Independent University Bangladesh

Master of Public Health

Thesis paper on

Identify the influencing factors that associated increasing the Antenatal Care Visit (ANC) among Bangladeshi women

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Abbreviation

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal care
BDHS	Bangladesh Demographic and Health Survey
EmOC	Emergency obstetric care
FANC	Focusing on antenatal care)
GA	Gestational age
HIV	Human Immune Deficiency Virus
ICPD	International Conference on Population and Development
MDG	Millennium Development Goals
MMR	Maternal mortality rate
SDG	Sustainable Development Goals
UN	United Nations
UNFPA	The United Nations Population Fund
UNICEF	The United Nations Children's Fund
WHO	World Health Organization

Abstract

Antenatal care for pregnant women including education, counseling, testing, and treatment to monitor and promote maternal and fetal well-being.Positive maternity visits also allow pregnant women to talk to their health care provider, which increases the likelihood that they will use a trained midwife. Although maternity care has attractive benefits and strategies, 303,000 women have died worldwide due to complications related to pregnancy and childbirth in recent years, and 99 percent of maternal deaths occur in developing countries.

There are different factors that influence the ANC practices in our country. Therefore, this study was conducted to identify the factors that influence the number of antenatal care visit (ANC) among Bangladeshi women.

Study design & method:For this study, Bangladesh Health and Demographic Surveys (BDHS) in 2017-2018 data were used. The study population the women of reproductive age aged in between 15 to 49 years. As the dependent variable for this study is ANC status. Therefore, these 5,012 women were selected as the samples for this study by using SPSS. The sample size for this study was 5,012. This study was started on 24 October Tuesday in 2017 and finished on 15 March Thursday in 2018.

Result:The findings of this study revealed that specific efforts are needed to target women in low-income areas, especially those from low-income sectors, through the provision of maternal health care services. The results showed that formal education,number of living children,wealth index, working status of women,family size and age are important factors associated with the use of ANC resources. Therefore,the knowledge,education and communication of the ANC must be strengthened to reach all mothers.Over time,women's empowerment through informal education and income-generating activities and the involvement of husbands during information,education and communication are highly recommended.

Introduction

Background

Antenatal care (prenatal care) care provided by pregnant mothers and adolescent girls by experienced health workers to ensure the best possible health for both mother and baby during pregnancy. Antenatal care for pregnant women including education, counseling, testing, and treatment to monitor and promote maternal and fetal well-being. Positive maternity visits also allow pregnant women to talk to their health care provider, which increases the likelihood that they will use a trained midwife[1]. Although maternity care has attractive benefits and strategies, 303,000 women have died worldwide due to complications related to pregnancy and childbirth in recent years, and 99 percent of maternal deaths occur in developing countries[2].Despite progress in some lands, the average annual death rate of 529,000 maternal deaths per minute during the year 2000 has not changed much since the International Conference on Population and Development (ICPD), according to recent WHO estimates by the United Nations. Children's Fund (UNICEF) and the United Nations Children's Fund (UNFPA) Fund[3]. Millions more women survive but suffer from pregnancy-related illnesses and disabilities[4].

The Bangladesh Demographic and Health Survey (BDHS) 2011 survey showed that 55% of women who gave birth in the three years before the study found the ANC at least once in every donor[5]. health-trained healthcare providers, such as a doctor, nurse, midwife, family welfare visitor, skilled midwife, medical assistant or community health worker[6]. In developing countries, women often face significant health risks during pregnancy themselves (e.g., anemia, edema, eclampsia etc.)[7] or in their children (e.g., sepsis and pneumonia, congenital asphyxia and trauma, tetanus, birth defects, and low birth weight. weight etc.)[8].Data from the 2014 BDHS shows that Bangladesh is far behind in achieving this goal. A comparison of the 2014 BDHS and BDHS surveys of 2004, 2007, and 2011 showed that the number of women who had not been visited by the ANC had dropped from 42 percent in 2004 to 21 in 2014. At the same time, the percentage of pregnant women visiting four or more prenatal visits increased from 17 percent in 2004 to the current level of 31%[9]. Bangladesh's Demographic and Health Survey 2014 survey showed that only 78% of women received prenatal care at least once from any provider and 64% of trained health care providers and only 31% received prenatal care 4 times or more. Bangladesh has strengthened emergency obstetric care (EmOC) under the Directorate General of Health Services, through national and international cooperation. In 1993, the United Nations Population Fund (UNFPA) began supporting government programs to develop 64 EmOC maternity and child welfare centers[10].

Problem statement

According to the United Nations Millennium Development Goals, each year at least half a million women and girls die needlessly because of complications during pregnancy, childbirth, or six weeks after birth[11]. Almost all (99%) of these deaths occur in developing countries.

Bangladesh is a developing country, and the health of this country is now much better than it was decades ago[12]. The country has made significant progress in achieving the Millennium Development Goals, which contribute to the reduction of maternal mortality, and is currently working on the SDGs agreed to be achieved by 2030[13]. However, the full potential of maternal health services has never been greater[14]. A recent maternal mortality survey in Bangladesh suggests that progress in reducing maternal mortality has stalled, with only 37% of pregnant women attending the ANC at least four times[15]. Although the Bangladeshi government and non-governmental organizations and international organizations are working together to increase the number of people in contact with the ANC, the success is noteworthy[16].Previous surveys conducted in Bangladesh and South Asia have strongly identified relevant aspects related to ANC communication with pregnant women such as population, socio-economic and environmental factors[17]. Only a handful of surveys, using data from previous statistical and health research, were conducted to determine the relationship between the decisions and content of ANC contacts in Bangladesh. Although there is a list of activities related to ANC resources, the main focus is on disclosing issues related to ANC communication and ANC usage[18]. However, a few important issues, such as the number of contacts in the ANC[19], the new WHO recommended more than 8 times contact with the ANC and consultation with ANC experts[20], were not taken seriously by health researchers.

