Pregnant women are counseled to consume caffeine in moderation, because large amounts of caffeine are associated with miscarriage. However, the relationship between caffeine, birth weight, and preterm birth is unclear (Cdc.gov, 2016).

### **1.3.1 Abortifacient food:**

#### **Cheese:**

Cheeses are made with mould and can contain listeria bacteria that cause listeriosis. Although an infection with listeria is rare, even a mild form of this infection in a pregnant woman can lead to miscarriage, stillbirth or severe illness in a newborn baby (Nhs.uk, 2016b).

### **Raw eggs**

Pregnant women should avoid raw or undercooked eggs and any foods that contain them, such as homemade mayonnaise. Raw eggs has the risk of salmonella poisoning (Nhs.uk, 2016b).

### **Unpasteurised milk**

Pregnant women should avoid unpasteurised milk. It can harm the fetus (Nhs.uk, 2016b).

### **Raw meat**

Pregnant women should not eat raw or undercooked meat. All meat and poultry should thoroughly cook so there's no trace of pink or blood. Should be particularly careful with sausages and minced meat. The latest advice from the Food Standards Agency (FSA) is that pregnant women should take care when eating cold cured meats such as salami, chorizo, pepperoni and Parma ham, because these meats are not cooked but cured and fermented, so they may contain toxoplasmosis-causing parasites (Nhs.uk, 2016b).

### **Fish**

There are some types of fish pregnant women should limit, such as tuna and oily fish and also avoid fish that contain mercury. (Nhs.uk, 2016b)

### **Alcohol**

Pregnant women should avoid drinking alcohol . Too much exposure to alcohol can seriously affect your baby's development. . (Nhs.uk, 2016b)

### **Caffeine**

Women should limit caffeine during pregnancy avoid having more than 200 milligrams (mg) of caffeine a day. High levels of caffeine can cause babies to have a low birth weight. Too much caffeine can also cause a miscarriage. Caffeine is found naturally in some foods and is added to some soft drinks. (Nhs.uk, 2016)

## **Pineapple**

Pineapples are rich in bromelain, which can cause the softening of the cervix leading to early labour. One can have pineapple in moderate quantities as it will have no effect on labour and delivery, however, its intake should be restricted during the first trimester to avoid any unforeseen event such as softening of the cervix. For this reason Pineapple is in list of foods to avoid during pregnancy (Pregnant and Diet, 2012).

## **Papaya**

Papaya intake apparently brings on labour early or causes miscarriage. This is partially true. Papayas, especially the unripe and semi-ripe ones are rich in latex, which is known to trigger uterine contractions. Green papaya was often applied directly to the uterus, but food forms such as green papaya salad, the seeds of papaya in the parasite killing papaya seed smoothie ahead, as well as supplements containing papain enzyme should be avoided during the third and final trimester of pregnancy. For this reason Papaya is in list of foods to avoid during pregnancy (Pregnant and Diet, 2012).

### **1.3.2 Weight gain**

The best way to start a pregnancy is to be at a healthy weight. Gaining a healthy amount of weight, based on weight before pregnancy, will help a pregnant have a more comfortable pregnancy and delivery. If pregnant women have too little weight will make it hard for the baby to grow properly. Gaining too much makes it more likely that pregnant women will have a longer labor and more difficult delivery.

It also makes it harder to return to normal weight after the baby is born. This is not the time to lose weight. In case of twins (and eating for three), the weight gain recommendations for women of an average weight is 37 to 54 pounds. Overweight women should gain 31 to 50 pounds, and obese women should gain 25 to 42 pounds. Gradual weight gain is as important as the number of pounds pregnant women gain, since baby needs a steady supply of nutrients and calories to grow during his or her stay in the womb (Babyourbaby.org,2016; Whattoexpect,2016).

### **1.3.3 Exercise**

All women without contraindications should be encouraged to participate in aerobic and strength-conditioning exercises as part of a healthy lifestyle during their pregnancy. Reasonable goals of aerobic conditioning in pregnancy should be to maintain a good fitness level throughout pregnancy without trying to reach peak fitness or train for an athletic competition. Women should choose activities that will minimize the risk of loss of balance and fetal trauma. Women should be advised that adverse pregnancy or neonatal outcomes are not increased for exercising women.

Initiation of pelvic floor exercises in the immediate postpartum period may reduce the risk of future urinary incontinence. Women should be advised that moderate exercise during lactation does not affect the quantity or composition of breast milk or impact infant growth. The American College of Obstetricians and Gynecologists reports that in the past, the main concerns of exercise in pregnancy were focused on the fetus and any potential maternal benefit was thought to be offset by potential risks to the fetus. However, they write that more recent information suggests that in the uncomplicated pregnancy, fetal injuries are highly unlikely (Davies *et al.*, 2016).

### **1.3.4 Sleep**

It has been suggested that shift work and exposure to bright light at night should be avoided at least during the last trimester of pregnancy to decrease the risk of psychological and behavioral problems in the newborn (Acog.org, 2016).

### **1.3.5 Environmental toxins**

Intrauterine exposure to environmental toxins in pregnancy has the potential to cause adverse effects on the development of the embryo/fetus and to cause pregnancy complications. Air pollution has been associated with low birth weight infants. Conditions of particular severity in pregnancy include mercury poisoning and lead poisoning (Acog.org, 2016).

## **1.4 Medication**

Drugs used during pregnancy can have temporary or permanent effects on the fetus. Anything (including drugs) that can cause permanent deformities in the fetus are labeled as teratogens (Alliance and Collaborative). In the U.S., drugs were classified into categories A, B, C, D and X based on the Food and Drug Administration (FDA) rating system to provide therapeutic guidance based on potential benefits and fetal risks. Drugs, including some multivitamins, that have demonstrated no fetal risks after controlled studies in humans are classified as Category A. On the other hand, drugs like thalidomide with proven fetal risks that outweigh all benefits are classified as Category X.

### **1.4.1 Recreational products**

- The use of recreational drugs in pregnancy can cause various pregnancy complications. One common form of alcohol used in many pharmaceutical preparations is ethanol which is used for medication and as well as cosmetic products to act either as a solvent or as an antimicrobial preservative. Pharmaceutical products with ethanol would fall under Category D of products screened by the US Food and Drug Administration.
- This category is for drugs which are known to cause various health risks to fetuses when the drugs are taken during pregnancy. Some experts caution against pregnant mothers consuming products that contain ethanol because it is a substance that can cause teratogenesis – or congenital defects in the developing fetus. Though a small amount of ethanol might not be harmful to either mother or fetus, some pharmaceutical products do contain significant levels of ethanol which then raises the risks of congenital defects being triggered in the developing fetus (BabyMed.com, 2008).
- Most people know that smoking causes cancer, heart disease, and other major health problems. Smoking during pregnancy causes additional health problems, including premature birth (being born too early), certain birth defects, and infant death.
- Smoking makes it harder for a woman to get pregnant.
- Women who smoke during pregnancy are more likely than other women to have a miscarriage.

- Smoking can cause problems with the placenta—the source of the baby's food and oxygen during pregnancy. For example, the placenta can separate from the womb too early, causing bleeding, which is dangerous to the mother and baby.
- Smoking during pregnancy can cause a baby to be born too early or to have low birth weight—making it more likely the baby will be sick and have to stay in the hospital longer. A few babies may even die.
- Smoking during and after pregnancy is a risk factor of Sudden Infant Death Syndrome (SIDS). SIDS is an infant death for which a cause of the death cannot be found.
- Babies born to women who smoke are more likely to have certain birth defects, like a cleft lip or cleft palate (Cdc.gov, 2016).
- Cocaine use during pregnancy can affect a pregnant woman and her unborn baby in many ways. During the early months of pregnancy, it may increase the risk of miscarriage. When the drug is used late in pregnancy, it may trigger premature labor. It also may cause an unborn baby to die or to have a stroke, which can result in irreversible brain damage.
- Women who use cocaine during pregnancy are: A. twice as likely to have a premature baby; B. More likely to have a low birth-weight baby; C. More likely to have babies born with smaller heads and smaller brains proportionate to body size (Tgorski.com, 2016).
- Cannabis in pregnancy has been shown to be teratogenic in large doses in animals, but has not shown any teratogenic effects in humans (Acog.org, 2016).

## **1.6 Major Complications**

### **1.6.1 Gestational diabetes**

Gestational diabetes is a type of diabetes that affects pregnant women, usually during the second or third trimester. Women with gestational diabetes don't have diabetes before their pregnancy, and after giving birth it usually goes away. In some women diabetes may be diagnosed in the first trimester, and in these cases the condition most likely existed

before pregnancy. Gestational diabetes is usually diagnosed through a blood test at 24–28 weeks into pregnancy.

Women who have had the condition in previous pregnancies may be tested earlier. With good management of gestational diabetes, pregnant women can increase chances of having a healthy pregnancy and baby. The hormones produced during pregnancy can make it difficult for the body to use insulin properly, putting pregnant women at an increased risk of insulin resistance. And, because pregnancy places a heavy demand on the body, some women are less able to produce enough insulin to overcome this resistance. This makes it difficult to use glucose properly for energy, so the glucose remains in the blood and the levels rise, leading to gestational diabetes (Mayoclinic.org, 2016).

#### **1.6.1.1 Complications of mother and child**

- **Excessive birth weight.** Extra glucose in bloodstream crosses the placenta, which triggers baby's pancreas to make extra insulin. This can cause baby to grow too large (macrosomia). Very large babies — those that weigh 9 pounds or more — are more likely to become wedged in the birth canal, sustain birth injuries or require a C-section birth.
- **Early (preterm) birth and respiratory distress syndrome.** A mother's high blood sugar may increase her risk of early labor and delivering her baby before its due date. Or her doctor may recommend early delivery because the baby is large. Babies born early may experience respiratory distress syndrome — a condition that makes breathing difficult. Babies with this syndrome may need help breathing until their lungs mature and become stronger. Babies of mothers with gestational diabetes may experience respiratory distress syndrome even if they're not born early.
- **Low blood sugar (hypoglycemia).** Sometimes babies of mothers with gestational diabetes develop low blood sugar (hypoglycemia) shortly after birth because their own insulin production is high. Severe episodes of hypoglycemia may provoke seizures in the baby. Prompt feedings and sometimes an intravenous glucose solution can return the baby's blood sugar level to normal.



**Type 2 diabetes later in life.** Babies of mothers who have gestational diabetes have a higher risk of developing obesity and type 2 diabetes later in life (Mayoclinic.org, 2016).

Untreated gestational diabetes can result in a baby's death either before or shortly after birth.

Gestational diabetes may also increase the mother's risk of:

- **High blood pressure and preeclampsia.** Gestational diabetes raises risk of high blood pressure, as well as, preeclampsia — a serious complication of pregnancy that causes high blood pressure and other symptoms that can threaten the lives of both mother and baby.
- **Future diabetes.** If one's have gestational diabetes, she is likely to get it again during a future pregnancy and also may develop type 2 diabetes. However, making healthy lifestyle choices such as eating healthy foods and exercising can help reduce the risk of future type 2 diabetes.

Of those women with a history of gestational diabetes who reach their ideal body weight after delivery, fewer than 1 in 4 eventually develops type 2 diabetes (Mayoclinic.org, 2016).

### **1.6.1.2 Management**

- monitoring blood glucose levels
- adopting a healthy eating pattern
- physical activity.
- Gestational diabetes can often initially be managed with healthy eating and regular physical activity. However, for some women with gestational diabetes, insulin injections will be necessary for the rest of the pregnancy. Approximately 10 – 20% of women will need insulin; however, once the baby is born insulin is no longer needed. This is safe for both you and your baby.
- After the baby is born, gestational diabetes usually disappears. A special blood glucose test (Oral Glucose Tolerance Test) (OGTT) is performed six weeks after delivery to ensure that blood glucose levels have returned to normal. However, women who have had gestational diabetes have an increased risk of developing

type 2 diabetes later in life and should be tested for diabetes at least every 2 – 3 years (Diabetesaustralia.com.au, 2016).

### **1.6.2 Hypertension in pregnancy**

Hypertensive disorders in pregnancy are a major cause of maternal, fetal and neonatal morbidity and mortality, both in developing and developed countries. Hypertension is the most common medical problem in pregnancy, complicating up to 15% of pregnancies and accounting for about a quarter of all antenatal admissions in the UK. Gestational hypertension, also referred to as pregnancy induced hypertension (PIH) is a condition characterized by high blood pressure during pregnancy. Gestational hypertension can lead to a serious condition called preeclampsia, also referred to as toxemia. Hypertension during pregnancy affects about 6-8% of pregnant women (Nhlbi.nih.gov, 2016).

#### **Complication of mother and child:**

- Abruptio placentae.
- Cerebrovascular accident.
- Disseminated intravascular coagulation.

#### **The fetus has an increased risk of:**

- Intrauterine growth restriction.
- Prematurity.
- Intrauterine death.

Although many pregnant women with high blood pressure have healthy babies without serious problems, high blood pressure can be dangerous for both the mother and the fetus. Women with pre-existing, or chronic, high blood pressure are more likely to have certain complications during pregnancy than those with normal blood pressure.

- The effects of high blood pressure range from mild to severe. High blood pressure can harm the mother's kidneys and other organs, and it can cause low birth weight and early delivery. In the most serious cases, the mother develops preeclampsia - or "toxemia of pregnancy"--which can threaten the lives of both the mother and the fetus.

- The effects of high blood pressure during pregnancy vary depending on the disorder and other factors. According to the National High Blood Pressure Education Program (NHBPEP), preeclampsia does not in general increase a woman's risk for developing chronic hypertension or other heart-related problems. The NHBPEP also reports that in women with normal blood pressure who develop preeclampsia after the 20th week of their first pregnancy, short-term complications--including increased blood pressure--usually go away within about 6 weeks after delivery.
- Some women, however, may be more likely to develop high blood pressure or other heart disease later in life. More research is needed to determine the long-term health effects of hypertensive disorders in pregnancy and to develop better methods for identifying, diagnosing, and treating women at risk for these conditions. Even though high blood pressure and related disorders during pregnancy can be serious, most women with high blood pressure and those who develop preeclampsia have successful pregnancies (Nhlbi.nih.gov, 2016).

## **Management**

Management depends on the woman's BP, gestational age and blood flow in the placenta. Non-pharmacological management is recommended for many women but is not recommended when there is the presence of associated maternal and fetal risk factors. Non-pharmacological management includes close supervision, limitation of activities, and some bed rest in the left lateral position. Encourage women with chronic hypertension to keep their dietary sodium intake low, either by reducing or substituting sodium salt, because this can reduce blood pressure. Pregnant women with uncomplicated chronic hypertension treatment to lower diastolic blood pressure not below 80 mmHg (Nice.org.uk, 2010).

