

## ECONOMIC BURDEN OF TYPE 2 DIABETES MELLITUS AMONG THE PATIENTS ATTENDING COMBINED MILITARY HOSPITAL, DHAKA

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### Abstract

**Introduction:** Diabetes Mellitus (DM) is a major concern for the developed as well as developing countries. It poses with enormous disabilities and economic burden to the victims. The treatment cost of diabetes is increasing day by day.

**Aim:** To ascertain how type 2 diabetes mellitus is incurring economic burden to the patients.

**Materials and Methods:** This descriptive cross sectional study was conducted during the period from January to June 2010 on 110 type 2 diabetes mellitus patients attending Combined Military Hospital, Dhaka. The patients were selected conveniently and data were collected by face to face interview with the help of a semi-structured questionnaire. For estimation of economic burden, both direct and indirect treatment costs were calculated.

**Results:** The study revealed that majority (36.4%) of the patients were in the age group of 46-55 years with the mean age of 53.65 (+10.44) years. Majority (60.0%) of them had lower monthly family income (Tk.5, 000-Tk.10, 000) and 36.4% of them lived in urban area. Most of the patients

(90.9%) were under treatment with drug, diet control and physical exercise. Regarding sources of fund for treatment, 31.8% patients used their savings while 27.3% took loan, 20% got help from relatives and the remaining 20.9% got donation and sold wealth. Average treatment cost incurred by the patients was estimated to Tk. 5543.35 (+1273.29). Average direct treatment cost was estimated to Tk.2656.88 (+1367.23) of which average drug cost was Tk.653.36 (+476.36), investigation cost was Tk.596.73 (+375.56), travel cost Tk.530.31 (+795.46), attendant cost Tk.865.87 (+734.22) and consultation fee was Tk.244.48 (+167.22). Average indirect cost was calculated to Tk.3081.27 (+1275.91) which was only due to loss of income due to illness.

**Conclusion:** The study findings will enable the health policy makers and health care providers at different levels to provide need based cost-effective health care services to reduce the economic burden of diabetes mellitus patients.

**Key-Words:** Economic Burden, Type 2 DM, Treatment cost

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## Introduction

Diabetes mellitus is a major concern for the developed as well as developing country like Bangladesh as it poses with enormous disabilities and economic burden to the victims. As an ice-berg disease prevalence of diabetes is more than five times higher at present than it was in the last decade. Currently the number of diabetic patients is estimated to be around 371 million globally in 2012 and this number is predicted to be double by 2025, with the greatest number of cases being expected in developing countries<sup>1,2</sup>.

The treatment cost of diabetes to the patients and society is increasing many folds day by day. Bangladesh is in a far worse position than developed countries where treatment for diabetes is easily available. About 83% of the population of the country live on US \$2 a day and it's difficult for people to afford relevant care. But if the 3 million type 2 diabetes had access to free care, the number of years of life would double (5.8 million) and production value would triple<sup>3</sup>. The current prevalence rate of diabetes in Bangladesh is 9.51% and it is supposed to rise to more than 10% in 2025 and almost all are of type 2 DM. In a survey in 2003, documented that a prevalence of diabetes mellitus is 11.2 % among city dwellers of Dhaka aged 20 years and above<sup>4</sup>. At present Bangladesh holds 10th position and will occupy 7th position with 11.1 million in 2030 in terms of number of diabetes patients in the world<sup>5</sup>.

As Armed Forces is the part and parcel of the large population of the country, therefore occurrence of

any non communicable disease like diabetes in this community will bear the same impacts like a civil community. This study aims to determine the economic burden of type 2 DM patients among Armed Forces personnel who earn stipulated monthly salary and attend CMH, Dhaka for treatment. The study findings in terms of different types of costs will enable the health policy makers and health care providers to formulate necessary strategies for providing need based cost-effective health care services to reduce economic burden of Armed Forces personnel who are suffering from type 2 DM patients.