Rationale

Maternal health means maternal health during pregnancy, childbirth, and after childbirth. Maternal health services are generally protective and patients are not sick, which leads to less use of services.The use of maternal health care services is essential for the early detection of mothers at high risk of illness and death during pregnancy.In developing countries, these problems are more common because of existing socio-economic conditions and the inadequacy of health facilities. Significant differences in maternal health care indicators may explain the significant differences in maternal mortality rate (MMR) between developed and developing countries.Available information suggests that approximately 12,000 women in Bangladesh are dying from complications related to pregnancy. ANC is the most vital part to ensure the health of mothers and upcoming child during pregnancy period. There are different factors that influence the ANC practices in our country. Very few researches have been conducted on this recently in Bangladesh. Therefore, this study was conducted to identify the factors that influence the number of antenatal care visit (ANC) among Bangladeshi women.

Research question

What are the factors that influence the number of antenatal care visit (ANC) among Bangladeshi women?

Objective

General objective

To identify the factors that influence the number of antenatal care visit (ANC) among Bangladeshi women.

Specific objectives

1. To identify the specific factors that affect the ANC
2. To assess the ANC status of the women
3. To identify the association of ANC status with the specific factors.

Literature review

All over the world thousands of women and babies are at risk of dying from complications related to pregnancy and childbirth[21]. For example, an estimated 303,000 women died and 2.6 million babies died in 2015 due to complications related to pregnancy and labor[22]. Although great strides have been made in the last two decades, there is still a need to improve access to quality care during pregnancy, abortion, and childbirth to reduce the risk of preventable deaths in women[23]. Antenatal care or antenatal care (ANC) is defined as "the care provided by trained health professionals for pregnant women and adolescent girls to ensure the best possible health conditions for mothers and children during pregnancy"[24]. In addition, the World Health Organization (WHO) has promoted various contraceptives[25]. For example, the WHO's FANC (focusing on maternity care) model emphasizes that a pregnant woman should visit the ANC fully[26], and be tested and treated for anemia, malaria, HIV / AIDS, and tetanus vaccination. In addition, the WHO recently proposed new ANC-related guidelines that include many other changes to the FANC model[27]. According to the new guidelines, a pregnant woman should be visited by the ANC at least eight[28], start her first visit at 12 weeks pregnant (GA), followed by a qualified health care provider aged 20, 26, 30, 34, 36, 38. and 40 weeks of GA[29]. In addition, these new guidelines emphasize that a woman's 'communication' with her provider should go beyond simple 'visits'[30]. This 'contact' between a pregnant woman and a health care provider should be an opportunity for quality care during pregnancy. These new guidelines aim to ensure both a healthy pregnancy and a successful transition to birth and birth[31]. In addition, these recommendations focus not only on mother and child screening but also on counseling, maternal nutrition, prevention, and treatment of common ailments, providing support for women at risk of intimate violence and preventive measures. areas such as malaria and / or areas where HIV is most prevalent[32].

The majority of maternal deaths (66%) occur in sub-Saharan Africa, and 99% of maternal deaths occur in low- and middle-income countries as the majority could not be prevented[33]. The main causes of maternal mortality were bleeding, infections caused by high blood pressure in pregnancy and sepsis and indirect causes, mainly due to the interaction between existing medical conditions and pregnancy. In 2001, the World Health Organization (WHO) issued guidelines for a new model of Maternal Care (ANC) called Fertilized or Prenatal Care (FANC), for use in developing countries, including Ghana[34]. The entrenched ANC means that pregnant women visit the ANC at least four times regularly and receive all the WHO recommended packages from skilled healthcare providers. This new model depends on the quality of services rather than the number of services available to pregnant mothers. Concentrated antenatal care eliminated traditional risk assessment and instead focused on helping women maintain a normal pregnancy. In response to this evidence, several countries in sub-Saharan Africa are taking steps to become accustomed to the FANC as a way to improve the health and well-being of mothers and children. Worldwide, there is a dramatic decline in maternal mortality rates — MMR[35].

Despite these recent decline, Sub-Saharan Africa has the highest MMR in the world[36], although there are strategies and interventions that prioritize maternal health. In sub-Saharan Africa, the maternal mortality rate (MMR) is estimated at 500 per 100,000 live births in 2010[37]. However, between 1990–2010 the annual decline was only 1.7% in the sub-Saharan region. The use of maternity services in other parts of Africa and developing countries has not been encouraging. Typically, pregnant women arrive late for services and perform below the recommended amount of antenatal care visit (FANC) visit[38]. Ghana's maternal mortality rate currently stands at 308 deaths per 100,000 live births, although this figure is low compared to the number of maternal deaths that occurred a decade ago. The ANC's role in reducing maternal mortality in Ghana has been reported by the World Health Organization, but some women do not join the ANC during pregnancy[39]. The rate of ANC visits varies between pregnant women; This is reflected in a study conducted in the Bunkpurugu region of Ghana, where 1.6% of pregnant women visited the ANC once, 12.9% between two and four times, 22.6% attended at least five times and the rest visited more than five times. In a few African countries such as Nigeria, 77% of pregnant women start using intensive prenatal care in the second trimester, and in Kenya 45% in the third trimester[40].

In Malawi, 48% of pregnant women start using intensive prenatal care in the second trimester[41]. According to visit statistics, in developed countries, 97% of pregnant women visit at least once and 99% of these pregnant women give birth with skilled midwives[42]. The opposite, however, is that, in developing countries, including Ghana, 49% of pregnant women visit at least once and usually two-thirds of these women give birth with untrained midwives. In incorporating FANC into the maternal and child health services in Ghana, the reproductive health policy and guidelines of the antenatal clinic (ANC) were revised to include early detection and treatment of all complications that occur during pregnancy[43]. Emphasis was placed on testing for birth and fertility readiness, preventing malaria in pregnancy and preventing mother-to-child transmission of HIV (PMTCT)[44]. The ANC program has been reduced from thirteen (13) times to full four (4) times, per person. FANC focuses on the quality of care rather than the number of visits and ensures good health during childbirth and delivery. This places the caregiver and client relationship as the key to success[45]. The type of relationship established by the midwife with the client such as kindness, respect, privacy, level of confidence during pregnancy is the basis of the amount of trust established and the level of care services performed in the absence of the midwife, especially at home[46].

