

Socio-economic profile and prevalence of hypertension among type 2 newly diagnosed diabetes mellitus patients attending a tertiary hospital in Dhaka

Wahiduzzaman M¹, Hossain MM², Haque KMM³, Zishan MSH⁴, Yasmin A⁵, Shuvon AAA⁶

Conflict of Interest: None

Received: 20.03.2023

Accepted: 28.03.2023

www.banglajol.info/index.php/JSSMC

ABSTRACT:

Introduction: Untreated coexistence of hypertension and diabetes mellitus (DM) may result in more severe complications. The implementation of earlier intervention to prevent these complications can be facilitated by earlier identification of the conditions and their associated factors.

Methods: This cross-sectional research was conducted at Sir Salimullah Medical College, Dhaka, between June 2020 and July 2021. Following the diagnosis of DM in the symptomatic patients, SPSS V 25 was utilized to collect socioeconomic history and blood pressure data for further analysis.

Results : 271 (40 %) of the 542 diabetic patients were between 33 to 47 years of age. Most (332, 60.9%) were females. A majority of the patients (302.55.7%) belonged to lower socioeconomic classes, with incomes ranging from 1 thousand to 14 thousand taka. 253 patients (46.7%) had a familial predisposition to diabetes. Concurrent hypertension was observed in 193 (35.6%) diabetic patients; this was substantially correlated with advancing age, lower socioeconomic status, and higher body mass index ($p < 0.05$).

Conclusion: Diabetic hypertensive patients were more prevalent among those with lower socioeconomic status, a demographic that is least likely to pursue and adhere to treatment. Therefore, it is necessary to develop and execute policies that guarantee their appropriate treatment and avert subsequent complications.

Key Words:

Retinoid, Pilosebaceous,

Propionibacterium, Hyperinsulinemia,

Glycemic Indexe

[J Shaheed Suhrawardy Med Coll 2023; 15(1): 55-58]

DOI: <https://doi.org/10.3329/jssmc.v15i1.76918>

1. Dr. Miah Wahiduzzaman, Assistant Professor, Department of Medicine, Holy Family Red Crescent Medical College Hospital, Dhaka.
2. Prof. Dr. Mir Mosarraf Hossain, Professor and Head, Department of Endocrinology, Holy Family Red Crescent Medical College Hospital, Dhaka.
3. Prof. Dr. K M Muzibul Haque. Professor and Head, Department of Anaesthesia, analgesia & ICU, Holy Family Red Crescent Medical College Hospital, Dhaka.
4. Dr. MD. Shahriar Hossain Zishan, Intern doctor, Holy Family Red Crescent Medical College Hospital, Dhaka.
5. Abida Yasmin, MBBS student (Final year, Session 2018-19), Sher E Bangla Medical College, Barisal
6. Dr. Ashfak Al Arif Shuvon, RMO, New Life Medical Services, Nawabganj, Dhaka.

Correspondence: Dr. Miah Wahiduzzaman, Assistant Professor, Department of Medicine, Holy Family Red Crescent Medical College Hospital, Dhaka.
Email: www.miahwahiduzzaman@yahoo.com, Mobile Number: 01682728964

Introduction

Diabetes mellitus (DM) is an exceedingly common noncommunicable disease that impacts an estimated 537 million people worldwide ¹. Diabetic DM manifests as a chronic metabolic disorder because of either inadequate insulin secretion or impaired insulin functionality, leading to sustained hyperglycemia. Regardless, diabetes mellitus (DM) is associated with substantial morbidity and mortality, encompassing a wide spectrum of complications that have emerged in recent years, including cancer, infections, functional and cognitive impairment, and traditional neuropathy, retinopathy, nephropathy, and vascular ². In the majority of cases, earlier detection of DM and appropriate intervention can effectively halt the progression of the disease and avert complications.

Socioeconomic status of the patient is also a significant factor in the development and management of DM. Access to healthcare, available treatment options, and control recommendations are all significant determinants in the management of DM. Socioeconomically disadvantaged individuals have a diminished likelihood of obtaining adequate resources and an increased susceptibility to complications associated with diabetes mellitus ³.

Hypertension is one of the most likely conditions to coexist with DM. The concurrent existence of both conditions substantially elevates the patient's susceptibility to cardiovascular and other systemic complications ⁴. The management of a hypertensive diabetic patient differs substantially and necessitates more stringent monitoring and interventions, such as the use of polypharmacy ⁵.