## Methodology

This was a cross sectional type of descriptive study. It was conducted on 110 type 2 diabetes mellitus patients among Armed Forces Personnel who attended Combined Military Hospital (CMH), Dhaka for treatment within the period covering January 2010 to June 2010. (Pregnant women who gave birth to baby from 1st July 2008 to 30th June 2009 are also included). Data collection was done by face to face interview from the respondents with the help of a pretested interview schedule. The data were compiled and analyzed by using SPSS 11.5 software.

## Results

The Cross sectional study was conducted with an aim of exploring the economic burden of the type 2 diabetes mellitus patients. Results were formulated on the basis of selective variables and written as follows:

**Table-I:** Socio-demographic characteristics of type 2 DM patients.

Characteristics	Findings
Sex	male-91%, Female-09%
Age	mean age: 53.65 years ( $\pm$ SD 10.44)
Marital Status	Married-91.8%, Widow/widower-5.5%, Unmarried-2.7%
Residence	Urban-36.4%, sub-Urban-33.6%
Education	SSC-37.3%, Class VI-X: 30%, HSC-14.5% Graduate-9.1%, Others-9%
Occupation	Retired-50.0%, Service holders- 42.7%, Housewife-6.4%
Monthly income	Tk.9809.09 ( $\pm$ SD-4235.01)

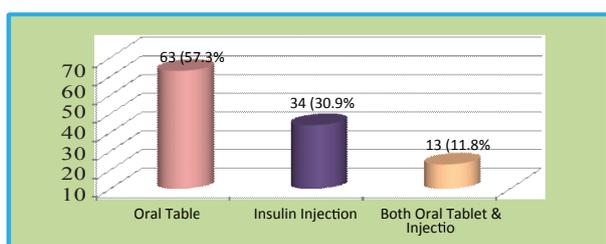
In respect of socio-demographic information, out of 110 patients most (91.0 %) were males and majority (36.4%) were in the age group of 46 - 55 years with the mean age of 53.65 ( $\pm$ SD10.44) years. Most (91.8 %) of the patients were married and majority (36.4%) came from urban area while half of them lived in semi-pucca houses. By education, majority (37.3%) had SSC level educational qualification and by occupation 50.0 % of them were retired while 42.7% were in service and their average monthly family income was Tk.9809.09 ( $\pm$ 4235.01) as shown in (Table-I).

Regarding type of treatment, most of the patients (90.9%) were under drug, diet control and physical exercise (Table-II) and most (88.0 %) of them performed physical exercise with an average duration of 40.10  $\pm$ 12.58 minutes/days.

**Table-II:** Distribution of the patients by the type of treatment received (n=110).

Treatment	Number (n=110)	Percent
Drug	9	8.2
Both diet control & Physical exercise	1	0.9
Drug, diet control & physical exercise	100	90.9
Total	110	100.0

Regarding drugs, majority of the patients 63 (57.3%) took oral hypoglycemic agents (Figure-1).



**Fig-1:** Type of drug taken by the patients

Among all, 40.0% patients had positive family history of diabetes and 45.5% of their parents had DM.

According to source of fund to maintain treatment cost, majority (31.8%) used their savings while 27.3% took loan, 20% got help from relatives, 10.9% from donation and the 10% sold their valuable wealth (Table-III).

**Table-III:** Distribution of the patients by sources of treatment cost (n=110)

Sources	Number (n=110)	Percent
Savings	35	31.8
Selling wealth	11	10.0
Taking loan	30	27.3
Donation	12	10.9
Help of relatives	22	20.0
Total	110	100.0

Average treatment cost incurred by the patients was Tk.5543.35+1273.29 while average direct cost and average indirect cost was Tk.2656.88+1367.23 and Tk.3081.27+1275.91 respectively. In respect of different direct costs, average consultation fee was Tk.244.48+167.22, average cost of drug was Tk.653.36+476.36, average investigation cost was Tk.596.73+375.56, average travel cost was Tk.530.31+795.46 and average attendant cost was Tk.865.87+734.22. On the other hand, as an indirect cost, average loss of income of the patients was Tk.3081.18+1276.00 (Table-IV).

