Preterm Prelabour Rupture of the Membrane & Feto-Maternal out come: an Observational Study

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Summary:

Objective: The aim of this study was to see the maternal and fetal outcome of preterm pre labor rupture membrane and to identify the risk factors for preterm pre labor rupture membrane.

Methods and Material: This was a cross-sectional descriptive type study carried out in Dhaka Medical College Hospital, Dhaka, during April to September, 2005 (6months) in the Department of Obstetric and Gynecology. 50 pregnant women with preterm premature rupture of the membrane (gestational age 29-0 to 36-6 weeks) were included in this study.

Results: The mean age of the women was 27.24±6.28years and 36% of them more than 30 years old. Sixty two percent women were multi gravid .Socio-economic condition, level of education and antenatal care of the women was low. Median gestational age of the patient was 35weeks. Fifty six percent had previous history of PROM, preterm delivery, abortion, MR and dilatation and curettage. Sixty two percent women had history of sexual activity between 2 to 7days. Seventy two percent women had UTI, anaemia, and lower genital tract infection. Mean duration of the latent period was 18.87±16.17hours and time interval of rupture membrane and delivery was 27.60 ± 21.127 hours. Eighty four percent patient delivered by vaginal route and Fifty four percent delivered within 24 hours of ruptured membrane .Forty two percent newborn suffered from neonatal asphyxia, respiratory distress syndrome, neonatal jaundice and neonatal sepsis. Thirty two percent women suffered from chorioamnionitis, abruptio placent and endometritis.

Conclusion: PPROM is malnutrition and poverty related disease .Antenatal care is an important tool to prevent PPROM by identifying the risk factors and its management. Steroid for fetal lung maturity, antibiotics to prevent fetal and maternal infection and induction and / or augmentation of labor will speeded delivery and reduce hospital stay and infection.

Key wards: Premature rupture of the membrane, maternal and neonatal outcome, risk factors.

(J Bangladesh Coll Phys Surg 2010; 28: 17-23)

Introduction:

Premature rupture of the membrane (PROM) is a common obstetric problem and the assessment of women with possible membrane rupture is a management issue faced in every day practice. When PROM occurs, the fetus loses relative isolation & protection offered within the amniotic cavity. In general PROM refers to rupture of membranes with leakage of amniotic fluid in the absence of uterine activity. The minimum latency for diagnosis of PROM is 1 hour. PROM occurs in approximately 8% of term pregnancy [1]. Under normal circumstances the fetal membrane ruptures during the active phase of labor.[2] When PROM occurs before 37 completed weeks, it is called preterm pre labor rupture of the membrane (PPROM). It is responsible for approximately 35% of all preterm delivery [3.] .PROM affects 2.7% to 17% of all pregnancies and in most cases happens spontaneously and without apparent cause [3]. PPROM complicates approximately 2%-3% of all pregnancies below 37 weeks gestation[1]. Incidence of preterm PROM in Bangladesh is not known but Incidence of PROM in Dhaka Medical College Hospital is 8.12% [4] and 1.94% at Holy Family Red Crescent Hospital [5]. Epidemiological studies have identified several risk factors associated with preterm PROM. Genital tract infection or colonization with various microorganisms, low socioeconomic condition, poor nutrition, anemia,

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poor hygiene, stress, high parity, smoking and ante partum hemorrhage have all been linked to an increased chance of preterm PROM. Education plays a significant role in reducing the risk of PROM especially in developing countries [6]. Preterm premature rupture of the membrane is important for both baby and mother. The survival rate of infants is directly related to their gestational age [1].There are numerous possible fetal consequences of preterm delivery due to PROM. There are respiratory distress syndrome, hypothermia, hypoglycemia, jaundice, necrotizing enterocolitis, intraventricular hemorrhage, neurologic impairment, apnea, retrolental fibroplasias, bronchopulmpnary dysplasia, patent ductus arteriosus, fetal limb contracture formation, pulmonary hypoplasia and neonatal sepsis depending upon gestational age. PROM causes 20% of all neonatal death [3]. Probable maternal complications are chorioamnionitis (3-30%), endometritis, abruptio placenta [1,2].Recurrence of PROM may occur in 20% cases.[1]

Aims and Objectives:

PROM is very common in the obstetric wards. We face problem in diagnosis, monitoring and adopting treatment policy. There were very limited studies about PROM in our country and no national statistics is available about the incidence of PROM or incidence of maternal and perinatal mortality and morbidity from PROM.

The aim of this study is to see the maternal and fetal outcome of preterm premature rupture of the membrane in preterm labor and to identify the risk factors for preterm PROM. It will give an opportunity to analyze the magnitude of problems caused by PROM.

Materials and Methods:

This is a cross-sectional descriptive type study, done in the Department of Obstetrics and Gynecology in Dhaka Medical College Hospital, Dhaka Bangladesh, from April 2005 to September 2005 (6months). Fifty pregnant women with preterm pre labor rupture of the membrane were recruited from the inpatient of the labor ward of DMCH. Both primi and multi gravid women ,who consented to participate in this study, whose pregnancy duration 28 to 36 weeks 6 days ,with spontaneous rupture of the membrane ,not in active labor were included in this study. Women with pregnancy 37completed weeks, with established labor, with ante partum hemorrhage and with infection were excluded from the study

After admission, full history including duration of pregnancy, time and onset of rupture of membranes, past history of rupture of membranes, past obstetric history was taken. Rupture of the membrane was diagnosed by history of a gush of fluid from the vagina or continued leakage of fluid from the vagina and demonstration of membranes rupture has to be made by a sterile speculum examination visualizing flow of amniotic fluid from the cervical os and / or it's pooling in posterior vaginal fornix spontaneously or by fundal pressure and demonstrating alkaline P^H of vaginal fluid by litmus paper. During speculum examination high vaginal swab was collected for culture and sensitivity and cervical dilatation and effacement was assessed at the same time. Gestational age was determined from LMP and from early USG scan. Pregnancy of more than 28 weeks duration was included in this study to avoid the conflict of abortion.

