

A Survey to study on the pregnancy patterns and its complications in Bangladesh

A thesis report submitted to the department of Pharmacy, East West University, Bangladesh, in partial fulfillment of the requirements for the degree of M. Pharm in Clinical Pharmacy and Molecular Pharmacology



Submitted by:

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2013-3-79-003

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Declaration by the Research Candidate

I, Rifat Chowdhury, hereby declare that the dissertation entitled “A Survey to study on the pregnancy patterns and its complications in Bangladesh”, submitted by me to the Department of Pharmacy, East West University, in the partial fulfillment of the requirement for the award of the degree of M. Pharm in Clinical Pharmacy and Molecular Pharmacology (Masters) is a bonafide record of original research work carried out by me under the supervision and guidance Dr. Repon Kumer Saha, Assistant Professor, Dept. of Pharmacy, East West University and it has not formed the basis for the award of any other Degree/Diploma/Fellowship or other similar title to any candidate of any University.

Place: Dhaka

Date 02-07-2015

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Certificate

This is to certify that the thesis “A Survey to study on the pregnancy patterns and its complications in Bangladesh, East West University in partial fulfillment of the requirements of the degree of M. Pharm in Clinical Pharmacy and Molecular Pharmacology was carried out by Rifat Chowdhury (ID# 2013-3-79-003) under our guidance and supervision and that no part of the thesis has been submitted for any other degree. We further certify that all the sources of information and laboratory facilities availed of in this connection is duly acknowledged.

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Acknowledgement

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Aim and Objectives

3.1Aims:

The purpose of the study is to document, review and critically analyze literature on pregnancy.

3.2Objectives:

The specific objectives are as follows:

- To review existing literature and conduct statistical analyses to establish the prevalence and determinants of pregnancy.
- To Determine the baby's age, growth, position, and sometimes gender
- To Identify any problems with how the fetus is developing
- To Look at the placenta, amniotic fluid, and pelvic.
- To Look for multiple pregnancies (twins, triplets, etc.)
- To Identify problems of the placenta, uterus, cervix, and ovaries
- To look for Pregnancy associated problems like morning sickness,Vomiting tendency or discomfort from heartburn or constipation,Back pain,Loss of Appetite,Sleeping Disturbance ,Nausea and vomiting etc.
- To Look for findings that might indicate an increased risk for Down syndrome, Nuchal fold thickening, Choroid Plexus Cysts Renal Pelvic Dilatation(RP), Echogenic Bowel

Abstract

A total of 200 pregnant women were included in the study and interviewed as per the questionnaire. The patients were within 17-35 years of age mostly were housewife. During the study period at CMUD, patients coming for the ultrasound imaging were interviewed as per questionnaire. Different clinical as well as generalized information including their monthly income, weight, height, blood group, number of children, abortion history, vaccination, morning sickness, bi-parietal diameter, femur length, expected delivery date, position of the child in placenta, visual activity of eye , Pregnancy associated problems like morning sickness, Vomiting tendency or discomfort from heartburn or constipation ,Back pain ,Loss of Appetite, Sleeping Disturbance etc, Concomitant Diseases like DM, HTN or Gastritis etc. chances of infection like Chickenpox,HIV ,Bacterial and Candidal vaginitis , abnormalities like Down syndrome, Nuchal fold thickening, Choroid Plexus Cysts Renal Pelvic Dilatation(RP), Echogenic Bowel were recorded for further analysis. However based on Ultrasonography different parameters were recorded to ensure reduction in maternal mortality.

Introduction

Pregnancy is the development of one or more offspring, known as embryo or fetus, in a woman's uterus. Pregnancy always associated with lots of complication both for fetus and Women caring fetus. The maternal mortality ratio (MMR) is not merely an indicator of maternal health but is also considered to be an important indicator of the health status and well being of a nation. Bangladesh has made a significant improvement in several health indicators. Nevertheless, although the maternal mortality ratio has declined from more than 600 in 1980 to 322 in 2004, it is still one of the highest in the world. Regional variations in MMR are also observed in Bangladesh.

In Bangladesh, pregnancy and delivery-related deaths account for 20 percent of the deaths in women of reproductive age. Ten percent death occurs during delivery, and the one in five occurs before delivery and remaining death after delivery. The leading causes of maternal deaths are hemorrhage (29 percent) and eclampsia (24 percent). Other direct major causes of maternal deaths are prolonged/obstructed labor and puerperal sepsis. The lack of knowledge on maternal health and negative attitude towards seeking delivery care from qualified providers contribute largely to the high rate of maternal deaths in Bangladesh .

1.1 Complications of pregnancy

Complications of pregnancy are problems that are caused by pregnancy. There is no clear distinction between complications of pregnancy and symptoms and discomforts of pregnancy. However, the latter do not significantly interfere with activities of daily living or pose any significant threat to the health of the mother or baby. In contrast, pregnancy complications may cause both maternal death and fetal death if untreated. Still, in some cases the same basic feature can manifest as either a discomfort or a complication depending on the severity. For example, mild nausea may merely be a discomfort (morning sickness), but if severe and with vomiting causing water-electrolyte imbalance it can be classified as a pregnancy complication (hyperemesis gravidarum).

In 2013, complications of pregnancy resulted in 293,000 deaths down from 377,000 deaths in 1990. The most common causes include maternal bleeding, complications of abortion, high blood pressure of pregnancy, maternal sepsis, and obstructed labor.

1.5 Importance Institutional delivery/delivery with the help of a birth attendant

Another important way to help more women survive pregnancy and childbirth is to provide them with access to skilled birth attendants such as trained nurse-midwives, trained traditional birth attendants or medical doctors. Skilled birth attendants can diagnose the need for emergency obstetric care and, if necessary, transfer the patient to a medical facility for treatment such as a caesarean section. A skilled birth attendant is essential to decrease maternal injuries, such as haemorrhages and obstructed labour that can result in fistula or death.

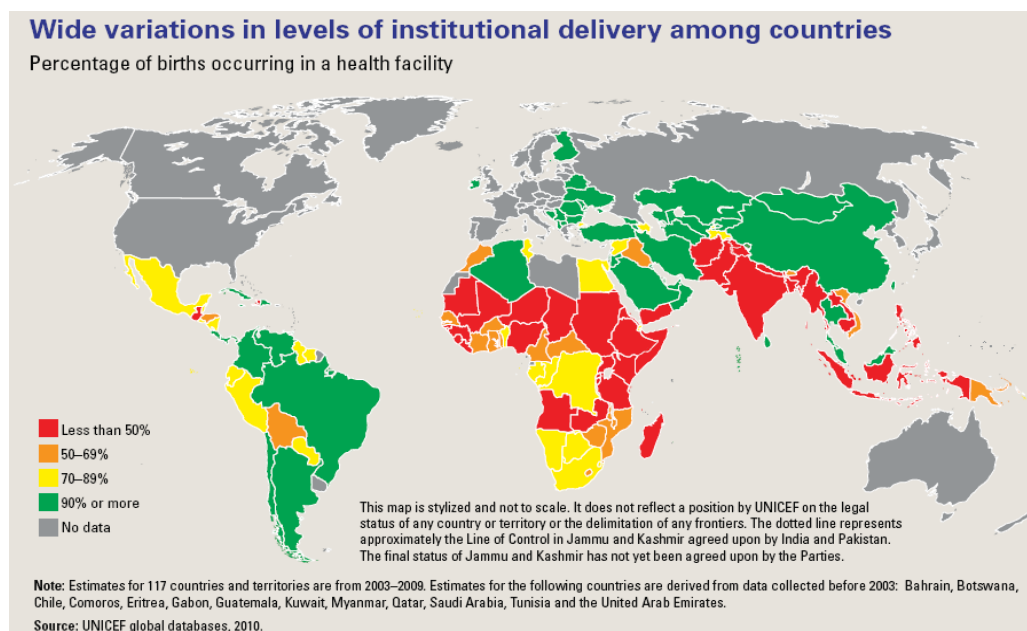


Figure 1.2: Wide variations in levels of institutional delivery among countries

The likelihood of a woman delivering her baby in a health facility also varied across sub-regions, but it has shown an increase in most of them (see table below). For the most recent period 2000–2007, births occurred almost solely in a health facility in Central Asia, Eastern Asia and Eastern

Europe. In contrast, a minority took place in a health facility in Eastern, Middle and Western Africa, Southern Asia and South-Eastern Asia. It is worth noting that the proportion of women who delivered in health facilities increased markedly between 1996 and 2000–2007 in Northern Africa from 57 to 78 per cent and in Southern Asia from 28 to 46 per cent.

Women receiving prenatal care, deliveries attended by a skilled attendant and deliveries in health facilities, by region, 1996 and 2000–2008 (latest available)

	Percentage pregnant women receiving prenatal care (at least 1 visit)		Percentage deliveries attended by a skilled attendant		Percentage deliveries in health facilities	
	1996	2000–2008	1996	2000–2008	1996	2000–2007
Africa						
Northern Africa	65	80	66	82	57	78
Southern Africa	86	92	67	78	64	72
Eastern, Middle and Western Africa	66	79	42	53	37	48
Asia						
Eastern Asia	93	94	95	98	89	94
South-Eastern Asia	77	77	64	62	52	48
Southern Asia	49	68	39	52	28	46
Central Asia	90	94	93	96	92	91
Western Asia	82	91	82	89	79	86
Latin America and the Caribbean						
Caribbean	95	96	88	92	86	79
Central America	75	90	70	82	62	76
South America	79	91	80	86	76	85
Oceania	84	..	81	81	87	..
Eastern Europe	97	97	99	100	98	99

Sources: 1996 data from United Nations, *The World's Women 2000: Trends and Statistics* (2000), p. 61, figure 3.8; 2000–2007/8 computed by United Nations Statistics Division based on data from the United Nations Statistics Division MDG database (accessed in August 2009).

Note: Unweighted averages.

Table 1.3: Showing women receiving prenatal care, deliveries attended by a skilled attendant and deliveries in health facilities, by region, 1996 and 2000–2008

1.6 Importance of prenatal care

Prenatal care is known to improve the outcome of pregnancy and birth for both mother and child. It not only monitors the health of the mother and foetus but also allows for the identification of potential complications. In addition, it can provide women with information about needed nutrition during pregnancy and breastfeeding. As the data show, the levels of prenatal care that women received varied among sub-regions. In the period 2000–2008, the overwhelming majority (over 90 per cent) of women in Southern Africa, Central and South America, the Caribbean, Eastern Asia, Central Asia, Western Asia and Eastern Europe received prenatal care at least once while pregnant. In contrast, only 68 per cent of women in Southern Asia received prenatal care during their pregnancy. The percentage of women receiving prenatal care (at least one visit) is 77% in South East Asia which is second lowest compared to the whole world. In Bangladesh only 51% of pregnant women receive prenatal care.

The availability of health facilities with access to emergency obstetrics is critical in cases where the mother experiences complications in labour and can be key to lowering the number of maternal deaths. However, in many countries, especially in the less developed regions, lack of availability of health facilities, coupled with inadequate transportation infrastructure sometimes prevents pregnant women from getting to a medical facility and receiving the emergency care they need. ²

