

Maternal' Awareness of Antenatal Care on Impact of Mothers' and Newborn Health in Bangladesh

Manju Ara Khatun¹, Shanzida Khatun²

¹Dhaka Nursing College, Dhaka, Bangladesh

²National Institute of Advance Nursing Education and Research (NIANER), Mugda, Bangladesh

Email: manjuarakhatun@yahoo.com

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Abstract

Background: Globally, maternal and infant morbidity and mortality is a serious public health problem. Maternal mortality rate in Bangladesh is 176 per lack live births which remain high as Government set target to be achieved by 2016. Antenatal care is extremely important health care service for the mothers' and unborn fetus during pregnancy. It is well recognized that good antenatal care improves maternal, perinatal and neonatal outcomes. **Objective:** To identify the maternal awareness of antenatal care on impact of mothers' and newborn health in Bangladesh. **Methods:** The study was conducted by using descriptive and cross-sectional design. This study was approved by the appropriate authority and informed consent forms were obtained from the participants. Two hundred forty-one of rural and two hundred one urban mothers completed three sets of questionnaires: 1) Socio-demographic, 2) Maternal Awareness and 3) Impact of Awareness. Content validity was done by the experts and internal consistency of these instruments was satisfactory with Cronbach's alpha over 0.74. **Result:** The average awareness scores of rural and urban mothers were 18.54 ± 2.77 and 19.69 ± 2.16 respectively. The mean scores of impact on rural and urban mothers were 9.41 ± 2.13 and 9.39 ± 2.25 respectively. Maternal' awareness of antenatal care; impact of mothers' and newborn health were found statistically significant ($t = 68.54, p < 0.001$) and ($t = 59.11, p < 0.001$) different among rural and urban mother's. It was observed that maternal' awareness of antenatal care and impact of mothers' and newborn health were significantly difference between rural and urban mothers' ($\chi^2 = 211.869, p 0.004$ and ($\chi^2 = 157.772, p 0.002$ respectively). **Conclusions:** The findings indicated that maternal' awareness of antenatal care on impact of mothers' and newborn health was statistically significant different between

rural and urban mothers'. Further intervention study is needed to evaluate the effect of intervention on maternal and child health outcomes that represent the whole population.

Keywords

Awareness, Impact, Mothers', Newborns, Antenatal Care

1. Introduction

Globally, maternal mortality and morbidity is a serious public health problem. Every year approximately 303,000 women die while pregnant and within 42 days after termination of pregnancy [1] [2]. Of these 99% of 800 maternal deaths per day occur in developing countries [3]. Each year 2.7 million newborns died within the first 28 days of life and 2.6 million babies' stillbirths [2], of which approximately 45% occur during labor and birth. In Bangladesh, the rate of maternal mortality, neonatal mortality, and stillbirth are 176/100,000 live births, 24/1000 live births, and 36/1000 births respectively [4], [5], [6], [7]. The low birth weight is 33/1000 live births [6]. Moreover a study found 22.6% low birth weight [8]. The overwhelming majority of these deaths could have been prevented [9] [10] [11].

The leading causes of maternal mortality are postpartum hemorrhage (31%), eclampsia/pre-eclampsia (20%), delayed and obstructed labour (7%), abortion (1%), other direct cause (5%) and indirect cause (35%) [12]. Maternal education, lack of access of antenatal care is significant associated with increased risk of stillbirth(s). Low birth weight (LBW) is closely associated with fetal and neonatal mortality and morbidity [13]. Premature birth, poor nutritional status, inadequate nutritional intake during pregnancy, and poverty are the major causes of low birth weight babies [14] and low birth weight is strongly associated with neonatal mortality and developmental problem in childhood and adulthood [15], type 2 diabetes, hypertension and cardiovascular disease in the later part of their life [8]. These deaths and complications have to occur especially due to lack of proper antenatal care or inadequate management of pregnancy [16] [17] [18].