Plan of management was decided on gestational age, cervical condition, latent period, presentation of the fetus, symptoms and signs of infection. All patients received a single course of dexamethasone consisting of two 12.5 mg I/M injection 12 hourly after admission. Few patients who showed uterine contraction short term tocolysis was given in order to allowed steroid therapy which can produce maximal effect on pulmonary maturation. Fetal surveillance was checked by daily fetal kick count and auscultation of fetal heart sound 4 hourly. All patients received prophylactic antibiotic for 7 days after admission. Inj. Ampicillin / Cephradin 500mg I/V 6 hourly for 48 hours, then this regimen was changed to oral form. This antibiotic was continued for seven days if patient remain undelivered. Maternal monitoring to detect the sign of chorioamnionitis was done by recording of pulse, blood pressure, temperature, fundal height, abdominal tenderness, color and smell of liquor and fetal conditions four hourly. Patients with features of chorioamnionitis which included maternal temperature above 100^0F, maternal tachycardia, fetal tachycardia (fetal heart rate>160 beat/minute), uterine tenderness, foul

smelled vaginal discharge and maternal leucocytosis (>16000/µL) was taken as the indication of termination of pregnancy. Patients with features of chorioamnionitis were given broad spectrum antibiotics in parental route during labor. Antibiotic was given to the baby after delivery in such cases. All the neonates were referred to neonatal ward for further management according to the hospital protocol. Without chorioamnionitis, a conservative approach was taken, advice for bed rest with bathroom facilities, to wear a sterile pad which was inspected every four hourly to detect any change of color of liquor and also to document amount of loss. If patient developed signs and symptoms of infection or conservative approach failed then pregnancy was terminated by induction, augmentation or caesarian section. The labor was induced with misoprostol or augmented with oxytocin drip if there was no contraindication or underwent caesarean section. Data were collected by standard questionnaire from the allocated patients. All data was checked and edited after collection. Then data was entered into computer and analyzed with the help of SPSS win 12software programme.

Results:

The main objective of the study was to find out the maternal and fetal outcome in preterm premature rupture of the membrane (PPROM) in respect of age, parity, antenatal care, educational background, nutrition, socio-economic condition, and occupation. The findings of the study are presented here.

Table-I shows demographic characteristics of the patients. The mean age of the women was 27.24±6.278years and ranged between 16-40years. Twenty percent belongs to less than 20years age

Table-I

Shows demographic characteristics of the patients		
Variables		
Age of the patients	27.24±6.278years	
	Less than 20years	12(24%)
	More than 31years	19(38%)
Parity	Primi	19(38%)
	Multigravid	41(62%)
Income	<4000/taka(monthly)	20(40%)
	4000-8000/Tk	25(50%)
Occupation	Unemployment	35(70%)
	Service	15(30%)
Education	below primary	16(32%)
	Up to SSC	18(36%)
	Above SSC	16(32%)
Antenatal care	Regular	5(10%)
	Irregular	20(40%)
	No	25(50%)
BMI	22.29±3.48kg/m2	
Gestational age in weeks	34.74±2.27weeks	
Menstrual period	5.40±1.21day	
Menstrual cycle	27.28±1.43days	
temperature	98.13±1.110F	
pulse	82.62±11.88/min	
SBP	128.9±9.27mmHg	
DBP	71.2±8.24mmHg	
Birth weight	2.59±.33kg	

group and 36% more than 31 years age group. Mean body mass index is 22.29kg /m^2. Sixty two percent women were multigravida where as 38% were primi gravida. Ninty percent women had monthly income ≤ 4000-8000/ taka. Thirty four (68%) respondents were educated up to SSC level and remaining 16(32%) women educated up to degree level.

Sixty two percent (31) patients were house wife and 22% (11) were service holder. Fifty percent (25) of the patients had no antenatal care and 40% had irregular and 10%had regular antenatal care. Mean gestational age of the patient was 34.74weeks with a standard deviation of ±2.266weeks. Median gestational age of the patient was 35weeks with a range from 29^{-0} to 36^{-6} weeks. This table also shown the mean temperature, pulse and blood pressure were 98.13^{0}F,82.62/min and 128/71mmHg respectively.

Table-II shows distribution of women according to their gestational age. 66% (33) respondents were near term, 24% (12) were between 32 to 34 gestational weeks and 5(10%) were less than 33 weeks.

Table-II

Shows distribution of respondents according to their gestational age	
Gestational age(week)	Frequency
29-0 to 31+6	5(10%)
32-0 to 34+6	12(24%)
35-0 to 36+6	33(66%)
Total	50(100%)

Table-III shows, 20 %(10) women had previous history of abortion, 14% (7) had previous history of PROM, 10% (5) had previous history of preterm delivery due to PROM, 8% (4) had history of MR and 4% had history of D&C.