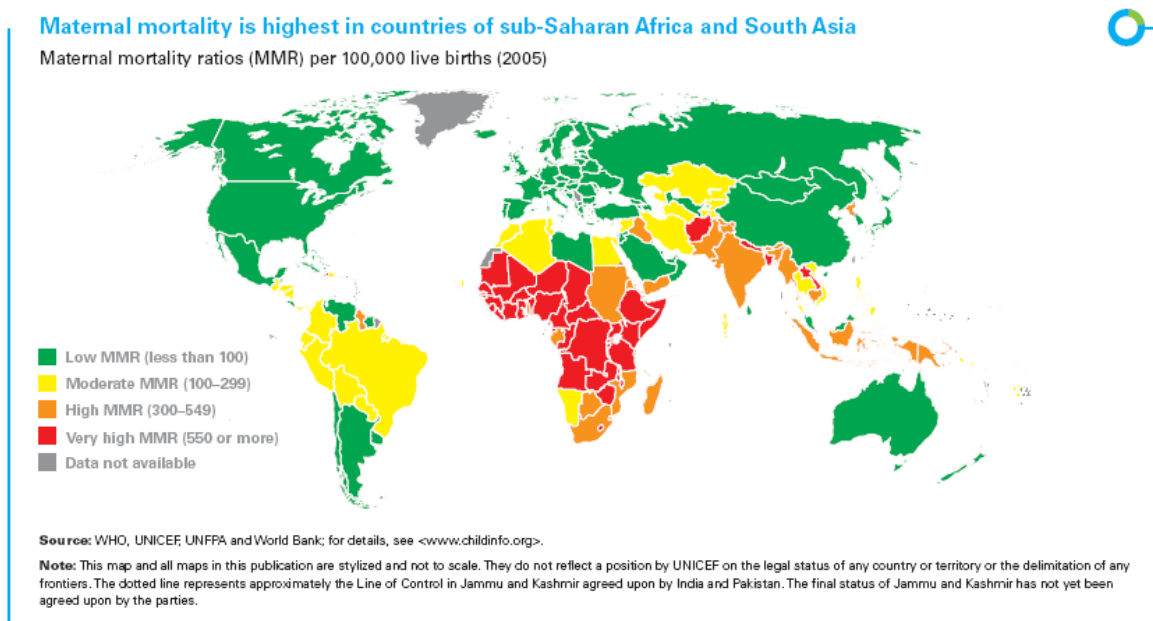


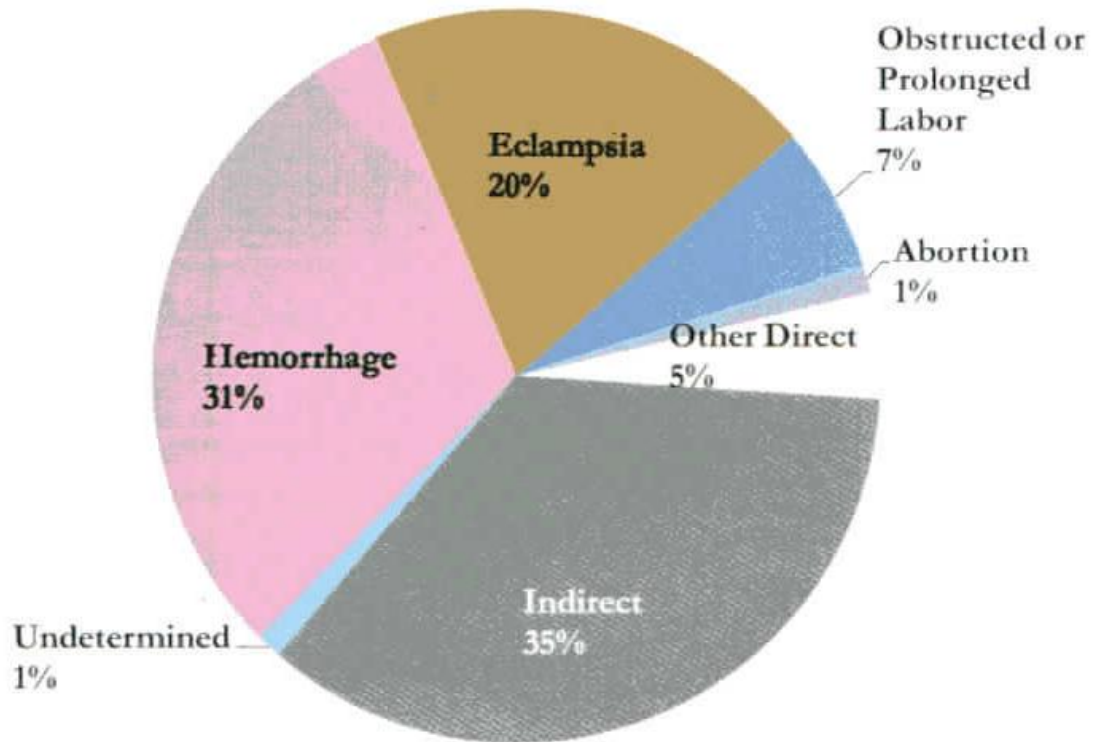
Figure 1.4: Map showing the maternal mortality ratios per 100,000 live births (2005)

1.7 Status on the progress of achieving millennium development goal 5

MDG 5 (Millennium development goal 5) on improving maternal health is one of the goals towards which least progress has been made.³ Gains in reducing maternal mortality remain slow in many developing countries, despite the fact that many deaths could be prevented if women had access to basic maternity and healthcare services. Thus, as of 2005, there were still an estimated 536,000 women who died of complications during pregnancy, childbirth or in the six weeks following delivery.

As per the Millennium Development Goal report of 2012, there have been important improvements in maternal health and reduction in maternal deaths, but progress is still slow.⁴

Causes of maternal deaths: Bangladesh, 2010



Maternal mortality has nearly halved since 1990, but levels are far removed from the 2015 target

Maternal mortality ratio, 1990, 2000 and 2010 (Maternal deaths per 100 000 live births, women aged 15-49)

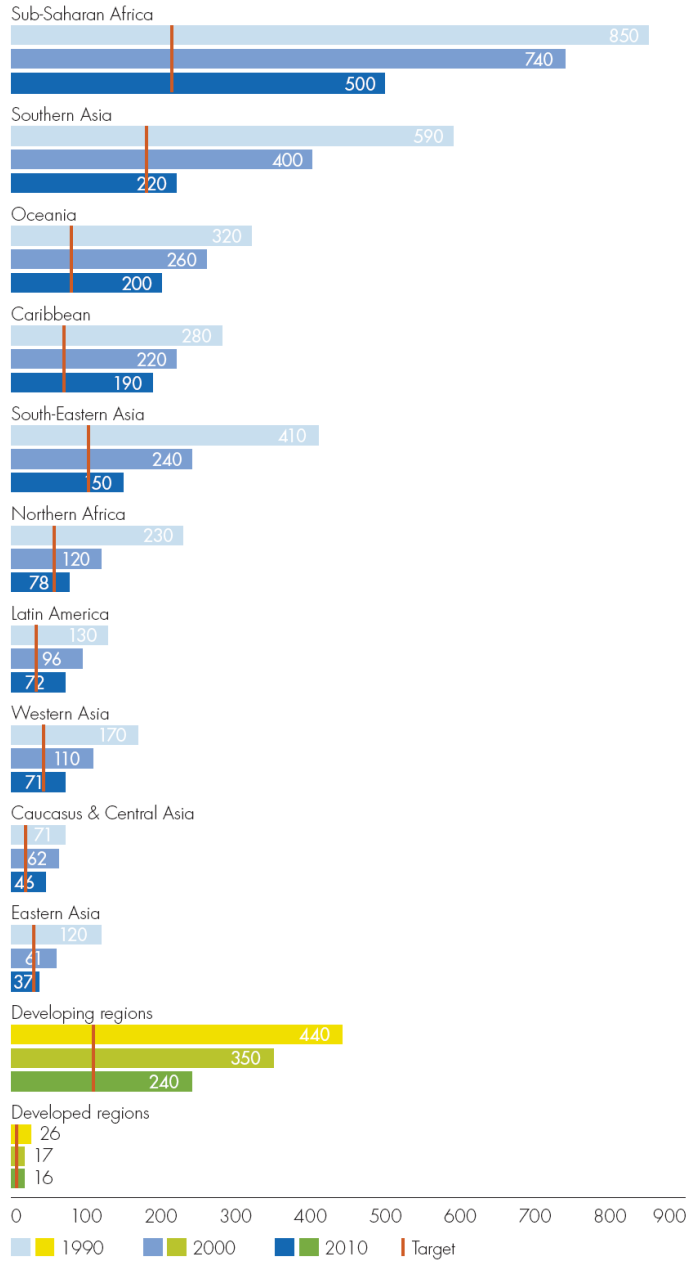


Figure 1.5: Bar diagram showing the maternal mortality ratio in 1990, 2000 and 2010

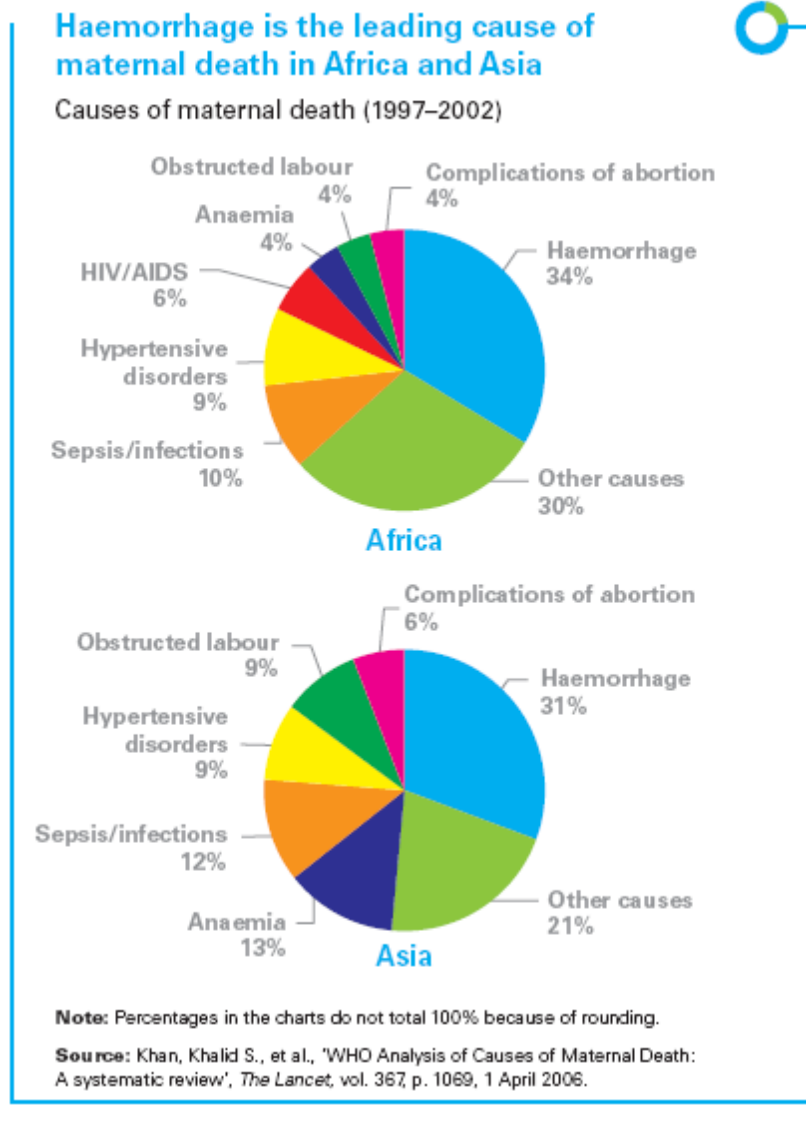
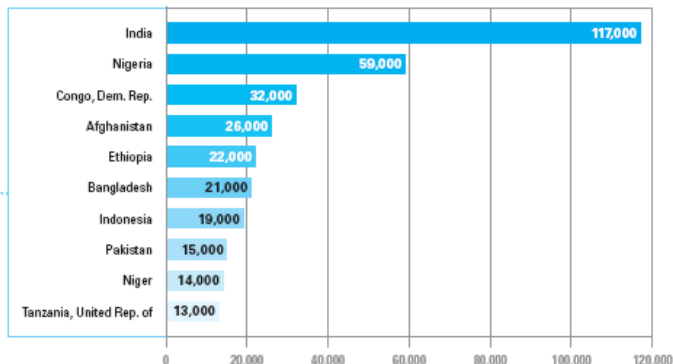
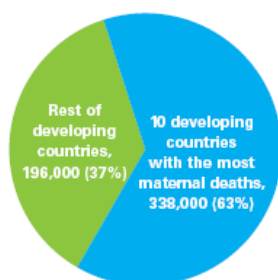


Figure 1.6: Pie chart showing causes of maternal death (1997-2002) in Africa and Asia

Most maternal deaths are caused directly by obstetric complications including post-partum haemorrhage, infections, eclampsia.⁵ Furthermore, gender inequality can also increase the chance of physical complications during pregnancy and childbirth as well as maternal mortality. For instance, women may be delayed or prevented from access to obstetric care in situations where they need the permission of a male relative to do so.²

10 countries account for almost two thirds of all maternal deaths in the developing world

Estimated annual number of maternal deaths (2005)



Source: WHO, UNICEF, UNFPA and World Bank; for details, see <www.childinfo.org>.

Figure 1.7 leading countries in maternal deaths worldwide

Number of maternal deaths, maternal mortality ratio and lifetime risk of maternal death by region, 2005

	Number of maternal deaths	Maternal mortality ratio (MMR)	Lifetime risk of maternal death, 1 in:
World	536 000	400	92
More developed regions	960	9	7 300
CIS countries	1800	51	1 200
Less developed regions	533 000	450	75
Africa	276 000	820	26
Northern Africa	5 700	160	210
Sub-Saharan Africa	270 000	900	22
Asia	241 000	330	120
Eastern Asia	9 200	50	1 200
South-Eastern Asia	35 000	300	130
Southern Asia	188 000	490	61
Western Asia	8 300	160	170
Latin America and the Caribbean	15 000	130	290
Oceania	890	430	62

Source: WHO, *Maternal Mortality in 2005* (2007), p. 16, table 2.

Note: CIS (Commonwealth of Independent States) countries included are: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, the Republic of Moldova, the Russian Federation and Ukraine. Estimates for more developed regions and less developed regions exclude CIS countries.