**Table-IV:** Distribution of the patients by total treatment cost (Monthly) (n=110)

Treatment cost (Tk.)	Number (n=110)	Percent
3000-4000	15	13.6
4000-5000	22	20.0
5000-6000	30	27.3
6000-7840	43	39.1
Total	110	100.0

Mean  $\pm$  SD = Tk.5543.35  $\pm$  1273.29 Range = Tk.3000-Tk.7840

By sex, majority (43%) of the male patients incurred higher treatment cost while majority of the female patients (60%) incurred lower treatment cost and this difference of treatment cost by sex was statistically significant [ (3) =23.393, p< 0.05] (Table-V).

**Table-V:** Distribution of the patients by treatment cost and sex (n=110)

Treatment cost (Taka)	Sex of the patients		Total
	Male (%)	Female (%)	
3000- 4000	9 (9.0%)	6 (60.0%)	15 (13.6%)
4000-5000	19 (19.0%)	3 (30.0%)	22 (20.0%)
5000-6000	29 (29.0%)	1 (10.0%)	30 (27.3%)
6000-7840	43 (43.0%)	0 (0.00%)	43 (39.1%)
<b>Total</b>	100 (100.0%)	10 (100.0%)	110 (100.0%)

P value < .05

By occupation of the patients, majority (38.3%) of service holders and majority of the retired patients (45.5%) incurred higher treatment cost while majority of the house-wives, (71.4%) incurred lower treatment cost and this variation of treatment cost by occupation was statistically significant ( $\chi^2_{(9)}=28.06, p < 0.05$ ) (Table-VI).

**Table-VI:** Distribution of the patients by treatment cost and occupation (n=110)

Treatment cost (Taka)	Occupation of the Patients				Total
	Service f (%)	Farmer f (%)	Housewife f (%)	Retired f (%)	
3000-4000	3 (6.4%)	0 (0.00%)	5 (71.4%)	7 (12.7%)	15 (13.6%)
4000-5000	9 (19.1%)	0 (0.00%)	1 (14.3%)	12 (21.8%)	22 (20.0%)
5000-6000	17 (36.2%)	1 (100.0%)	1 (14.3%)	11 (20.0%)	30 (27.3%)
6000-7840	18 (38.3%)	0 (0.00%)	0 (0.00%)	25 (45.5%)	43 (39.1%)
<b>Total</b>	47 (100%)	1 (100.0%)	7 (100.0%)	55 (100.0%)	110 (100.0%)

$\chi^2$  value = 28.06, df = 9, P < .05

## Discussion

This cross sectional descriptive study was conducted among 110 diabetes patients who attended Combined Military Hospital, Dhaka. The aim of the study was to determine the economic burden of diabetic patients. Among 110 patients, majority i.e. 40 (36.4%) of them were in the age group of 46-55 years, followed by 33 (30.0%) in the age group of 56-65 years with mean age 53.65 ( $\pm 10.44$ ) years. This clearly indicates that the group (>40 years) is one of the risk factor for diabetes which was in consistence with the study by Ahmed G U et al<sup>6</sup>. As per profession, majority 55 (50%) were retired followed by service holders (42.7%) and housewives (6.4%). It was observed from the occupational findings that, prevalence of diabetes was more among those who were less exposed to physical activities. This

observation was consistent with the findings by Azimi-Nezhad M et al<sup>7</sup> and Kelestimur F et al<sup>8</sup>. The study revealed that 60% were in low income group (Tk.5000 to 10000) with average income of Tk.9809.09 ( $\pm 4235.01$ ). Majority of the patients i.e. 40 (36.4%) lived in urban area. A study by Sayeed M A et al<sup>9</sup> (1997) observed that prevalence of type 2 diabetes was 6.7% and IGT 12.4% among urban population and the lowest prevalence was observed among the poor socioeconomic classes. The study was partially similar with this study. Dissimilarity was seen in economic status of the patients and which may be due to different study places.