Developing countries are having difficulty finding quality FANC services, especially in rural and peri-urban areas. Competitiveness of labor and money and poor communication with other programs or sectors (malaria, HIV, emergency obstetric care) can be found at different levels of the health system, especially where policies are not well defined. Lack of communication between health care providers, as well as the perception of some women, families and communities about pregnancy as a natural process of living, may lead to a reduction in the importance of FANC[47].

In 2003, an analysis of EDHS data for 2000 showed that the most recent use of obstetric care in the five years prior to the study was 26.7%. In addition, there has been a significant difference in the use of antenatal care facility[48]. Addis Ababa women tend to show the highest use of antenatal care (83.1%), followed by women from other cities (63.4%) and rural areas (21.6%)[48]. Similarly, a study conducted in southern Ethiopia in 2003 showed that the proportion of women who received maternity care during their recent birth six years before the study was 26.1%[49]. Women living in rural areas are less likely to receive care during pregnancy than in urban women. This requires efforts to investigate key factors that contribute to the adoption of the ANC and other maternal health services. As a result of such efforts, many of the social aspects of individual mothers are affected by a basic need for care. In this case, good examples are maternal age, education and equality, which have been evaluated as decisions on the use of health care over and over again. Another important factor in the use of maternity care services, especially in Africa, is the cultural background of the woman[50].

In Ethiopia, the use of prenatal care is low compared to WHO recommendations, and there is a difference in the use of ANC services in each region of the country. In a study in Ethiopia, it was found that 2,598 (36.6%) women had visited the ANC four times, with accommodation, district, mother's education, home wealth index, desire to get pregnant, newspaper readings, and many times. radio listening, and television watching times were all closely linked to the ANC's use[51]. According to a study in Vietnam, women living in rural areas are less likely to follow the national recommendation to visit the ANC. Moreover, according to a study in Ethiopia, only 23.3 percent of rural people completed four or more ANC visits, while 71.6 percent of urban residents completed four or more ANC visits[51]. Compared to urban women, rural women had a 0.35 chance of ending the ANC visit four or more times (OR 0.35, CI: 0.22, 0.53). A study conducted in northwestern Ethiopia showed that urban mothers were 9.54 times higher (AOR: 9.54; CI: 5.99, 15.17) more likely to have skilled delivery services to health facilities compared to their rural counterparts[52]. According to a survey conducted in rural Ethiopia, rural Ethiopians had less access to consultation with the ANC during pregnancy than the national average. Lack of knowledge, lack of education, hard work, poverty, and lack of health care are all associated with the ANC's non-visit[52].

To prevent unwanted consequences of pregnancy, antenatal care (ANC) is a very important way to diagnose early pregnancy complications. The ANC is an important factor in reducing maternal mortality, as well as providing pregnant women with a wide range of health promotion programs and preventive health services. One of the ANC's most important tasks is to provide health information and services that can greatly improve the lives of women and their children. The ANC is also an opportunity to inform women about the danger signs and symptoms that should be sought from their healthcare provider[53]. The figures for ANC visits vary from country to country. In Western Europe, North America and many other countries the ANC includes visits of a 12-16 pregnant woman to health care facilities, as well as a modest visit to her home[53]. However, the WHO and the Indonesian government have commended at least four ANC visits for a normal pregnant woman; that is one visit each in the first and second

trimester, as well as two visits in the third trimester (usually 1-1-2). Unfortunately, the actual number of visits does not always reach the recommended number of small visits, which indicates the need to examine the underlying factors[54].

The United Nations (UN) Sustainable Development Goals (SDGs) call for a global reduction of maternal mortality to 70 or less than 100,000 live births and to ensure universal access to sexual and reproductive health services by 2030. Based on a systematic review of the UN Maternal Mortality Estimation Inter-Agency Group, in 2015 alone, approximately 830 women die daily from complications during pregnancy or childbirth; about 99% of these deaths occur in developing countries. Numerous studies show that access to quality maternity care can prevent maternal mortality and can reduce up to 20% maternal mortality. The ANC's services have long been regarded as an important part of the ongoing care of pregnant mothers and newborns. The ANC has been seen as an important figure in ensuring a safe motherhood as the world undergoes maternal reforms[55].

Methodology

Study design

It is a descriptive type of cross-sectional study.

Sources of data

For this study, the data source is Bangladesh Health and Demographic Surveys (BDHS) in 2017-2018 under the authority of the National Institutes of Population research and Training (NIPORT) of the Ministry of Health and family Welfare (MOHFW).

Study area

Bangladesh consists of eight administrative divisions: Barisal, Chattogram, Dhaka, Mymensingh, Khulna, Rajshahi, Rangpur, and Sylhet. Each division is divided into districts, and each district into upazilas. Each urban area in an upazilla is divided into wards, which are further subdivided into mohallas. A rural area in an upazila is divided into union parishads (UPs) and, within UPs, into mouzas. These divisions allow the country as a whole to be separated into rural and urban areas.

Study area coverage by eight divisions

Figure : 1

Study population

The study population for this study was women of reproductive aged in between 15 to 49 years.

Sample design and sample size

Among the study population, data was collected from 20,127 women. Among 20,127 women, ANC related information was provided by only 5,012 women. As the dependent variable for this study is ANC status. Therefore, these 5,012 women were selected as the samples for this study by using SPSS. The sample size for this study was 5,012.

Study period

This study was started on 24 October Tuesday in 2017 and finished on 15 March Thursday in 2018.

Sampling criteria

Inclusion criteria

- Who were pregnant currently and every mother who has children.
- Who were presented at home and actively attended the interview.

Exclusion criteria

- Who was not ever married.
- Who has no children and who ever not pregnant.
- Who refused to attend the interview.
- Women who was not present at their home during interview time.

Questionnaires

The 2017-18 BDHS used five types of questionnaires:

1. The Household Questionnaire
2. The Woman's Questionnaire (ever-married women age 15–49)
3. The Biomarker Questionnaire
4. Two verbal autopsy questionnaires to collect data on causes of death among children under age 5, and
5. The Community.