Table 1.4: Showing the number of maternal deaths, maternal mortality ratio and lifetime risk of maternal death by region, 2005

As per a survey in UK (Nelson A.L., 2011), underestimation of pregnancy risks can lead to contraceptive method discontinuation, can decrease motivate to seek pre-conceptional care and can lead to greater medico legal liability for providers of obstetrical care. Over one quarter of women could not correctly name any health risk associated with pregnancy. When shown a list of potential health risks, only 13.3% correctly identified all the health problems that increased in pregnancy. Only 49% knew that risks of venous thromboembolism (VTE), diabetes and hypertension increase in pregnancy; 30.6% did not know that VTE risk increases.⁷ In Bangladesh perspective most pregnant women are less literate compared to women in UK. However, this article shows the importance on improving the knowledge on pregnancy related complications of pregnant women.⁷

1.7.1 Millennium Development Goal Indicators for Bangladesh

MILLENNIUM DEVELOPMENT GOAL INDICATORS

Millennium Development Goal Indicators by sex			
Bangladesh 2011			
Goal	Value		Total
	Female	Male	
1. Eradicate extreme poverty and hunger			
1.8 Prevalence of underweight children under five years of age	38.5	34.3	36.4
2. Achieve universal primary education			
2.1 Net enrollment ratio in primary education ¹	76.6	73.0	74.8
2.3 Literacy rate of 15-24 year olds	81.9	67.8	74.9
3. Promote gender equality and empower women			
3.1a Ratio of girls to boys in primary education	na	na	1.1
3.1b Ratio of girls to boys in secondary education	na	na	1.1
3.1c Ratio of girls to boys in tertiary education	na	na	0.6
4. Reduce child mortality			
4.1 Under-five mortality rate (per 1000 live births) ²	50	57	53
4.2 Infant mortality rate (per 1000 live births) ²	37	48	43
4.3 Proportion of 1 year-old children immunized against measles	86.8	88.3	87.5
5. Improve maternal health			
5.1 Proportion of births attended by skilled health personnel ³	na	na	31.7
5.2 Contraceptive prevalence rate ⁴	61.2	na	na
5.3 Adolescent birth rate ⁵	118.3	na	na
5.4a Antenatal care coverage: at least 1 visit by skilled health professional ³	54.6	na	na
5.4b Antenatal care coverage: at least 4 visits by any provider ³	25.5	na	na
5.5 Unmet need for family planning	13.5	na	na
6. Combat HIV/AIDS, malaria and other diseases			
6.1 Percentage of population 15-24 years with comprehensive knowledge of HIV/AIDS ⁶	11.9	14.4	13.1

na = Not applicable

¹ Net attendance ratio measured in BDHS approximates MDG indicator 2.1

² Expressed in terms of deaths per 1,000 live births

³ Rate refers to live births in the three years preceding the survey

⁴ Percentage of currently married women age 15-49 using any method of contraception

⁵ Equivalent to the age-specific fertility rate for women age 15-19, expressed in terms of births per 1,000 women age 15-19

⁶ Comprehensive knowledge means knowing that consistent use of condoms during sexual intercourse and having just one uninfected faithful partner can reduce the chance of getting the AIDS virus, knowing that a healthy-looking person can have the AIDS virus, and rejecting the two most common local misconceptions about AIDS transmission or prevention.

Table 1.8: Showing the Millennium Development Goal Indicators by sex

As per Koblinsky et al., 2008, Bangladesh is on its way to achieving the MDG 5 target of reducing the maternal mortality ratio by three-quarters between 1990 and 2015, but the annual rate of decline needs to triple. Although the use of skilled birth attendants has improved over the past 15 years, it remains less than 20% as of 2007 and is especially low among poor, uneducated rural women. Increasing the numbers of skilled birth attendants, deploying them in teams in facilities, and improving access to them through messages on antenatal care to women, have the

potential to increase such use. The use of caesarean sections is increasing although not among poor, uneducated rural women. Strengthening appropriate quality emergency obstetric care in rural areas remains the major challenge. Strengthening other supportive services, including family planning and delayed first birth, menstrual regulation, and education of women, are also important for achieving MDG 5.⁶

1.8 Teenage pregnancy in Asia: Factors and implications

Teenage pregnancy, pregnancy within 19 years of age, is a public health concern both in developed and developing countries^{8,9}. Evidence in developing world indicates that one-third to one-half of women become mothers within 19 years of age, making pregnancy related causes as leading causes of death¹⁰.

South Asian countries (India, Pakistan, Sri Lanka, Nepal, Maldives, Bhutan and Bangladesh) have high proportions of teenage pregnancies, since early marriage is common and there is a social expectation to have a child soon after marriage.^{11,12}

A study showed that nearly 60% of all girls are married by the age of 18 years and one fourth are married by the age of 15 years in South Asia.¹³ Within South Asia, the recorded teenage pregnancy rate is highest in Bangladesh 35% followed by Nepal 21% and India 21%¹⁴. Although teenagers represent a large proportion of population in the developing countries, still relatively little is known about their sexual knowledge and experience and the risk associated with the teenage pregnancy. Teenage pregnancy can have significant effect on the level of education of women, their employment opportunities and marital stability and it increases their economic and social dependency on family and neighbours^{15,16,17}

Low involvement of teenage girls in decision making also contributed to early pregnancy. Most adolescent marriages (80%) were arranged by parents without the girl's consent¹⁸.

1.8.1 Consequences of teenage pregnancy

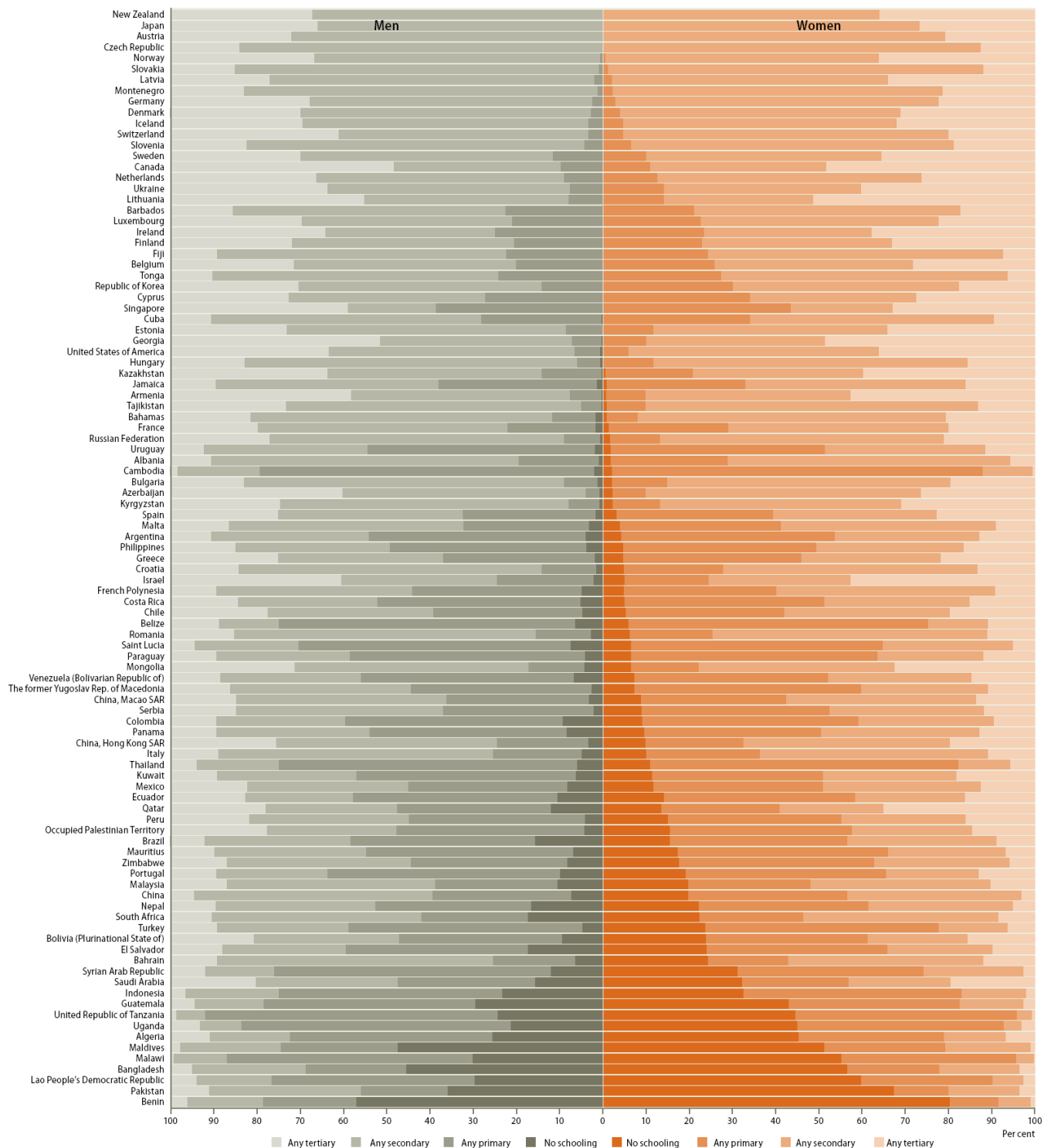
Most of the studies, nine out of ten, have examined the relationship between teenage pregnancy and its consequences. The studies found that pre-term delivery, still birth, fetal distress, birth asphyxia, anaemia, low birth weight, pregnancy-induced hypertension (PIH) and spontaneous abortion were most frequently encountered complications during teenage medical consequences, there are many adverse social consequences identified within this review. Lower access to higher education, high divorce rates, premature death of women, population growth, weak and unhealthy children and single motherhood are all negative consequence of teenage pregnancy^{19,20,21,22,23}

Sharma et al., identified that the risk of pregnancy complications was 2.5 times higher among pregnant teenagers compared to mothers in their twenties.²³

The likelihood of PIH (13%) and pre-eclampsia (5%) was significantly higher ($p < 0.001$ and $p = 0.03$) among pregnant teenagers compared to the women in their twenties (3% and 1% respectively) in a Sri Lankan study²¹. Of those studies investigating the link between teenage pregnancy and still birth, Khandait et al., found an association 3% ($p < 0.05$) compared to the mothers at 20-29 age years group (2%).²⁰

Two studies reported higher pre-term delivery among teenage mothers compared to older women. Shrestha reported 3% in teenage mothers compared to 1% in mature mothers and Goonewardene et al., in 2005 reported 19% in teenagers compared to 11% in older mothers, which was marginally significant ($p = 0.06$). A small hospital-based study found that fetal distress (6%) and birth asphyxia (2%) was commonly reported among pregnant teenagers. There are conflicting findings regarding the link between spontaneous abortion and teenage pregnancy. Shrestha has reported that spontaneous abortion was similar 15 (3%) among teenage mothers and mothers in their twenties. However, Ganatra et al.,³⁴ in 2002 noted that such likeliness is very low (2%) among teenage mothers and very high among matured mothers 166 (14%).^{18,21,24} Education could play a significant role in developing self-confidence, increasing age at first sexual intercourse and delaying marriage.²⁵

Distribution of population by sex and the highest level of education attained, 1995–2007 (latest available)



Source: Compiled by the United Nations Statistics Division from UNESCO Institute for Statistics (2009a) and United Nations, *Demographic Yearbook* data collections (2009).
Note: Data refer to educational attainment of population aged 25 and over. The population whose education level is unknown has been proportionately distributed over the four categories of educational attainment.

Figure 1.6: Showing the distribution of population by sex and the highest level of education attained, (1995-2007)

Table 2.12.2 Educational attainment of the female household population									
Percent distribution of the de facto female household populations age six and over by highest level of schooling attended or completed and median years completed, according to background characteristics, Bangladesh 2011									
Background characteristic	No education	Primary incomplete	Completed primary ¹	Secondary incomplete	Completed secondary or higher ²	Don't know/missing	Total	Number	Median years completed
Age									
6-9	24.1	75.8	0.0	0.1	0.0	0.0	100.0	3,923	0.0
10-14	4.1	55.6	4.4	35.8	0.1	0.0	100.0	4,597	3.5
15-19	5.8	12.5	9.6	52.8	19.3	0.0	100.0	4,383	6.9
20-24	9.8	14.4	12.5	44.9	18.3	0.0	100.0	4,135	6.5
25-29	18.7	18.8	11.8	33.5	17.2	0.0	100.0	3,564	4.9
30-34	30.9	20.8	10.6	21.8	15.8	0.0	100.0	2,717	3.8
35-39	41.3	18.7	10.0	17.8	12.3	0.0	100.0	2,297	1.9
40-44	49.0	18.7	10.4	13.4	8.5	0.0	100.0	2,206	0.0
45-49	54.4	18.9	10.0	10.9	5.8	0.0	100.0	1,878	0.0
50-54	62.2	16.7	9.3	8.1	3.7	0.0	100.0	1,305	0.0
55-59	67.9	12.2	8.9	7.6	3.3	0.0	100.0	1,208	0.0
60-64	73.9	13.7	6.7	4.4	1.2	0.0	100.0	1,001	0.0
65+	81.3	9.7	5.2	3.1	0.6	0.0	100.0	1,925	0.0
Residence									
Urban	22.0	24.0	8.0	27.3	18.7	0.0	100.0	8,676	4.4
Rural	31.7	29.2	8.3	24.4	6.5	0.0	100.0	26,465	2.3
Division									
Barisal	20.6	32.2	11.3	26.6	9.4	0.0	100.0	2,087	3.7
Chittagong	27.1	28.1	8.0	27.9	8.8	0.0	100.0	6,819	3.2
Dhaka	30.3	27.1	8.1	23.3	11.2	0.0	100.0	11,248	2.8
Khulna	26.7	27.6	6.7	29.3	9.6	0.0	100.0	4,022	3.4
Rajshahi	31.4	27.2	8.6	24.0	8.8	0.0	100.0	4,872	2.6
Rangpur	33.5	28.1	6.9	23.2	8.3	0.0	100.0	3,847	2.0
Sylhet	31.6	28.9	10.9	22.1	6.5	0.0	100.0	2,246	2.3
Wealth quintile									
Lowest	46.8	34.7	6.5	11.5	0.4	0.0	100.0	6,573	0.0
Second	34.7	32.1	8.7	21.9	2.7	0.0	100.0	6,915	1.6
Middle	28.2	27.9	9.6	28.7	5.7	0.0	100.0	7,153	3.2
Fourth	22.9	25.7	9.3	31.2	10.9	0.0	100.0	7,226	4.1
Highest	15.8	19.9	7.0	30.8	26.6	0.0	100.0	7,275	6.1
Total	29.3	27.9	8.2	25.1	9.5	0.0	100.0	35,141	2.9

Note: Total includes three women with missing information on age.
¹ Primary complete is defined as completing grade 5.
² Secondary complete is defined as completing grade 10.