Antenatal care (ANC) is an effective tool to reduce both infant and maternal mortality and morbidity. The principle of ANC is to provide advice, education, reassurance, and support; to address and treat the minor problems of pregnancy; and to provide effective screening during the pregnancy [19] [20]. It is well recognized that good antenatal care improves maternal, perinatal and neonatal outcomes. Ministry of Health and Family Welfare (MOHFW) initiated the Health, Population, and Nutrition Sector Development Program (HPNSDP) for five years, from July 2011 to June 2016. Antenatal care service is one of the programs which is working toward achieving Millennium Development Goals 4 and 5 (child mortality and maternal health) [21]. The target indicators of MDGs 4 and 5 includes reduce maternal mortality rate from 194/100000 live births to

<143/1000000 live births; neonatal mortality rate from 32/1000 live births to 21/1000 live births; and infant mortality rate from 43/1000 live births to 31/1000 live births will need to be achieved by 2015 [22] [23] [24]. ANC is one of the programs which can achieve the Millennium Development Goals 4 & 5. So it is needed to see the maternal awareness about antenatal care whether antenatal care services effectively achieved.

There was no previous published study in Bangladesh. The study intended to identify the maternal awareness of antenatal care on impact of mother's and newborn health. The findings can be played an important role to the nurse midwives to provide adequate information to the pregnant mother's that can help to increase maternal awareness for good health of mother's and newborn which may help in achieving the Sustainable Millennium Development Goals (SDGs) 4.

Conceptual framework

The conceptual framework of this study guided by the literature on Antenatal care, Millennium Development goals progress report of Government of the Republic of Bangladesh 2012 and World Health Organization (WHO) Country Cooperation Strategy Bangladesh 2014-2017 to developed conceptual framework. In this study mainly three domain were used. This includes 1) socio-demographic refers to age, religion, education, occupation of mothers', monthly family income, number of family member, number of children, gestational age and condition during pregnancy which are affect of mothers' awareness, and impact of mothers' and newborn health; 2) awareness refers to knowing about meaning and important of antenatal care, ANC visits, colostrums, benefits of colostrums, breastfeeding, benefit of colostrums and breastfeeding, duration of exclusive breastfeeding, length of breastfeeding with complementary feeding, nutrition during pregnancy, place of delivery and postnatal care which are influence to impact of mothers' and newborn health; and 3) impact refers to outcome of mothers' awareness on antenatal care regarding place of delivery, birth attendants, face any problem during delivery, condition of mothers' during and after delivery, birth weight of newborn, condition of baby during and after birth, type of first feed, time of colostrums feeding and exclusive breastfeeding after birth which influence by the socio-demographic and maternal' awareness of ANC.

2. Methods

2.1. Setting and Participants

Participants were recruited from Dhaka Medical College Hospital (DMCH) and Sir Salimullah Medical College Hospital (SSMCH), Mitford, Dhaka, Bangladesh. Mother's of this study were postpartum mothers'. This study was conducted from May 2014 to October 2014 at inpatients department for maternal and child birth care delivery. The sample size was estimated in this study by using statistical formula.

$$N = \frac{Z^2 p(1-p)}{d^2} =$$

$$N = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 384.16$$

However, for 15% attrition the final sample size for data analysis was four hundred forty two mothers. Two hundred forty one for rural and two hundred one for urban mothers' as considered their living place. A systematic random sampling method was used to recruit the eligible subjects in this study. All Mothers' met the following inclusion criteria: a) gave childbirth at least one day before; b) agreed to participate, c) both healthy and unhealthy mothers'. Disagreed to participate of mothers' were excluded from this study. According to section criteria, systematic random sampling techniques were made by distribution of patients' bed. Two alternative bed selected to prevent bias. If the selected occupied bed unable to meet the criteria then next occupied bed were included for sampling.

2.2. Measure

Data were collected by using three questionnaires: 1) The Demographic data questionnaire, 2) Awareness questionnaire and 3) Impact questionnaire.

The demographic data questionnaire

The Demographic Data Questionnaire was designed by the researcher based on the literature review. The characteristics of mothers' consisted of age, religion, educational level, occupation, monthly family income, living place, number of family member, number of children, length of pregnancy and condition during pregnancy.

Awareness related questionnaire

Awareness refers to knowledge related questionnaire was developed by the researcher based on the literature review. It consisted of meaning of antenatal care, importance of antenatal care, number of ANC received, meaning of colostrums, benefit of colostrums, meaning of exclusive breastfeeding, duration of exclusive breastfeeding, advantages of breastfeeding, breastfeeding continue with complimentary feeding, nutrition during pregnancy, place of delivery, and postnatal care.