For my study, I used the data derived from second questionnaire.

The questionnaire was prepared in English and then translated into and printed in Bangla.

The Woman's Questionnaire collected information from ever-married women age 15–49. Women answered questions on the following topics:

- Background characteristics (for example, age, education, religion, and media exposure)
- Reproductive history
- Use and source of family planning methods
- Antenatal, delivery, postnatal, and newborn care, and breastfeeding
- Child immunizations
- Infant feeding practices, and illness
- Marriage and sexual activities
- Fertility preferences
- Husband's background and respondent's work

Data collection

The questionnaire was pretested before the final data collection. Based on observations in the field and suggestions made by the pretest teams, revisions were made in the wording and translations of the questionnaires.

A total of 210 field staff were recruited based on their educational level, prior survey experience, maturity, and willingness to spend 4 months on the project for data collection purpose. Data collection occurred in five phases, each about 4 weeks in duration. The number of teams declined with each subsequent phase, starting with 20 teams in the first phase and ending with 17 teams at the end of data collection.

Data Processing

The data processing began shortly after fieldwork commenced. It consisted of office editing, coding of open-ended questions, data entry, and editing of inconsistencies found by the computer program. Eight data entry operators and two data entry supervisors performed the work, which commenced on 17 November 2017 and ended on 27 March 2018. The task used the Census and Survey Processing System (CSPro), a software jointly developed by the United States Census Bureau, ICF, and Serpro S.A.

- The dependent variables are Respondent's current age categorized by <18 years, 18-30 years, 31-40 years and 41-49 years.
- Highest educational level categorizes by no education, primary education, secondary education and higher education.
- Husband/partner's education level categorize by no education, primary education, secondary education and higher education.

- Age of respondents at 1st birth as 13-17 years, 18-25 years, 26-30 years, and more than 30 years.
- Type of place of residence was categorized as urban and rural area.
- Division of our countries are eight divisions such as Barisal, Chittagong, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, Sylhet.
- Wealth index was categorized as poorest, poorer, middle, richer, richest.
- The religion was categorized by Islam, Hinduism, Buddhism, Christianity.
- Number of living children from 0 to 9.
- Number of household members (listed) are distributed by 4 or less than 4, 5 to 8, 9 or more members.
- Health insurance type: social security –it is covered by no health insurance and missing (no participants have any health insurance).
- Respondent currently working or not. Services received: received ANC or not received ANC. Rest of the variables were dropped which is not relevant to this study.

Data analysis software

Data analysis was done by using SPSS (Statistical Package for the Social Science) version 26.0. Tables and graphs were prepared by using MS Excel.

List of variables

Dependent variables

ANC status of the Bangladeshi women.

Independent variables

a) Women's age

b) Level of education

c) Husband's level of education

d) Age at first birth

e) Residence

f) Division

g) Wealth index

h) Religion

i) Number of living children

j) Household size

k) Working status

Ethical clearance

This data is a secondary sources of data , collected/downloaded from BDHS website and that's why no need any ethical clearance.

Results

The high coverage of antenatal care will be benefited for every mothers and childrens.The result section will shows the condition of ANC among Bangladeshi women and how this are related to others variables

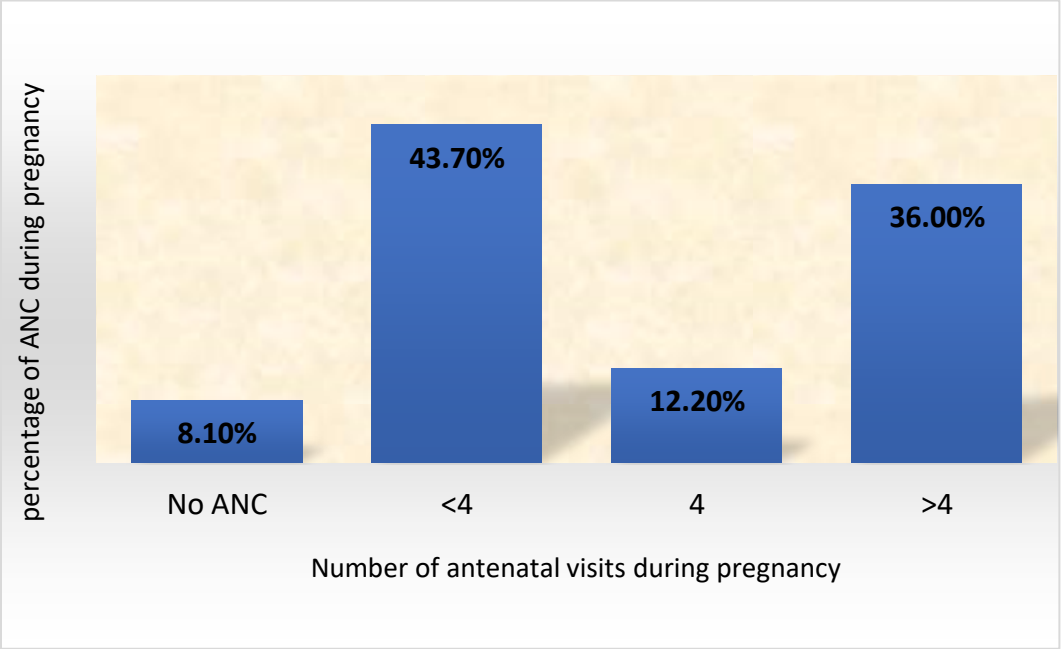

Figure: 2 **Distribution of the respondents according to their number of antenatal visits during pregnancy**

Among all the 5012 respondents, 8.10% didn't receive any ANC visit, 43.70% received less than 4 ANC visits, 12.20% received 4 ANC visits and the rest 36.00% respondents received more than 4 ANC visits (Figure 02).

Table 01: Distribution of the respondents according to their age

Age	No. of respondents (n)	Percentage (%)
15-18 years	214	4.30
18-30 years	3953	78.90
31-40 years	803	16.00
41-49 years	42	0.80
Total	**5012**	**100.00**

Among all the respondents, 4.30% were aged between 15-18 years, maximum of the respondents about 78.90% were aged between 18-30 years and 16% were aged in between 31 to 40 years (Table 01).