Table 1.4: Showing the Educational attainment of the female household population

Table 2.12.1 Educational attainment of the male household population

Percent distribution of the de facto male household populations age six and over by highest level of schooling attended or completed and median years completed, according to background characteristics, Bangladesh 2011

Background characteristic	No education	Primary incomplete	Completed primary ¹	Secondary incomplete	Completed secondary or higher ²	Don't know/missing	Total	Number	Median years completed
Age									
6-9	28.5	71.4	0.0	0.1	0.0	0.0	100.0	4,002	0.0
10-14	5.8	60.9	3.6	29.5	0.2	0.0	100.0	4,624	3.0
15-19	7.4	17.7	11.5	43.3	20.2	0.0	100.0	3,302	6.4
20-24	12.6	16.8	13.5	29.9	27.2	0.0	100.0	2,738	6.1
25-29	17.1	15.8	14.5	29.5	23.0	0.0	100.0	2,651	5.2
30-34	24.3	17.8	11.6	23.2	23.1	0.0	100.0	2,410	4.6
35-39	31.1	16.9	10.2	19.5	22.3	0.0	100.0	2,197	4.2
40-44	33.6	15.1	9.3	18.5	23.5	0.0	100.0	1,983	4.1
45-49	37.1	17.9	8.4	17.5	19.0	0.0	100.0	1,881	3.1
50-54	42.0	16.7	10.2	16.0	15.1	0.0	100.0	1,689	1.9
55-59	38.4	12.1	8.1	16.9	24.6	0.0	100.0	1,194	3.9
60-64	44.9	15.0	13.4	11.1	15.6	0.0	100.0	1,085	1.4
65+	50.4	15.1	10.5	14.1	10.0	0.0	100.0	2,419	0.0
Residence									
Urban	16.9	24.3	8.4	24.2	26.3	0.0	100.0	8,170	4.8
Rural	27.4	31.4	8.9	21.0	11.3	0.0	100.0	24,008	2.7
Division									
Barisal	17.9	34.1	9.1	24.2	14.7	0.0	100.0	1,821	3.7
Chittagong	22.2	33.0	8.7	22.7	13.5	0.0	100.0	5,809	3.3
Dhaka	26.6	27.5	8.5	20.4	17.1	0.0	100.0	10,374	3.3
Khulna	22.0	28.2	8.0	25.1	16.7	0.0	100.0	3,707	4.0
Rajshahi	26.5	27.9	8.3	21.6	15.8	0.0	100.0	4,623	3.3
Rangpur	27.6	29.0	9.3	21.4	12.7	0.0	100.0	3,764	3.1
Sylhet	24.4	34.5	11.3	19.9	9.9	0.0	100.0	2,080	2.7
Wealth quintile									
Lowest	45.0	37.1	7.6	9.3	1.0	0.0	100.0	6,143	0.0
Second	31.0	35.3	10.0	18.6	5.1	0.0	100.0	6,426	1.7
Middle	23.1	31.0	10.2	24.5	11.2	0.0	100.0	6,501	3.5
Fourth	16.9	26.0	9.4	28.6	19.0	0.0	100.0	6,386	4.6
Highest	9.2	19.4	6.7	27.2	37.5	0.0	100.0	6,721	7.6
Total	24.7	29.6	8.8	21.8	15.1	0.0	100.0	32,177	3.4

Note: Total includes one man with missing information on age.

¹ Primary complete is defined as completing grade 5.

² Secondary complete is defined as completing grade 10.

Table 1.5: Showing the Educational attainment of the male household population

Recently, reviews have been conducted on teenage pregnancies in developing countries. However, information related to risk factors affecting teenage pregnancy is absent in developing country context, including Bangladesh, although most of the marriages occurs before 18 years of legal age at marriage in this country.²⁶

As per Millenium development goals 2012, fewer teens are having children in most regions, but progress has slowed²⁷

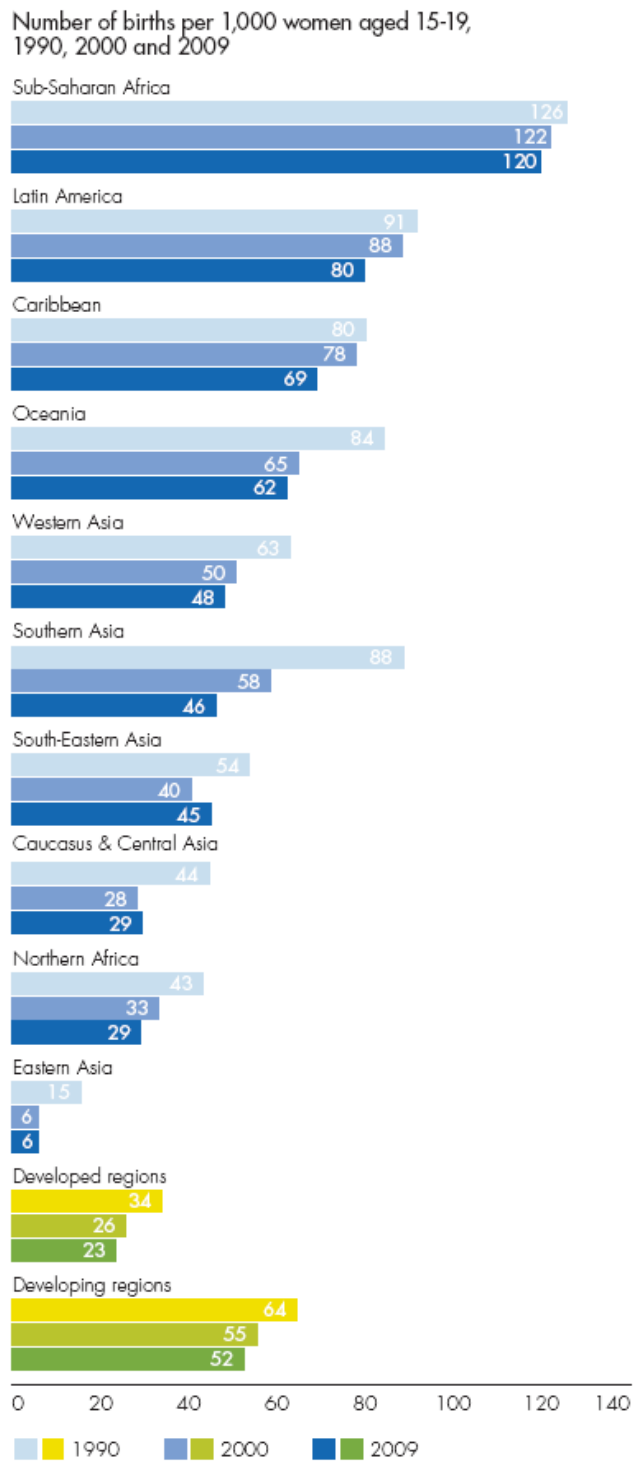


Figure 1.7: Bar diagram showing the number of births per 1000 women aged 15-19 in 1990, 2000 and 2009

Although the excess risk for birth defects among children of mothers with diabetes mellitus is well documented, there are few data concerning the risk for specific malformations. As per the Atlanta Birth Defects Case-Control Study, a population-based study, Infants of mothers with gestational diabetes mellitus who required insulin during the third trimester of pregnancy were 20.6 (95% CI = 2.5, 168.5) times more likely to have major cardiovascular system defects than infants of non-diabetic mothers. The absolute risk for infants of this group of diabetic mothers was 9.7%. No statistically significant differences were found among infants of mothers with gestational diabetes mellitus who did not require insulin during pregnancy. These results suggest a stronger association than previously reported between maternal diabetes mellitus and specific categories of major malformations and implicate gestational diabetes mellitus as a risk factor for major cardiovascular system defects.²⁸

1.9 Impact on economic growth on maternal health

The results indicate that better health has a positive effect on growth of output and that an extra year of life expectancy enhances the productivity of workers and increases output (real GDP) by 4%. This indicates that better health accounts for about 11% of the economic growth overall during the period 1960–1990. They also find that countries with higher initial levels of health (adult survival) realize more modest contribution to growth from better health than countries with lower initial health. Accumulation of physical capital (per capita measured in PPP conversion factors) and education (years of schooling attained per male between ages 15–60 years) accounts for 67% and 14%, respectively.²⁸

1.10 Demographic and socioeconomic profile of Bangladesh

Bangladesh is one of the most densely populated country with a land mass of 147,570 sq. km and a population of more than 149.8 million, 70% of whom live in rural areas. The population

growth rate is 1.374% per annum According to UNDP, around 83% of the population live on less than US\$ 2 a day and 36% on less than US\$ 1 a day. Through continuous effort of the government and the non-government sectors, income poverty has declined from an estimated 58% of the population during 1983-84 to just below 50% in 2000 with one percent reduction every year³⁰

The majority of Bangladeshis who are age 6 and older have attended school. Only one in four men and about one in three women have never attended school.

There is no gender difference in primary education. However, men are more likely to have completed secondary school or have attained a higher education compared with women (15 percent versus 10 percent). There has been an increase in the proportions of men and women who have completed secondary or higher education since 2007. For men, the proportion has increased from 12 percent to 15 percent, and for women it has increased from 7 percent to 10 percent in 2011.³⁰

Demographic indicators from selected sources, Bangladesh, 2001 and 2011

Indicators	Census 2001	Census 2011
Population (millions)	130.03	149.8
Intercensal growth rate (percent)	1.54	1.374
Density (population/km ²)	881	1015
Percent urban	23.5	27.0
Life expectancy(year)*	2002	2010
Male	64.5	66.6
Female	65.4	68.8

Source: Bangladesh Bureau of Statistics (2012b)

* Source: BBS, 2011b

Table 1.6: Showing the Demographic indicators from selected sources in Bangladesh, 2001 and 2011

As per a study by BRAC, Bangladesh has achieved substantial gains in the field of health during the last three decades despite modestly declining poverty and inadequate health services.

However, Infant Mortality Rate (IMR) and maternal mortality ratio (MMR) continue to be unacceptably high compared to many other developing countries, with persisting socioeconomic differentials.³¹ Intra-partum, post-natal and neonatal cares have the potential to save 20-40% of newborn lives. However to date, post-natal care for mothers and newborns has received relatively little emphasis in public health programmes in Bangladesh, with only a tiny minority of mothers and babies in high-mortality settings receiving post-natal care. Care at birth and in the first days of life not only saves the lives of mothers and newborns, but also reduces serious complications that may have long term effect. The Saving Newborn Lives (SNL) initiative demonstrated remarkable changes in all areas of maternal and newborn care, albeit still low.³¹

NGOs, meanwhile, have established non-formal education programmes, concentrating on children 8-15 years with a special emphasis on girls. Despite some progress in ranking of HDI, the status of women still remains low. The UNDP gender-related development index (GDI) ranks Bangladesh very low, at 105th position (out of 146 countries). It implies social inequalities i.e. inequalities in income and education between men and women. Women experience greater deprivation and vulnerability due to their subordinate position and low status in the society with patriarchal value system. Women are largely involved in the informal sector and subsistence activities. Violence against women in the form of rape, assault, trafficking and acid throwing is prevalent (UNICEF 2000; UNFPA 2003). Gender-based violence in the country aggravates the built-in gender discrimination.³¹

1.12 Demographic and health indicators

Although there has been considerable improvement in the health indicators, still more than 60% of the population has very little access to basic healthcare (MOHFW 2003). The number of qualified physicians and nurses in Bangladesh is quite low, compared to other low-income countries³². Around 26% of professional posts in rural areas remain vacant³³. Despite modestly declining poverty and inadequate health services, Bangladesh has achieved substantial gains in the field of health in the three decades since independence in the '70s, as evidenced in mortality and fertility declines in this low income country compared to other South Asian countries.³¹

About a quarter of the population consists of adolescents and youths. Some of the problems concerning adolescents include early age at marriage, high fertility and low levels of secondary

and tertiary education. The higher death rate among girls compared to boys aged 15- 19 (1.81 as against 1.55 per 1,000 population) is mainly due to maternal causes. Access to appropriate reproductive health information and services for this group is inadequate.