Table-III

Shows distribution of obstetric and gynecologic history of the respondents	
Variables	Frequency
History of abortion	10(20%)
History of PROM	7(14%)
History of preterm delivery due to PROM	5(10%)
History of MR	4(8%)
History of D&C	2(4%)

Table-IV shows time of sexual activities before PPROM. 62 % women had history of sexual activities between 2 to 7days.

Table-IV

Shows relation of preterm PROM with sexual behavior	
Time of last coitus	Frequency
< 48 hours	6(12%)
2 -7 days	30(60%)
1week-1 month	10(20%)
> 1month	04(08%)
Total	50(100%)

Table-V shows distribution of associated diseases. 34% (17) had urinary tract infection, 26% (13) had anaemia, 12 %(6) had lower genital tract infection, 10 %(5) had hypertension, 4% (2) had diabetes mellitus and 2% (1) had renal disease.

Table-V

Shows distribution of associated disease	
Variables	Frequency
Urinary tract infection	17(34%)
Anaemia	13(26%)
Lower genital tract infection	6(12%)
Hypertension	5(10%)
Diabetes mellitus	2(4%)
Renal disease	1(2%)

Table-6 shows cervical condition at the time of admission. Sixty eight percent women had cervical effacement 0 to50% and 32% had 51to100%.Cervical dilatation was less than 2cm in 72% women and more than 2cm in 28% women.

Table-VI

Shows cervical condition at the time of admission (n-50)		
Cervical condition		Frequency
Cervical effacement	0-51%	34(68%)
	51-100%	16(32%)
cervical dilatation	<2cm	36(72%)
	>2cm	14(28%)

In this study 78% women had cephalic, 16% had breech and 06% had shoulder presentation.

Table VII shows distribution of latent period.46% women start labor pain within 15hours, 26% women within 16-30hours, 10% women within 31-45 hours,

8% women after 45-60hours and 10% women had no labor pain. Mean time interval of rupture membrane and onset of labor pain was 18.87 hours with a standard deviation of ±16.19hours.

Table-VII

Frequency distribution of respondents with gestational age and time interval of membrane rupture to the onset of labor pain (n=50)

Time interval of membrane ruprure and onset of labor pain	gestational age in weeks			Total
	29-31	32-34	35-36+	
1-15 hours	0	5	18	23
15-30 hours	0	2	11	13
31-45 hours	0	1	4	5
46-60 hours	1	3	0	4
No labor pain	4	1	0	5
Total	5(10%)	12(24%)	33(66%)	50(100%)
Latent period(mean)	18.87±16.19hours			

Table VIII shows time interval between rupture of the membrane and delivery of baby. Twenty four percent

Table-VIII

Frequency distribution of respondents with gestational age and time interval of membrane rupture to the onset of labor pain(n=50)

Time interval of membrane ruprure and delivery	Parity		Total
	Primi	Multi	
<12hour			
	3	9	23(46%)
12-24 hours	6	9	13(26%)
24-48hours			
	3	8	11(22%)
>48hours	4	3	7(14%)
Undelivered	3	2	5(10%)
	19(38%)	31(26%)	50(100%)
Time interval of membrane ruprure & delivery(mean)	27.60±21.127hours		

patients with PPROM delivered within 12 hours followed by 15(30%) patients between 12-24hours, 22% (11) patients between 24-48hours, 14% women after 48 hours and 10% women remained undelivered. Mean time interval of onset of rupture membrane and delivery was 27.60 hours with a standard deviation of ±21.127hours.

Table IX shows fetal outcome. Average weight of the baby was 2.59kg. Forty two percent neonates suffers from neonatal asphyxia (2.2%), respiratory distress syndrome (11.1%), neonatal jaundice (22.2%) and neonatal sepsis (6.7%).

Table-IX

Fetal outcome

Variables	Percent
Neonatal asphyxia	2.2
Respiratory distress syndrome	11.1
Neonatal jaundice	22.2
Neonatal sepsis	6.7

Table X shows maternal outcome. Thirty two percent women suffered from chorioamnionitis (14%), abruptio placenta (2%), puerperal sepsis(10%) ,endometritis(4%) and wound infection(2%).

Table-X

Maternal outcome

Variables	Percent
Chorioamnionitis	14
Endometritis	4
Puerperal sepsis	10
Abruptio placenta	2
Wound infection	2

Figure-1 shows relationship between gestational age and latent period. Onset of labor pain and delivery was earlier in multiparus women than primigravida.

