Recently Directorate General of Health Services provided a circular to maintain death audit in every department of health sector (Public health-2/ESD-01/information/2008/454). Death audit is important because it gives an understanding to what happens and why. This helps to go beyond rates and ratios to determine the inciting factors and to take measures how deaths could have been avoided[7].

This study was designed to find out relation between some factors like age, sex, causes, diurnal variation, duration of hospital stay with death pattern in adult medicine units, in a tertiary health facility and major error in death certification as described by WHO like mechanism of death listed without an underlying cause, improper sequencing of events and competing cause of death, minor errors like abbreviation, absence of time intervals and mechanism of death followed by underlying legitimate cause of death[8].

Methodology:
This was a cross-sectional study carried out in medicine department of Mitford hospital, Dhaka from March 2010 to August 2010. During this period a total of 100 consecutive deaths except those who were brought dead included in this study. Death certificate play a important role to make successful death audit. Our existing death certificate which is supplied by the government of Bangladesh was not adequate enough to fulfill the format of cause of death section based on the recommendation of the World Health Organization. More over our doctor are not trained enough for appropriate fulfillment of death certificate. Major errors are mechanism of death

listed without an underlying cause, Improper sequencing, Competing cause and minor errors are using abbreviations, absence of time intervals, mechanism of death followed by underlying legitimate cause of death. Definition of major & minor errors in death certificate are shown in Table(I)). Ethical clearance was obtained from the concerned authority to conduct the research work. We used purposive non probability sampling for collection of cases. Our inclusion criteria was all death during study period & exclusion criteria was Brought dead. We developed a network with nurses, internee and midlevel doctors so that one of us could reach the hospital within half an hour of a death. After taking permission from hospital authority necessary data were collected from hospital case records, admission register, case files A checklist was designed to record profile of patients, time of admission, diagnosis at the time of admission, time of death and cause of death. Data were analyzed by SPSS where necessary.

Results:
During the study period a total 13,123 (Male-5249, 40%; Female-7874,60%) patients were admitted in the medicine department of Sir Salimullah Medical College (SSMC) and Mitford Hospital. Among them consecutive 100 deaths in medicine ward were analyzed under death audit. Among 100 deaths 48% were male(n=48) and 52% were female(n=52). The age range was 15-85 years. The highest incidence of death occurred in 56-65 years group. This group represents 24% of total death. Within this group 66.7%(N=16) were male and 33.3%(N=8) were female. As shown in table (II).

Table-I

Definition of major & minor errors in death certificate	
MAJOR ERROR	
Type of error	Definition
Mechanism of death listed without an underlying cause	Mechanism or nonspecific condition as the underlying cause of death
Improper sequencing	Sequence of event does not make same underlying cause of death not listed on the lowest completed line of part-I
Competing cause	Two or more casually unrelated etiologically specific disease listed in part-I
MINOR ERRORS	
Abbreviations	Abbreviation used in identifying the disease
Absence of time intervals	No time interval listed in part –I or part –II
Mechanism of death followed by underlying legitimate cause of death	*Use of mechanism but qualified by an etiologically specific cause of death*

Table-II

Age-sex distribution of the study population=100)			
Age(years)	Male	Female	Total
15-25	6	8	14
26-35	3	5	8
36-45	4	8	12
46-55	8	9	17
56-65	16	8	24
66-75	6	10	16
76-85	4	3	7
>85	1	1	2
Total	48	52	100

Table-III

Distribution of cases by cause of death and sex".				
Cause of death	Male	Female	Total	Percentage
Cerebrovascular disease	15	14	29	29
Chronic liver disease	7	6	13	13
Infectious disease	6	14	20	20
Chronic kidney disease	2	2	4	4
Ischemic Heart disease	4	0	4	4
Poisoning	3	3	6	6
Malignancy	3	4	7	7
Cor Pulmonale	3	2	5	5
Diabetic Keto acidosis	3	1	4	4
Hypoglycaemia	0	1	1	1
Undiagnosed	2	3	5	5
Others	0	2	2	2

First day (within 24 hour of admission) death accounted for 46%(n=46) of all death, by the second day 23%(n=23) of all death occurred. Before the 5th day 88%(n=88) of all death occurred. Only 7% of all death occurred after 10th day. Fig (I) shows the grouped duration of study and end point (Died).