Although improving, in terms of national averages, maternal health status for many Bangladeshi women remains poor. Around 50% of Bangladeshi women were found to be chronically malnourished with a body mass index less than 18.5. Over 43% of pregnant women were iodine deficient and more than 2.7% developed night blindness during pregnancy.³⁰

1.13 Mortality Ratio Dropped 40% in Bangladesh

As per a major survey by the Government of Bangladesh, which received significant technical support from ICDDR,B, suggest that the maternal mortality ratio in Bangladesh has dropped by 40% in the last nine years. The survey findings suggest that maternal mortality declined from 322 in 2001 to 194 in 2010, a 40% decline in 9 years. The decline was driven partly by increases between 2001 and 2010 in the use of health facilities for deliveries (from 9 to 23 %) and for maternal complications (from 16 to 29 %). This was a consequence of improved access to care, substantially better education among women, improved awareness of services and the need for care and better economic conditions. In addition, declining fertility (from 3.2 to 2.5 children per women between 2001 and 2010) reduced high-risk higher parity births. Overall death rates have declined significantly among women in most reproductive age groups, while there have been large declines in deaths due to material causes, infections, circulatory conditions and even suicides. While there are substantial declines in all causes of direct obstetric deaths, haemorrhage and eclampsia are the dominant direct obstetric causes of deaths, together responsible for more than half of all maternal deaths. The predominance of haemorrhage and eclampsia deaths and deaths after delivery indicate a need to strengthen access to treatment for these two conditions, improve referral systems and improve referral level care. There have been reductions in deaths during pregnancy, during and after delivery, however, the main declines occurred for pregnancy and delivery.³⁴

Literature Review

William et al Department of Obstetrics and Gynecology, Louisiana State University Medical Center, Shreveport, Louisiana, and Department of Obstetrics and Gynecology, College of Medicine, University of South Florida, on their study **Macrosomia Prediction Using Ultrasound Fetal Abdominal Circumference of 35 Centimeters or More** (October 8, 1998.) **Suggested that** birth weights greater than 4000 g can be predicted by ultrasound measurements of abdominal circumferences.

John Wiley & Sons on New charts on **ultrasound dating of pregnancy and assessment of fetal growth: longitudinal data from a population-based cohort study** (17 March 2008) results indicate that, up to 24 weeks of pregnancy, dating by ultrasound examination provides a better prediction of the date of delivery than does last menstrual period. The earlier the ultrasound assessment in pregnancy, preferably between 10 and 12 weeks, the better the estimate of gestation.

American Journal of Roentgenology on **Sonographic prediction of gestational age: accuracy of second- and third-trimester fetal measurements.** (December 1991) measured the accuracy of second- and third-trimester sonographic predictors of gestational age against highly reliable gold standard (crown-rump length) in a group of fetuses. Using a prospectively collected computerized data base, we selected 460 fetal sonograms obtained at 14-42 weeks of gestation in which age could be reliably established on the basis of crown-rump length in the first trimester.

Luciano Bovicelli et al, Estimation of gestational age during the first trimester by real-time measurement of fetal crown-rump length and biparietal diameter(5 dec 2005) A series of 237 patients in the first trimester of pregnancy were examined to derive normal growth curves for fetal crown-rump length (CRL) and biparietal diameter (BPD) using sector scanner real-time ultrasound equipment. Conventional B-scan CRL measurements were obtained from 50 of these patients: In 41 (82%), the values fell within a range ± 5 mm of those of real-time. Another group of 97 patients between 7 and 13 wk of gestation was then examined in a blind trial to confirm the accuracy of real-time measurements in estimating gestational age. An estimate was made in 95% of cases to within 4.6 days with CRL and to within 5 days with BPD. A similar comparison was made with both of these dimensions using a comparative nomogram, giving a prediction within 3.9 days in 95.7 percent of cases. This method is now used routinely.

Nausea and Vomiting in Pregnancy(October 14, 2010) feature begins with a case vignette highlighting a common clinical problem. Evidence supporting various strategies is then presented, followed by a review of formal guidelines, when they exist.

Beverly O'Brien CNM, DNS^{*} et al (2 APR 2007) their comparative study on Seventy to 90 percent of all pregnant women experience nausea, and 50 percent have at least one episode of vomiting or retching. A continuous measure was used to quantify symptoms of nausea with or without vomiting or retching during pregnancy in 126 women. Relationships between symptoms and selected variables were evaluated. Nausea with or without vomiting or retching was associated with maternal age, occupation, parity, cigarette smoking, infant gender and the personality trait of independence. Significant associations were entered into multiple regression equations. Fourteen percent of the variation in symptoms overall, 25.1 percent of the variation in nausea symptoms, and 16.6 percent of the variation in vomiting or retching symptoms were explained by a combination of these selected independent variables. Although this study found associations, independent variables contributed little to predicting or explaining the presence and severity of nausea and vomiting during pregnancy. More sensitive measures and evaluation are required to understand and treat this perplexing phenomenon.

In 1992, evidence in developing world indicates that one-third to one-half of women become mothers within 19 years of age, making pregnancy related causes as leading causes of death¹⁰.

In 1995, 1997 and 1998, a study showed that nearly 60% of all girls are married by the age of 18 years and one fourth are married by the age of 15 years in South Asia.¹³ Within South Asia, the recorded teenage pregnancy rate is highest in Bangladesh 35% followed by Nepal 21% and India 21%¹⁴. Although teenagers represent a large proportion of population in the developing countries, still relatively little is known about their sexual knowledge and experience and the risk associated with the teenage pregnancy. Teenage pregnancy can have significant effect on the level of education of women, their employment opportunities and marital stability and it increases their economic and social dependency on family and neighbors^{32, 33, 34}.

In 2000, the likelihood of PIH (13%) and pre-eclampsia (5%) was significantly higher ($p < 0.001$ and $p = 0.03$) among pregnant teenagers compared to the women in their twenties (3% and 1% respectively) in a Sri Lankan study²¹. Of those studies investigating the link between teenage pregnancy and still birth, *Khandait et al., (2000)* found an association 3% ($p < 0.05$) compared to the mothers at 20-29 age years group (2%)².

In 2000, the mean weekly increase in the BPD between 12 and 29 weeks gestation was 2 mm/week, between 29 and 36 weeks, 2 mm/week and between 36 and 40 weeks, 1 mm/week. The mean weekly increase in the FL between 12 and 29 weeks gestation was 2 mm/week, between 29 and 36 weeks, 2 mm/week and between 36 and 40 weeks, 1 mm/week¹⁹.

Sharma et al., (2001), identified that the risk of pregnancy complications was 2.5 times higher among pregnant teenagers compared to mothers in their twenties⁴².

In 2001, the majority of the women with eating disorders in this group had pregnancies of average length, which resulted in infants of normal birth weight with good Apgar scores. Although 6.1% of the babies in our group had a reported birth defect, there were otherwise minimal obstetric or fetal/neonatal complications. One caveat, however, is that the rate of birth

by cesarean section and the frequency of postpartum depression were higher than population norms. Clinical differences were found between the women who were symptomatic during pregnancy and those who were not¹³.

In 2002, low involvement of teenage girls in decision making also contributed to early pregnancy. Most adolescent marriages (80%) were arranged by parents without the girl's consent³⁵.

In 2002, two studies reported higher pre-term delivery among teenage mothers compared to older women. *Shrestha., (2002)* reported 3% in teenage mothers compared to 1% in mature mothers³⁵ and *Goonewardene et al., (2005)* reported 19% in teenagers compared to 11% in older mothers, which was marginally significant ($p = 0.06$). A small hospital-based study found that fetal distress (6%) and birth asphyxia (2%) was commonly reported among pregnant teenagers. There are conflicting findings regarding the link between spontaneous abortion and teenage pregnancy⁴⁰. *Shrestha., (2002)* has reported that spontaneous abortion was similar 15 (3%) among teenage mothers and mothers in their twenties³⁵. However, *Ganatra et al., (2002)* noted that such likeliness is very low (2%) among teenage mothers and very high among matured mothers 166 (14%)⁴³.

In 2002, forty-six percent of women had not used a contraceptive method in the month they conceived, mainly because of perceived low risk of pregnancy and concerns about contraception (cited by 33% and 32% of nonusers, respectively). The male condom was the most commonly reported method among all women (28%), followed by the pill (14%). Inconsistent method use was the main cause of pregnancy for 49% of condom users and 76% of pill users; 42% of condom users cited condom breakage or slippage as a reason for pregnancy. Substantial proportions of pill and condom users indicated perfect method use (13-14%). As many as 51,000 abortions were averted by use of emergency contraceptive pills in 2000⁸.

In 2003, South Asian countries (India, Pakistan, Sri Lanka, Nepal, Maldives, Bhutan and Bangladesh) have high proportions of teenage pregnancies, since early marriage is common and there is a social expectation to have a child soon after marriage^{30, 31}.

Yuelian et al., (2003) reported a higher risk of miscarriage, particularly those occurring within the first 3 months of gestation, is associated with prior first trimester induced abortion ⁴.

In 2004, teenage pregnancy, pregnancy within 19 years of age, is a public health concern both in developed and developing countries ^{28, 29}.

In 2005, most of the studies, nine out of ten, have examined the relationship between teenage pregnancy and its consequences. The studies found that pre-term delivery, still birth, fetal distress, birth asphyxia, anaemia, low birth weight, pregnancy-induced hypertension (PIH) and spontaneous abortion were most frequently encountered complications during teenage medical consequences, there are many adverse social consequences identified within this review. Lower access to higher education, high divorce rates, premature death of women, population growth; weak and unhealthy children and single motherhood are all negative consequence of teenage pregnancy ^{40, 41, 42}.

In 2005, the reasons most frequently cited were that having a child would interfere with a woman's education, work or ability to care for dependents (74%); that she could not afford a baby now (73%); and that she did not want to be a single mother or was having relationship problems (48%). Nearly four in 10 women said they had completed their childbearing, and almost one-third were not ready to have a child. Less than 1% said their parents' or partners' desire for them to have an abortion was the most important reason. Younger women often reported that they were unprepared for the transition to motherhood, while older women regularly cited their responsibility to dependents ⁶.

Although imprecise the results of *Debbie et al., (2005)* suggest that neither childhood nor adulthood socioeconomic adversity is associated with pregnancy induced hypertension ⁴⁸.

In 2008, *UNICEF* reported, globally, more than 500,000 women die each year because of complications related to pregnancy and childbirth. They are dying because they have no access or limited access to health care, or because the quality of care is poor. They die due to hemorrhage, sepsis, hypertensive disorders, unsafe abortion and prolonged or obstructed labor – complications that can often be effectively treated in a health system that provides skilled personnel facilities to handle emergencies when they occur and post-partum care. A woman's health and nutritional status, including HIV and anemia, underlie these causes, along with

societal factors such as poverty, inequity, women's low status and attitudes towards women and their needs ².

As per *Koblinsky et al., 2008*, Bangladesh is on its way to achieving the MDG 5 target of reducing the maternal mortality ratio by three-quarters between 1990 and 2015, but the annual rate of decline needs to triple. Although the use of skilled birth attendants has improved over the past 15 years, it remains less than 20% as of 2007 and is especially low among poor, uneducated rural women. Increasing the numbers of skilled birth attendants, deploying them in teams in facilities, and improving access to them through messages on antenatal care to women, have the potential to increase such use. The use of caesarean sections is increasing although not among poor, uneducated rural women. Strengthening appropriate quality emergency obstetric care in rural areas remains the major challenge. Strengthening other supportive services, including family planning and delayed first birth, menstrual regulation, and education of women, is also important for achieving MDG 5 ¹⁸.

Khalid et al., (2008) reported a comparative study of blood group of different normal populations of Al- Nassiriyah city with RA patients of this study confirm that the blood group A is increased in patients of repeated abortion ¹².

Erica et al., (2008) reported that the current study found that there was no effect on the cardiovascular capacity of the women or on the duration of labor or the type of delivery for women practicing water aerobics regularly during pregnancy in comparison to those not practicing exercise at all. However, fewer women in the exercise group requested analgesia ⁵⁰.

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first days of life not only saves the lives of mothers and newborns, but also reduces serious complications that may have long term effect. The Saving Newborn Lives (SNL) initiative demonstrated remarkable changes in all areas of maternal and newborn care, albeit still low³⁸.