### **1.6.3 Preeclampsia in pregnancy**

Preeclampsia is a condition that typically starts after the 20th week of pregnancy and is related to increased blood pressure and protein in the mother's urine (as a result of kidney problems). Preeclampsia affects the placenta, and it can affect the mother's kidney, liver, and brain. When preeclampsia causes seizures, the condition is known as eclampsia--the second leading cause of maternal death in the U.S. Preeclampsia is also a leading cause of

fetal complications, which include low birth weight, premature birth, and stillbirth. There is no proven way to prevent preeclampsia. Most women who develop signs of preeclampsia, however, are closely monitored to lessen or avoid related problems. The only way to "cure" preeclampsia is to deliver the baby (Nhlbi.nih.gov, 2016).

### **Causes:**

- Women with chronic hypertension (high blood pressure before becoming pregnant).
- Women who developed high blood pressure or preeclampsia during a previous pregnancy, especially if these conditions occurred early in the pregnancy.
- Women who are obese prior to pregnancy.
- Pregnant women under the age of 20 or over the age of 40.
- Women who are pregnant with more than one baby.

Women with diabetes, kidney disease, rheumatoid arthritis, lupus, or scleroderma (Nhlbi.nih.gov, 2016).

### **Maternal medical risk factors for preeclampsia**

The following are maternal medical risk factors for preeclampsia:

- Chronic hypertension, especially when secondary to such disorders as hypercortisolism, hyperaldosteronism, pheochromocytoma, or renal artery stenosis
- Preexisting diabetes ( type 1 or type 2), especially with microvascular disease
- Renal disease
- Systemic lupus erythematosus
- Obesity
- Thrombophilia
- History of migraine
- Use of selective serotonin uptake inhibitor antidepressants (SSRIs) beyond the first trimester

## Placental/fetal risk factors for preeclampsia

The following are placental/fetal risk factors for preeclampsia:

- Multiple gestations
- Hydrops fetalis
- Gestational trophoblastic disease (Emedicine.medscape.com, 2016).

### **1.6.4 Thyroid disorder in pregnancy**

Thyroid disease is a disorder that affects the thyroid gland. Sometimes the body produces too much or too little thyroid hormone. Thyroid hormones regulate metabolism—the way the body uses energy—and affect nearly every organ in the body. Too much thyroid hormone is called hyperthyroidism and can cause many of the body's functions to speed up. Too little thyroid hormone is called hypothyroidism and can cause many of the body's functions to slow down.

Thyroid hormone plays a critical role during pregnancy both in the development of a healthy baby and in maintaining the health of the mother. Women with thyroid problems can have a healthy pregnancy and protect their fetuses' health by learning about pregnancy's effect on the thyroid, keeping current on their thyroid function testing, and taking the required medications. Two pregnancy-related hormones—human chorionic gonadotropin (hCG) and estrogen—cause increased thyroid hormone levels in the blood. Made by the placenta, hCG is similar to TSH and mildly stimulates the thyroid to produce more thyroid hormone. Increased estrogen produces higher levels of thyroid-binding globulin, also known as thyroxin-binding globulin, a protein that transports thyroid hormone in the blood.

These normal hormonal changes can sometimes make thyroid function tests during pregnancy difficult to interpret. Thyroid hormone is critical to normal development of the baby's brain and nervous system.

During the first trimester, the fetus depends on the mother's supply of thyroid hormone, which comes through the placenta. At around 12 weeks, the baby's thyroid begins to function on its own. The thyroid enlarges slightly in healthy women during pregnancy, but not enough to be detected by a physical exam. A noticeably enlarged thyroid can be a

sign of thyroid disease and should be evaluated. Thyroid problems can be difficult to diagnose in pregnancy due to higher levels of thyroid hormone in the blood, increased thyroid size, fatigue, and other symptoms common to both pregnancy and thyroid disorders (Niddk.nih.gov., (2015).

### **Hyperthyroidism**

Hyperthyroidism in pregnancy is usually caused by Graves' disease and occurs in about one of every 500 pregnancies. Graves' disease is an autoimmune disorder. In autoimmune diseases, the immune system attacks the body's own cells and organs. Although Graves' disease may first appear during pregnancy, a woman with preexisting Graves' disease could actually see an improvement in her symptoms in her second and third trimesters. Remission—a disappearance of signs and symptoms—of Graves' disease in later pregnancy may result from the general suppression of the immune system that occurs during pregnancy(Niddk.nih.gov., (2015).

The disease usually worsens again in the first few months after delivery. Pregnant women with Graves' disease should be monitored monthly. More information is provided in the NIDDK health topic, Graves' Disease. Rarely, hyperthyroidism in pregnancy is caused by hyperemesis gravidarum—severe nausea and vomiting that can lead to weight loss and dehydration. This extreme nausea and vomiting is believed to be triggered by high levels of hCG, which can also lead to temporary hyperthyroidism that goes away during the second half of pregnancy (Niddk.nih.gov., (2015).

### **Complication of mother and child**

Uncontrolled hyperthyroidism during pregnancy can lead to

- congestive heart failure
- preeclampsia—a dangerous rise in blood pressure in late pregnancy
- thyroid storm—a sudden, severe worsening of symptoms
- miscarriage
- premature birth
- low birth weight

If the mother is being treated with antithyroid medications, hyperthyroidism in the baby is less likely because these medications also cross the placenta. Women who have had surgery or radioactive iodine treatment for Graves' disease should inform their health care provider, so the baby can be monitored for thyroid-related problems later in the pregnancy. Hyperthyroidism in a newborn can result in rapid heart rate, which can lead to heart failure; early closure of the soft spot in the skull; poor weight gain; irritability; and sometimes an enlarged thyroid that can press against the windpipe and interfere with breathing. Women with Graves' disease and their newborns should be closely monitored by their health care team (Niddk.nih.gov., (2015).

### **Treatment**

Experts agree that women in their first trimester of pregnancy should probably not take methimazole due to the rare occurrence of damage to the fetus. Another anti thyroid medication, propyl thiouracil (PTU), is available for women in this stage of pregnancy or for women who are allergic to or intolerant of methimazole and have no other treatment options. Health care providers may prescribe PTU for the first trimester of pregnancy and switch to methimazole for the second and third trimesters (Niddk.nih.gov., (2015).

### **Hypothyroidism**

Hypothyroidism in pregnancy is usually caused by Hashimoto's disease and occurs in three to five out of every 1,000 pregnancies. Hashimoto's disease is a form of chronic inflammation of the thyroid gland. Like Graves' disease, Hashimoto's disease is an autoimmune disorder. In Hashimoto's disease, the immune system attacks the thyroid, causing inflammation and interfering with its ability to produce thyroid hormones. Hypothyroidism in pregnancy can also result from existing hypothyroidism that is inadequately treated or from prior destruction or removal of the thyroid as a treatment for hyperthyroidism (Niddk.nih.gov., (2015).

### **Treatment**

Hypothyroidism is treated with synthetic thyroid hormone called thyroxine—a medication which is identical to the T<sub>4</sub> made by the thyroid. Women with preexisting hypothyroidism will need to increase their prepregnancy dose of thyroxine to maintain

normal thyroid function. Thyroid function should be checked every 6 to 8 weeks during pregnancy. Synthetic thyroxine is safe and necessary for the well-being of the fetus if the mother has hypothyroidism (Niddk.nih.gov., (2015).

### **1.6.5 Anemia in pregnancy**

Anemia is a medical condition in which there is not enough healthy red blood cells to carry oxygen to the tissues in the body. When the tissues do not receive an adequate amount of oxygen, many organs and functions are affected. Anemia during pregnancy is especially a concern because it is associated with low birth weight, premature birth and maternal mortality. Women who are pregnant are at a higher risk for developing anemia due to the excess amount of blood the body produces to help provide nutrients for the baby. Anemia during pregnancy can be a mild condition and easily treated if caught early on. However, it can become dangerous, to both the mother and the baby, if it goes untreated (WebMD, 2016).

#### Types of Anemia During Pregnancy

Several types of anemia can develop during pregnancy. These include:

- Iron-deficiency anemia
- Folate-deficiency anemia
- Vitamin B12 deficiency

**Iron-deficiency anemia:** This type of anemia occurs when the body doesn't have enough iron to produce adequate amounts of hemoglobin. That's a protein in red blood cells. It carries oxygen from the lungs to the rest of the body. In iron-deficiency anemia, the blood cannot carry enough oxygen to tissues throughout the body. Iron deficiency is the most common cause of anemia in pregnancy.

**Folate-deficiency anemia:** Folate, also called folic acid, is a type of B vitamin. The body needs folate to produce new cells, including healthy red blood cells. During pregnancy, women need extra folate. But sometimes they don't get enough from their diet. When that happens, the body can't make enough normal red blood cells to transport oxygen to tissues throughout the body. Folate deficiency can directly contribute to certain types of birth defects, such as neural tube abnormalities (spina bifida) and low birth weight.



**Vitamin B12 deficiency:** The body needs vitamin B12 to form healthy red blood cells. When a pregnant woman doesn't get enough vitamin B12 from her diet, her body can't produce enough healthy red blood cells. Women who don't eat meat, poultry, dairy products, and eggs have a greater risk of developing vitamin B12 deficiency, which may contribute to birth defects, such as neural tube abnormalities, and could lead to preterm labor (WebMD, 2016).

### **Causes:**

The cause of anemia truly comes down to how many red blood cells are being produced in the body and how healthy they are. A fall in hemoglobin levels during pregnancy is caused by a greater expansion of plasma volume compared with the increase in red cell volume. This disproportion between the rates of increase for plasma and erythrocytes has the most distinction during the second trimester (American Pregnancy Association, 2013).

### **Management**

For prevention, all pregnant women are given folate 0.4 mg po once/day. Women who have had a fetus with spina bifida should take 4 mg once/day, starting before conception. Pregnant women may need to start taking an iron supplement and/or folic acid supplement in addition to her prenatal vitamins.

Pregnant women should need another blood test after a specific period of time so that doctor can check hemoglobin and hematocrit levels are improving. To treat vitamin B12 deficiency, pregnant women should take a vitamin B12 supplement. To prevent anemia during pregnancy, pregnant women should eat well-balanced meals and add more foods that are high in iron to her diet (WebMD, 2016).

Aim for at least three servings a day of iron-rich foods, such as:

- lean red meat, poultry, and fish
- leafy, dark green vegetables (such as spinach, broccoli, and kale)
- iron-enriched cereals and grains
- beans, lentils, and tofu
- nuts and seeds

- eggs

Foods that are high in vitamin C can help your body absorb more iron. These include:

- citrus fruits and juices
- strawberries
- kiwis
- tomatoes
- bell peppers(WebMD, 2016).

Also, she can choose foods that are high in folic acid to help prevent folate deficiency.

These include:

- leafy green vegetables
- citrus fruits and juices
- fortified breads and cereals
- dried beans (WebMD, 2016)

### **1.7 Other complications**

The following are some examples of pregnancy complications:

- Postpartum psychosis
- Thromboembolic disorders. The leading cause of death in pregnant women in the US (Merck Manuals Consumer Version, 2016)
- PUPPP a skin disease that develops around the 32nd week (Pruritic Urticarial Papules and Plaques of Pregnancy). Signs are red plaques, papules, and itchiness around the belly button that then spreads all over the body except for the inside of hands and face.
- Ectopic pregnancy, implantation of the embryo outside the uterus.
- Hyper emesis gravid arum, excessive nausea and vomiting that is more severe than normal morning sickness (Merck Manuals Consumer Version, 2016).

## **1.8 Mortality rate of fetus and mother**

Every day, approximately 830 women die from preventable causes related to pregnancy and childbirth. 99% of all maternal deaths occur in developing countries. Maternal mortality is higher in women living in rural areas and among poorer communities. Young adolescents face a higher risk of complications and death as a result of pregnancy than other women. Skilled care before, during and after childbirth can save the lives of women and newborn babies. Between 1990 and 2015, maternal mortality worldwide dropped by about 44%. Between 2016 and 2030, as part of the Sustainable Development Agenda, the target is to reduce the global maternal mortality ratio to less than 70 per 100 000 live births. Maternal mortality is unacceptably high. About 830 women die from pregnancy- or childbirth-related complications around the world every day. By the end of 2015, roughly 303 000 women will have died during and following pregnancy and childbirth. Almost all of these deaths occurred in low-resource settings, and most could have been prevented. Women in developing countries have, on average, many more pregnancies than women in developed countries, and their lifetime risk of death due to pregnancy is higher. A woman's lifetime risk of maternal death – the probability that a 15 year old woman will eventually die from a maternal cause – is 1 in 4900 in developed countries, versus 1 in 180 in developing countries (WHO, 2016).

### **Mortality rate of fetus and mother in Bangladesh**

Bangladesh still records a high maternal mortality ratio, with 320 deaths per 100,000 births. This means that about 12,000 women die from pregnancy or childbirth related complications every year - more than 30 every day. Moreover, a malnourished mother is very likely to give birth to a low birth weight baby, a major underlying cause of death for newborns. Bangladesh has one of the world's highest rates of adolescent motherhood, based on the proportion of women under the age of 20 giving birth every year. 28% of adolescent women (age 15-19) are already mothers with at least one child and another 5 % is pregnant.

The number of deaths among adolescent mothers is double the national average. These high mortality rates are underpinned by the fact that 85 per cent of women give birth at home, most with unskilled attendants or relatives assisting. The low status of women, poor quality and low uptake of services are some of the reasons for this situation. Because

most births occur at home without skilled attendants, there is a high death rate of children under one month.

Almost 80 per cent of neonates do not receive post natal care from a trained provider within six days of birth<sup>4</sup>. The first week of life is the most critical time for a newborn; three in four newborn deaths occur within the first week, almost 50 per cent of them within 24 hours, often at home and with no contact with the formal healthcare system. The major newborn killer is infection (52%) followed by birth asphyxia/unable to breath at birth (21%) and low birth weight/pre-term deliveries (11%) (WHO, 2016).

**CHAPTER 2**  
**LITERATURE REVIEW**

## **2.1 Management of Thyroid Dysfunction during Pregnancy and Postpartum: An Endocrine Society Clinical Practice Guideline .**

The aim was to update the guidelines for the management of thyroid dysfunction during pregnancy and postpartum published previously in 2007. This evidence-based guideline was developed according to the U.S. Preventive Service Task Force, grading items level A, B, C, D, or I, on the basis of the strength of evidence and magnitude of net benefit (benefits minus harms) as well as the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system to describe both the strength of recommendations and the quality of evidence. The guideline was developed through a series of e-mails, conference calls, and one face-to-face meeting. An initial draft was prepared by the Task Force, with the help of a medical writer, and reviewed and commented on by members of The Endocrine Society, Asia and Oceania Thyroid Association, and the Latin American Thyroid Society. A second draft was reviewed and approved by The Endocrine Society Council. At each stage of review, the Task Force received written comments and incorporated substantive changes. Practice guidelines are presented for diagnosis and treatment of patients with thyroid-related medical issues just before and during pregnancy and in the postpartum interval. These include evidence-based approaches to assessing the cause of the condition, treating it, and managing hypothyroidism, hyperthyroidism, gestational hyperthyroidism, thyroid autoimmunity, thyroid tumors, iodine nutrition, postpartum thyroiditis, and screening for thyroid disease. Indications and side effects of therapeutic agents used in treatment are also presented (Groot *et al.*, 2012).