During working hour (Regular hospital work hours) that means 8 AM to 3 PM only (n=23) 23% of death occurred, rest of the deaths (77% ,n=77) occurred after(regular hospital work hours) working hour period. Among the 77% of death that occurred after official hour. 62.3% of death occurred during 9 PM to 8 AM.as shown in Fig(II).

In the present study , during data collection we observed almost 100% of our existing death certificate had major

Legend:
- Less than 5 days = 88%
- 5-10 days = 5%
- Greater than 10 days = 7%
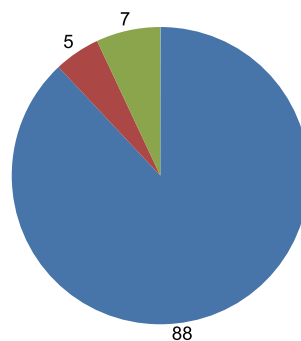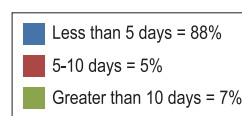
Fig.-1: *Distribution of death according to duration of Hospital stay.*
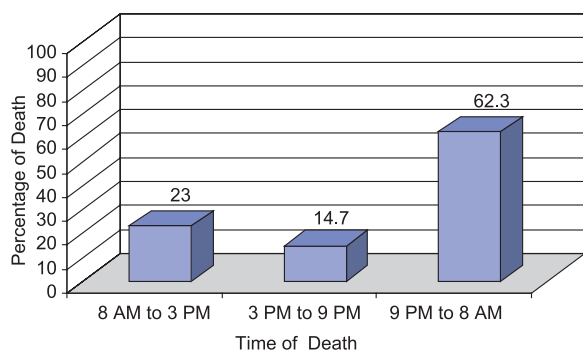
139

Fig.-2: *Diurnal variation of death*

error in a form of mechanism of death listed without an underlying cause, improper sequencing and had 100% minor error in the form of abbreviation , absence of time interval .

According to the audit, the highest underlying cause of death was non communicable disease that comprises substantial amount of death and rest of the causes are due to communicable diseases and few are undiagnosed causes as shown in fig(III). It also shows that there is no significant variation between male and female in non communicable disease. Among the non communicable disease, Cerebrovascular disease that were 29%(n=29) of total deaths. Among the cerebrovascular deaths, as
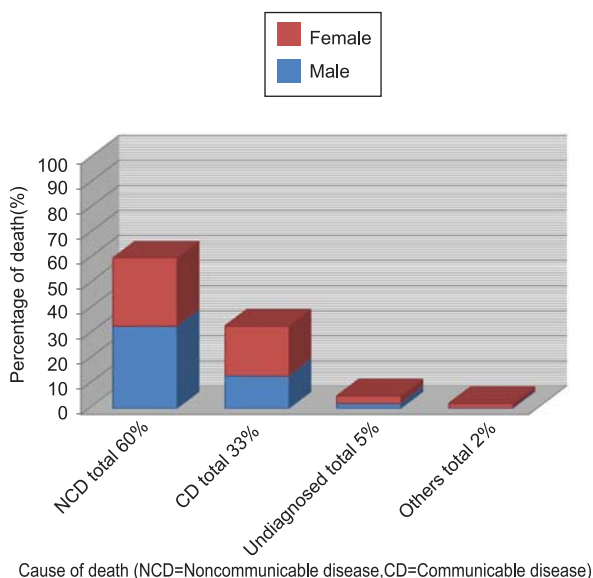

Cause of death (NCD=Noncommunicable disease,CD=Communicable disease)

Fig.-3: *Distribution of death by Non communicable (NCD) and Communicable Disease(CD) between male and female*

co-morbidity Hypertension was responsible for 79.3% cases and Diabetes Mellitus was responsible for 20.7% cases. As an underlying cause of death infectious disease contributes 20%, chronic liver disease 13%, malignancy 7%, poisoning 6%, cor pulmonale were 5%. Table(III) shows the underlying cause of death among the study population.