Figure 2 shows association of educational status of respondents and occurrence of UTI. UTI is common among the respondents of lower educational back ground. X^2 value= 12.517; df=4; P value= 0.14.
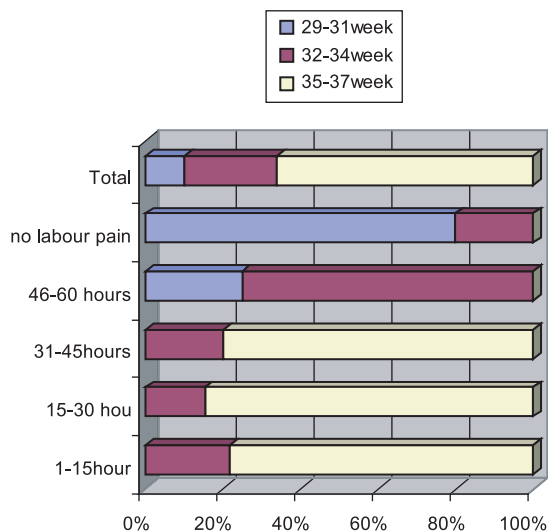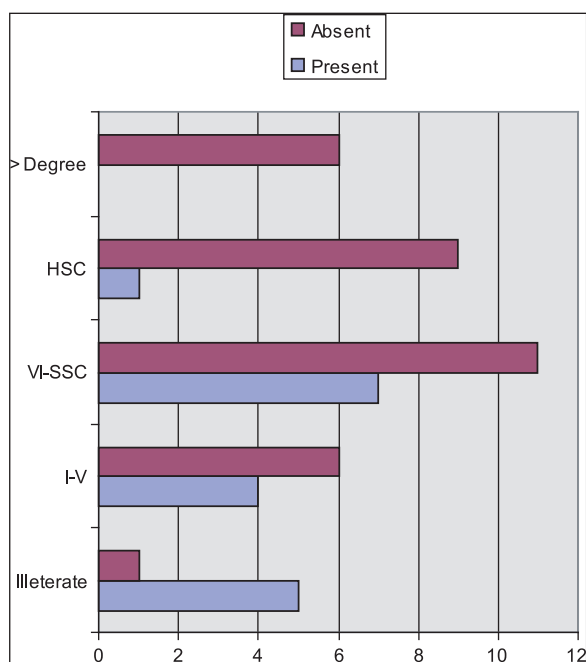
Fig.-1: *Relation of gestational age with latent period*

Fig.-2: *Association of educational status of respondent and occurrence of UTI(n-50).*

Discussion:

Incidence of PPROM varies from country to country and in the same country, from hospital to hospital. It is due to socioeconomic condition of the patient and also of the country. In DMCH, majority of the women came from lower middle and poor class of the society. PPROM was more common among multiparous [7]

women than primi, this findings is opposite to shaheen et al [5] .Mean age of the patient was 27.24±6.278 years, which is similar to other studies [4,7,8] . Previous history of abortion, PROM, preterm delivery due to PROM, menstruation regulation and dilatation and curettage are common among PROM women and in this study 56 %(28) had such type of history [9,10]. In this study, seventy percent patients were housewife and student. It indicates unemployment and its consequence are responsible for PROM. Poverty and illiteracy is interrelated and it affects nutrition, living standard, personal hygiene, immunity and awareness of the patient.

Infection is the most common cause of PPROM and in this study, 34% had UTI, and 12% had lower genital tract infection, [1,2,11] .Anaemia, hypertention and diabetes are associated risk factors of PPROM by affecting nutrition and immunity of the patient produce PROM.[1,11] Subclinical infection, High blood sugar level, over distention of abdomen decrease tensile strength of fetal membrane and vaginal microflora produce mucinase and sialidase enzymes, which facilitate rupture of membrane.[12]

Coitus increases the incidence of PPROM by causing local trauma and also facilitates microbial entrance into the upper genital tract. This study shows that 72% patients had sexual activity within one week.[7,10] but lower rate was observed in other study[9,5]. Sixty six percent respondents developed PPROM between 35-36 gestational weeks and these findings similar to S. Tasmin[4] and Shaheen ET al[5]. Regarding latent period, 46% women developed labor pain between 1-15 hours of rupture membrane and another 26% developed labor pain between 15-30 hours and mean duration of the latent period was 18.87 hours with a std. deviation of± 16.186hours and it has similarity with other studies[1,9,10]. The duration of latency period varies inversely with gestational age.[1]

Regarding mode of delivery, Eighty four percent patient delivered by vaginal route, 15.6% delivered by caesarean section. Indication of caesarean delivery included the diagnosis of chorioamnionitis, fetal distress and malpresentation.

Mean time interval of rupture membrane and delivery was 27.60 hours with a std. deviation of ± 21.127 hours. Fifty four percent women delivered within 24

hours [9, 10] and among them 36% are multi and 18% are primi. Progress of labor are speeded among women with higher gestational age and gravidity .[1]

Regarding neonatal outcome, we assess neonatal weight which was 2.59kg. Forty two percent neonates suffered from neonatal asphyxia (2.2%), respiratory distress syndrome (11.1%), neonatal jaundice (22.2%) and neonatal sepsis (6.7%) and admitted to special baby care unit. This result is accord with some other studies.[4] [5] In DMCH, intensive neonatal care facilities are limited .We didn't check fetal lung maturity. Gestational age and birth weight at the time of delivery both affect neonatal survival. More the Gestational age and birth weight, more the rate of surival.[2]

Thirty two percent women suffered from chorioamnionitis (14%), abruptio placenta(2%) ,puerperal sepsis(10%) ,endometritis(4%) and wound infection(2%). [9,10] Studies shows that bacterial vaginosis group of organism(Gardnerella vaginalis and bacteroid species) and a group of enteropharyngeal organisms were associated with PPROM.[12.] These organisms are normal commensel of vagina. We used ampicillin / cephradin in all cases (hospital supply), while other use erythromycin[4, 13] and cephradin& metronidazole[5] .The occurrence of chorioamnionitis (14%) was more [9, 10.] But no chorioamnionitis[5] among cephradin and metronidazole user. Standard of hospital and management strategy also have some influences on development of chorioamnionitis.   We were unable to do C-reactive protein and ultrasonography to predict infection earlier.