## **2.2 Women With Pregnancy Induced Hypertension Have A Higher Risk of Developing Essential Hypertension—A Case Control Study From a Tertiary Care Center In Pakistan**

The aim of this study was to determine the association of essential hypertension with pregnancy-induced hypertension in women. The case-control study was conducted at Aga Khan University Hospital, Karachi, from January 2012 to March 2013, and comprised on hypertensive female patients who visited the outpatient medicine clinics. The patients were aged 18-65 years and had been pregnant at least once. Cases were women diagnosed as hypertensive or pre-hypertensive and the controls were normotensive women. The primary outcome was essential hypertension and the main exposure was pregnancy-

induced hypertension. Of the 258 subjects, 175 (49.7%) were cases and 177 (50.3%) were controls. The overall mean age was  $44.6 \pm 13.3$  years. Odds Ratio (95% Confidence interval) for pregnancy-induced hypertension for the outcome of essential hypertension was 1.6. The odds ratio increased further to 2.5 after adjustment for age, family history of hypertension and physical activity. The association remained after further adjusting for body mass index in the final model; Women who develop hypertension in pregnancy are at higher risk of developing essential hypertension later in life (Qasim *et al.*, 2016).

### **2.3 The 2011 Survey on Hypertensive Disorders of Pregnancy (HDP) in China: Prevalence, Risk Factors, Complications, Pregnancy and Perinatal Outcomes.**

Hypertensive disorders of pregnancy (HDP) are a group of medical complications in pregnancy and also a risk factor for severe pregnancy outcomes, but it lacks a large-scale epidemiological investigation in recent years. This survey represents a multicenter cross-sectional retrospective study to estimate the prevalence and analyze the risk factors for HDP among the pregnant women who had referred for delivery between January 1st 2011 and December 31st 2011 in China Mainland. A total of 112,386 pregnant women were investigated from 38 secondary and tertiary specialized or general hospitals randomly selected across the country, of which 5,869 had HDP, accounting for 5.22% of all pregnancies. There were significant differences in the prevalence of HDP between geographical regions, in which the North China showed the highest (7.44%) and Central China showed the lowest (1.23%). Of six subtypes of HDP, severe preeclampsia accounted for 39.96%, gestational hypertension for 31.40%, mild preeclampsia for 15.13%, chronic hypertension in pregnancy for 6.00%, preeclampsia superimposed on chronic hypertension for 3.68% and eclampsia for 0.89%. A number of risk factors for HDP were identified, including twin pregnancy, age of >35 years, overweight and obesity, primipara, history of hypertension as well as family history of hypertension and diabetes. The prevalence of pre-term birth, placental abruption and postpartum hemorrhage were significantly higher in women with HDP than those without HDP. The possible risk factors confirmed in this study may be useful for the development of early diagnosis and appropriate treatment of HDP (Ye *et al.*, 2014).

## **2.4 Factors associated with the use and quality of antenatal care in Nepal: a population-based study using the demographic and health survey data**

Good quality antenatal care (ANC) reduces maternal and neonatal mortality and improves health outcomes, particularly in low-income countries. Quality of ANC is measured by three dimensions: number of visits, timing of initiation of care and inclusion of all recommended components of care. Although some studies report on predictors of the first two indicators, no studies on the third indicator, which measures quality of ANC received, have been conducted in Nepal. Nepal follows the World Health Organization's recommendations of initiation of ANC within the first four months of pregnancy and at least four ANC visits during the course of an uncomplicated pregnancy. This study aimed to identify factors associated with 1) attendance at four or more ANC visits and 2) receipt of good quality ANC. Data from Nepal Demographic and Health Survey 2011 were analysed for 4,079 mothers. Good quality ANC was defined as that which included all seven recommended components: blood pressure measurement; urine tests for detecting bacteriuria and proteinuria; blood tests for syphilis and anaemia; and provision of iron supplementation, intestinal parasite drugs, tetanus toxoid injections and health education. Half the women had four or more ANC visits and 85% had at least one visit. Health education, iron supplementation, blood pressure measurement and tetanus toxoid were the more commonly received components of ANC. Older age, higher parity, and higher levels of education and household economic status of the women were predictors of both attendance at four or more visits and receipt of good quality ANC. Women who did not smoke, had a say in decision-making, whose husbands had higher levels of education and were involved in occupations other than agriculture were more likely to attend four or more visits. Other predictors of women's receipt of good quality ANC were receiving their ANC from a skilled provider, in a hospital, living in an urban area and being exposed to general media. Continued efforts at improving access to quality ANC in Nepal are required. In the short term, less educated women from socioeconomically disadvantaged households require targeting. Long-term improvements require a focus on improving female education (Joshi *et al.*, 2014).



## **2.5 Physical Activity and Hypertensive Complications During Pregnancy: Findings From 2004 to 2006 North Carolina Pregnancy Risk Assessment Monitoring System**

Preexisting hypertension in women who become pregnant is associated with hypertensive complications during pregnancy. These complications account for about 15% of maternal deaths. Several studies suggest that the risk of hypertensive complications during pregnancy is reduced by physical activity; other studies, however, found no such protective effect of physical activity. This population-based study investigated the association between physical activity and hypertensive complications during pregnancy using data from the North Carolina Pregnancy Risk Assessment Monitoring System (PRAMS), an ongoing, population-based, cross-sectional survey of women who delivered live infants. Data collected from 3348 women who participated in PRAMS between 2004 and 2006 were analyzed. Physical activity levels before pregnancy and during pregnancy were assessed using PRAMS self-reported questionnaires. The diagnosis of hypertensive complications during pregnancy was determined from birth certificate data. Multivariate logistic regression was used to estimate the association between physical activity and hypertensive complications and to control for potential confounders. The data showed no evidence of a strong association between physical activity before pregnancy and hypertensive complications during pregnancy. However, a dose-response relationship between physical activity and hypertensive complications during pregnancy was found after adjustment for prepregnancy body mass index for women participating in physical activity for 1 to 4 days per week (adjusted odds ratio [OR], 0.63; 95% confidence interval [CI], 0.45–0.90), and those participating for 5 or more days per week (OR, 0.46; 95% CI, 0.20–1.02). There was a statistically significant protective effect of physical activity only among women who were physically active both before and during pregnancy (adjusted OR, 0.65; 95% CI, 0.44–0.96). These findings suggest that women who engage in physical activity during pregnancy are less likely to develop pregnancy-related hypertensive complications (Martin and Huber, 2011).

## **2.6 Knowledge of Danger Signs for Major Obstetric Complications Among Pregnant KwaZulu-Natal Women.**

The explicit objectives of the present study were to assess the level of knowledge on pregnancy “danger signs” and HIV status, estimate the proportion of pregnant women uses health care facilities, and identify sociodemographic predictors. A cross-sectional

community-based study was conducted by means of a questionnaire survey among 340 black pregnant women from the province of KwaZulu-Natal. The mean age of the pregnant women was 26 years where teenage pregnancy rate was 13%. Most of the pregnant women were single (78%), less educated (60%), and unemployed (92%). Though most of the study population (92%) attended health care facilities, only half (52%) of them knew about some of the “danger signs” of pregnancy, and 39% of them knew about their HIV status. Known HIV status was related to the knowledge of pregnancy complication ( $P = .018$ ). Knowledge of “danger signs” of pregnancy was significantly ( $P = .012$ ) associated with the age of the expectant mother. Low level of knowledge on “danger signs” of pregnancy and their HIV status are observed among pregnant women. This warrants an urgent attempt to introduce health education strategies to rural population of South Africa (Hoque and Hoque, 2011).

### **2.7 Providing information on pregnancy complications during antenatal visits: unmet educational needs in sub-Saharan Africa**

Lack of information on the warning signs of complications during pregnancy, parturition and postpartum hampers women's ability to partake fully in safe motherhood initiatives. We assessed the extent to which women in 19 countries of sub-Saharan Africa recall receiving information about pregnancy complications during antenatal care for the most recent pregnancy, and examined the impact of advice receipt on the likelihood of institutional delivery. A cross-sectional, cross-country analysis was performed on data from the most recent Demographic and Health Surveys (DHS) of 19 countries of sub-Saharan Africa. Multilevel logistic regressions were used to predict the probability of receiving information and delivering in a health centre, by clinical risk factors (age, parity, previous pregnancy termination), social factors (area of residence, education), and the frequency of service utilization (number of visits). The percentage of women recalling information about potential complications of pregnancy during antenatal care varied widely, ranging from 6% in Rwanda to 72% in Malawi, and in 15 of the 19 countries, less than 50% of women reported receiving information. Institutional delivery ranged from 29% (Ethiopia) to 92% (Congo Brazzaville). Teenagers (OR = 0.84), uneducated (OR = 0.65) and rural women (OR = 0.70) were less likely to have been advised, compared with women aged 20–34 years, women with secondary education and urban women, respectively. Likelihood of recalling information increased with the number of antenatal

visits. Advice reception interacts with the number of antenatal visits to increase the likelihood of institutional delivery. There is a high level of unmet need for information on pregnancy complications in sub-Saharan Africa, particularly among those who face significant barriers to accessing care if complications occur. Educational interventions are critical to safe motherhood initiatives; health providers must fully use the educational opportunity in antenatal care (Nikiema, Beninguisse and Haggerty, 2009).

## **2.8 Maternal and neonatal outcomes of antenatal anemia in a Scottish population: a retrospective cohort study.**

Antenatal anemia is a major public health problem in the UK, yet there is limited high quality evidence for associated poor clinical outcomes. The objectives of this study were to estimate the

incidence and clinical outcomes of antenatal anemia in a Scottish population. Material and A method retrospective cohort study of 80 422 singleton pregnancies was conducted using data from the Aberdeen Maternal and Neonatal Databank between 1995 and 2012. Antenatal anemia was defined as haemoglobin  $\leq 10\text{g/dl}$  during pregnancy. Incidence was calculated with 95% confidence intervals (CI) and compared over time using a chi-squared test for trend. Multivariable logistic regression was used to adjust for confounding variables. Results are presented as adjusted odds ratios with 95% CI. The overall incidence of antenatal anemia was 9.3 cases/100 singleton pregnancies, decreasing from 16.9/100 to 4.1/100 singleton pregnancies between 1995 and 2012. Maternal anemia was associated with antepartum hemorrhage, postpartum infection, transfusion and stillbirth, reduced odds of postpartum hemorrhage and low birth weight. No other outcomes were statistically significant. This study shows the incidence of antenatal anemia is decreasing steadily within this Scottish population. However, given that anemia is a readily correctable risk factor for major causes of morbidity and mortality in the UK, further work is required to investigate appropriate preventive measures (Rukuni *et al.*, 2015).

## **2.9 A survey on perception of complications among pregnant women**

Giving birth to an off-spring is the most beautiful experience for a woman. Yet in most of the world, pregnancy and childbirth is a tough journey. Every pregnant woman faces the risk of sudden, unpredictable complications that could end in death or injury to herself or

to her infant. To determine the awareness of pregnancy related complications among pregnant women in Govt. Hospital in Narasaraopet, Guntur, SouthIndia. A prospective, observational, cross sectional study was conducted by collecting the data in a structured questionnaire and also by interviewing the patients for a period of 4 months. Only 46% were having knowledge about the high risk pregnancy. Anemia was seen in 68% of the selected subjects. Swelling over feet was noted in one fourth of respondents and blood pressure of more than 140/90mmHg was seen in 36% of the subjects. Lack of awareness about obstetric danger signs was related to low level of education about the danger signs of pregnancy (Singh and Arora, 2007).

## **Significance of the study**

Complications of pregnancy are health problems that occur during pregnancy. They can involve the mother's health, the baby's health, or both. Some women have health problems that arise during pregnancy, and other women have health problems before they become pregnant that could lead to complications. It is very important for women to receive health care before and during pregnancy to decrease the risk of pregnancy complications (Cdc.gov, 2016).

Globally, every minute, at least one woman dies from complications related to pregnancy or child birth that means 529 000 women a year. In addition, for every woman who dies in childbirth 10 million women birth, around 20 more suffer injury, infection or disease approximately each year (WHO, 2005).

Every minute of every day, somewhere in the world, a woman dies of pregnancy- or birth-related complications — more than half a million women each year. The world mortality rate is higher now than in 2000. As many as one in six women in parts of Africa died from pregnancy- or birth-related complications. In 2007, the World Health Organization reported that 40 countries have lower maternal death rates than the U.S (Gallagher, 2009).

Women need not die in childbirth. We must give a young woman the information and support she needs to address her reproductive health needs, help her through a pregnancy, and care for her and her newborn well into childhood. The vast majority of maternal deaths could be prevented if women had access to quality family planning services; skilled care during pregnancy, childbirth and after delivery; or post-abortion care and where permissible, safe abortion services (WHO, 2016).

The major complications that account for 80 percent of all maternal deaths are severe bleeding, infections, high blood pressure during pregnancy, obstructed labor and unsafe abortion. Women are expected to receive health education about pregnancy including outcomes, danger signs during pregnancy, nutrition and family planning as well as other services when they attend clinic for antenatal care. However other women do not attend antenatal clinic and they may receive the information about danger signs through media or close friends/relatives (Mengesha and Taye, 2014).

Bangladesh has a high maternal mortality ratio, with 320 deaths per 100,000 births. This means there are about 11,000 to 12,000 women dying from pregnancy or childbirth complications every year in Bangladesh. And because maternal and newborn health is inextricably linked, of those women who die, only one in four of their babies will survive their first week of life. Moreover, a malnourished mother is very likely to give birth to a low birth weight baby. Bangladesh has one of the world's highest rates of adolescent motherhood, based on the proportion of women younger than 20 giving birth every year. One in three teenage girls in Bangladesh is already a mother. Another 5 percent are pregnant with their first child .

Maternal mortality for adolescents is double the national figure. This Study will help in the efforts of reducing maternal and child morbidities and mortalities by increasing awareness among pregnant women which also help to reduce the maternal mortality ratio in the country (UNICEF, 2001). This study will help to know about danger signs and warning signs during pregnancy. Pregnant women who doesn't know about risk factor of complication and what to do if complication arise, this study will help and give them all such information they want. They will come to know about many abortifacient food that they even unknown about them and don't know harmful effect.