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A systematic review by *Lancaster et al., (2010)*, found that the main risk factors for low mood in pregnancy were life stress, history of depression, lack of social support, unintended pregnancy, means-tested government-funded health insurance, domestic violence, lower income, lower education, smoking and single status. Some of these factors may be accentuated or attenuated by lifestyle change. However, others are likely simple markers of poorer socioeconomic status and difficult circumstances²¹.

Raj, A. D. et al., (2010) reported education could play a significant role in developing self-confidence, increasing age at first sexual intercourse and delaying marriage⁴⁴.

As per a survey in UK (*Nelson A.L., 2011*), underestimation of pregnancy risks can lead to contraceptive method discontinuation, can decrease motivate to seek pre-conception care and can lead to greater medico legal liability for providers of obstetrical care. Over one quarter of women could not correctly name any health risk associated with pregnancy. When shown a list of potential health risks, only 13.3% correctly identified all the health problems that increased in pregnancy. Only 49% knew that risks of venous thromboembolism (VTE), diabetes and hypertension increase in pregnancy; 30.6% did not know that VTE risk increases. In Bangladesh perspective most pregnant women are less literate compared to women in UK. However, this

article shows the importance on improving the knowledge on pregnancy related complications of pregnant women ²⁷.

Olorunfemi., (2012) reported low socioeconomic background are twice more likely to get pregnant as a teenager when compared with those from high socio-economic background. Sex education and sexual health services are not on their own effective strategies for encouraging teenagers to defer parenthood ⁷.

The study of *Sarah et al., (2012)* examined how women describe alcohol, tobacco and/or drug use (ATOD) as reasons for deciding to have abortions and assesses the differences between women reporting and not reporting ATOD as reasons for deciding to have an abortion ⁹.

Eileen et al., (2012) reported psychosocial distress and poor eating habits contributed to inadequate dietary quality. Assessing for depression, stress, poor eating habits, and overall dietary quality during the crucial first trimester may identify women needing more intensive dietary monitoring and intervention throughout pregnancy ⁴⁶.

In 2014, well-being in pregnancy was independently and positively associated with education and physical activity and negatively associated with low GI dietary intervention. These findings have significance not only for women at risk of low mood but also for healthcare professionals when counseling women about the importance of healthy lifestyle in pregnancy ⁴⁷.

Mulugeta et al., (2014) reported that anemia is a global public health problem which has an eminence impact on pregnant mother. Low income, large family size, hookworm infection, and HIV infection were associated with anemia. Hence, efforts should be made for early diagnosis and management of HIV and hookworm infection with special emphasis on those having low income and large family size ⁴⁹.

Methodology

4.1 Study Design:

This is a cross sectional (descriptive study), where data was collected through interviews with a structured questionnaire as well as recorded data of each patient. The study protocol was reviewed and approved by the supervisor.

4.2 Study Area:

The study was carried out in CMUD (Centre for medical ultrasound and Doppler) a education and research centre for ultrasound imaging techniques as well as analysis of blood samples.

4.3 Study Population:

A total of 200 pregnant women were included in the study and interviewed as per the questionnaire. The patients were within 17-35 years of age mostly were housewife.

4.4 Data Collection:

During the study period at CMUD, patients coming for the ultrasound imaging were interviewed as per questionnaire. Different clinical as well as generalized information including their monthly income, weight, height, blood group, number of children, abortion history, vaccination, morning sickness, bi-parietal diameter, femur length, expected delivery date, position of the child in placenta, visual activity of eye , Pregnancy associated problems like morning sickness, Vomiting tendency or discomfort from heartburn or constipation ,Back pain ,Loss of Appetite, Sleeping Disturbance etc, Concomitant Diseases like DM, HTN or Gastritis etc. chances of infection like Chickenpox,HIV ,Bacterial and Candidal vaginitis , abnormalities like Down syndrome, Nuchal fold thickening, Choroid Plexus Cysts Renal Pelvic Dilatation(RP), Echogenic Bowel were recorded for further analysis.

4.5 Statistical analysis:

Data were organized, tabulated and aggregated using Microsoft excel. Results were prepared using pie and bar charts.

RESULTS

5.1 Percentage of population in different age groups:

During the study period 200 patients were interviewed. The age of the patients ranged from 15 to 35 years. Majority of the patients were within the 20-25 year age group (50%), while 26% of the respondents were teenagers.

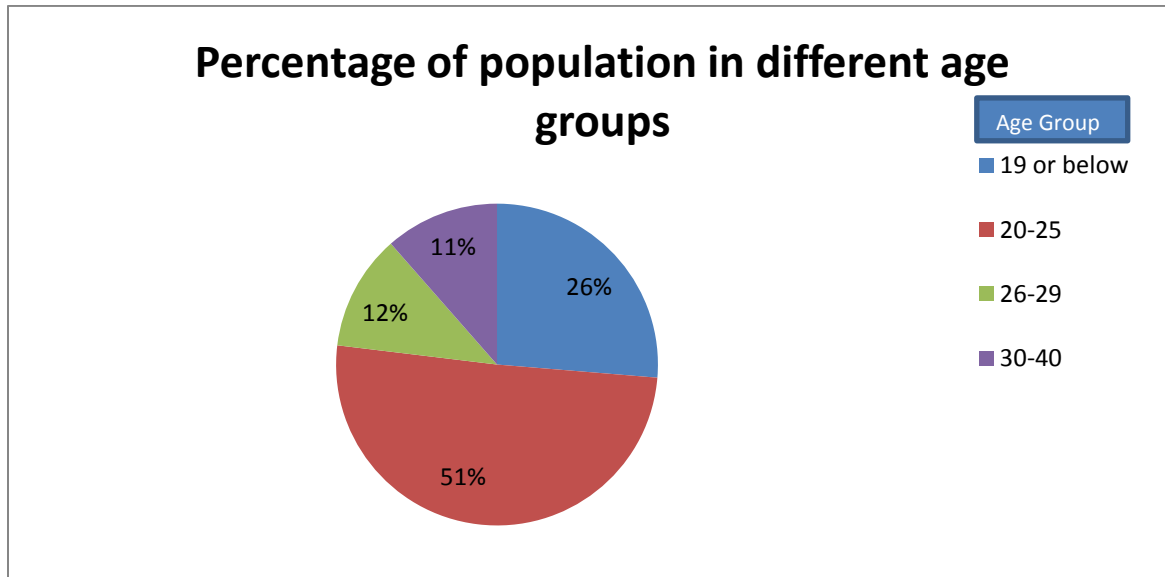


Figure 5.1: Pie chart illustrating the different age group within the sample population

5.2 Age of Marriage

Majority of the patients were married when they were teenagers (75%) or even before reaching teen age. Even though there are laws for preventing childhood marriages in Bangladesh, majority (93%) of the respondents got married before 19 years age.

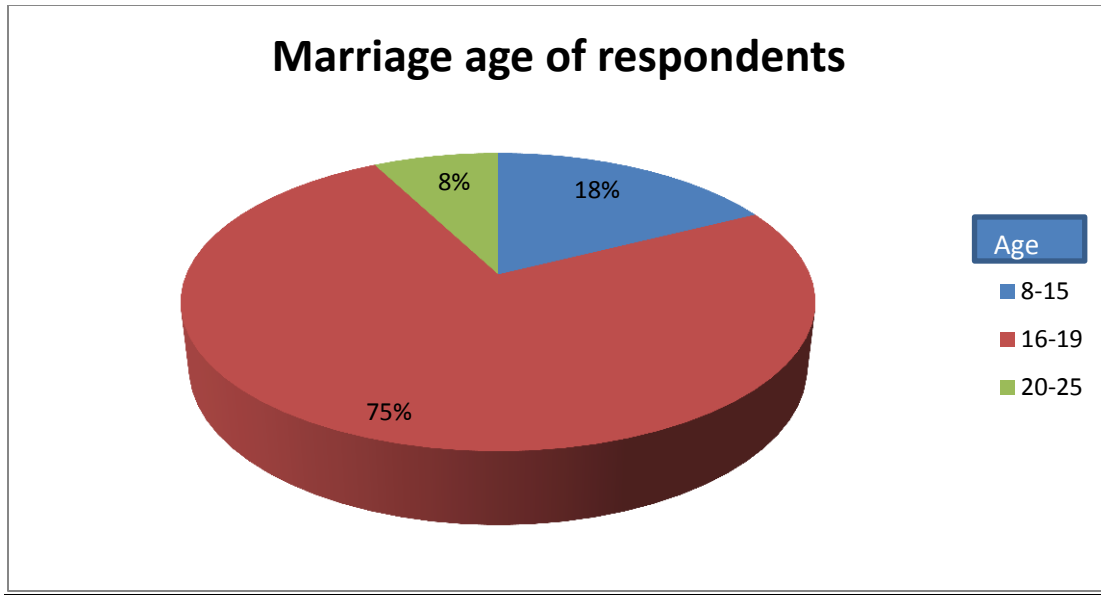


Figure 5.2: Pie chart illustrating the different age groups of marriage within the sample population

5.3 Level of education of the respondents

Level of education of the respondents were classified as no education, any primary (any education upto class 5), Any Secondary (class 6 to S.S.C. exams), Higher secondary (Upto H.S.C exams), Tertiary (any education higher than H.S.C.). Majority of the respondents (63%) were within any primary group, 26% has done any secondary education, while 7% of the respondents did no schooling.

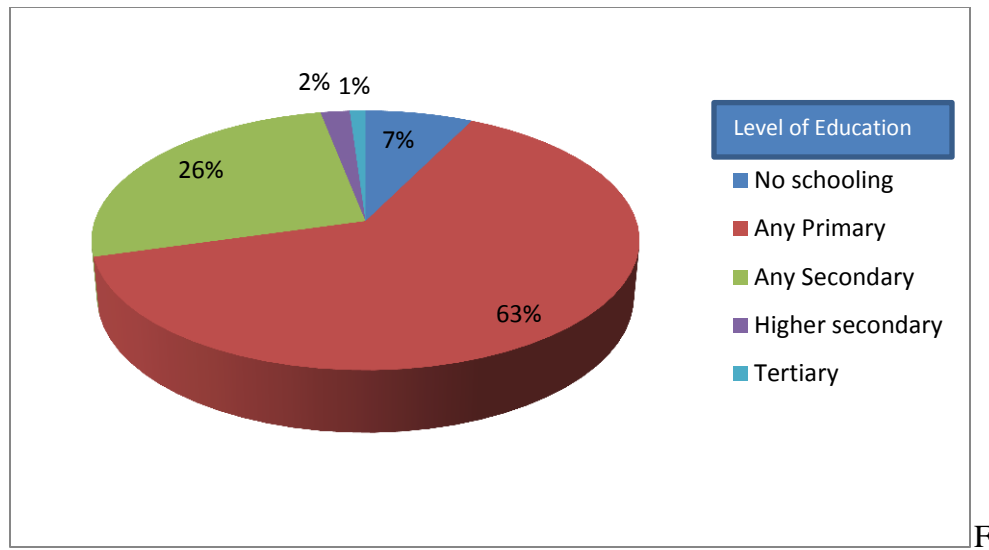


Figure 5.3: Pie chart illustrating the different level of education within the sample population

5.4 Occupation of the respondents

Majority of the respondents were housewives (88%), other occupations were maid, garment worker, tailor, etc.

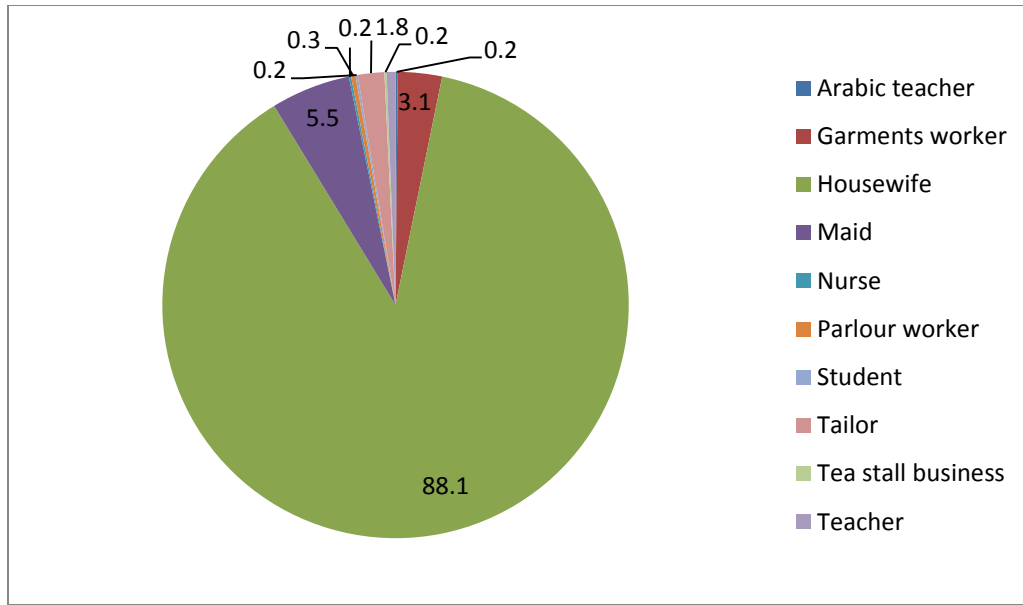


Figure 5.4: Pie chart illustrating the different occupation within the sample population

5.5 Comparison of age when first conceived

The respondents were divided into 3 groups according to their age:

- 15-19
- 20-25
- Greater than 26

Majority of the respondents were found to conceive within 20-25 years age (56%). Alarminglly 44% of the respondents first conceived during their teen ages (15-19 age group).