Conclusion:
From the above study, we found that majority of the patients were poor, their access to antenatal care was poor. It might be due to lack of awareness and/ or knowledge. It was presumptive that PPROM was malnutrition and poverty related disease .Antenatal care is an important tool to prevent PPROM by identifying risk factors and its management .Preterm prelabor rupture of membranes has significant impact on perinatal out come. But our main target was healthy mother and healthy baby. In managing PPROM, timely use of proper antibiotics, steroid and

induction or augmentation of labor speeded labor, reduce hospital stay and ultimately reduce perinatal and maternal complications.

Reference:
1. Griff Jones; Pre labour rupture of the membrane; Obstetrics &Gynaecology-An evidenced based text for MRCOG; Arnold, Member of the hodder headline group.www.arnold publishers.com; 1st edition; Oxford University press; 2004; p297.

2. Andrea CScharfe, Jude P Crino: Pre term labor and Pre labor rupture of the membranes; The Johns Hopkins Manual of Gynecology Obstetrics; 2nd edition, 2000; Lippincot Williams & Wilkins, USA, p123.

3. Willium's Obstetric Gynaecologic: Pre term labor, Pre labor rupture of the membranes, 19th edition, 1993; Appleton & Lange, California,USA; p361.

4. Tasnim S, A B Bhuiyan: Outcome of premature rupture of membranes; Bangladesh Journal of Obstetrics& Gynaecology , 1998;13(1),16-20.

5. Shaheen Rhaman Chowdhury et al; Incidence and outcome of preterm pre mature rupture of membranes and pre term labor at Holy Family Red Crescent Medical College Hospital, Bangladesh Journal of Obstetrics& Gynaecology , 2005;20(1),19-24.

6. Bhide AG: Premature rupture of membranes. In: Krishna U, Tank DK, Daftary S. editors; Pregnancy at risk, Current concepts; 3rd edition; Jaypee Brothers publishers, India; 1997, 360.

7. Begum A, Choudhury: A clinical evaluation of 60 cases; J Inst Postgra Med res 1991; 6:11-15.

8. Moretti M, Sibai BM: Maternal and perinatal outcome of expectant management of premature rupture of membranes in the mid trimester; Am J Obstet Gynecol 1988; 159:390-96.

9. J Sultana,T A Chowdhury, M H Khan,K Begum: Amniotic fluid index values after preterm premature   rupture of the membranes and subsequent prenatal infections ; Bangladesh Journal of Obstetrics& Gynaecology , 2005;20(2),51-55.

10. Ahmed Nazneen. Maternal and fetal outcome in premature rupture of membrane [dissertation] Dhaka Bangladesh College of Physician and   Surgeon (BCPS); 2002.

11. Ashley S. Roman,MD,MPH&Martin L .Pernoll,MD. Late pregnancy complication, Current obstetric Gynaecologic Diagnosis and treatment. 8th edition. Appleton & Lange. 1994; 286-87.

12. Mcdonald HM, O'Loughlin JA, Jolley P, Vigneswaren R, McDonald PJ; Vaginal infection and preterm labor; Br. J Obstet Gynecol;1991May, 98(5):427-35.

13. kenyon S,Boulvain M, Neilson J :Antibiotics for preterm pre mature rupture of membranes; ORACLE Clinical Co-ordinating Centre,Leicester Royal Infirmary, Department of Obstetrics,Clinical Science Building,oracle@le.ac.uk

Burden of Heart Failure Patients in a Tertiary Level Cardiac Hospital

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Summary:

Objective: Heart failure (HF) has become an increasingly frequent cause of hospital admission and carries a poor prognosis. There is a paucity of data in Indo-Asians particularly in Bangladesh on characteristics of heart failure patients. The purpose of this study was to determine the etiological factors and co-morbidity of hospitalized heart failure patients.

Method: A hospital based cross sectional study was done at a tertiary cardiac hospital in Dhaka city. Hospital medical records of 14009 patients admitted between January 2005 and August 2006 were reviewed and 1970 patients with the diagnosis of HF were identified. Relevant etiological information and socio demographic data were abstracted from the hospital record files.

Result: About one-seventh of total hospital admitted patient had HF. Mean age (SD) was 54.1 (15.3) years.

Majority (35.79%) had ischaemic heart disease (IHD) as the principal etiological factor but this frequently co-existed with a history of hypertension (46.8%). Hypertension was considered the primary risk factor of HF in 29.14% of cases. Hypertension alone and in co-existence with other etiology was found in 48.07% (947) cases. Diabetes Mellitus (DM) co-existed with IHD in 41.4% (292) and it (32.64%) was found more prevalent in Dilated Cardiomyopathy (DCM) patient with HF.

Conclusions: The mean age of hospitalized HF patients is remarkably lower than other related studies done abroad. The single most common etiology for HF is ischemic heart disease in this population. Hypertension is the most common risk factor. Measures to prevent ischaemic heart disease and control of risk factors are essential to prevent premature onset of HF.