**Aims and objectives of this study:**

- To find out prevalence of pregnancy among pregnant women.
- To assess womens' awareness about danger signs and warning signs of pregnancy.
- To identify the level of antenatal care .

**CHAPTER 3**  
**METHODOLOGY**

### **3.1 Type of the study**

It is a survey based study

### **3.2 Study population**

Pregnant women who were second and third trimester were the study population. The study was carried out in Sylhet (Habiganj sadar hospital, Jalalabad rural area, Shurjer hasi clinic in Habiganj) and Chittagong (Anderkilla maternity Chittagong Medical college and hospital, Chittagong maternity hospital, Chittagong Maa o Shisu clinic, Bashkhali general hospital). In these areas 154 respondents were found.

### **3.3 Inclusion Criteria**

- Pregnant women who were in second and third trimester

### **3.4 Exclusion Criteria**

Unwilling to participate or unable to comply with protocol requirement

### **3.5 Data Collection Method**

The data was collected through questionnaire that is formed in English language. It consists of questions to find out the prevalence of pregnancy and to assess the awareness of warning sign and danger sign of pregnancy and complications. The data was collected by face to face interview.

### **3.6 Development of the Questionnaire**

The questionnaire was developed based on different findings in available in journal and research paper

### **3.7 Sampling Technique**

In this study convenient sampling technique was followed.

### **3.8 Data collecting period**

The duration of the study was about three months that started from January, 2016 up to March, 2016.



### **3.9 Data Analysis**

After collecting, all data were checked and analyzed with the help of Microsoft Office Excel 2007

**CHAPTER 4**

**RESULTS**

#### 4.1 Age distribution

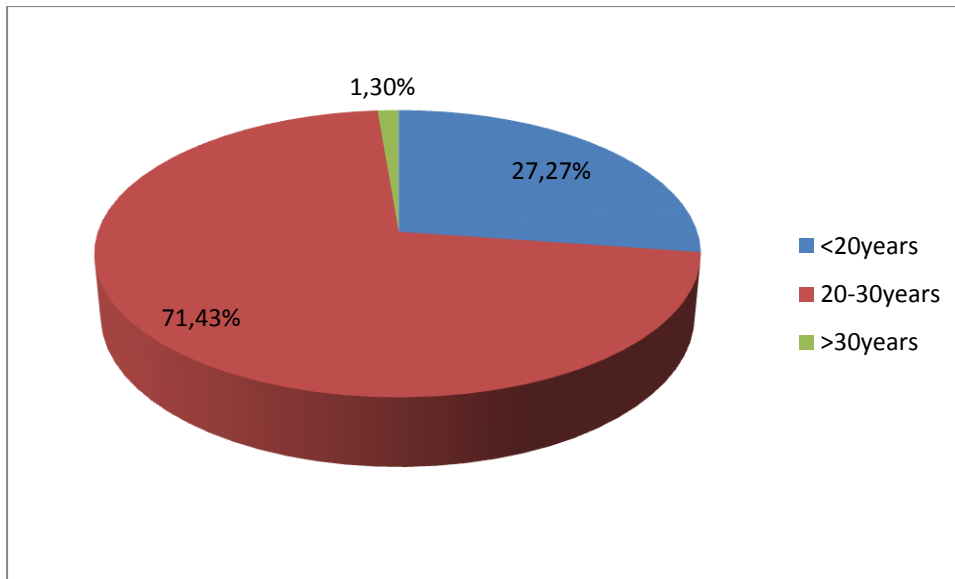


Fig4. 1: Age Distribution

The majority of the pregnant women in Sylhet and Chittagong were in the highest age range of 20-30 years (71.43%). Below 20 and above 30 were 27.27% and 1.30% respectively.

#### 4.2 Educational status

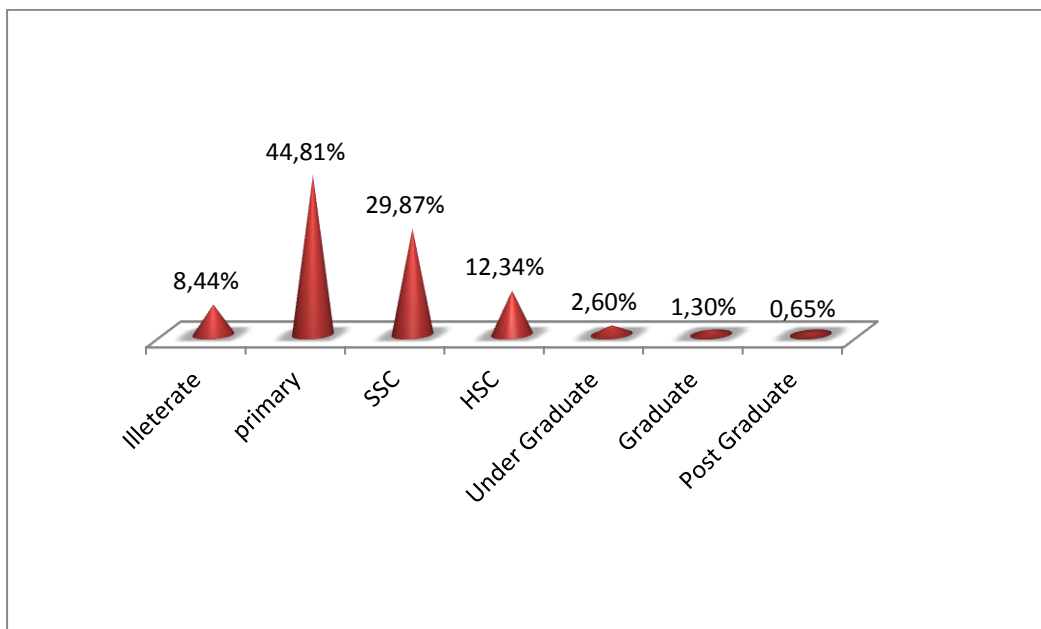


Fig 4.2: Educational status of respondents

The educational status of most of the pregnant patient are primary(44.81%). Some were illiterate(8.44%). The rest of the respondent had educational status HSC, Under Graduate, Graduate and Post graduate.

### 4.3 Obstetric History

#### 4.3.1 Number of total pregnancy

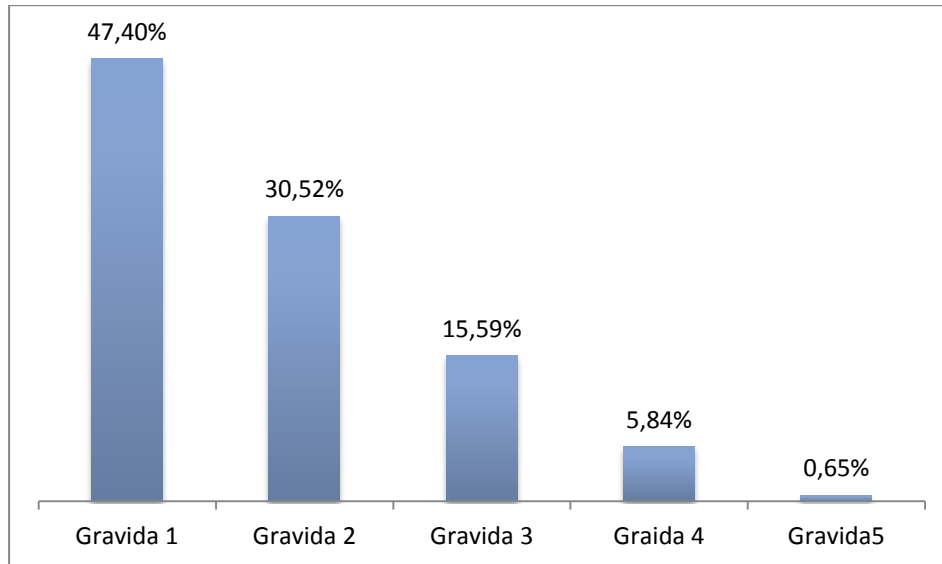


Fig 4.3.1: Obstetric History

Gravida means the number of times the women has been pregnant. The majority of pregnant women were in gravida 1 stage(47.40%) and in gravid 2 stage(30.52%). The rest of the respondent were in gravid 3(15.59%), gravid 4(5.84%) and gravida 5 (0.65%) stage.

### 4.3.2 Abnormalities

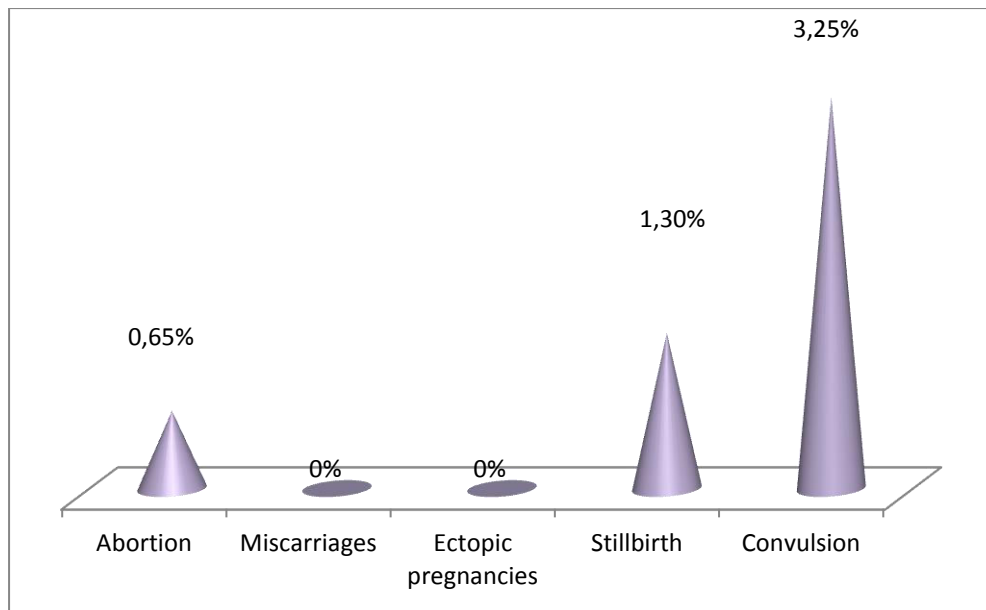


Fig: Abnormalities during pregnancy

Abnormality was less in pregnant patient. Only 0.65% were undergo abortion .Few pregnant women undergo stillbirth(1.30%) and convulsion(3.25%).

### 4.4 Last Menstrual Period ( LMP)

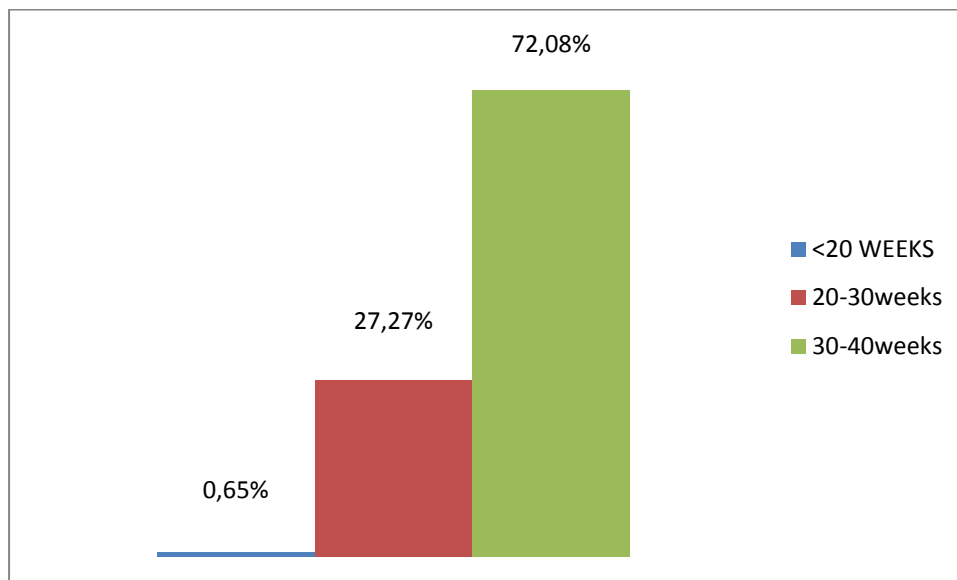


Fig 4.4: Graphical representation of Last Menstrual Period

Among the respondent 72.08% pregnant women's LMP was in the range of 20-30 weeks.0.65%and 27.27% pregnant women's LMP was less than 20 weeks and 27.27% respectively.

#### 4.5 Consultation with doctor, nurse or other health workers before getting pregnant

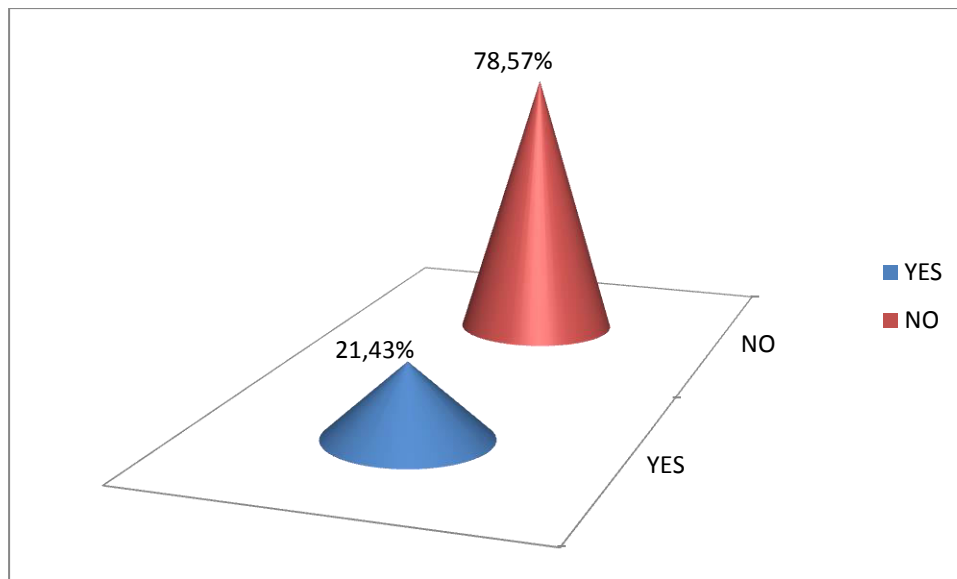


Fig 4.5: Consultation before getting pregnant

Among the total respondent, 21.43% women consult with doctor or nurse before getting pregnant. 78.57% women didn't consult.