Impact related questionnaire

Impact related questionnaire was developed by the researcher based on the literature review. It consisted of place of delivery; face any problem during child birth, mothers' condition during and after child birth, birth weight of newborn, babies' condition during and after birth, type of first feeding after birth, time of colostrums, exclusive breastfeeding after birth.

2.3. Validity and Reliability

The content validity of the instruments was completed by experts from obstetric & gynecologists, pediatrics, and nursing specialists. The researcher reviewed and revised all instruments using the experts' suggestions. Pilot study was conducted with thirty postpartum mothers who had the same inclusion criteria as the subjects of this study. The internal consistency and reliability of the instruments

were tested using Cronbach's alpha coefficient, with an acceptable level of at least 0.70 [25]. In this study Cronbach's alpha coefficients was satisfactory for the study variables.

2.4. Data Collection

A descriptive approach was used. Data were collected through self-report questionnaires. After getting permission from the Directors of DMCH and SSMC Mitford Hospital, the researcher met with the charge nurse of the selected ward and the participants who met the inclusion criteria. The researcher introduced herself and briefly explained the purpose of the study and explained informed consent and that mother's had a right to refuse to participate in the study at any time. Then the researcher asked participants to provide answers in accordance with the questions being asked. The individual interview was conducted for 30 minutes.

2.5. Data Analysis

Both descriptive and inferential statistics were used to analyze the data. Descriptive statistics were used to analyze the characteristics of mother's. The differences between maternal awareness of antenatal care on impact of mother's and newborn health were analyzed using chi-square test. Maternal awareness and impact of mother's and newborn health were analyzed by using descriptive statistics and correlation between awareness of antenatal care and impact of mother's and newborn health analyzed by t-test.

2.6. Ethical Consideration

This study was a part of doctoral thesis and was an own pay distance learning (American World University, USA). Permission was taken from appropriate authority. Then researcher took written permission from Director of DMCH and SSMCH, Mitford, Dhaka for data collection. Written consent obtained from the mothers'. All mothers' were well informed about the study purposes and methods. Mothers also informed that there was no risk for giving information; no obligation to attend this study; can withdraw any time; and confidentiality strictly maintain.

3. Result

3.1. Participants

A total of four hundred forty two postnatal mothers' gave child birth who participated in this study. Among them 241 mothers' were living in rural area and 201 mothers' in urban area. The mean age of 241 rural and 201 urban postnatal mothers' were 24.77 ± 4.05 and 24.77 ± 4.5 years (range, 18 - 38) respectively. Most of the rural and urban mothers' had below college education (78.4%, 65.2%) and majority of mothers in both areas were Muslim (80.5%, 87.1%). A large number of mothers' had no paid employment (rural 96.7%, urban 93.0%).

The average monthly family income of mothers in both areas were 9153.53 ± 4302 Taka and 9970.15 ± 5210.480 Taka respectively that were below than national standard. In Bangladesh the average monthly household income was 31883 Taka (US dollars \$1073) in 2015 [26]. Majority (60.2%) of rural mothers' was join family and 67.2% urban mothers' was nuclear family, more than half of rural mothers' had ≥ 2 children (60.6) and 50.2% had < 2 children in urban mothers'. 64.3% rural and 60.2% urban mothers' family member were 4 - 6 persons. A majority 84.6% rural and 76.6% urban mothers' duration of pregnancy was 37 weeks and more, and majority had no complication 97.5% rural and 98.0% urban mothers' during pregnancy (Table 1).

3.2. Differences in Rural Maternal Awareness of Antenatal Care and Impact of Mothers' and Newborn Health and Demographic Characteristics

Table 2 shows the differences in maternal awareness of antenatal care and impact of mothers' and newborn health according to demographic characteristics. Rural mothers' awareness was statistically significantly different by monthly family income ($t = 4.30$, $p < 0.001$). Impact of rural mothers' and newborn health was statistically highly significant different by the length of pregnancy ($t = 3.768$, $p < 0.001$) and complication during pregnancy ($t = -2.607$, $p 0.010$).