Table 02: Distribution of the respondents according to their highest education attainment

Highest education attainment	No. of respondents (n)	Percentage (%)
No education	312	6.20
Primary	1392	27.80
Secondary	2402	47.90
Higher Secondary & above	906	18.10
Total	**5012**	**100.00**

A total of 47.90% of the respondents were educated up to secondary level and 27.80% were educated up to primary level.Very few (6.20%) respondents had no formal education (Table 02).

Table 03: Distribution of the respondents according to their husbands' highest education attainment

Highest education attainment	No. of respondents (n)	Percentage (%)
No education	679	13.50
Primary	1657	33.10
Secondary	1635	32.60
Higher secondary and above	962	19.20
Don't know	13	0.30
Missing	66	1.30
Total	**5012**	**100.00**

The findings reveal that 13.50% respondent's husbands had no formal education, about one-third of the respondents were educated up to primary level, 32.60% were educated up to secondary level, 19.20% were educated up to higher than that (Table 03).

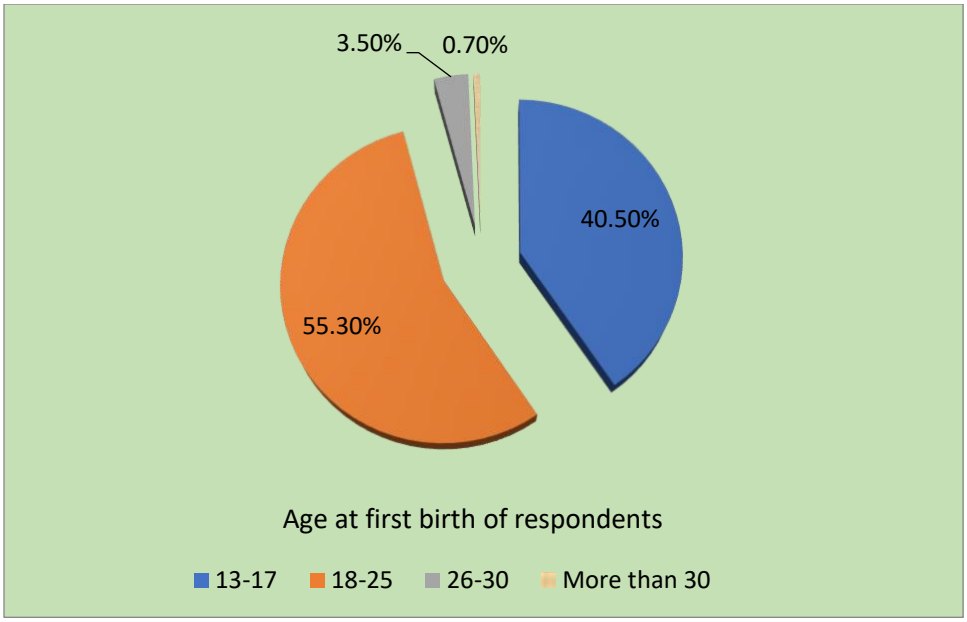

Figure: 3 **Distribution of the respondents according to their age at first birth**

Among all the respondents, 40.50% respondent's age at first birth was in between 13 to 17 years and more than half (55.30%)of respondent's age at first birth was in between 18 to 25 years (Figure 03).

Table 04: Distribution of the respondents according to their type of place of residence

Type of place of residence	No. of respondents (n)	Percentage (%)
Urban	1725	34.40
Rural	3287	65.60
Total	**5012**	**100.00**

The distribution of the respondents according to their type of place of residence shows that 34.40% respondents were urban residents and 65.60% were rural (Table 04).

Table 05: Distribution of the respondents according to their division

Division	No. of respondents (n)	Percentage (%)
Barisal	533	10.60
Chittagong	835	16.70
Dhaka	741	14.70
Khulna	524	10.50
Mymensingh	603	12.00
Rajshahi	527	10.50
Rangpur	559	11.20
Sylhet	690	13.80
Total	**5012**	**100.00**

According to table 05, 10.60% respondents were from Barisal, 16.70% from Chittagong, 14.70% from Dhaka, 10.50% from Khulna, 12.00% from Mymensingh, 10.50% from Rajshahi, 11.20% from Rangpur and the rest 13.80% respondents were from Sylhet division (Table 05).

Table 06: Distribution of the respondents according to their wealth index

Wealth index	No. of respondents (n)	Percentage (%)
Poorest	1079	21.50
Poorer	1017	20.30
Middle	905	18.10
Richer	988	19.70
Richest	1023	20.40
Total	**5012**	**100.00**

Among all the respondents, about one-fifth of the respondents were in the poorest wealth index, 20.30% were poorer, 19.70% were richer and 20.40% were belongs to the richest wealth index (Table 06).