#### 4.6 Intake of multivitamins during the month before getting pregnant

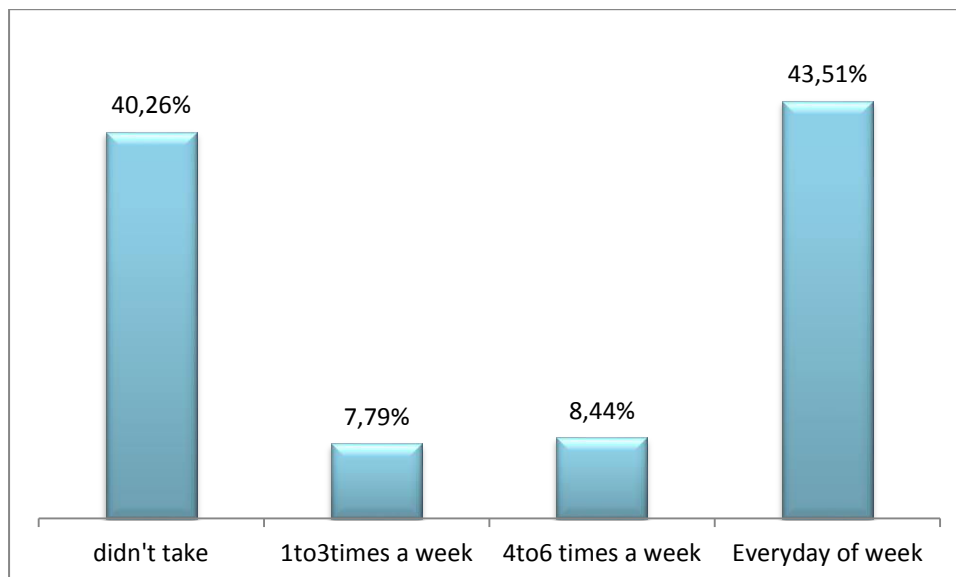


Fig4.6: Intake of multivitamins during the month before getting pregnant

From the graph it can be seen that 40.26% of pregnant women did not take multivitamins before getting pregnant. 43.51% patient take multivitamin everyday of week. 8.44% patient take multivitamin 4 to 6 times a week. 7.79% take 1 to 3 times a week.

#### 4.7 Occupational status

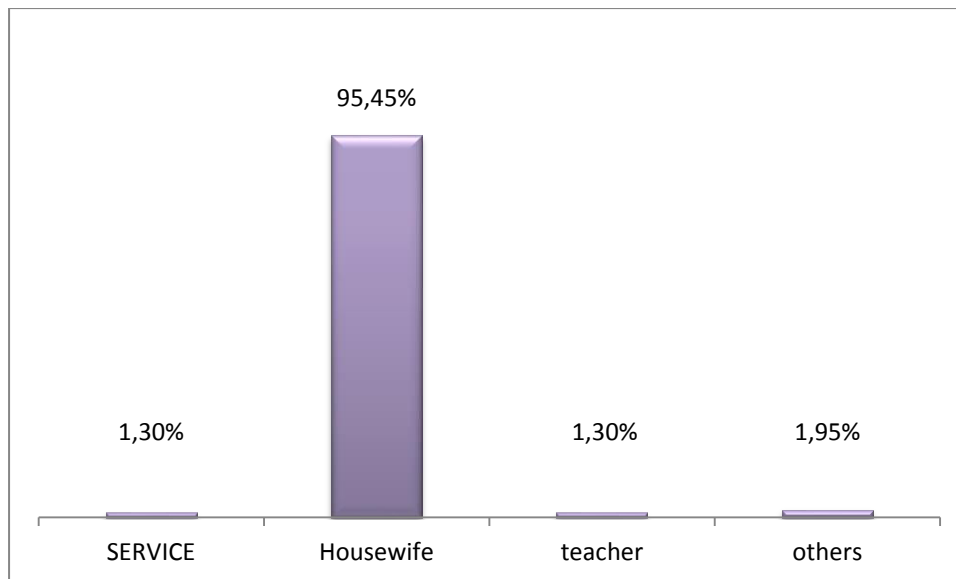


Fig 4.7: Occupational status of respondents

The majority of pregnant women were housewife(95.45%).1.30% were in service and teaching profession. The rest 1.95% were in other sector of occupation.

#### 4.8 Occupational chemical

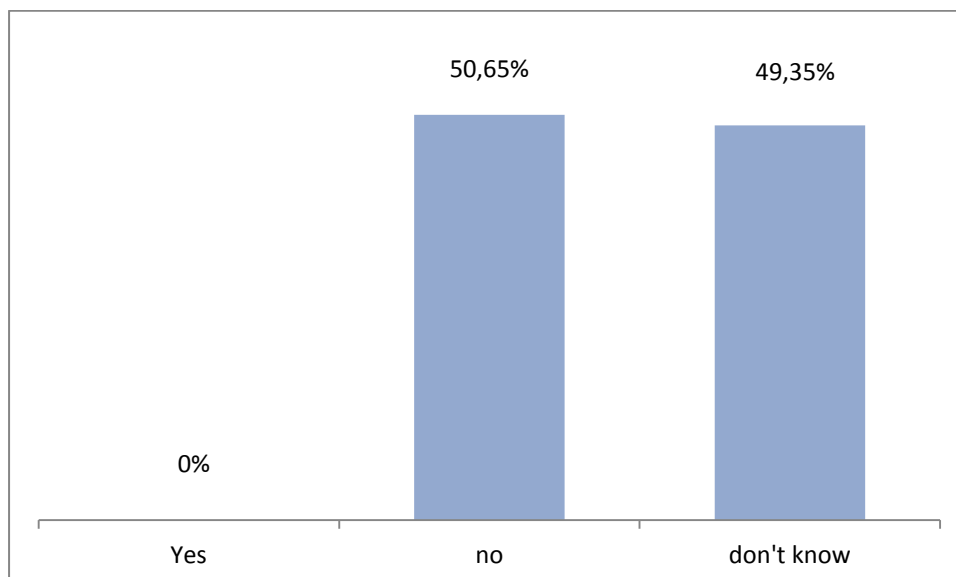


Fig 4.8: Exposure of occupational chemical

Among the respondent, about 50.65% pregnant women said that they do not expose from any type of chemicals in their occupational environment. The rest respondent 49.35% said that they don't know about chemical exposure.

#### 4.9 Information about rubella virus

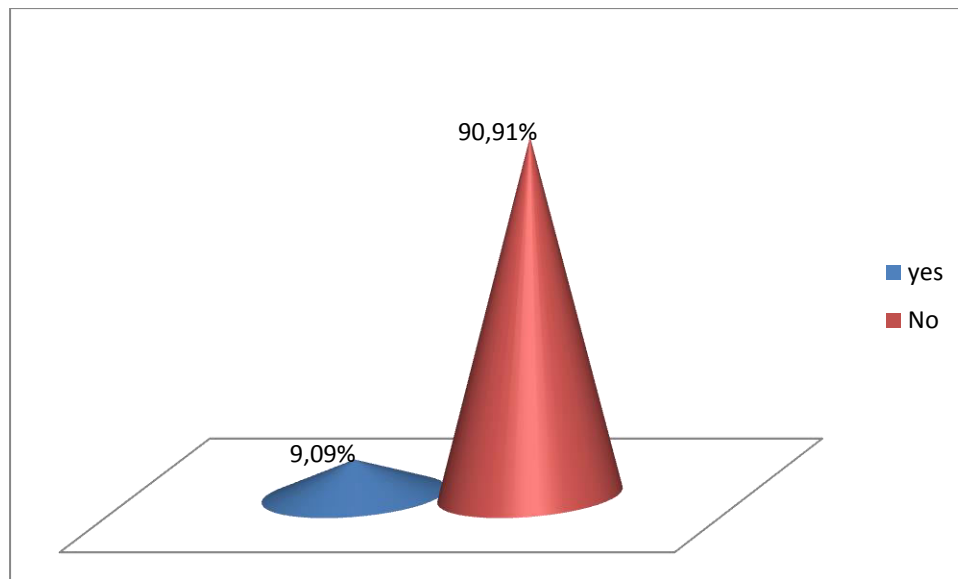


Fig 4.9: Information about rubella virus

It showed that 90.91% pregnant women said that they don't know about rubella virus. About 9.09% pregnant women said that they know about rubella but they weren't vaccinated.

#### 4.10 Awareness of warning signs

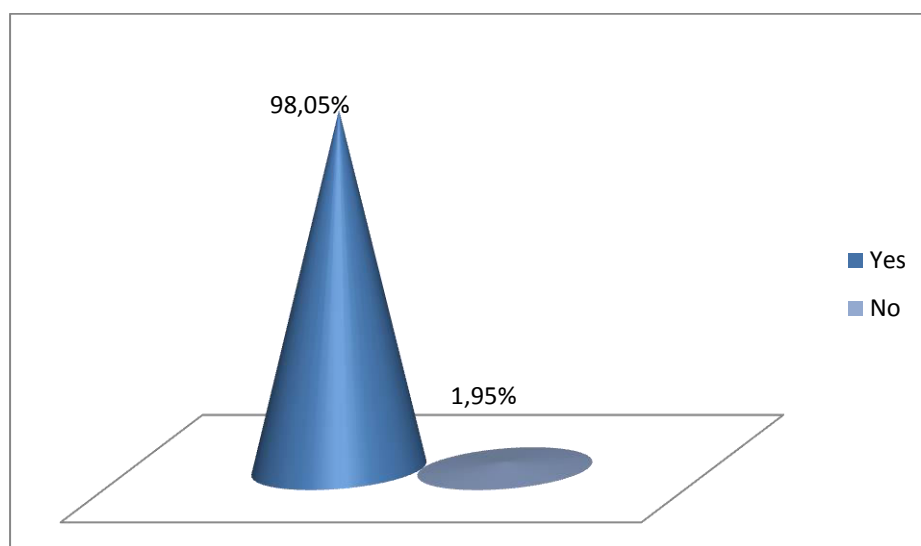


Fig 4.10: Awareness of warning signs

It showed that about 98.05% pregnant women were aware of warning signs but 1.95% said that are not aware of warning signs.



#### 4.11 Warning signs

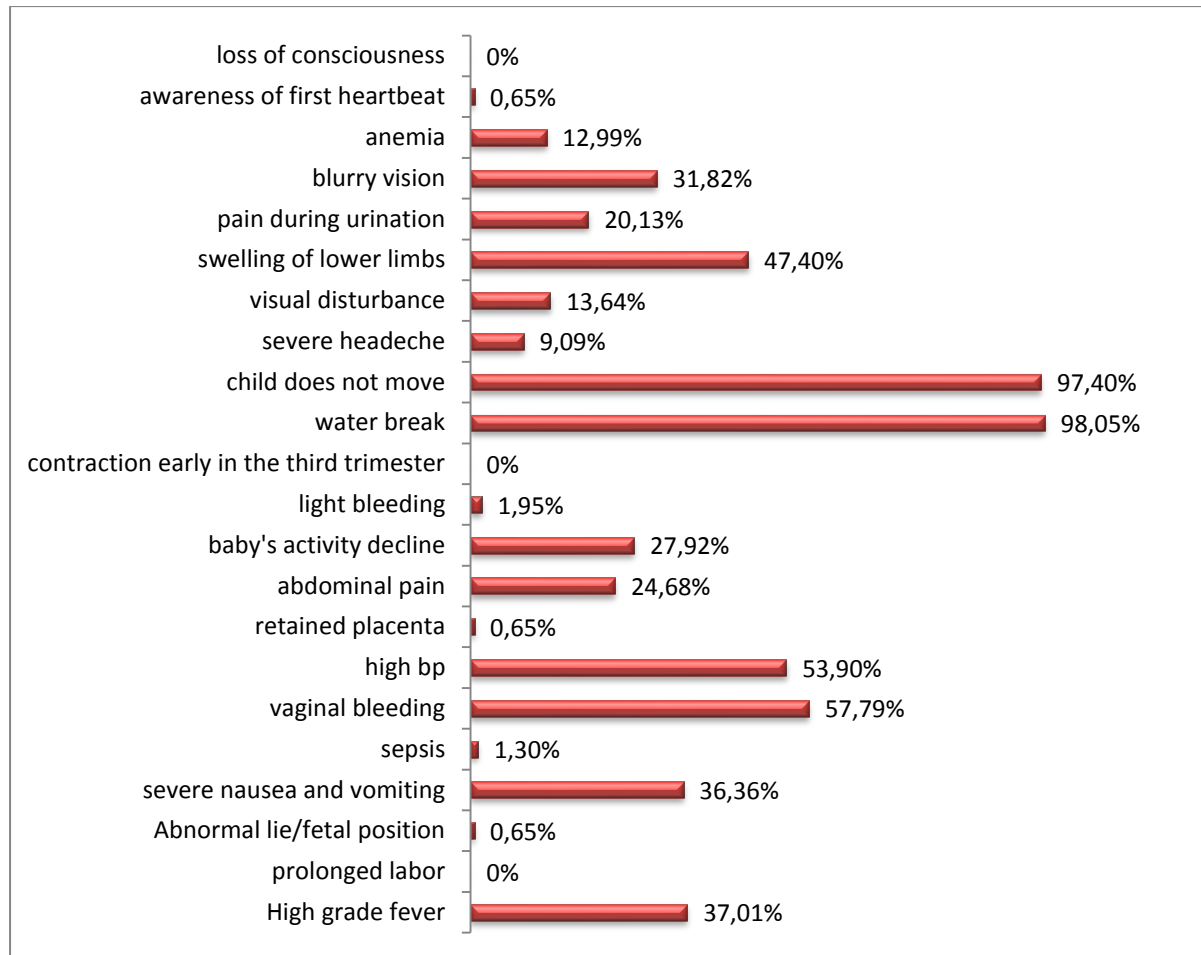


Fig 4.11: Awareness of warning signs

Most of the respondent about 97.40% and 98.05% pregnant patient said that they are aware about child does not move and water break respectively. A few were know about sepsis(1.30%) , abnormal lie(0.65%), light bleeding(1.95%), loss of consciousness (0%) as a warning sign.