Likewise, DM is an increasing concern in Bangladesh.⁶ The prevalence of DM in the general population increased from 4.0% in 1995 to 10.4% in 2019, representing a substantial national disease burden. Furthermore, the management of diabetes mellitus, including treatment adherence and self-awareness, was found to be significantly influenced by socioeconomic status ⁷. Additionally, hypertension is on the rise in Bangladesh; however, there is a scarcity of data regarding the mutual coexistence of these two conditions. The objective of this research is to examine the socioeconomic status of diabetic patients who also have hypertension at a tertiary medical center located in one of the world's major metropolitan areas.

Materials and methods

A cross-sectional investigation was carried out at Sir Salimullah Medical College Hospital in Dhaka, outpatient setting, from June 2020 to July 2021. Patients with DM-like symptoms initially provided informed consent. Following this, their sociodemographic and clinical information was collected. Following this, venous blood was drawn in order to conduct an oral glucose tolerance test during fasting and two hours after a meal. This investigation recruited participants with fasting glucose levels of 7 mmol/L or higher and postprandial glucose levels of 11.1 mmol/L or higher two hours later on Automatic biochemistry analyzer (AS-12, Bioelab, China). Blood pressure was measured through manual sphygmomanometer (ALPK2, Japan) and stethoscope (ALPK2, Japan). Patients were deemed hypertensive if their systolic and diastolic blood pressure were above 139 mmHg & 89 mmHg respectively in 2 settings one day apart on both arms. Participants in this study were those who met the following criteria: a minimum age of 18 years, exhibit symptoms of diabetes mellitus (DM) such as polyphagia, polydipsia, polyuria, recurrent infections, and compromised wound healing, not taking any medications which can alter blood sugar, not-pregnant. Following the process of data cleansing and sorting, descriptive presentation and analysis were conducted utilizing SPSS V 25.

Results

Table 1: Socio-economic status of the participants

| | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| Age group | | |
| 18-32 years | 81 | 14.9 |
| 33-47 years | 217 | 40 |
| 48-62 years | 198 | 36.5 |
| 63-77 years | 39 | 7.2 |
| 78-92 years | 7 | 1.3 |
| Gender | | |
| Male | 212 | 39.1 |
| Female | 330 | 60.9 |
| Monthly income (in thousand taka) | | |
| 1-14 | 302 | 55.7 |
| 15-29 | 159 | 29.3 |
| 30-44 | 54 | 10 |
| 45-59 | 24 | 4.4 |
| 60-74 | 3 | 0.6 |
| Family history of DM | | |
| Yes | 253 | 46.7 |
| No | 287 | 53.0 |

In total, 542 participants were enrolled in this study. 217 (40%) of the patients fell within the age range of 33 to 47 years, while the age group of 48 to 62 years comprised 198 (36.5%). Females comprised the majority of the participants (332,60.9%). As shown in Table 1, a majority of the patients (302.55.7%) had monthly income from 1 to 14 thousand taka. Almost half of the patients (253,46.7%) had family history of DM.

Table 2: Associated factors with Hypertension in DM patients

| | Hypertension | | P value |
|----------------------------------|--------------|-------------|---------|
| | Absent | Present | |
| Age group (in years) | | | |
| 18-32 years | 66(18.9%) | 15(7.38%) | 0.000 |
| 33-47 years | 148(42.4%) | 69(35.8%) | |
| 48-62 years | 109(31.2%) | 89(46.1%) | |
| 63-77 years | 22(6.3%) | 17(8.8%) | |
| 78-92 years | 4(1.1%) | 3(1.6%) | |
| Monthly income (in taka) | | | |
| 1-14 | 210 (60.20%) | 92(47.70%) | 0.003 |
| 15-29 | 88(25.20%) | 71(36.80%) | |
| 30-44 | 39(11.20%) | 15(7.80%) | |
| 45-59 | 10(2.90%) | 14(7.30%) | |
| 60-74 | 2(0.60%) | 1(0.50%) | |
| BMI | | | |
| Underweight | 15(4.30%) | 9(4.70%) | 0.019 |
| Normal | 146(41.80%) | 57(29.50%) | |
| Overweight | 151(43.30%) | 94(48.70%) | |
| Obese | 37(10.60%) | 33(17.10%) | |
| Duration of symptoms (in months) | | | |
| <12 | 323(92.60%) | 177(91.70%) | 0.200 |
| 12-24 | 3(0.90%) | 16(8.30%) | |
| >24 | 3(0.90%) | 0 | |