Discussion :

In our death audit 88% of all death occurred within 5th day of admission which is consistent with another study conducted in tertiary hospital KADUNA Nigeria[9]. Where 65% of death occurred within 5th day of admission .It is our limitation that we don't know whether the disease pattern and severity is similar or not in two hospital. The similarity of result between two study is due to almost similar socioeconomic background in perspective of health care facilities in two countries. First day death contributes a significant portion of a hospital mortality rate even though the hospital can do little to prevent them. Lack of ICU facilities and intensive care contributes the most . In absence of ICU facilities, close monitoring of seriously ill patient by better utilization of hospital resources both human and logistics can substitute the ICU facilities as it is present in snake bite clinic in Chittagong Medical College Hospital, Chittagong and in malaria ward in Bikaner, INDIA[10] .

In this study 62.3% of death occurred during 9 pm to 8 am which is consistent with another study conducted in Germany from 1987 to 1991[11].In our country availability of health care provider and facilities are minimum during this period. To reduce mortality we can ensure optimum number of health care provider and arrange optimum health care facilities during this period.

In our study 100% of death certificate had major error. In a study conducted in Canada major error were found in 32.9% cases[8]. High incidence of error in death certification was probably due to error from death certificate which was supplied by the government of Bangladesh. Our existing death certificate has only one part where as standard death certificate by WHO consist of two parts. First part contains immediate cause , and underlying cause sequentially which is absent in our death certificate. There is no part two in our death certificate which indicates the contributory factors of death. There is no space for approximate time interval

between onset and death in our existing death certificate. There is also lack of knowledge about the process of death certification among the young doctors. There should be more structured and organized teaching to reduce the error in death certification .

In this study the underlying cause of most death resulted from cerebrovascular disease (29%). High number of death due to stroke with risk factor like hypertension, diabetes mellitus provides the hint of non-communicable disease as emerging health problem. In one study conducted in Bangladesh at 2010 found that 66% of death was due to non communicable disease in adult population[12]. In the health bulletin of DGHS 2010 the common cause death has been found due to poisoning in Upazilla hospital[13].

Although the audit has become an integral part of medical care in industrialized countries, the experience in developing countries yet very rudimentary. However Government of Bangladesh has taken initiatives to establish perinatal death audit in different hospital since 2004. A decrease in overall mortality rates was recorded after introduction of perinatal mortality audit in LAMB Hospital of Bangladesh (a NGO)[5]. This glorious example should be an eye opening for the professionals , hospital managers and the planners for introducing death audit in a 'non blaming' atmosphere.

Conclusion:

Death certificate is an important tool of death audit, whereas most of our death certificate had both major and minor errors. Measures should be taken to improve our death certificate. In our hospital maximum death occurred during 9 pm to 8 am. To reduce hospital mortality we should ensure facilities of health care during this vulnerable time. Regarding the cause of death, most of the death occurred due to non communicable disease which is about 60% of all death and rest of the causes are due to communicable disease(infectious disease and Chronic liver disease) and few are undiagnosed causes. Although there is no significant variation between male and female in non communicable disease female are more prominent feature of communicable disease which about 20% compared to 13% of male. Among the non communicable causes the most important causes are cerebrovascular disease and among the communicable disease Infectious disease are the leading cause of death then Chronic liver disease is

the second most important cause of death. So measure should be taken to better prevention of non communicable disease and concomitantly communicable disease should be prevented and treated as early as possible.

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