#### 4.12 Awareness of danger signs

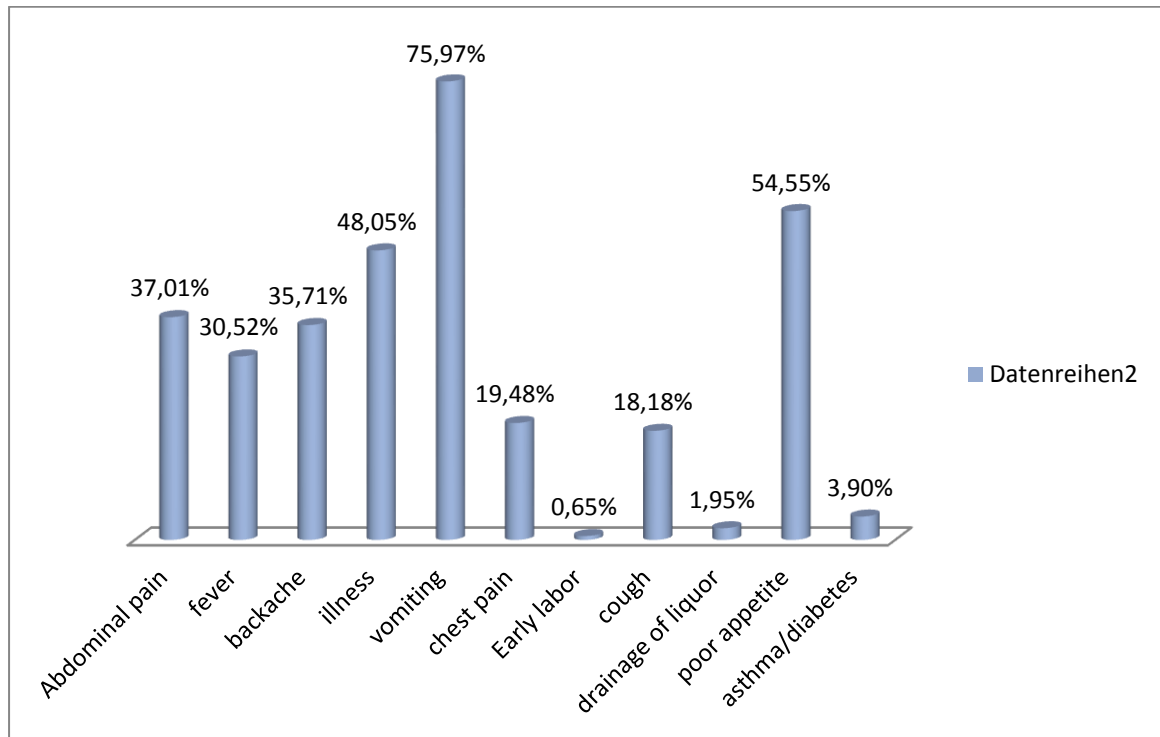


Fig 4.12: Awareness of danger signs

Most of the respondent about 75.97% pregnant patient know about the danger sign vomiting.54.55% and few respondent believed that drainage of liquor(1.95%) is an indicative danger sign.

### 4.13 Getting information

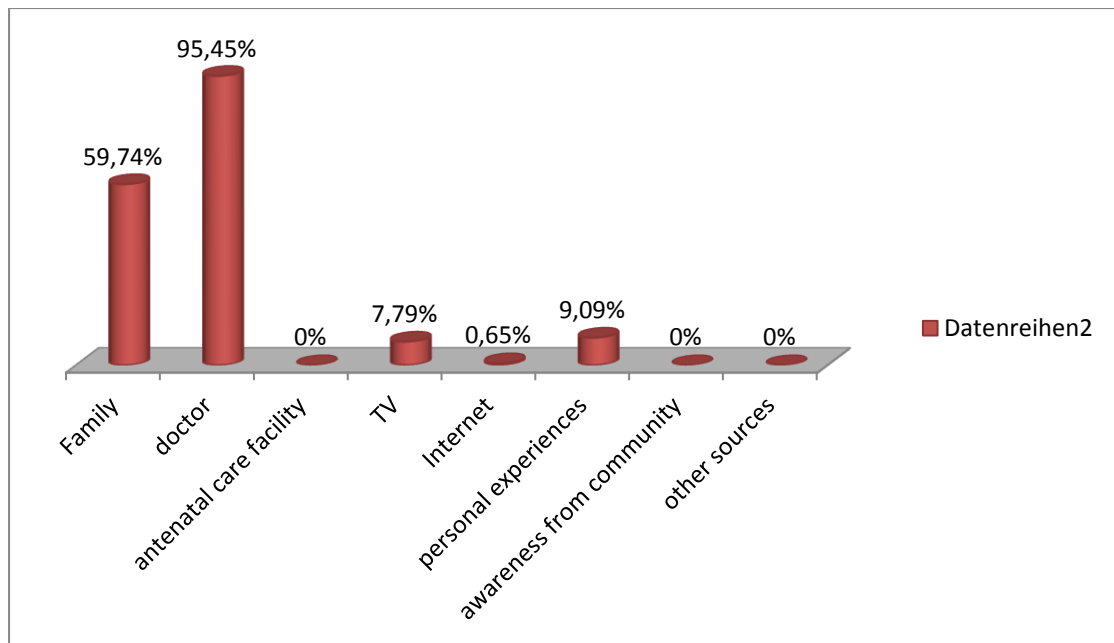


Fig4.13: Getting information of pregnant respondent

Majority of the pregnant women got information from doctor(95.45%) and their family(59.74%).

### 4.14 Antenatal care visiting

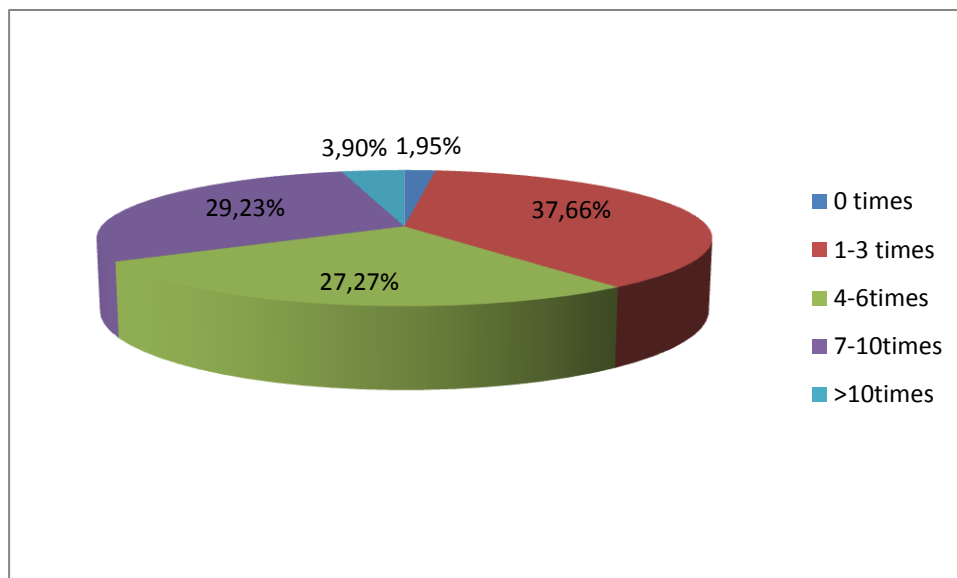


Fig 4.14: Antenatal care visiting

Among the respondent, about 1.95% pregnant women didn't visit antenatal care. Most of the respondent visit antenatal care about 1-3 times.

#### 4.15 Information, education or counseling provided from antenatal visit

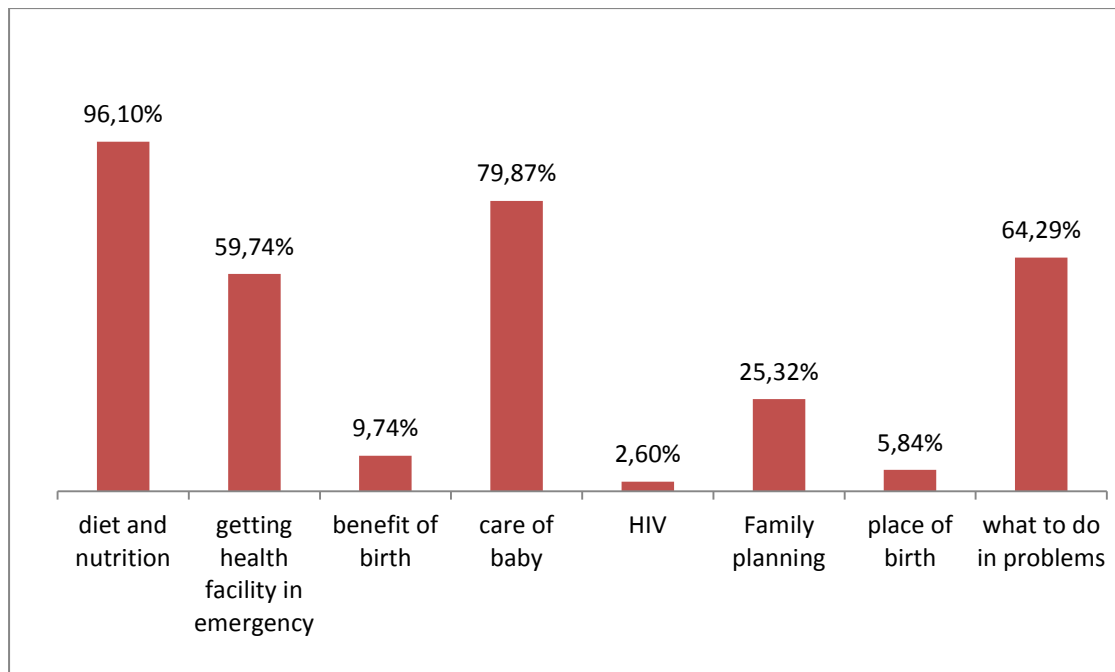


Fig 4.15 : Information, education or counseling provided from antenatal visit

Most of the respondent were provided information about diet and nutrition. Only 2.60% respondent were told about HIV.

#### 4.16 Communication between health worker and patients

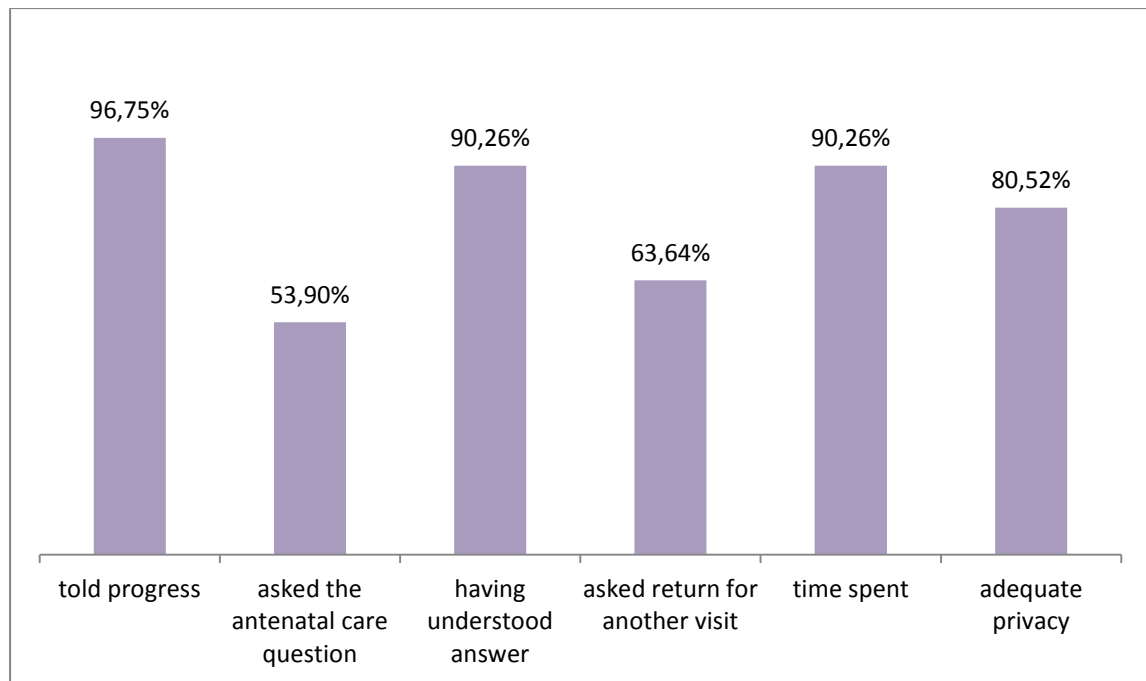


Fig 4.16: Communication between health worker and patients

Majority of the pregnant women said that their health worker told about progress of their pregnancy, asked the antenatal care questions. Pregnant women also understood answer's given by provider. Health care provider also asked for another visits or appointment, also spent time and maintained adequate privacy of the patients.

#### 4.17 Abortifacient food

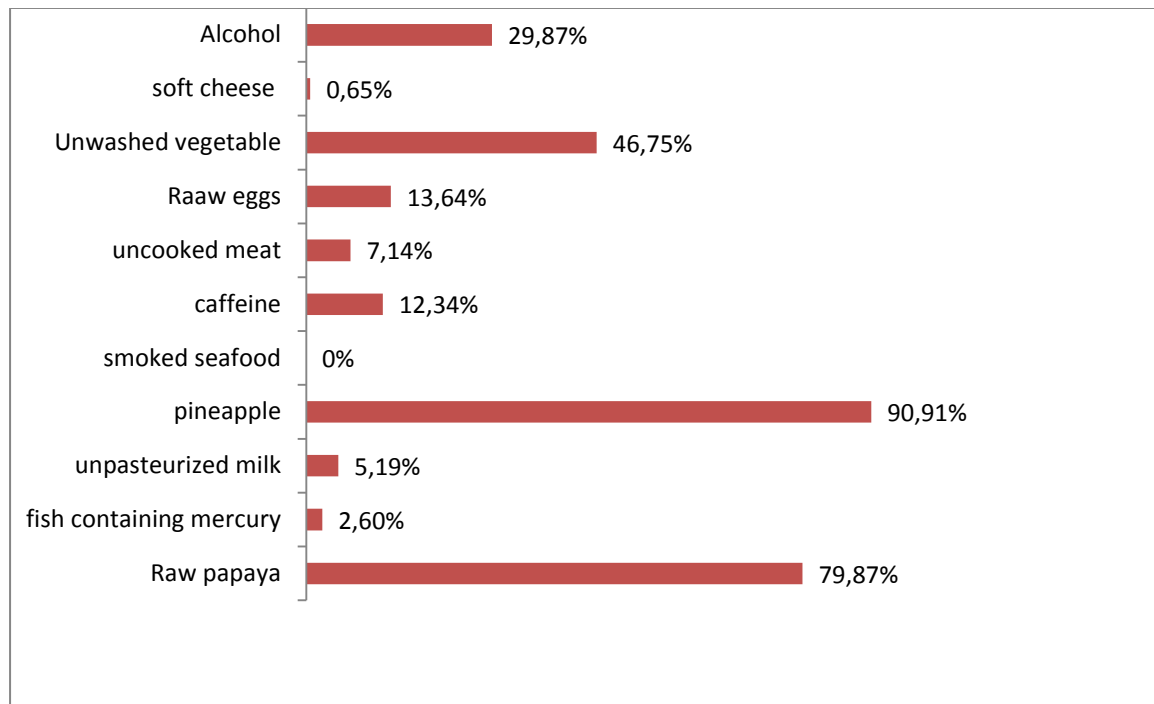


Fig 4.17: Knowledge of abortifacient food

Majority of pregnant patient knew about the abortifacient food such as pineapple (90.91%), Raw papaya (79.87%), unwashed vegetables (46.75%). They had little knowledge about Fish containing mercury (2.60%), Smoked seafood (0%), Soft cheese (0.65%).