The potential factors associated with patients who have hypertension and diabetes are detailed in Table 2. 193 patients with diabetes (35.6 %) also had hypertension. The majority of patients were aged 30 years or older, with the highest prevalence (89, 46.1%) among those aged 48-69. A significant majority of hypertensive patients (163, 84.5%) had an income below 30,000 taka. The majority of hypertensive patients (127,65.8%) were classified as overweight or obese. Statistically, these variables were significant (p< 0.05).

Table 3: Hyperglycemic profile of the participants

| | Mean | SD |
|---|------|-----|
| Average fasting glucose (mmol/L) | 12.1 | 8.4 |
| Average 2 hours postprandial glucose (mmol/L) | 17.4 | 5.2 |

The average fasting glucose of the participants was 12.1 ± 12.1 and 2 hours post prandial glucose was 17.4 mmol/L.

Discussion

The purpose of this research was to identify the sociodemographic characteristics of hypertensive diabetic patients. The age of the most of our patients exceeded 30 years, with (415,76.5%) falling within the 33–62 years age range. Age is a well-established and immutable risk factor for the onset of both hypertension and diabetes, with the occurrence of these conditions escalating substantially as age increases. After the age of 30, fasting plasma glucose levels are estimated to increase by 1-2 mg/dL per decade, while postprandial glucose levels rise by approximately 15 mg/dL per decade⁸. This accounts for the increased prevalence of hyperglycemia and consequent diabetes mellitus among the elderly⁸. This result is comparable to that of another Bangladeshi study⁹, which discovered an increase in the prevalence of DM at a younger age, with the maximum incidence occurring between the ages of 35 and 44. Females comprised 330 (60.9%) of the respondents. Similar research conducted in Bangladesh, where female participants had a disproportionately higher prevalence of DM than their male counterparts, provides further support for the female preponderance^{9,10}. Additionally, there was a higher prevalence of undiagnosed and inadequately treated DM among females¹⁰. Although there are multiple contributing factors to the female predominance of DM, obesity is a pivotal element in its pathogenesis. As indicated by prior research¹¹, 219 out of 330 female participants in our study (66.3%) were overweight or obese [data not presented]. The greater frequency of DM in the lower socioeconomic category is consistent with the findings of Kim et al.¹², who identified psychosocial stress among the lower working class as a significant risk factor for the development of DM, as supported by prior research. Nevertheless, this discovery contradicts the results of Ahsan et al.⁷, who observed that DM was more prevalent among individuals from superior socioeconomic backgrounds compared to those with lower social status. Almost half of the patients had a history of DM in their family which is a major risk factor for developing DM. A familial history of DM was associated with a 76.3% increased risk of developing the disease, according to one study¹³. Our study identified several factors that were substantially associated with patients who had hypertension and diabetes. Hypertension was more prevalent in the elderly, with the majority of cases occurring around the age of 50. The increased prevalence of hypertension

among the elderly has been linked to arterial and arteriolar rigidity, which is primarily caused by structural changes induced by atherosclerosis and subsequent calcification¹⁴. Concomitant hypertension and diabetes mellitus in the elderly increases the risk of systemic complications and necessitates more aggressive treatment strategies and more frequent monitoring. According to our findings, diabetic patients from lower socioeconomic classes had a higher prevalence of hypertension. This result is consistent with the findings of Blok et al.¹⁵, who observed a greater prevalence of hypertension among members of the lower working class. This may be indicative of the challenges faced by individuals from lower socioeconomic backgrounds in accessing healthcare facilities, which can lead to inadequate diagnosis and treatment of the disease. The majority of patients with hypertension in our study were obese or overweight. Obesity is a significant risk factor in the development of hypertension, potentially attributable to an increased prevalence of dyslipidemia and premature atherosclerotic change¹⁶.

Limitations

There were some limitations to the investigation. The accumulation of data occurred amidst the COVID-19 pandemic. The accessibility of laboratory facilities and other extensive variables, including patient access, was restricted. Furthermore, it should be noted that the research was carried out exclusively in an urban environment, which may limit its applicability to the broader populace.