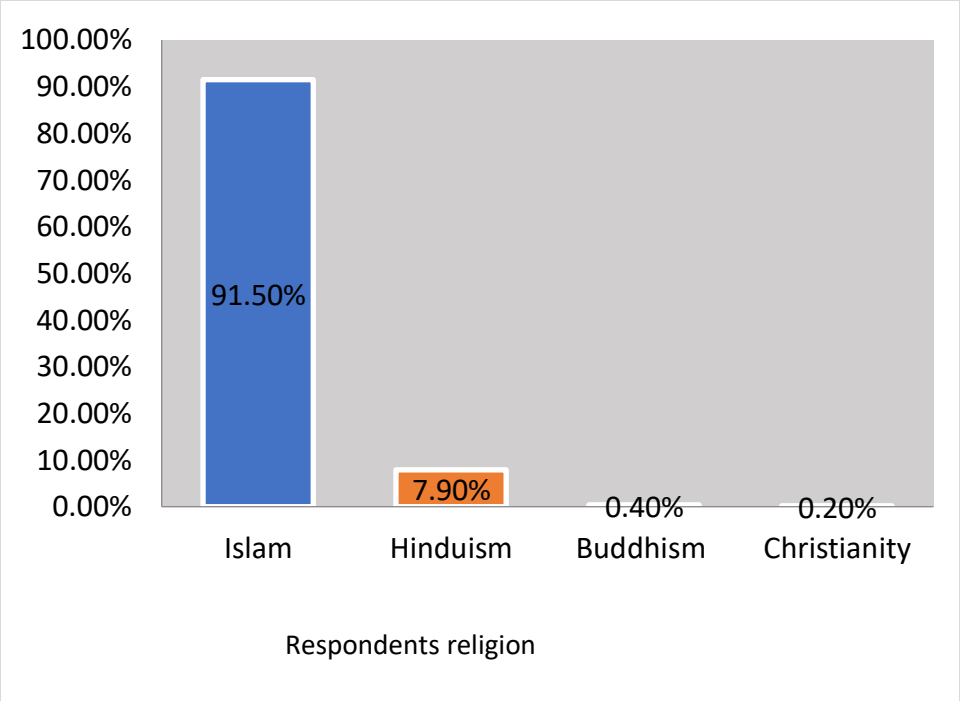

Figure: 4 Distribution of the respondents according to their religion

Among all the respondents, 91.50% were the followers of Islam, 7.90% were Hindu, 0.40% were Buddhist and the rest 0.20% were Christian (Figure 04).

Table 07: Distribution of the respondents according to their number of living children

Number of living children	No. of respondents (n)	Percentage (%)
0	50	1.00
1 to 4	4801	95.7
5 to 9	161	3.3
Total	**5012**	**100.00**

Majority of the respondents (95.70%) had one-four child, and only 1% had no child. (Table 07).

Table 08: Distribution of the respondents according to the number of their household members

Number of HH members	No. of respondents (n)	Percentage (%)
4 or less than 4	1511	30.10
5 to 8	2718	54.20
9 or more	783	15.60
Total	**5012**	**100.00**

According to the table 08, more than half (54.20%) of the respondent's household had 5 to 8 members whereas about 30% respondent's household had 4 or less than 4 family members. Only 15.60% respondent's household had 9 or more members.

Distribution of the respondents according to their health insurance type

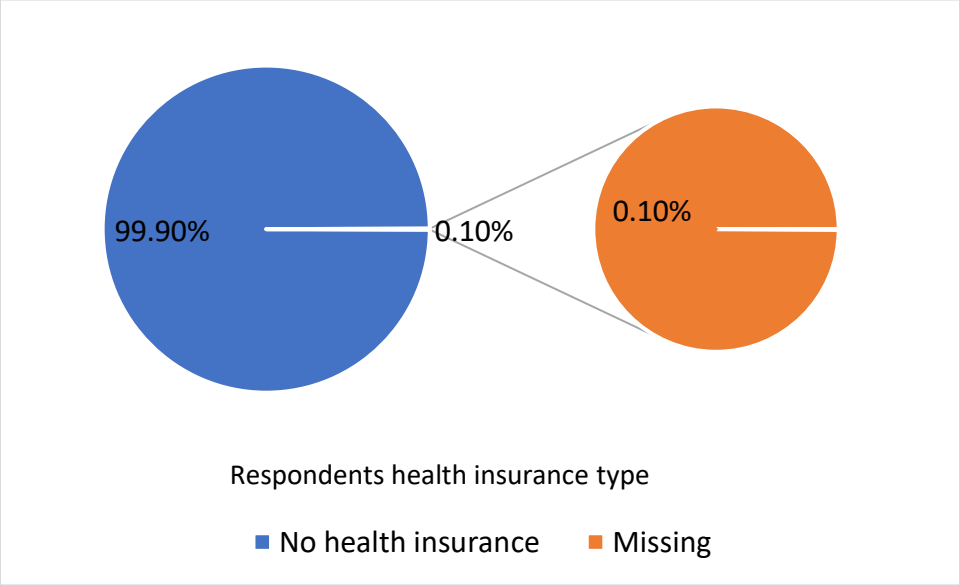

Figure: 5

Almost all the respondents, 99.90% had no health insurance for them (Figure 05).

Table 09: Distribution of the respondents according to their current working status

Current working status	No. of respondents (n)	Percentage (%)
Not working	3132	62.50
Working	1880	37.50
Total	**5012**	**100.00**

Among all the respondents, nearly two-third of the respondents (62.50%) were not working whereas the rest respondents were involved in some kind of income generating activities (Table 09).

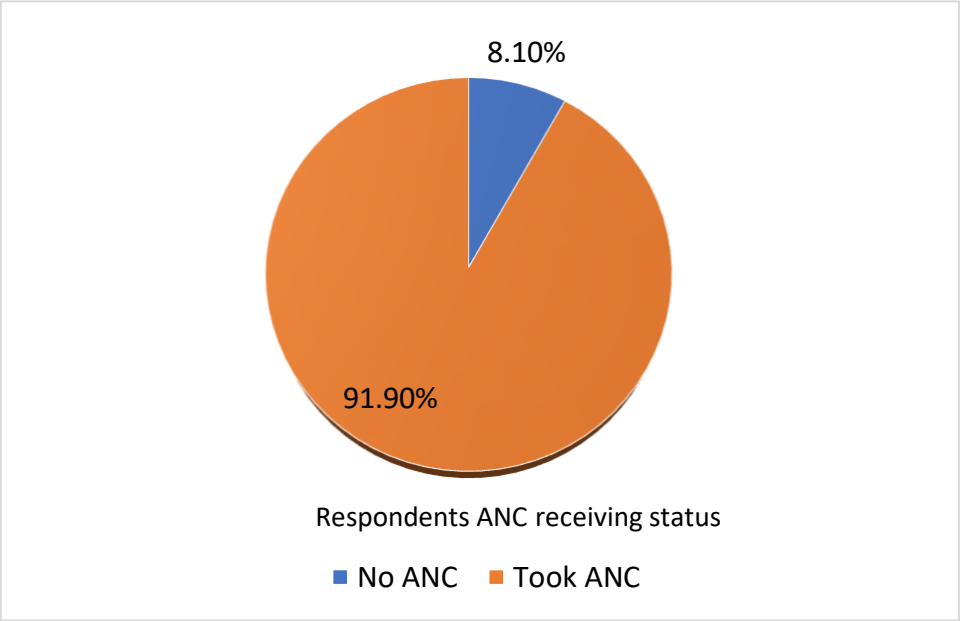

Figure: 6 Distribution of the respondents according to their ANC receiving status

Overall, a total of 91.90% respondents had taken ANC services whereas 8.10% respondents had not received any ANC services (Figure 06).