#### 4.18 Types of complication in pregnancy

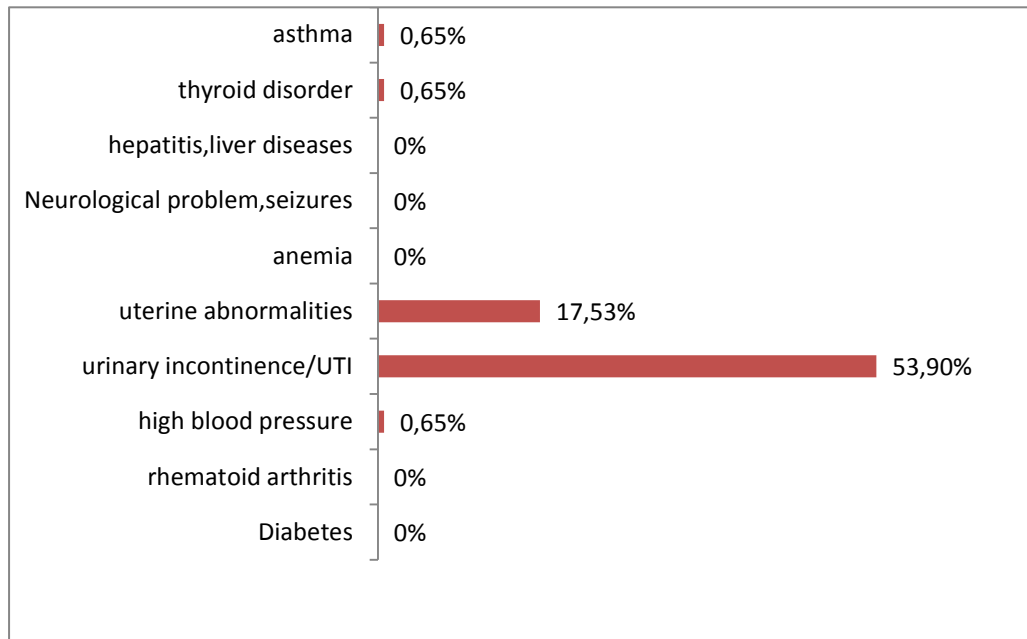


Fig4.17 Types of complication in pregnancy

Among the respondent, 53.90% pregnant women had urinary incontinence problem in 154 women. Uterine abnormalities found in 17.53% women. Thyroid disorder found in 1 pregnant women of 154 pregnant women.

#### 4.19 Complication during and current pregnancy

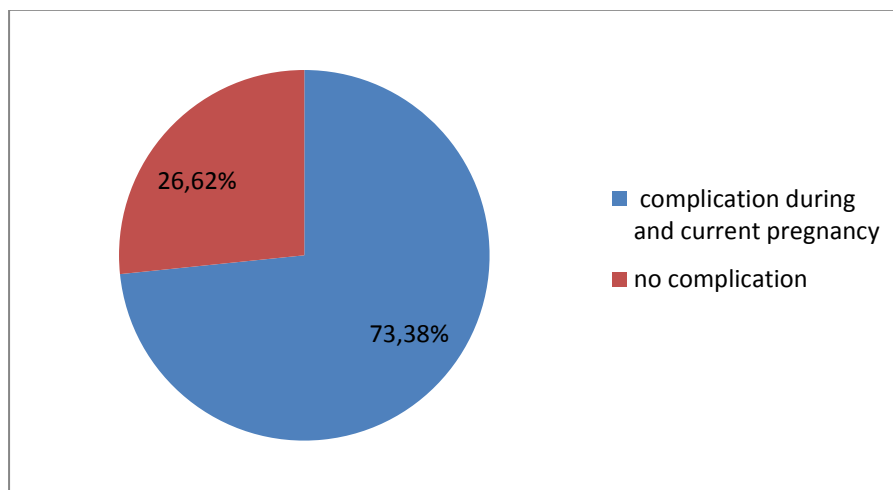


Fig 4.18 Complication during and current pregnancy

Among the respondent 73.38% women had complication during and current pregnancy. About 26.62% women had no complication.

#### 4.20 Complications of current pregnancy

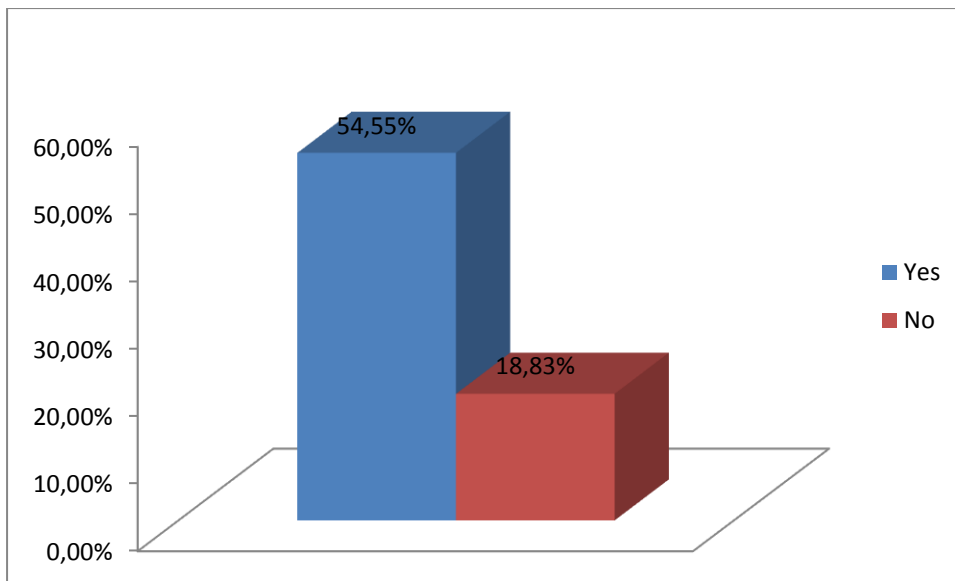


Fig 4.21: Complications during current pregnancy

Among the respondent 54.55% had complication during pregnancy and 18.83% had no complications

#### 4.21 Growth of baby

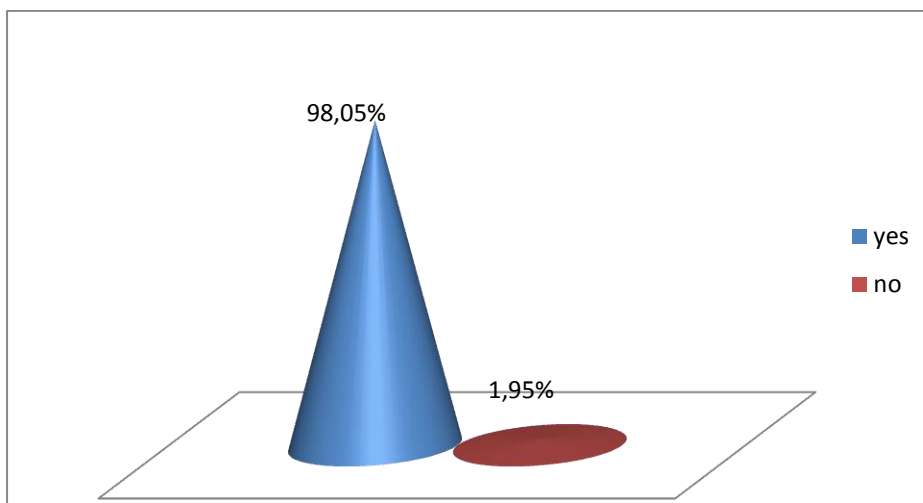


Fig 4.22 Growth of baby

Among the respondent 98.05% baby's growth was normal and 1.95% suffered from abnormalities.



## 4.22 Medication

Therapeutic class	Percentage (%)
<b>NSAIDs</b>	30.52%
Ketorolac	9.09%
Diclofenac	18.18%
Acetaminophen	1.30%
Aceclofenac	1.95%
Antacid	5.19%
<b>Antibiotics</b>	
Metronidazole	31.82%
Cephalosporin	30.51%
<b>PPI</b>	
Omeprazole	10.38%
Pantoprazole Rabeprazole	11.69%
Esomeprazole	0.65%
<b>H2 receptor blocker</b>	
Ranitidine	1.30%
<b>Antispasmodic drug</b>	
Tiemonium Methylsulphate	5.19%
<b>Anti thyroid drug</b>	
Thyrox	0.65%
<b>Benzodiazepam</b>	7.79%

<b>Vitmin supplement</b>	
Calcium carbonate and Vit -D	75.32%
Vitamin B and zinc supplement	15.58%
Ascorbic acid	47.40%
Folic acid and iron supplement	5.19%

**CHAPTER 5**  
**DISCUSSION**

Globally, approximately 358,000 women still die annually as a result of complications of pregnancy and childbirth. The main burden of these deaths is shouldered by two of the developing regions, sub-Saharan Africa and South Asia. These two regions together bear 87% of the global maternal deaths with 57% of the maternal deaths occurring in the sub-Saharan Africa region alone (Akililu Solomon et al., 2015). This situation is worse in developing countries like ours in Bangladesh due to inadequate access to modern health services and poor utilization and lack of awareness of the population about the complications and also for not likely to practicing some factors that is important to follow in pregnancy. So we have done a survey among 300 pregnant women (second and third trimester) for knowing their awareness about danger signs as well as warning signs of pregnancy. So, this survey may help them to increase their consciousness about complication during pregnancy.

This survey is conducted among 154 pregnant women in Sylhet and Chittagong. Among the respondent, about 71.43% pregnant women were aged between 20- 30 years. Among them less than 20 years aged pregnant women were 27.27%. Though this age range has prominent risk of pregnancy related complications.

Our study found that about 44.81% women have education below SSC and 1.30% completed their graduation. It showed that about 8.44% pregnant women were illiterate among 154 pregnant women. It showed that about 95.45% were house wife. A few were service holder among 154 pregnant women who had good knowledge about warning sign and danger signs. In this study maximum pregnant women were in gravida one stage and gravid two stage since most respondent were in age range of below 20 and 20-30 years so it showed gravida one and two stage mostly.

Of enrolled women, mostly suffered from obstetric complication such as convulsion in their previous pregnancy (3.25%) and 1.30% had stillbirth. According to Saito, (2009) recurrent pregnancy loss is the syndrome that repeated miscarriage, stillbirth, and premature delivery impairing the ability to have a live birth. In one study conducted in 2012, it showed that 84.8% of the women interviewed were not aware of danger signs and symptoms of pregnancy complication. Socio demographic factors-including duration

of education and current employment; husband's duration of education; family size; and whether women were given information about danger signs and symptoms

Our survey showed that among the respondent 75.97% were aware about danger sign vomiting and they have little knowledge about drainage of liquor, and early labor. All the respondent knew at least one danger sign. Among the respondent 98.05% were aware about warning sign during pregnancy. Most of the respondent know about water break (98.05%) and child does not move (97.40%). They have good knowledge about high BP and vaginal bleeding. But they have no knowledge about prolonged labor and have little knowledge retained placenta (0.65%), abnormal lie(0.65%) and sepsis(1.30%). This because lack of proper education and consciousness of pregnant women and their family members.

One study conducted in 2009 that more than 98% of the women attended antenatal care at least once. Half of the women knew at least one obstetric danger sign. The percentage of women who knew at least one danger sign during pregnancy was 26%, during delivery 23% and after delivery 40%. Few women knew three or more danger signs. In a study conducted in 2014 in India showed that 50.73% of the respondents had average knowledge of warning signs. Compared to this, our population had better knowledge about the warning signs and danger signs.(Mahalingam and Venkatesan, 2014).

A survey conducted on pregnant women in Debra Birhan town in central Ethiopia showed that only 38.6% of the respondents had knowledge about danger signs (Solmon et.al,2015). This study showed that in our country pregnant women had better knowledge than them (98.05%). We found that most of the respondent knew about multiple warning sign as if they were completed their primary and secondary level of education.

From the study we found that the women with higher educational status like undergraduate, graduate or post graduate were more conscious about their pregnancy period, danger signs of pregnancy complications and also very much positive in taking care of those factors that could minimize the threat to their baby as well as to them.

In this research 98.05% pregnant women consulted with the doctor at least one time. Among the 154 respondent all were informed about pregnancy knowledge during pregnancy. Maximum respondent came to know the information from their family and

doctors. Even who didn't consult with the doctor they came to know about information from their family members. They were also very much concerned about the medication they were taking, about their physical activity, about the warning and dangerous signs of pregnancy, about various abortifacient foods. If they gave stillbirth or if they had miscarriage, abortion they even did not know the reasons behind this. They did not concern at all to avoid these situations. So if they wanted to take a proper care to their health as well as to their baby, they could not because of shortage of money.

In this survey it showed that most of the pregnant women suffer from urinary incontinence. Thyroid disorder is found in one patient out of 154 pregnant women. Uterine abnormalities found in 17.53% patients. Thyroid disorder found in 1 patient of 154 pregnant patient, 0.65% patient had high blood pressure and asthma. Complication diabetes is not found among the respondent. Most of the respondent visited doctor 1-3 times and it was observed that most of the respondent gathered information from their respective doctors.

Doctors mostly provided them with the information about diet and nutrition. Most of the respondent knew about abortifacient food raw papaya and pineapple. In this study it showed that about 90.91% respondents know that pineapple can cause abortion and 79.87% know that raw papaya is an abortifacient food. They have no knowledge about smoked seafood and little knowledge about fish containing mercury because of their lack of proper education and unconsciousness of family members.

**CHAPTER 6**  
**CONCLUSION**

Pregnancy related complications are well known in Bangladesh but happens in large number. Pregnant women are aware about the complication that may arise but they seem to fail to avoid the complications. This is because they take it less seriously or they totally ignore the symptoms. In case of this study we must consider the fact that, respondent number was not very high and the level of complication found in pregnant women were very poor and thier knowledge about abortifacient food was low. Hence the results do not illustrate the whole scenario. There is an opportunity to carry out this research work in future with more number of respondents.



**CHAPTER 7**  
**REFERENCES**

## References

American Pregnancy Association, (2013). *Anemia During Pregnancy: Causes, Symptoms & Treatment*. Available at: <http://americanpregnancy.org/pregnancy-concerns/anemia-during-pregnancy/> [Accessed 21 Feb. 2016].