Table 1. General characteristic of rural and urban mothers'.

Characteristics	Categories	Rural Mothers' (N = 241)			Urban Mothers' (N = 201)		
		N	%	M \pm SD	N	%	M \pm SD
Age (years)	<26	131	54.4	24.77 \pm 4.05	124	61.7	24.77 \pm 4.56
	≥ 26	110	45.6		77	38.3	
Education level	Illiterate	37	15.4	9153.53 \pm 4302.528	38	18.9	9970.15 \pm 5210.48
	< College	189	78.4		131	65.2	
	College +	15	6.2		32	15.9	
Religion	Islam	194	80.5	1.61 \pm 0.496	175	87.1	1.59 \pm 0.71
	Hindu	47	19.5		26	12.9	
Employment status	Employed	8	3.3	2.06 \pm 0.711	14	7.0	4.02 \pm 1.23
	Unemployed	233	96.7		187	93.0	
Monthly family income (TK.)*	<10000	25	10.4	37.17 \pm 0.84	12	6.0	37.4 \pm 1.18
	≥ 10000	216	89.6		189	94.0	
Type of family	Single	96	39.8	47	135	67.2	23.4
	Joint	145	60.2		66	32.8	
Number of children	<2	94	39.0	154	101	50.2	76.6
	≥ 2	147	61.0		100	49.8	
Number of family member	<4	43	17.8	197	59	29.3	98.0
	≥ 4	198	82.2		142	70.7	
Length of pregnancy	<37 wks	36	14.9	6	47	23.4	2.0
	≥ 37 wks	205	85.1		154	76.6	
Complication during pregnancy	Yes	6	2.5	235	4	2.0	97.5
	No	235	97.5		197	98.0	

Notes: *BDT = 100 = USD = (\$1.21).

Table 2. Differences in awareness of antenatal care and impact of rural mothers' and newborn health according to demographic characteristics (N = 241).

Demographic characteristics	Categories	Maternal Awareness		Impact of mothers' and newborn health	
		M ± SD	t/x ² (p)	M ± SD	t/x ² (p)
Age of mothers	<26 yrs	24.60 ± 2.93	-0.806 (0.421)	15.03 ± 1.95	1.222 (0.223)
	≥26 yrs	24.90 ± 2.72		14.73 ± 1.76	
Education	Illiterate	25.02 ± 3.43	0.664 (0.516)	14.66 ± 1.46	-0.933 (0.352)
	Below college	24.72 ± 2.76		14.97 ± 14.97	
Religion	Muslim	24.80 ± 3.03	0.686 (0.493)	14.91 ± 1.99	0.397 (0.692)
	Hindu	24.48 ± 1.83		14.79 ± 1.27	
Employment status	Unemployed	24.76 ± 2.86	0.455 (0.650)	14.86 ± 1.81	-1.654 (0.099)
	Employee	24.00 ± 1.73		16.67 ± 5.50	
Number of children	<2	24.61 ± 2.76	-0.542 (0.588)	14.97 ± 1.93	0.529 (0.597)
	≥2	24.81 ± 2.88		14.84 ± 1.83	
Number of family member	<4	24.43 ± 3.11	-0.754 (0.451)	14.88 ± 1.91	-0.057 (0.955)
	≥4	24.80 ± 2.78		14.90 ± 1.86	
Monthly family income	<1000	26.96 ± 4.68	4.30 (<0.001)	14.64 ± 2.15	-0.699 (0.485)
	≥10000	24.47 ± 2.42		14.92 ± 1.84	
Length of pregnancy	<37 wks	24.50 ± 2.11	-0.527 (0.598)	15.94 ± 2.88	3.768 (<0.001)
	≥37 wks	24.77 ± 2.94		14.70 ± 1.57	
Complication during pregnancy	Yes	24.75 ± 2.85	0.638 (0.524)	14.84 ± 1.81	-2.607 (0.010)
	No	24.00 ± 2.00		16.83 ± 3.19	

Table 3. Differences in awareness of antenatal care and impact of urban mothers' and newborn health according to demographic characteristics (N = 201).