Regarding type of therapy received by the patients, the study showed that out of 110 patients, majority i.e. 100 (90.9%) were under drug, diet control and physical exercise. Most of the patients i.e. 97 (88 %) performed physical exercise as recommended by the physician. The study also revealed that out of all patients, majority 63 (57.3%) took oral tablet (OHA) where as 34 (30.9%) took insulin injection and the remaining 13 (11.8%) patients dependent on OHA and insulin. A study by Islam M Z et al<sup>10</sup> concluded that 11.7% were on diet control and physical exercise and majority (50.6%) patients were on OHA which was found similar with this study.

Regarding source of funding for treatment cost, the study showed that majority i.e. 35 (31.8%) used savings for treatment while 30 (27.3%) took loan, 22 (20%) got help from relatives, 12 (10.9%) from donation and remaining 11(10%) from sold wealth. Savings were the main source to meet the treatment cost among the patients. Average monthly direct cost for the disease was found to be Tk. 2656.88(+ 1367.23) which was not similar with the treatment cost of type 2 diabetes patient estimated in the study conducted by Islam M Z et al<sup>10</sup>. (2008), where it was found to be Tk. 742.97 (+593.36) and this deviation may be due to gradual increase of cost of drug, investigation, consultation fee and traveling expense with time (by these twoyears duration). Out of average monthly direct cost, average drug cost was Tk.653.36 (+476.36) while cost of investigation was Tk.596.73

(+476.56), travel cost was Tk.530.31 (+795.46), attendant cost was Tk.865.87 (+734.22) and Tk.244.48 (+167.22) was for consultation fee. The study conducted by Islam M Z et al<sup>10</sup> revealed that drug cost was the highest among all direct costs which was identical with this study.

This study revealed that average monthly indirect cost was Tk. 3081.27(+ 1275.91) is loss of income due to illness. This study also showed that average monthly treatment cost was 5543.35(+ 1273.29). Out of this, average monthly direct cost for the disease was found to be Tk.2656.88 (+ 1367.23) and indirect cost was Tk. 3081.27(+ 1275.91). This finding was similar with the study carried out by González J C, Walker J H and Einarson T R; in Columbia<sup>11</sup>. This study also revealed that there was no statistically significant association among the treatment cost with age, place of residence, monthly family income and source of funding for treatment of the patients. There was also no statistically significant association found between travel cost and place of residence of the patients. On the other hand there was statistical significant association between treatment cost with sex, marital status and occupation of the patients. As the prevalence of diabetes is increasing day by day, the overall economic burden of diabetic patients is also greatly rising. This study clearly indicates that, enormous economic burden imposed to the diabetic patients definitely reduces their capability to handle such a notorious deadly disease.

### Conclusion

This descriptive cross-sectional study was conducted among type 2 DM patients to ascertain economic burden of the disease and also to correlate these with socio-demographic characteristics of the patient. In this study it was reflected that prevalence of the disease was more among productive age group and majority had lower income. The studies also revealed that majority of the patients were retired and had SSC level education. Regarding therapy, most of them were under drug, diet control and physical exercise; among them, majority took oral tablet.

According to the sources for funding of treatment, majority used savings for their treatment. In respect of direct treatment cost, majority of the patients spent more money for attendant cost purpose and for purchasing drugs, while in indirect treatment cost, it is only the amount of loss of income due to illness. Average treatment cost incurred by the patients was found more as indirect treatment cost. There were significant association found between treatment cost with sex, marital status and occupation of the patients.

This study has addressed the economic magnitude of diabetes mellitus in army personnel and which definitely represents the situation in Bangladesh. Finally all those involved in diabetes care need to be aware of what drives cost. Demand for economic research will continue to be increased because of need to assess the growing number of interventions available such as free treatment cost, subsidy, health insurance etc. to minimize the cost incurred by the patients. To reduce economic burden of

DM, early diagnosis and prompt treatment along with adherence to diabetes therapy is essential. Overall awareness and health education are the prime need to combat this deadly disease as well as to overcome the economic burden of the disease.

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