Acog.org. (2016). *Marijuana Use During Pregnancy and Lactation - ACOG*. [online] Available at: <http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Marijuana-Use-During-Pregnancy-and-Lactation> [Accessed 23 Jun. 2016]

BabyMed.com. (2008). *Medications With Alcohol During Pregnancy | BabyMed.com*. [online] Available at: <http://www.babymed.com/pregnancy-safety/medications-alcohol-during-pregnancy> [Accessed 27 Jun. 2016].

CDC(2016). *Tobacco Use and Pregnancy | Reproductive Health CDC*. [online] Available at: <http://www.cdc.gov/reproductivehealth/maternalinfanthealth/tobaccousepregnancy/> [Accessed 27 Jun. 2016].

Cole, L., Khanlian, S., Sutton, J., Davies, S. and Rayburn, W. (2004). Accuracy of home pregnancy tests at the time of missed menses. *American Journal of Obstetrics and Gynecology*, 190(1), pp.100-105.

Choosingwisely.org. (2016). *American College of Obstetricians and Gynecologists | Choosing Wisely*. Available at: <http://www.choosingwisely.org/societies/american-college-of-obstetricians-and-gynecologists/> [Accessed 27 Jun. 2016].

Chambliss, L. and Clark, S. (2014). Paper gestational age wheels are generally inaccurate. *American Journal of Obstetrics and Gynecology*, 210(2), pp.145.e1-145.e4.

Collinsdictionary.com, (2016). *Definition of "trimester" | Collins English Dictionary*. Available at: <http://www.collinsdictionary.com/dictionary/english/trimester> [Accessed 21 Feb. 2016].

Davies, G.A.; Wolfe, L. A.; Mottola, M. F.; MacKinnon, C ; Arsenault, Marc-Yvon; Bartellas, E; Cargill, Y; Gleason, Tom; Iglesias, Stuart. (2003). Exercise in pregnancy

and the postpartum period. *Journal of Obstetric and Gynaecology Canada.*, 25(6), pp.516-529.

Della G, S., LaGasse, L., Arria, A., Derauf, C., Grant, P., Smith, L., Shah, R., Huestis, M., Liu, J. and Lester, B. (2009). Patterns of Methamphetamine Use During Pregnancy: Results from the Infant Development, Environment, and Lifestyle (IDEAL) Study. *Maternal and Child Health Journal*,

Diabetesaustralia.com.au, (2016). *Managing gestational*. Available at: <https://www.diabetesaustralia.com.au/managing-gestational-diabetes> [Accessed 21 Feb. 2016].

D Groot., Marcos A., Erik A., Nobuyuki A., Linda B., Rhoda C., Creswell E., John L., Dominique L., Susan M., Jorge M., Joanne R., Scott S., (2012) Management of Thyroid Dysfunction during Pregnancy and Postpartum: An Endocrine Society Clinical Practice Guideline. A systemic review. *Endocrine Society's Journals*. 97(8):2543–2565.

Emedicine.medscape.com, (2016). *Hypertension and Pregnancy: Overview, Chronic Hypertension, Differential Diagnosis*. Available at: <http://emedicine.medscape.com/article/261435-overview#a4> [Accessed 24 Feb. 2016].

Gallagher, J. (2009). *My Wife Died After Giving Birth*. Harper's BAZAAR. Available at: <http://www.harpersbazaar.com/beauty/health/a416/wife-died-after-childbirth-0909/> [Accessed 16 Jun. 2016].

Gillespie, D. (1999) Reducing perinatal and neonatal mortality. *Child Health Research Project Special Report*. [Online] 3(1), p.34. Available at: <http://www.mnh.jhpiego.org> [Accessed 17 Jan. 2016].

Hoque, M. and Hoque, M. (2011). Knowledge of Danger Signs for Major Obstetric Complications Among Pregnant KwaZulu-Natal Women: Implications for Health Education. *Asia-Pacific Journal of Public Health*, 23(6), pp.946-956.

Joshi, C., Torvaldsen, S., Hodgson, R. and Hayen, A. (2014). Factors associated with the use and quality of antenatal care in Nepal: a population-based study using the demographic and health survey data. *BMC Pregnancy Childbirth*, 14(1), p.94.

Kieler, H., Axelsson, O., Nilsson, S. and Waldenstro, U. (1995). The length of human pregnancy as calculated by ultrasonographic measurement of the fetal biparietal diameter. *Ultrasound in Obstetrics and Gynecology*, 6(5), pp.353-357.

Jukic, A., Baird, D., Weinberg, C., McConnaughey, D. and Wilcox, A. (2013). Length of human pregnancy and contributors to its natural variation. *Human Reproduction*, 28(10), pp.2848-2855.

Merck Manuals Consumer Version, (2016). *Urinary Tract Infections During Pregnancy Women's Health Issues*. [online] Available at:<http://www.merckmanuals.com/home/women-s-health-issues/pregnancy-complicated-by-disease/urinary-tract-infections-during-pregnancy> [Accessed 21 Feb. 2016].

Mengesha, E. and Taye, H. (2014) The Level of Awareness on Danger Signs of Pregnancy and Associated Factors among ANC Attendant Pregnant Women in Debarq Town, North West Ethiopia, 2012. *Translational medicine and biotechnology*, [Online] 2(5), pp.1-2. Available at: <http://oiirj.org/oiirj/tmb> [Accessed 17 June. 2016].

Mayoclinic.org, (2016). *Gestational diabetes Complications - Mayo Clinic*. Available at: <http://www.mayoclinic.org/diseases-conditions/gestational-diabetes/basics/complications/con-20014854> [Accessed 21 Feb. 2016].

Mahalingam, G. and Venkatesan, M. (2014) Mother's Knowledge of Warning Signs of Pregnancy, Labour and Puerperium. *International Journal of Medical Science and Public Health*. 3(6), 720-722.

Martin, C. and Huber, L. (2011). Physical Activity and Hypertensive Complications During Pregnancy: Findings From 2004 to 2006 North Carolina Pregnancy Risk Assessment Monitoring System. *Obstetrical & Gynecological Survey*, 66(2), pp.81-83.

Nikiema, B., Beninguisse, G. and Haggerty, J. (2009). Providing information on pregnancy complications during antenatal visits: unmet educational needs in sub-Saharan Africa. *Health Policy and Planning*, 24(5), pp.367-376.

Nhlbi.nih.gov, (2016). *High Blood Pressure in Pregnancy - NHLBI, NIH*. Available at: <http://www.nhlbi.nih.gov/health/resources/heart/hbp-pregnancy> [Accessed 24 Feb. 2016].

Nichd.nih.gov.(2016a). *What are some common complications of pregnancy?*[online] Available at:<https://www.nichd.nih.gov/health/topics/pregnancy/conditioninfo/Pages/complications.aspx> [Accessed 27 Jun. 2016].

Nichd.nih.gov. (2016b). *NICHD - Eunice Kennedy Shriver National Institute of Child Health and Human Development*. [online] Available at: <https://www.nichd.nih.gov/Pages/index.aspx> [Accessed 27 Jun. 2016].

Nhs.uk. (2016a). *Your pregnancy and baby - Pregnancy and baby guide - NHS Choices*. Available at: <http://www.nhs.uk/conditions/pregnancy-and-baby/pages/pregnancy-and-baby-care.aspx> [Accessed 27 Jun. 2016].

Nhs.uk, (2016b). *Foods to avoid during pregnancy - Health questions - NHS Choices*. Available at: <http://www.nhs.uk/chq/Pages/917.aspx?CategoryID=54> [Accessed 24 May,2016]

NPR.org. (2011). *Doctors To Pregnant Women: Wait At Least 39 Weeks*. Available at: <http://www.npr.org/templates/transcript/transcript.php?storyId=138473097> [Accessed 27 Jun. 2016].

Niddk.nih.gov.(2015) *Pregnancy and Thyroid Disease*. Available at: <http://www.niddk.nih.gov/health-information/health-topics/endocrine/pregnancy-and-thyroid-disease/Pages/fact-sheet.aspx> [Accessed 22 May. 2016].

Nice.org.uk. (2010). *Hypertension in pregnancy: diagnosis and management | 1-Guidance | Guidance and guidelines | NICE*. Available at: <https://www.nice.org.uk/guidance/cg107/chapter/1-guidance> [Accessed 15 May 2016].

Nguyen, T., Larsen, T., Engholm, G. and Moller, H. (1999). Evaluation of ultrasound-estimated date of delivery in 17 450 spontaneous singleton births: do we need to modify Naegele's rule?. *Ultrasound in Obstetrics and Gynecology*, 14(1), pp.23-28.

Pembe, A., Urassa, D., Carlstedt, A., Lindmark, G., Nyström, L. and Darj, E. (2009). Rural Tanzanian women's awareness of danger signs of obstetric complications. *BMC Pregnancy Childbirth*, 9(1), p.12. [Accessed 15 May 2016].

Pendergast LL, e. (2016). *Postpartum depressive symptoms across time and place: structural invariance of the Self-Reporting Questionnaire among women from the international...* - PubMed - NCBI. Ncbi.nlm.nih.gov. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/24981251> [Accessed 21 Feb. 2016].

Pregnant, W. and Diet, P. (2012). *Fruits to Avoid During Pregnancy: Grapes, Papaya, Pineapple*. Only my health. Available at: <http://www.onlymyhealth.com/fruits-avoid-during-pregnancy-grapes-papaya-pineapple-1307089264> [Accessed 24 Feb. 2016]

Qasim, A., Bashir, A., Riaz,S. and Almas, A. (2016) Women with Pregnancy Induced Hypertension have A Higher Risk of Developing Essential Hypertension .A Case Control Study From A Tertiary Care Center In Pakistan. *Journal of the Pakistan Medical Association*. 66(2), 179-181.

Rukuni, R., Bhattacharya, S., Murphy M. F., Roberts, D., Stanworth S. J. and Knight, M. (2016) Maternal and Neonatal Outcomes of Antenatal Anemia In A Scottish Population: A Retrospective Cohort Study. *Acta Obstetricia et Gynecologica Scandinavica*. 95(5):555-64

Saito, A. (2009) The Causes and Treatment of Recurrent Pregnancy Loss. *Journal of the Japan Medical Association*. 52(2), 97-101.

Solomon, A., Amanta, A. and Chirkose<sup>1</sup>, E. (2015) Knowledge about Danger Signs of Pregnancy and Associated Factors Among Pregnant Women in Debra Birhan Town, Central Ethiopia. *Science Journal of Public Health*. 3(2), 269-273.

Singh, A. and Arora, A. (2007). The changing profile of pregnant women and quality of antenatal care in rural North India. *Indian J Community Med*, 32(2), p.135.

The Free Dictionary.com, (2016). *trimester*. Available at: <http://www.thefreedictionary.com/trimester> [Accessed 21 Feb. 2016].

Tunon, K., Eik-Nes, S., Grottum, P., von Düring, V. and Kahn, J. (2000). Gestational age in pregnancies conceived after in vitro fertilization: a comparison between age assessed from oocyte retrieval, crown-rump length and biparietal diameter. *Ultrasound in Obstetrics and Gynecology*, 15(1), pp.41-46.

John A. Daller, A. (2016). *Breast pain: MedlinePlus Medical Encyclopedia*. Nlm.nih.gov. Available at: <https://www.nlm.nih.gov/medlineplus/ency/article/003152.htm> [Accessed 21 Feb. 2016].

United Nations Children's Fund (UNICEF). The Progress of Nations. New York, USA: UNICEF, 1996. Available at: [www.unicef.org/pon96/woestima.html](http://www.unicef.org/pon96/woestima.html) [Accessed on May 2016 ]

Verhaegen, J., Gallos, I., van Mello, N., Abdel-Aziz, M., Takwoingi, Y., Harb, H., Deeks, J., Mol, B. and Coomarasamy, A. (2012). Accuracy of single progesterone test to predict early pregnancy outcome in women with pain or bleeding: meta-analysis of cohort studies. *BMJ*, 345(sep27 4), pp.e6077-e6077.

Vazquez, J. (2010). Constipation, haemorrhoids, and heartburn in pregnancy. *BMJ Clinical Evidence*, [online] 2010. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3217736/> [Accessed 21 Feb. 2016].

WHO, (2016). Trends in Maternal Mortality 1990-2008. Available at: <http://www.who.int/reproductivehealth/publications/monitoring/9789241500265/en/index.html>. [Accessed 18 June.2016]

Womens-health.co.uk. (2016a). *Menstruation During Pregnancy*. Available at: <http://www.womens-health.co.uk/menstruation-during-pregnancy.html> [Accessed 27 Jun. 2016].

Womens-health.co.uk. (2016b). *Miscarriage: Top Resource for Miscarriage Signs and Treatment*. Available at: <http://www.womens-health.co.uk/miscarr.asp> [Accessed 27 Jun. 2016].

WHO(2016a) Treatments For Iron-Deficiency Anaemia In Pregnancy".[http://apps.who.int/rhl/pregnancy\\_childbirth/medical/anaemia/gwguide/en/](http://apps.who.int/rhl/pregnancy_childbirth/medical/anaemia/gwguide/en/) N.p., 2016. [Accessed 10 Feb. 2016]

World Health Organization. (2016). *Maternal mortality*. Available at: <http://www.who.int/mediacentre/factsheets/fs348/en/> [Accessed 15 May 2016].

WebMD. (2016). *Anemia in Pregnancy: Causes, Symptoms, and Treatment*. Available at: <http://www.webmd.com/baby/guide/anemia-in-pregnancy?page=3> [Accessed 15 May 2016].

Whattoexpect, (2016). *Pregnancy Weight Gain | What to Expect*. Available at: <http://www.whattoexpect.com/pregnancy/weight-gain/> [Accessed 24 Feb. 2016].

World Health Organization, (2016). *Antenatal care*. Available at: [http://www.who.int/gho/maternal\\_health/reproductive\\_health/antenatal\\_care\\_text/en/](http://www.who.int/gho/maternal_health/reproductive_health/antenatal_care_text/en/) [Accessed 24 Feb. 2016].\_(World Health Organization, 2016)

Weight gain during pregnancy. (1969). *Obstetrics & Gynecology*, 33(1), pp.138-139.

Ye, C., Ruan, Y., Zou, L., Li, G., Li, C., Chen, Y., Jia, C., Megson, I., Wei, J. and Zhang, W. (2014). The 2011 Survey on Hypertensive Disorders of Pregnancy (HDP) in China: Prevalence, Risk Factors, Complications, Pregnancy and Perinatal Outcomes. *PLoS ONE*, 9(6), p.e100180.

Whitworth, M., Bricker, L., Nelison, J. and Doveswell, T. (2010). Ultrasound for fetal assessment in early pregnancy. *Cochrane Database of Systematic Reviews (4)*, Available at: <http://www.ncbi.nlm.nih.gov/pubmed/20393955> [Accessed 28 Jun. 2016].