Demographic characteristics	Categories	Maternal Awareness		Impact of mothers' and newborn health	
		M±SD	t/ x ² (p)	M ± SD	t/ x ² (p)
Age of mothers	<26 yrs	21.57 ± 2.82	0.590 (0.556)	14.23 ± 1.88	0.302 (0.763)
	≥26 yrs	21.34 ± 2.35		14.15 ± 1.91	
Education	Illiterate	22.62 ± 3.63	2.780 (0.006)	14.06 ± 2.63	-0.460 (0.646)
	Below college	21.25 ± 2.35		14.22 ± 1.71	
Religion	Muslim	21.47 ± 2.59	-0.275 (0.783)	14.29 ± 1.80	1.812 (0.072)
	Hindu	21.63 ± 3.13		13.54 ± 2.43	
Employment status	Unemployed	21.51 ± 2.68	0.490 (0.625)	14.28 ± 1.84	2.180 (0.030)
	Employee	21.15 ± 2.18		13.15 ± 2.28	
Number of children	<2	21.54 ± 2.95	0.497 (0.620)	13.96 ± 1.93	-1.935 (0.054)
	≥2	21.35 ± 2.24		14.48 ± 1.73	
Number of family member	<4	21.15 ± 1.73	-1.146 (0.253)	13.92 ± 1.92	-1.361 (0.175)
	≥4	21.62 ± 2.94		14.31 ± 1.87	
Monthly family income	<10000	24.25 ± 4.79	3.873 (<0.001)	14.25 ± 2.38	0.105 (0.916)
	≥10000	21.30 ± 2.36		14.19 ± 1.86	
Length of pregnancy	<37 wks	21.12 ± 1.54	-1.125 (0.262)	13.92 ± 2.61	-1.195 (0.233)
	≥37 wks	21.60 ± 2.92		14.29 ± 1.57	
Complication during pregnancy	Yes	21.53 ± 2.72	1.095 (0.275)	14.15 ± 1.91	-1.210 (0.228)
	No	20.67 ± 0.65		14.83 ± 1.40	

3.3. Differences in Urban Maternal Awareness of Antenatal Care and Impact of Mothers' and Newborn Health and Demographic Characteristics

Table 3 shows urban mothers' awareness was statistically significantly different by education ($t = 2.780$, $p = 0.006$) and monthly family income ($t = 3.873$, $p < 0.001$). Impact of mothers' and newborn health was statistically significant by employment status ($t = 2.180$, $p = 0.030$).

3.4. Differences among Maternal Awareness of ANC and Impact of Mothers' and Newborn Health

Mothers' awareness on antenatal care and impact of mothers' and newborn health analyzed by descriptive statistics and t-test. The average awareness and impact score of rural mothers' was 18.54 ± 2.77 , 9.41 ± 2.13 and highly significant different between awareness and impact was found ($t = 68.54$, $p < 0.001$) and 19.69 ± 2.16 , 9.39 ± 2.25 and it was also highly significant different between them ($t = 59.11$, $p < 0.001$) among urban mother's (**Table 4**).

3.5. Relationship between Maternal Awareness of ANC and Impact of Mothers' and Newborn Health

Table 5 Chi-square test analysis revealed that correlation between awareness of antenatal care and impact of mothers' and newborn health was found highly significant ($\chi^2 = 211.869$, $p = 0.004$) among the rural mothers' and also highly significant found ($\chi^2 = 157.772$, $p = 0.002$) among the urban mothers'.

4. Discussion

The present study examined the maternal awareness of antenatal care on impact of mothers' and newborn health in Bangladesh. Two hundred forty one rural and two hundred one urban mothers' were recruited in this study. The present findings showed on behalf of rural mothers' awareness statistically significantly different only by monthly family income ($t = 4.30$, $p < 0.001$) and on behalf of urban mothers' awareness was highly significant with education ($t = 2.780$, $p = 0.006$) and monthly family income ($t = 3.873$, $p < 0.001$). A study revealed

Table 4. Descriptive statistics independent t-test among maternal awareness and impact of mothers' and newborn health.

Area	Maternal Awareness		Impact of Mothers' and Newborn health	
	M \pm SD	t (p)	M \pm SD	t (p)
Rural mothers'	18.54 ± 2.77	103.77 (<0.001)	9.41 ± 2.13	68.54 (<0.001)
Urban mothers'	19.69 ± 2.16	128.91 (<0.001)	9.39 ± 2.25	59.11 (<0.001)

Table 5. Relationship between maternal awareness of antenatal care and impact of mothers' and newborn health.