Table 10: Association of respondents' ANC receiving status with their age

Age category	No ANC (408)	Took ANC (4604)	Chi-square	p value
<18 years	17	197	16.863	0.001
18-30 years	299	3654		
31 to 40 years	83	720		
41 to 49 years	9	33		

The correlation between ANC receiving status with the age of respondents shows that there is significant association ($p<0.05$) between ANC receiving status and the age of respondents (Table 10).

Table 11: Association of respondents' ANC receiving status with their highest education attainment

Education	No ANC (408)	Took ANC (4604)	Chi-square	p value
No education	86	226	289.902	0.000
Primary	183	1209		
Secondary	130	2272		
Higher secondary	9	897		

According to table 16, there is significant association ($p<0.05$) between ANC receiving status and the highest education attainment of respondents.

Table 12: Association of respondents' ANC receiving status with their husbands' highest education attainment

Husband's education	No ANC (408)	Took ANC (4604)	Chi-square	p value
No education	120	559	197.803	0
Primary	191	1466		
Secondary	77	1558		
Higher	11	951		
Don't know	1	12		

Similar findings were found in case of the ANC receiving status with respondent's husbands' highest education attainment. There was significant association ($p<0.05$) between the both variables.

Table 13: Association of respondents' ANC receiving status with their age at first birth

Age at 1st birth	No ANC (408)	Took ANC (4604)	Chi-square	p value
13-17	210	1820	24.581	0.000
18-25	190	2583		
26-30	7	169		
More than 30	1	32		

Table 13 shows the association of respondents' ANC receiving status with their age at first birth. The findings show that there is significant association ($p<0.05$) between respondents' ANC receiving status with their age at first birth.

Table 14: Association of respondents' ANC receiving status with their type of place of residence

Residence	No ANC (408)	Took ANC (4604)	Chi-square	p value
Urban	88	1637	32.486	0.000
Rural	320	2967		

Significant association ($p<0.05$) was found in between respondents' ANC receiving status with their type of place of residence (Table 14).

Table 15: Association of respondents' ANC receiving status with their division

Division	No ANC (408)	Took ANC (4604)	Chi-square	p value
Barisal	73	460	76.558	0
Chittagong	72	763		
Dhaka	49	692		
Khulna	20	504		
Mymensingh	56	547		
Rajshahi	25	502		
Rangpur	25	534		
Sylhet	88	602		

Table 15 shows the association of respondents' ANC receiving status with their division. The findings show that there is significant association ($p<0.05$) in between respondents' ANC receiving status with their division.

Table 16: Association of respondents' ANC receiving status with their wealth index

Wealth index	No ANC (408)	Took ANC (4604)	Chi-square	p value
Poorest	195	884	249.804	0.000
Poorer	109	908		
Middle	56	849		
Richer	37	951		
Richest	11	1012		

As shown in table 16, significant association ($p<0.05$) was found in between respondents' ANC receiving status with their wealth index.

Table 17: Association of respondents' ANC receiving status with their religion

Religion	No ANC (408)	Took ANC (4604)	Chi-square	p value
Islam	385	4204	11.868	0.008
Hinduism	19	377		
Buddhism	4	14		
Christianity	0	9		

The table 17 shows that there is significant association ($p<0.05$) in between respondents' ANC receiving status with their division.

Table 18: Association of respondents' ANC receiving status with their number of living children

No. of living children	No ANC (408)	Took ANC (4604)	Chi-square	p value
0	2	48	162.421	0
1 to 4	364	4437		
5 to 9	42	119		

Table 18 shows the association of respondents' ANC receiving status with their number of living children. The findings show that there is significant association ($p<0.05$) between respondents' ANC receiving status with their number of living children.

Table 19: Association of respondents' ANC receiving status with their number of family members

HH size	No ANC (408)	Took ANC (4604)	Chi-square	p value
4 or less than 4	99	1412	8.746	0.013
5 to 8	248	2470		
9 or more	61	722		

According to the table 19, significant association ($p<0.05$) was found in between respondents' ANC receiving status with their number of family members.

Table 20: Association of respondents' ANC receiving status with their working status

Working status	No ANC (408)	Took ANC (4604)	Chi-square	p value
Not working	221	2911	13.127	0.000
Working	187	1693		

Table 20 is showing the association of respondents' ANC receiving status with their working status. The findings show that there is significant association ($p<0.05$) in between both the variables.

Output of linear regression analysis

Dependent variable – ANC Status

Table 21: Model summary

Mode	R	R square	Adjusted R square	Std. error of the estimate
1	0.519	0.270	0.268	0.23405

Table 21 is showing the model summary of linear regression analysis. This table provides the R and R^2 values. The R value represents the simple correlation and is 0.519 which indicates a high degree of correlation. The R^2 value (the "R Square" column) indicates how much of the total variation in the dependent variable.

Table 22: ANOVAs

Model	Sum of squares	df	Mean square	F	Sig
Regression	101.127	11	9.193	167.823	0.000
Residual	273.627	4995	0.055		

This table indicates that the regression model predicts the dependent variable significantly well. This indicates the statistical significance of the regression model that was run. Here, $p < 0.05$, and indicates that, overall, the regression model statistically significantly predicts the outcome variable.