(J Bangladesh Coll Phys Surg 2010; 28: 24-29)

Introduction:

Bangladesh is passing through an epidemiological transition. Burden of infectious diseases are coming down while with increased life expectancy and wide spread change of lifestyle, non-communicable diseases are on the rise [1]. Cardiovascular diseases are one of

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Received: 22 April, 2009   **Accepted:** 11 September, 2009

the main causes of morbidity and mortality in this country now. Heart failure (HF) is a significant and growing health problem as the population ages. Despite improvements in therapy, mortality and morbidity remain high [2] . In the United Kingdom, most patients admitted to hospital with HF are more than 65 years old and remain inpatients for a week or more . Prevalence of heart failure rises from around 1% in the age group 50-59 years to between 5 and 10% of those aged 80-89 years [3]. Heart failure is frequently due to coronary artery disease, tends to affect elderly people and often leads to prolonged disability. Although the outlook depends to some extent on the underlying cause of the problem, heart failure carries a very poor prognosis, approximately 50% of patients with severe HF due to severe left ventricular dysfunction will die within 2years [3]. Hospitalized heart failure is regarded as prognostically more adverse with a high mortality and readmission rate .However, there is a paucity of data on outcomes of heart failure in particular in Indo-Asians [4].

There is an ever increasing number of hospital admissions due to heart failure in different hospitals

in Bangladesh, however there is a paucity of data on characteristics of the patients in terms of demographic and etiological information. It is important to identify the etiological factors associated with HF in this population to determine strategy for prevention and early detection. In this study we sought to determine the disease burden of heart failure patients and the age and sex specific prevalence of heart failure among patients admitted into NHFH&RI and to identify the etiological pattern of diseases leading to heart failure with associated co-morbid factors.

Materials & Method:

Settings: This was a single center cross sectional study carried out at National Heart Foundation Hospital & Research Institute (NHFH&RI), a tertiary teaching hospital in Dhaka, Bangladesh. This centre receives a mixture of affluent and low-middle income patients and serves the entire country as a referral center for patients requiring high-intensity tertiary care.

The hospital medical records from January 2005 to August 2006 were searched & all patients suffering from heart failure were included in this study. Variables recorded includes age, sex, history of Diabetes Mellitus (DM) (defined as a fasting glucose $\geq$ 126 mg/dl or on treatment), Hyperlipidemia (fasting cholesterol $\geq$ 200mg/dl or on treatment), hypertension (blood pressure $\geq$140/90mmHg or on treatment). Associated co-morbidity were classified into some major group of heart diseases: old myocardial infarction (OMI), acute coronary syndrome (ACS), dilated cardiomyopathy (including ischaemic and other causes), valvular heart diseases, hypertensive heart disease, congenital heart diseases. Among the ACS were acute myocardial infarction (AMI), recent myocardial infarction (RMI), and unstable angina (UA).

Coronary artery disease was considered the primary aetiology if the patient had a documented history of myocardial infarction (acute or in the past); unstable angina pectoris; a history of stable angina ; or coronary artery disease confirmed at coronary angiography. Such cases were subdivided into those with acute cardiac ischaemic syndromes (acute myocardial infarction or unstable angina pectoris), and those without. Hypertension was considered the

aetiology if there was a history of hypertension from the general practice records or sustained hypertension (blood pressure greater than 140/90 mmHg) during hospital admission and there was no documented history of myocardial infarction or angina, and no evidence of other cardiac pathology. The presence and severity of underlying valvular heart disease was assessed from the history, clinical examination and echocardiographic findings. The presence of cardiac arrhythmias was noted and the temporal relationship of these to the development of heart failure ascertained. Data were checked for completeness and consistencies. The descriptive statistics were analysed with SPSS for windows version 12.5.

Results:

Among 14,009 total admitted patients throughout this period 1970 patients were found to have a diagnosis of heart failure ie 14.1% of totally admitted patients had heart failure. The mean age of these patients were 54.1 $\pm$ 15.3 years ranging from 1 to 95 years with a high preponderance of males. The majority of the patient population was in the age group of 51- 60 years (30.7%) (Table I). 71.7% of the cases were male & 28.3% female by gender specification. Chronic heart failure patients were more prevalent among the patient population (71.3% chronic Vs 28.7% acute). Coronary artery disease was found to be the common cause of heart failure in adult population (n=705, 35.79%).

Majority of the ACS patients were diagnosed as AMI (n=400, 20.3%). Among total study population, 49.4% (n=974) patients were hypertensive and 18.8% (n=371) patients were diabetic. 29.14% (n=574) patients had hypertensive heart disease leading to heart failure. The patients with heart failure having coronary artery disease (n=705) had hypertension (n=330, 46.8%) as the most prevalent major risk factor; diabetes was found to be second common co-morbid factor. Patients with dilated cardiomyopathy (n=242) had DM (n=79; 32.64%) as most prevalent comorbid factor. Among the congenital heart diseases, ventricular septal defect (VSD) and patent ductus arteriosus (PDA) were most common cause of heart failure needing hospitalization (Table 2).

Mortality rate of the study population were 9.7% and was higher among males (10.6% vs. 7.7%) than females.