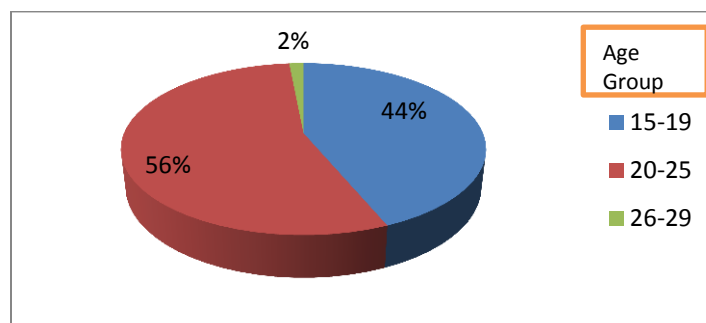


Figure 5.5: Pie chart illustrating the comparison of age when first conceived within the sample population

5.6 Comparison of BMI of the pregnant women in the study population

BMI is the relationship between height and weight that can be used to help everyone stay within healthy weight without being under or overweight. In case of pregnancy, the ranges of BMI are as follows:

- BMI Less than 19.8: Underweight
- BMI 19.9-25.5: Healthy weight
- BMI 25.6-29.9: Mildly overweight
- BMI 30-35: Moderately overweight
- BMI Over 35: Seriously overweight

Amongst the study population, 82% of the pregnant women were found to be within healthy weight and 12% were found to be underweight.

While comparing the age groups having lower BMI, 71% of pregnant women having low BMI were found to be of age 19 or below.

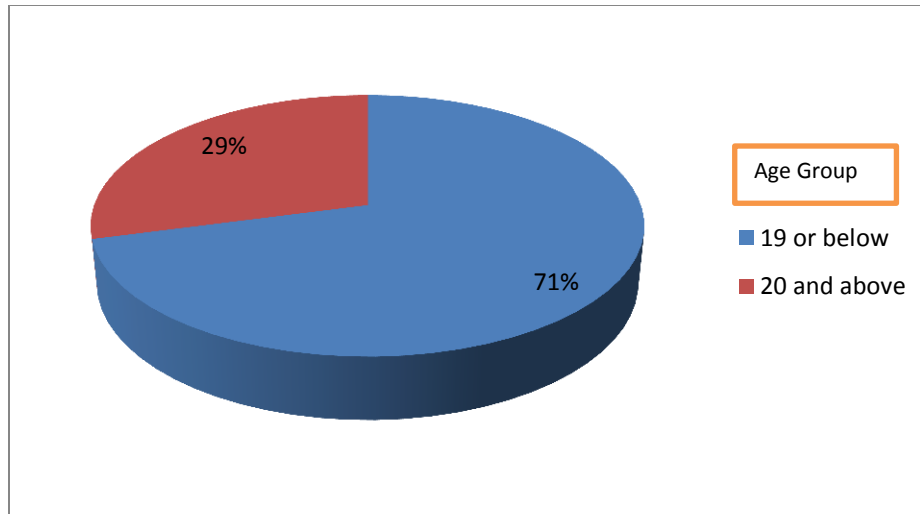


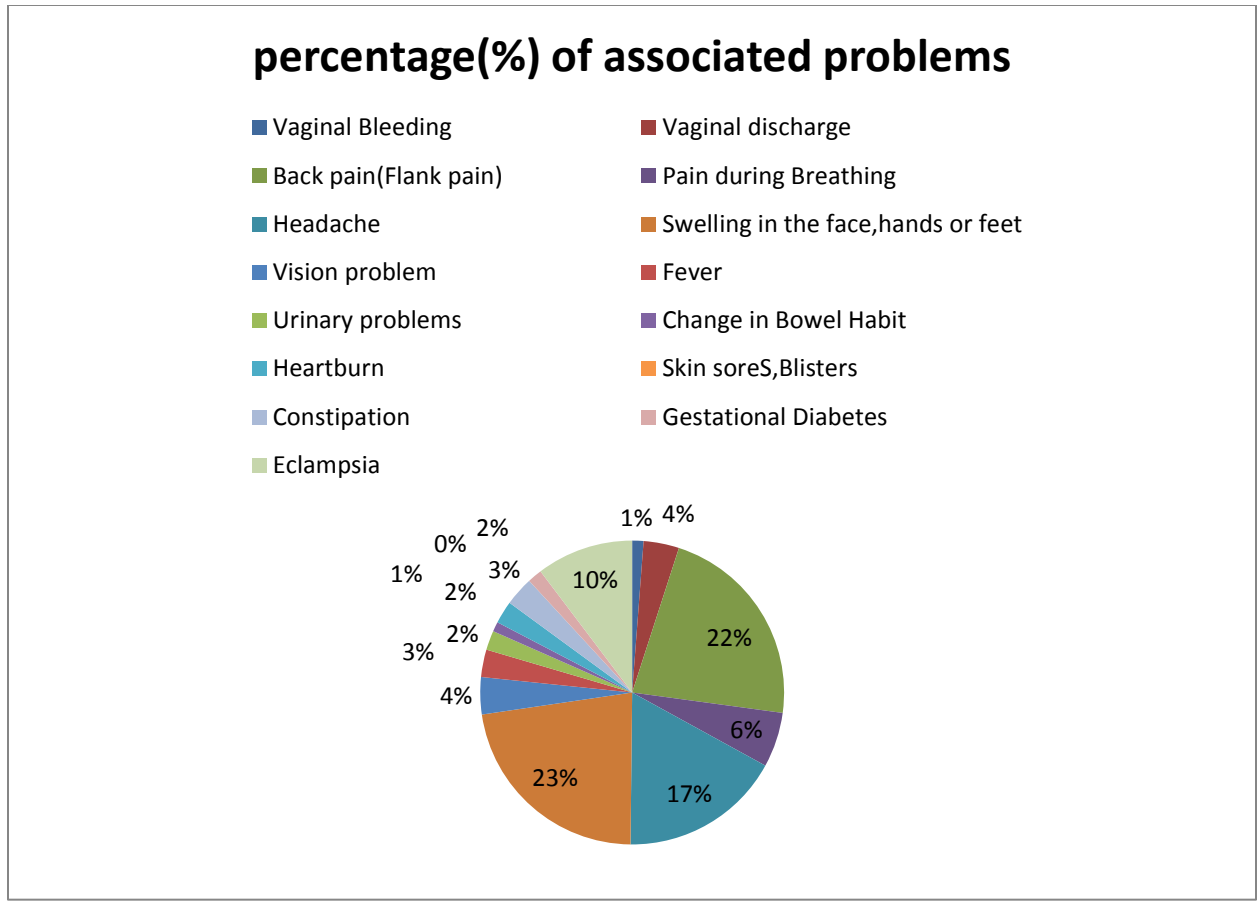
Figure 5.6: Pie chart illustrating the comparison of age groups of lower BMI within the sample population

5.7 Blood group of the patients

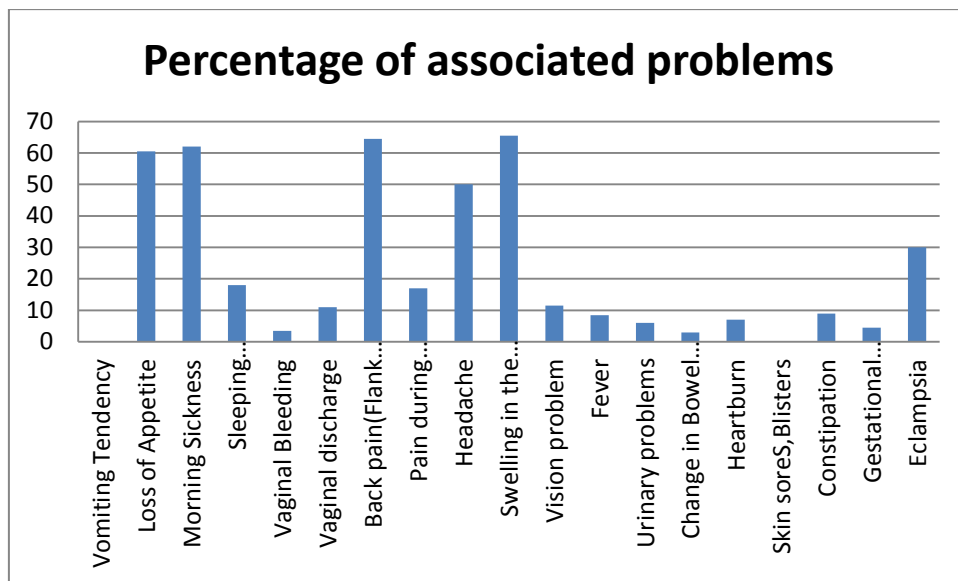
Out of 200 patients 20% had no idea what their blood group was even though most of them were in their last trimester of pregnancy. 98% had no idea what their husbands blood group was.

5.8 Percentage of Pregnancy associated problems among the respondents:

Figures shows that more than 76.5% patients have vomiting tendency, 60.5% have morning tendency, 62% have loss of appetite, 18% have sleeping disturbance, Only 3.5% and 11% patients having vaginal discharge and vaginal bleeding, 64.5% patients suffering from back pain(Flank pain) , 17% patients feel pain during breathing, 50% patients having headache 65.5% patients having swelling on their hands, feet 11.5% patients with less visual activity, 8.5% patients suffer from fever, 6% having urinary problem, 3% with change in bowel habit, 7% have hurt burn, 0% with Skin sores, Blisters, 9% constipation, 4.5% gestational diabetes, 30% have eclampsia.



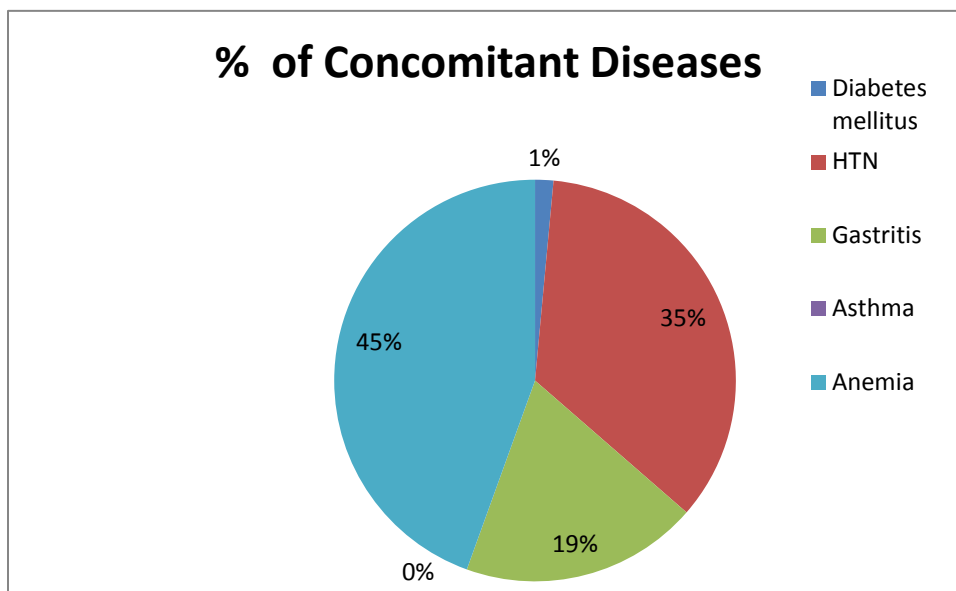
5.7 Figure: Pie chart illustrating the percentage of pregnancy associated problems.



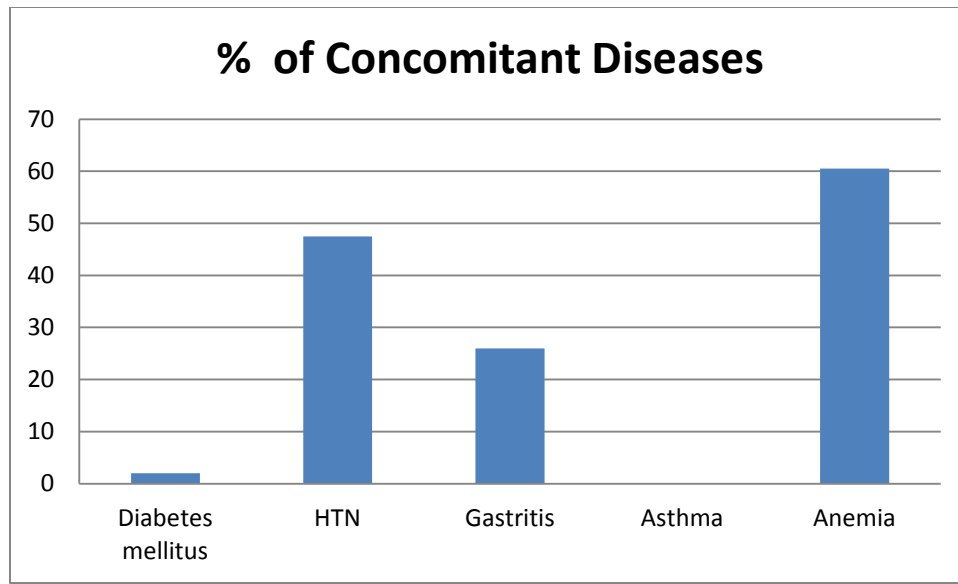
5.8 Figure: Bar illustrating the percentage of pregnancy associated problems.