Table 23: Coefficients

Variable	Un-standardized coefficient		Standardized coefficient	t	Sig
	B	Std. error	Beta		
No. of ANC visit	0.135	0.003	0.508	41.719	0.000
Respondent's age	-0.002	0.001	-0.47	-3.326	0.001
Respondents' highest education attainment	0.077	0.005	0.230	16.718	0.000
Respondents' husbands' highest education attainment	0.051	0.004	0.187	13.405	0.000
Respondents' age at first birth	0.033	0.00	0.069	4.929	0.000
Type of place of residence	0.006	0.009	0.011	0.703	0.482
Division	0.005	0.002	0.041	2.968	0.003
Wealth index	0.039	0.003	0.207	13.398	0.000
Religion	0.015	0.012	0.017	1.238	0.216
Number of living children	-0.035	0.003	-0.143	-10.136	0.000
Number of household members	-0.006	0.006	-0.015	-1.070	0.285
Respondents' current working status	0.006	0.008	0.010	0.725	0.468

The table 23 is showing the coefficient. It is providing the necessary information to predict the dependent variable from the independent variables as well as determine whether the independent variables contribute statistically significantly to the model.

Discussion

This study assessed the factors that influence the number of ANC visits by the women during pregnancy in Bangladesh. Antenatal care allows management of pregnancy, detection and treatment of complications, and promotion of better maternal and child health. However, women rarely recognize childbearing as problematic and, there-fore, do not seek care. The results of the present study showed that among all 12.20% received 4 ANC visits. This is also consistent with the report from North Godar zone in Ethiopia where 45.7% of mothers had received at least 4 ANC visits[56].

The findings show that there is significant association ($p<0.05$) between ANC receiving status and the age of respondents. Likewise, a study conducted in Vietnam found that older women (more than 25 years old) were more likely to utilize antenatal care[57]. The maternal education, husband's education and wealth index were significantly associated with ANC contacts, the WHO recommended ANC contacts and ANC contacts by qualified doctors. All types of contact for ANC services, however, were higher among the highly educated women, women from richest families and women having educated spouses.Significant association ($p<0.05$) was found between ANC receiving status and the highest education attainment of respondents which indicates that education is a vital factor that influence the number of ANC visits. This finding is supported by that of a study in Indonesia which found that literacy of women had a significant association with the use of ANC services[58]. The study findings also show that there is significant association ($p<0.05$) between respondents' ANC receiving status with their age at first birth and wealth index. Another study conducted in Bangladesh showed the similar findings[59].Studies Tamil Nadu (India) and Indonesia reported that monthly family-income had a positive influence on postnatal check-ups also[58].A similar study conducted among 32 low-income countries including Bangladesh found that the women belong to rich household utilized 4.25 times higher attendance for ANC than the poor women which was in line with this study[60]. Higher utilization of ANC among women in the wealthiest households suggests that affordability could be an important issue in ANC service utilization. Further, the rich families are educated, have greater independence, and greater access to health care.

The study findings also revealed that there is significant association ($p<0.05$) between respondents' ANC receiving status with their number of living children. Also, significant association ($p<0.05$) was found in between respondents' ANC receiving status with their number of family members and working status. This finding is very much similar to the study findings of Guatemala[61] and South India[62]. The coefficients and ANOVA test also provides the necessary information to predict the dependent variable from the independent variables as well as determine whether the independent variables contribute statistically significantly to the model.

Conclusion

The findings of this study suggest that specific efforts are needed to target women in low-income areas, especially those from low-income sectors, through the provision of maternal health care services. The results shows that formal education, number of living children, wealth index, working status of women, family size and age are important factors associated with the use of ANC resources. Therefore, the knowledge, education and communication of the ANC must be strengthened to reach all mothers. Over time, women's empowerment through informal education and income-generating activities and the involvement of husbands during information, education and communication are highly recommended.

Limitation: The data source of this study is a secondary type of source and it is a cross sectional study which is easy to conduct. If it was a cohort study the study will be strong and more valid. This result is not representative of all over Bangladesh.

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MPH Program

Thesis Supervision Logbook
Student Name:
Student ID No:
Thesis onset Date:
Supervisor Name:

Sl	Date with semester	Meeting Time		Meeting Platform	Total Hour/s	Supervisor Sign	Remarks
		From	To				

Annexure

Variable name	Label	Values
no_anc	Number of antenatal visits during pregnancy	0 = "No antenatal visits" 98 = "Don't know"
res_age	Respondent's current age	
edu	Highest educational level	0 = "No education" 1 = "Primary" 2 = "Secondary" 3 = "Higher"
hus_edu	Husband/partner's education level	0 = "No education" 1 = "Primary" 2 = "Secondary" 3 = "Higher" 8 = "Don't know"
age_1st	Age of respondent at 1st birth	
typ_res	Type of place of residence	1 = "Urban" 2 = "Rural"
div	Division	1 = "Barisal" 2 = "Chittagong" 3 = "Dhaka" 4 = "Khulna" 5 = "Mymensingh" 6 = "Rajshahi" 7 = "Rangpur" 8 = "Sylhet"
wealth_in	Wealth index combined	1 = "Poorest" 2 = "Poorer" 3 = "Middle" 4 = "Richer" 5 = "Richest"
rel	Religion	1 = "Islam" 2 = "Hinduism" 3 = "Buddhism" 4 = "Christianity" 96 = "Other"
no_child	Number of living children	
hh_size	Number of household members (listed)	
insure	Health insurance type: social security	0 = "No" 1 = "Yes"
work	Respondent currently working	0 = "No" 1 = "Yes"

rec_anc	Services received: Antenatal care	0 = "No" 1 = "Yes"
time_fac	Time to facility	100 = "Hours: 0" 101 = "Hours: 1" 201 = "Days: 1" 998 = "Don't know"
no_anc_1	SMEAN(no_anc)	
no_anc_cat	Category of number of ANC visit	1 = "No ANC" 2 = "<4" 3 = "4" 4 = ">4"
res_age_cat	Respondent age category	1 = "15-18 years" 2 = "18-30 years" 3 = "31-40 years" 4 = "41-49 years"
age_1st_cat	Age at 1st birth category	1 = "13-17 years" 2 = "18-25 years" 3 = "26-30 years" 4 = "More than 30 years"
hh_size_cat	Household size category	1 = "4 or less than 4" 2 = "5 to 8" 3 = "9 or more"
anc_dichotomous	ANC status	1 = "Took ANC" 2 = "No ANC"