Table-I

Age and Sex distribution of heart failure patients admitted in NHFH&RI from January 2005 to August 2006 (n=1970)

Age group (years)	Number	%
≤30	169	8.6
31- 40	204	10.4
41- 50	389	19.5
51- 60	604	30.7
61- 70	388	19.7
71- 80	165	8.4
≥81	51	2.6
Sex	Number	%
Male	1413	71.7
Female	557	28.3

Table-II

Distribution of study population by their etiological disease pattern & associated co-morbid factors (n=1970)

| Morbidity type	No. of cases	(%)	Co-morbid Factors	
			HTN	DM
CAD	705	35.75	330(46.8%)	292(41.4%)
Old MI	305		150	125
AMI	305		78	75
RMI	82		27	36
UA	114		75	56
Hypertensive heart disease	547	29.14		
Dilated cardiomyopathy	242	12.28	70 (28.93%)	79 (32.64%)
Valvular heart disease	437	22.18		
Others	12	0.6		

Table-III

Comparison of etiological factors in different studies in different territories

Etiology	Teerlink et al, 31 studies, 1989 – 90 15	Framingham Heart Study 15 USA		Hillingdon Study 5,15 West London	NHFH&RI, Kabiruzzaman et al, Bangladesh
		Men	Women		
IHD	50	59	48	36	35
Hypertension	4	70	78	14	29
Idiopathic	18	-	-	-	-
Valvular	4	22	31	7	22
DCM	-	-	-	12	
Unknown	13	-	-	34	-
Other	10	7	7	10	0.6	
AF	-	-	-	5	-

DCM = Dilated cardiomyopathy. IHD = Ischemic heart disease.
AF = Atrial Fibrillation. (--) = Not mentioned as etiology.

Table-IV

Age of heart failure patients in different territories of the World

> Hillingdon study, West London 5,	Median age = 76 years
> ESC countries 10,	Mean age = 75 years
> Framingham Heart study, USA8,	Mean age = 70 years
> Seow et al, Singapore 6,	Mean age = 68 years
> Jafary et al, Pakistan 4,	Mean age = 61 years
> Kabiruzzaman et al, NHFH&RI, Bangladesh,	Mean age = 54 years
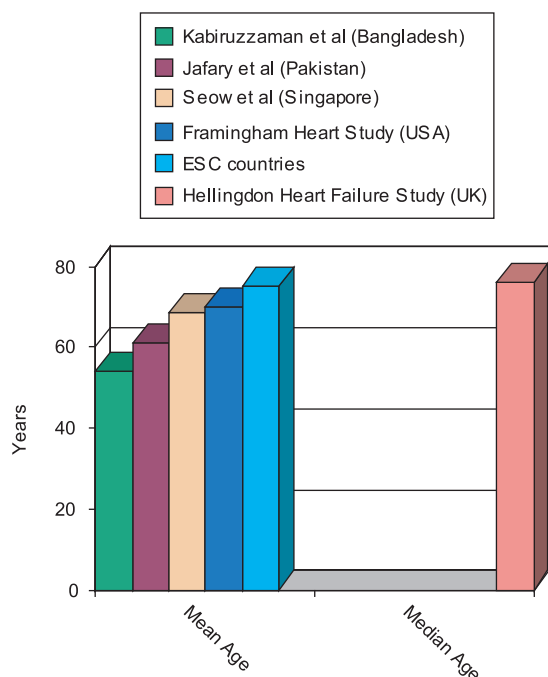
Fig.-1: *Mean and median age of heart failure patients in different studies*

Discussion:

Clinical survey of heart failure in the general population is uncommon. Much of our current knowledge of heart failure is based on highly selected hospital series, or patients selected for clinical trials. Such patients do not reflect the spectrum of heart failure as it presents in the population.

Our study shows that mean age of hospitalized heart failure patients was 54.1 ± 15.3 years with higher prevalence in male than female and coronary heart disease being most common cause of heart failure. The mean age of our heart failure population is remarkably lower than that observed in different studies done abroad [3-10]. The possible reasons for premature onset of heart failure may be lack of awareness of morbid risk factors and appropriate treatment. It has been reported that Asians may be less compliant with medication, perhaps because of distrust of western medicine and different cultural views [11].

Hypertensive heart disease leading to heart failure was found in 29.14%. This was second common cause of HF in our study. In addition to producing a pure form of hypertensive cardiomyopathy, hypertension is a major risk factor for heart failure from any cause [2].

In the United Kingdom, most patients admitted to hospital with heart failure are more than 65 years old. The prevalence of heart failure rises from around 1% in the age group 50-59 years to between 5 and 10% of those aged 80-89 years. Heart failure is frequently due to coronary artery disease [3].

The Hillingdon heart failure study evaluated the incidence and aetiology of heart failure in one district of west London, England using clinical and echocardiographic data and a case definition based on three cardiologists applying the ESC definition of heart failure. The median age at the time of diagnosis of heart failure was 76 years. The incidence of heart failure was significantly higher in men than women at all ages with an age-standardised ratio of 1.75. The primary aetiologies were coronary heart disease (36%), unknown (34%), hypertension (14%), valve disease (7%), atrial fibrillation alone (5%), and other (5%) [5].

Seow et al studied 225 patients in Singapore with LVEF ≤ 40%, their mean age±SD was 68.5±12.3 years and more than 51.1% of the subjects were aged 70 years and more. The most common cause of HF

was coronary heart disease (85.5%). Co morbid medical conditions were prevalent in this cohort, with 83.5% having at least one co-morbid condition. Hypertension was the most prevalent co-morbid condition; affecting 60% of the patients; followed by diabetes mellitus (56.9%) [6.]