Variable	Area	χ^2	p
Maternal Awareness and impact of mothers and newborn health	Rural Mothers'	211.869	0.004
	Urban mothers'	157.772	0.002

antenatal care increases mothers' knowledge [27]. Generally rural mothers' having to more chance to share their knowledge with their relatives or neighbors. So their awareness did not significant different with their education. On behalf of urban mothers', it is difficult to do their share knowledge because of boundary living. For this awareness of urban mothers' was significant different with their education. Bangladesh is a developing and over populated country as compared to living place. In addition, per capita income is not standard as compared to developed countries.

Impact of mothers' and newborn health on maternal awareness of antenatal care was found significant different. The present study revealed that impact of rural mothers' and newborn health was statistically highly significant different by length of pregnancy ($t = 3.768$, $p < 0.001$) and condition during pregnancy ($t = -2.607$, $p 0.010$). Impact of urban mothers' and newborn health was significantly different by employment status ($t = 2.180$, $p 0.030$). Studies reported length of pregnancy is the most important for effective outcome of mother's and newborn health. Antenatal care module 13 revealed that quality of care is important and women perceptions of their care should be sought and considered to prevent complications during pregnancy at all stages [19] [28]. Length of pregnancy and condition during pregnancy of rural mother's was significant different with the impact of mothers and newborn health. Because mothers did not aware as they have low level education, besides this mother's have to depend with their family.

Bangladesh demographic health survey stated that the importance of ANC is the reduction of maternal morbidity and mortality by utilization of ANC services but remains low due to several factors contributing to the low utilization of antenatal care [29]. The present study showed that mother's awareness of ANC on impact of mother's and newborn health was found statistically highly significant different ($t = 68.54$, $p < 0.001$, $t = 59.11$, $p < 0.001$) among rural and urban mothers and also found significant correlation ($\chi^2 = 211.869$, $p 0.004$, $\chi^2 = 157.772$, $p 0.002$). Proper antenatal care during pregnancy is very important to provide adequate advice and support to the woman and her family for developing healthy home behaviors and a birth and emergency preparedness plan to increase awareness of maternal and newborn health needs and self care during pregnancy, and the postnatal period, including the need for social support during and after pregnancy besides these preparing for early and exclusive breastfeeding and essential newborn care and considering the role of a supportive companion at birth [30] [31].

Health Population Nutrition Sector Development Program (HPNSDP) collaboration with the Ministry of Health and Family Welfare (MOHFW) initiated different program to be achieved the MDGs within five years from July 2011 to June 2016. Reduce child mortality and improve maternal health are the MDGs [14]. Antenatal care service is one of the programs which have been working to achieve the set target. The present study though found satisfactory findings regarding mother's awareness of ANC on impact of mother's and newborn health.

But there have some limitations which did not meet the represent of whole population. So further community based intervention study necessary to represent the whole population in Bangladesh.

4.1. Implications for Nursing Practice

Nurse-midwife can provide adequate knowledge about antenatal care for pregnant mothers' on impact of mother's and newborn health. This study will help the Nurse-midwife for the prevention of pregnancy related problems and health promotion of mothers' and newborn health.

4.2. Implications for Future Studies

Future study is needed to identify the factors related to maternal antenatal care on mothers and newborn health with diverse setting. Further intervention study is also needed to evaluate the effect of intervention on maternal and child health outcomes. These may to improve mothers and newborn health in Bangladesh and also help to achieve the SDGs.

4.3. Limitations

Data were collected from two medical college hospitals. As a hospital based study, the results may not be generalized to whole population in Bangladesh.

5. Conclusion

This study demonstrated the implication of the antenatal care to assess the maternal awareness of antenatal care (ANC) on impact of mothers' and newborn health. The findings indicated that maternal' awareness of antenatal care on impact of mothers' and newborn health was statistically significant different both rural and urban mothers'. This study suggested that nurse-midwives can actively participate in facilitating information to support mothers' which may help to increase the mothers' awareness for better health outcomes for mothers and newborn in Bangladesh.

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