Conclusion

A significant percentage of the participants simultaneously presented with diabetes mellitus and hypertension, both of which are life-threatening conditions if left untreated. The majority of patients belonged to the lower socioeconomic class, which increases the likelihood of inadequate diagnosis and treatment. It is imperative to develop policies that facilitate their convenient access to healthcare services, thereby enabling them to obtain appropriate treatment and prevent any subsequent complications.

Reference

1. Kumar A, Gangwar R, Ahmad Zargar A, Kumar R, Sharma A. Prevalence of Diabetes in India: A Review of IDF Diabetes Atlas 10th Edition. *Curr Diabetes Rev.* 2024 Jan;20(1).
2. Tomic D, Shaw JE, Magliano DJ. The burden and risks of emerging complications of diabetes mellitus. *Nat Rev Endocrinol.* 2022 Sep 6;18(9):525–39.
3. Darvishi A, Nikkiah A, Mahmudimanesh M, Balajam NZ, Shafiee G, Heshmat R. Socioeconomic inequalities in type 2 diabetes mellitus: a study based on a population-based survey in Iran. *BMC Public Health.* 2024 Mar 30;24(1):926.
4. Al-Azzam N, Al-Azzam S, Elsalem L, Karasneh R. Hypertension prevalence and associated factors among patients with diabetes: A retrospective cross-sectional study from Jordan. *Annals of Medicine and Surgery.* 2021 Jan;61:126–31.
5. Ganesh J, Viswanathan V. Management of diabetic hypertensives. *Indian J Endocrinol Metab.* 2011;15(8):374.
6. Akhtar S, Nasir JA, Sarwar A, Nasr N, Javed A, Majeed R, et al. Prevalence of diabetes and pre-diabetes in Bangladesh: a systematic review and meta-analysis. *BMJ Open.* 2020 Sep 9;10(9):e036086.
7. Ahsan KZ, Iqbal A, Jamil K, Haider MM, Khan SH, Chakraborty N, et al. Socioeconomic disparities in diabetes prevalence and management among the adult population in Bangladesh. *PLoS One.* 2022 Dec 20;17(12):e0279228.
8. Gambert SR, Pinkstaff S. Emerging Epidemic: Diabetes in Older Adults: Demography, Economic Impact, and Pathophysiology. *Diabetes Spectrum.* 2006 Oct 1;19(4):221–8.
9. Chowdhury MAB, Islam M, Rahman J, Uddin MJ, Haque MdR. Diabetes among adults in Bangladesh: changes in prevalence and risk factors between two cross-sectional surveys. *BMJ Open.* 2022 Aug 5;12(8):e055044.
10. Khatun MM, Rahman M, Islam MJ, Haque SE, Adam IF, Chau Duc NH, et al. Socio-economic inequalities in undiagnosed, untreated, and uncontrolled diabetes mellitus in Bangladesh: is there a gender difference? *Public Health.* 2023 May;218:1–11.
11. Kautzky-Willer A, Leutner M, Harreiter J. Sex differences in type 2 diabetes. *Diabetologia.* 2023 Jun 10;66(6):986–1002.
12. Kim YJ, Jeon JY, Han SJ, Kim HJ, Lee KW, Kim DJ. Effect of Socio-Economic Status on the Prevalence of Diabetes. *Yonsei Med J.* 2015;56(3):641.
13. Abdulaziz Alrashed F, Ahmad T, Almurdi MM, Alqahtani AS, Alamam DM, Alsubiheen AM. Investigating the relationship between lifestyle factors, family history, and diabetes mellitus in non-diabetic visitors to primary care centers. *Saudi J Biol Sci.* 2023 Sep;30(9):103777.
14. Pinto E. Blood pressure and ageing. *Postgrad Med J.* 2007 Feb;83(976):109–14.
15. Blok S, Hagggenburg S, Collard D, Van Der Linden EL, Galenkamp H, Moll van Charante EP, et al. The association between socioeconomic status and prevalence, awareness, treatment and control of hypertension in different ethnic groups: the Healthy Life in an Urban Setting study. *J Hypertens.* 2022 May;40(5):897–907.
16. Jiang SZ, Lu W, Zong XF, Ruan HY, Liu Y. Obesity and hypertension. *Exp Ther Med.* 2016 Oct;12(4):2395–9.