5.9 Percentage of patients with concomitant Diseases:

Figures show that 2% patients have Diabetes mellitus, 47.5% patients have HTN , 26% patients have gastritis, 0% patients have asthma,60.5% patients have anemia.



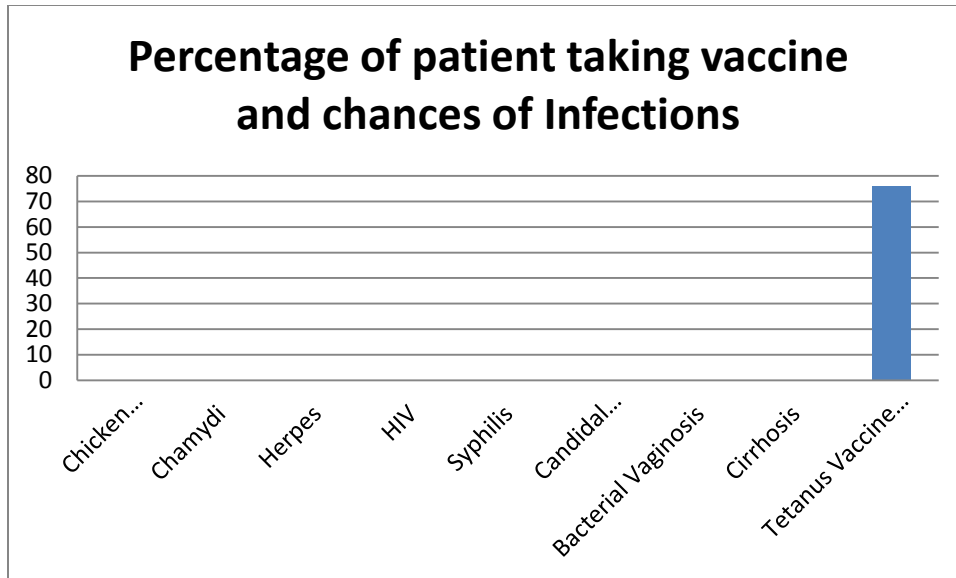
5.9 Figure: : Pie chart illustrating the percentage of concomitant diseases.



5.10 Figure: Bar chart illustrating the percentage of concomitant diseases.

5.10 Percentage of patients taking vaccine and chances of infection:

76% percent patients have taken vaccine and there is a less chance of caught infection.



5.11 Figure: Bar chart illustrating the percentage of patients taking vaccine.

5.411 Mean Fetal Growth rate of study population at 4-40 weeks of gestation:

G/A Weeks+Day(Population)	BPD (mm)	Femur Length (mm)
20.3	47	33
31.1	81	59
25.5	64	46
37.1	90	72
28.6	71	53
31.1	75	61
35.4	84	69
29.3	73	54
27.3	65	52
28.3	70	52
31.6	78	61
8.1	25	16
31.2	80	56
32.4	79	64
14	25	11
34.3	85	66
24.6	62	43
23.6	59	41
28	71	50
10.2	CRL	33
29.2	70	56
38.1	88	74
27.3	65	52
34.3	86	66
42.4	81	61
30.1	77	57
28.4	71	53
36.2	86	66
23.6	59	41
	39	21
35.4	84	69
39.4	90	70
25.6	66	44
23.1	56	39
29.2	74	54
23.4	57	40
31.1	77	52
34.1	85	65
35	87	67
19.6	48	31

17.3	40	25
31.3	70	60
33.4	84	62
32.3	82	60
31.1	77	52
25.5	62	47
34	82	66
32.2	82	62
28.6	75	50
31.6	71	60
40.3	90	70
31.6	76	66
24.6	60	44
35.2	89	70
34.6	84	68
22.1	53	37
29.3	73	55
20.5	51	31
16.5	39	23
12.5	17	8
34.4	85	65
39	85	77
37	90	73
29.5	72	56
28.6	57	42
34.5	86	67
30.5	78	37
32.6	81	63
37.4	89	68
31.2	79	58
33.1	80	63
30	75	57
28.1	70	53
29.4	74	55
31.6	60	59
22.4	53	40
28.2	69	52
33	83	57
29.5	75	55
29.3	72	56
30	75	56
22.2	53	30
26.2	63	47
34.3	88	64
22.5	56	36
24.2	62	40

32.6	35	27
30.6	76	60
10.3	46	35
10.3		35
24.3	60	42
28.5	72	53
25.2	59	46
13.2	23	11
24	59	42
24.6	62	43
23.5	58	42
22.3	56	37
30.2	76	46
7.1		10
15.2	33	14
22.1	52	48
12.4	19	6
30.3	77	57
30.4	77	57
28.4	72	53
32.3	79	63
26.3	65	49
26.2	66	47
30.2	76	56
22	52	37
27.2	69	48
21.1	44	34
14.3	27	13
13.6	24	12
23.4	59	40
30.5	78	56
30.5	78	56
18.1	41	28
13.1	29	9
31.3	78	48
25.4	64	44
22.4	53	40
28.2	69	52
33	83	57
29.5	75	55
29.3	72	56
30	75	56
22.2	53	30
26.2	63	47
34.3	88	64
22.5	56	36

24.2	62	40
32.6	35	27
30.6	76	60
10.3	46	35
10.3		35
24.3	60	42
28.5	72	53
25.2	59	46
24	59	42
24.6	62	43
23.5	58	42
22.3	56	37
30.2	76	46
7.1		10
15.2	33	14
22.1	52	48
12.4	19	6
30.3	77	57
30.4	77	57
28.4	72	53
32.3	79	63
26.3	65	49
26.2	66	47
30.2	76	56
22	52	37
27.2	69	48
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14.5	26	12
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28.2	69	52
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30	75	56
22.2	53	30
26.2	63	47
34.3	88	64
22.5	56	36
24.2	62	40
32.6	35	27
30.6	76	60
10.3	46	35
10.3		35
24.3	60	42
28.5	72	53

25.2		59	46
31.2		80	56
32.4		79	64
14		25	11
34.3		85	66
24.6		62	43
23.6		59	41
28		71	50
10.2	CRL		33
29.2		70	56

Discussion

The study found that Ultrasound is an effective technology to measure the biparietal diameter (BPD) and femur length (FL) plus a consideration of additional parameters such as head circumference (HC), occipitofrontal diameter (OFD), abdominal circumference (AC) and humerus length (HL). Expected delivery date can also be measured.

The study also found that education level of the women are highly related with the age of marriage, age of first conception as well as the number of abortions amongst the study population.

63% of the respondents had completed up to any primary education but did not continue any further. 26% women were found to have completed up to any secondary. While 7% did no schooling.

Majority of the participants were housewives (88.1%) which suggests that majority of the women who completed up to primary or secondary education don't get a suitable job and lead their lives as housewives. As a result these women are largely dependent on other family members for income. This finding is in line with the previous studies.^{15,16,17}

Majority of the participants 75% were married during their teen ages (16-19). 18% of the patients got married within age 8-15. Approximately 73% of the women's families were below poverty line (earning below USD 2 per person in family)

Alarmingly 44% of the respondents first conceived during their teen ages (15-19 age group) which is in line with the age of early marriage. As per evidence from studies in developing world one-third to one-half of women become mothers within 19 years of age, making pregnancy related causes as leading causes of death¹⁰. Previous studies found that pre-term delivery, still birth, fetal distress, birth asphyxia, anaemia, low birth weight, pregnancy-induced hypertension (PIH) and spontaneous abortion were most frequently encountered complications during teenage.^{19,20,21,22,23} The likelihood of haemorrhage and pre-eclampsia was significantly higher among pregnant teenagers compared to the women in their twenties.²⁰ As a result this group of patients are at a higher risk of abortion or even maternal mortality.

It is well known that the weight and nutrition of the mother is important in ensuring proper weight as well as development of the baby. Upon checking the BMI of the patients, it was found that 82% patients had normal weight but 12% were underweight. Additionally 71% of the patients who were underweight were found to be teenagers.

It was found that amongst women who had no education, (65%) of got married within age of 15-19. Similar trends were seen in case of 1st time conceived (56%). 50% of these women had abortions and amongst them 40% had abortions during their teen ages.

In case of the respondents completing any primary education, there was a decline in marriage age in age group 8-14 from 29% to 6%. However, the teenage marriage is still high. 92% of the respondents got married within 15-19 years age. The age of conceiving for the first time reduced moderately to 49% from 56%. Remarkably the 1st time abortion age also reduced in teenage from 40% to 26%. However, the percentage doubled to 23% from 10% in women 20 years or older.

In case of the respondent group that completed any secondary education the percentage of teen marriage decreased slightly to 87%. No women got married before 15 years age and women marrying at age group 20 and higher increased to 13%. The age of conceiving for the first time reduced moderately to 36% from 56% in women who had no education. Remarkably the 1st time abortion in teen age also reduced in teenage from 40% to 15%.

This comparison shows that with increase in education levels, the marriage in teen age, 1st time abortion as well as 1st time conceived gets affected. The women get married at an older age, conceive for the first time at an older age and therefore at lesser risk of abortions. 50% of the women with no education had at least one abortion, whereas only 27% of the women having secondary education had an abortion.

Even more alarming is the fact that 94% of the pregnant women had no understanding or knowledge of the different complications that may occur during pregnancy and suffering from Nausia, vomiting etc.

Therefore, it is highly probable that they will not be able to proactively understand the different symptoms that may require them to immediately seek medical care and place them in increased risk of abortion as well as maternal mortality.

Another crucial factor was that 98% of the patients did not know the blood group of their husband and 59% of the patients did not know their own blood group along with their

Prenatal care is known to improve the outcome of pregnancy and birth for both mother and child. It not only monitors the health of the mother and foetus but also allows for the identification of potential complications.² In this study, none of the respondents had visited a healthcare facility previously during the current pregnancy period. However, most of the women (72%) were in their third trimester when they had come to get a health check up in the NGOs which had sent them for the ultrasound imaging after the check up. This places them at an additional risk if any complications were to happen before the check up.

BPD (Biparietal diameter) and FL (Femur length) were recorded as clinical parameters for measuring the foetal growth rate. BDP and FL increased gradually with increase in Gestational age. However, the growth rate for both BPD and FL were found to be lower in underweight patients compared to normal or overweight patients.

As per Koblinsky et al., 2008, Bangladesh is on its way to achieving the MDG 5 target of reducing the maternal mortality ratio by three-quarters between 1990 and 2015. However, based on this study there are a number of risk factors and behavioural, social issues that need to be addressed to ensure reduction in maternal mortality as well as ensuring appropriate maternal health.⁶

Conclusion

Ultrasonography should be done to measure biparietal diameter (BPD) and femur length (FL) p head circumference (HC), occipitofrontal diameter (OFD), abdominal circumference (AC) and humerus length (HL) to ensure that a healthy baby is developing. Pregnancy associated problems are morning sickness, Vomiting tendency or discomfort from heartburn or constipation, Back pain, Loss of Appetite, Sleeping Disturbance and so on. Nausea and vomiting often develop by five to six weeks of pregnancy. The symptoms are worst around nine weeks, and typically improve by 16 to 18 weeks of pregnancy. Concomitant Diseases like DM, HTN or Gastritis can occur. If there is a family history of diabetes, Patient may have a chance of develop diabetes that only occurs during pregnancy (gestational diabetes). Gestational diabetes can be treated by control diet , exercising, checking blood sugar levels, and possibly taking oral medicines or insulin shots to keep blood sugar levels within a target range. HTN and Gastritis can be treated with proper medication. Chances of infection like Chickenpox, HIV Bacterial and Candidal vaginitis are quite common. Which should be be treated with proper vaccination. Even at teen age the mothers do not have the kind of maturity or knowledge needed to be proactive in preventing abortions. In many cases the teen age mothers are not physically strong enough and are more prone to complications.

Government programmes as well as NGOs need to ensure increased campaign and training in helping the illiterate or low educated pregnant women regarding different risk factors that they need to be aware of in order to prevent the unwanted abortions. These steps should help improve maternal health considerably reducing maternal as well as child mortality. Married couples having low education should be given education/training in proper and safe techniques of contraception which should prevent unwanted pregnancies.