In Pakistan, Jafary et al studied 196 patients with mean age ± SD 61.2 ± 12.8 years with a high preponderance of males. All of them were suffering from systolic heart failure with LVEF ≤ 40%, requiring hospital admission with more than 60% suffering from hypertension (67.3%) and diabetes mellitus (60.7%) and more than three-fourths having a history of coronary artery disease in the past [4.]

In the United States, it is primarily a disease of ageing, with over 75% of existing and new cases occurring in individuals over 65 years of age[7.] In the USA, the Framingham heart study has reported the mean age at the time of diagnosis of heart failure was 70 years. The incidence of heart failure to be 0.3% per annum in men and 0.2% per annum in women aged 50-59 years; rising by a factor of 10 to 2.7% per annum in men and 2.2% per annum in women aged 80-90 years. The incidence of heart failure was significantly higher in men than women at all ages with an age-standardized incidence ratio of 1.67 [8]

Mcmurray et al studied trends in hospitalization for heart failure in Scotland 1980-1990. They found seventy-eight percent of discharges were in persons aged ≥ 65years and 48% of discharges were male [9.]

Remes et al studied incidence of heart failure in 45-74 year old inhabitant in four rural communities in Eastern Finland. The incidence rates of heart failure increased with age in both sexes. Coronary heart disease or hypertension was evident in 80% cases [12.]

This is a single centre retrospective cohort study and our results may not be extrapolated to the entire Bangladeshi population. However, our hospital provides services to a wide mix of patients, ranging from affluent to poor, somewhat reflective of the population at large throughout Bangladesh. Because of the retrospective nature of the study several important variable are missing in our study including reliable documentation of sign and symptoms as well as anthropometric values. We could not determine co-

morbid illness like COPD, renal functional impairment, obesity.

Heart failure is a significant and growing health problem as the population ages. About one-seventh of total hospital admitted patients had heart failure. The mean age (54.1±15.3) of our heart failure patients was significantly lower than the other studies done abroad (Table-4). Coronary heart disease (with or without hypertension) should be the dominant aetiology of heart failure in the Bangladesh. In this study the single most common aetiology was ischaemic heart disease (35.79%) and past history of hypertension was common (48.07%). This is very similar to the findings in the heart failure study done in Hillingdon (West London) [5], Finland [12] and Sweden [13] and is not dissimilar to that reported from Framingham study [14] (Table-3). The number of patients with heart failure is bound to rise at the premature age if appropriate measurement is not taken to manage risk factors and to increase public awareness. Clinical and Epidemiological study is needed to explore further details.

References:

1. Ministry of Health and Family Welfare, Government of People's Republic of Bangladesh. Strategic plan for Surveillance and Prevention of Noncomunicable Disease in Bangladesh 2007-2010. 2007, Dhaka

2. Dar O, Cowie MR. 2008. The Epidemiology and Diagnosis of Heart Failure. In: Fuster V, Walsh RA, O'Rourke RA, Poole-Wilson P (eds). Hurst's The Heart. 12th ed. McGraw-Hill, New York, pp. 713-721.

3. Bloomfield P, Bradbury A, Grubb NR, Newby DE. 2006. Cardiovascular disease. In: Boon NA, Colledge NR, Walker BR, Hunter JAA (eds). Davidson's Principles and Practice of Medicine, 20th ed. Churchill Livingstone, Edinburgh, pp. 519-644.

4. Jafary FH, Kumar M, Chandna IE. Prognosis of hospitalized new- onset systolic heart failure in Indo-Asians- A lethal problem. J Cardiac Fail 2007; 13:855-860.

5. Cowie MR, Wood DA, Coats AJ, et al. Incidence and aetiology of heart failure: a Population-based study. Eur Heart J 1999; 20:421-8.

6. Seow SC, Lee YP, Chan YH, et al. Heart Failure Mortality in South Asian Patients With Left Ventricular Systolic Dysfunction. J Cardiac Fail 2007; 13:476-481.

7. Bashore TM, Granger CB, Hranitzky P. 2007. Heart. In: McPhee SJ, Papadakis MA, Tierney LM (eds). Current Medical Diagnosis and Treatment, 46th ed. McGraw Hill, New York, pp. 316-428.

8. Ho KK, Pinsky JL, Kannel WB, et al. The epidemiology of heart failure: the Framingham study. J Am Coll Cardiol 1993; 22(4 suppl A):6A-13A.

9. McMurray J, McDonagh T, Morrison CE, Dargie HJ. Trends in hospitalization for heart failure in Scotland 1980-1990. Eur Heart J 1993; 14:1158-62.

10. The Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2008 of the European Society of Cardiology. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2008. European Journal of Heart Failure dol:10.1016/j.ejheat.2008.08.005

11. Sung CL. Asian patients' distrust of western medical care: one perspective. M Sinai J Med 1999; 66:259-61.

12. Remes J, Reunanen A, Aromaa A, Pyorala K. Incidence of heart failure in Eastern Finland: a population-based surveillance study. Eur Heart J 1992; 13: 588-93.

13. Eriksson H, Svarsudd K, Larsson B et al. Risk factors for heart failure in the general population: the study of men born in 1913. Eur Heart J 1989; 10: 647-56.

14. Kannel WB, Pinsky J, Trends in cardiac failure- incidence and causes over three decades in the Framingham study (Abstr). J Am Coll Cardiol 1991; 17: 87A.

15. Lip GYH, Gibbs CR, Beevers DG. ABC of heart failure, Aetiology. BMJ Volume 320 8 January 2000. www.bmj.com