Abstract:

Objective: The aim of the present study was to find out the common co-morbid conditions associated with type 2 diabetes mellitus. Methods: A descriptive, cross sectional study was conducted from January 2016 to June 2016 among 300 patients attending at Medicine outpatient department of the Community Based Medical College Hospital and Endocrine outpatient department of the Mymensingh Medical College Hospital after obtaining requisite consent from the patients. Data were collected through the interviewing of the patients. The collected data were entered into the computer and analyzed by using SPSS (version 20.1) to know the common co-morbid conditions associated with type 2 diabetes mellitus. The study was approved by the institutional ethical committee. Results: In a pool of 300 type 2 diabetics, Most of the patients (57.3%) belonged to the middle age group 41-60 years. More than half of the respondents were female (n=223, 74.3%). Among 300 cases, 188 patients had shown association with different co-morbid conditions. Female patients (77%) suffered from more co-morbid conditions than male patients (23%). Hypertension was the most commonly associated disease (65.42%) with DM. Conclusion: Most of the diabetic patients have co-morbid conditions. Hypertension was the most commonly associated disease with DM.

Keywords: Co-morbid condition; Diabetes mellitus.
Common co-morbid conditions associated with type 2 diabetes mellitus

Medical College Hospital after obtaining requisite consent from the patients. Departmental screening committee of Department of endocrinology, Mymensingh Medical college Hospital, Department of Medicine, Community Based Medical College hospital and Institutional. There are no violations of moral and ethical norms during preparing this research. Only type 2 diabetic outpatients were included in this study. Purposive sampling was adopted for collecting data. The interviews were held directly in the corridor just outside the Outpatient Department. The relevant information was entered into the predesigned proforma to know the common co-morbid conditions associated with type 2 diabetes mellitus. The collected data were entered into the computer and analyzed by using SPSS (version 20.1).

**Ethical clearance:** This study got ethical approval before conducting the study from Ethics Committee of Mymensingh Medical College, Mymensingh and Community Based Medical College Hospital.

**Result**

Most of the patients (57.3%) belonged to the middle age group 41-60 years. More than half of the respondents were female (n=223, 74.3%). (Table 1)

**Table 1: Demographic characteristics of the study population (n=300)**

| Parameters         | Number | Percentage |
|--------------------|--------|------------|
| Age of the patients |        |            |
| ≤ 40 years        | 77     | 25.7       |
| 41-60 years       | 172    | 57.3       |
| > 60 years        | 51     | 17.0       |
| Total             | 300    | 100.0      |

| Sex               |        |            |
|-------------------|--------|------------|
| Male              | 77     | 25.7       |
| Female            | 223    | 74.3       |
| Total             | 300    | 100        |

Among 300 cases, 188 patients had shown association with different co-morbid conditions and 112 patients had not shown any association with those. (Figure 1)

**Table 2: Prevalence of Co-morbidities associated with DM (n=188)**

| Co-morbidities         | Number | Percentage |
|------------------------|--------|------------|
| Hypertension           | 123    | 65.42      |
| Dyslipidaemia          | 14     | 7.44       |
| Ischaemic heart disease| 35     | 18.61      |
| Depression             | 12     | 6.38       |
| Asthma                 | 15     | 7.97       |
| CKD or Renal failure   | 09     | 4.78       |
| Liver disease          | 02     | 1.06       |
| Diabetic Neuropathy    | 10     | 5.31       |
| Diabetic foot          | 09     | 4.78       |
| Gout                   | 02     | 1.06       |
| Chronic obstructive pulmonary disease | 01 | 0.53 |

*Patients may suffer from more than one co-morbid condition.

**Discussion**

All together a total of 300 patients were interviewed during the study period. This study showed that diabetes mellitus was more prevalent in female patients (77%) suffered from more co-morbidity than male patients (23%). (Figure 2)

Hypertension was the most commonly associated disease (65.42%) with DM followed by Ischaemic heart disease (18.61%). (Table 2)

![Figure 1: Pie chart showing co-morbidities of the study population](image1)

Female patients (77%) suffered from more co-morbid conditions than male patients (23%). (Figure 2)

![Figure 2: Pie chart showing presence of co morbidity among male and female (n=188).](image2)
patients than in male patients. Similar results were obtained in the study conducted by Abebaw et al. (2016), Alam et al. (2014) and Mann et al. (2009) 4,5,6. This study revealed a higher prevalence of diabetes was among middle aged patients. A study done in India by sajith et al. (2014) also found similar result 7. In our study 188 (63%) patients suffered from different co-morbid conditions. Disimilar results were obtained in the study conducted by Struijs et al., (2006), where 44% patients of diabetes mellitus have co-morbid conditions 8. Hypertension accounted for 65% of the total complications which are higher than the study reported in Thailand (hypertension accounted for 55.53% of the total complication). Our study findings are quite similar to the study conducted in India by Shamna and Marimuthu (2011) that hypertension is more common complication affecting 59% of people with diabetes. These findings are significantly alarming, as hypertension is a predictor of cardiovascular disease 9,10. In our study female patients (77%) suffered from more co-morbid conditions than male patients. Struijs et al., (2006) in their study reported that Patients with diabetes without co-morbidity were more likely to be male 8.

Conclusion

Most of the diabetic patients have co-morbid conditions. Hypertension was the most commonly associated disease with DM. Presence of co-morbidity with diabetes pose significant health care burdens on both families and society. The result of the present study highlights the need for comprehensive management of diabetic patients including treatment of co-morbidity.

Acknowledgements

The authors are grateful to the entire staff of the medical outpatient department of the Mymensingh Medical College Hospital and Community Based Medical College Hospital, Mymensingh for their cooperation and support during the study period.

Conflict of Interest

Authors declare no conflict of Interest.

Authors Contributions:

Data gathering and idea owner of this study: Kartick Chanda Shaha

Study design: Kartick Chanda Shaha , Md. Shamsur Rahman

Data gathering: Kartick Chanda Shaha, Md. Shamsur Rahman , Tasmin Shahnaz

Writing and submitting manuscript: Kartick Chanda Shaha , Tasmin Shahnaz

Editing and approval of final draft: Kartick Chanda Shaha, Habibunnahar

References:

1. Manzella, D., RN (2016) “What is comorbidity or a comorbid condition?” Available from: https://www.verywell.com/comorbidity-disease-diabetes-1087365

2. Rashid, M.K.M., Anandhasayanam, A., Kaunan, S. and Noon, M.SD. “Prevalence of co-morbidities in type 2 diabetes mellitus patients, the awareness level and the impact of pharmacists patient education program”, International journal of pharma research and review, 2015;4(5):11-20.

3. John, D.P. and Eve, A.K. “The impact of Comorbid chronic conditions on diabetes care”, Diabetes care 2006; 29(3):725-731.

4. Abebaw, M., Messele, A., Hailu, M. and Zewdu, F. “Adherence and associated factors towards anti-diabetic medication among type 2 diabetic patients on follow up at university of Gondar hospital, northwest Ethiopia”. Advances in nursing, 2015; vol. 2016, Article ID 8579157, 7 pages.

5. Alam, M.S., Aqil, M., Qadry, S.A.S., Kapur, P. and Pillai, K.K.” Utilization pattern of oral hypoglycemic agents for diabetes mellitus type 2 patients attending out patient department at a university hospital in new Delhi”. Pharmacology and pharmacy. 2014;5:636-645.

6. Mann, D.M., Ponieman, D., Leventhai. H. and Halm. E.A. “Predictors of adherence to diabetes medications: the role of disease and medication beliefs”. J Behav Med. 2009;32: 278-284.

7. Sajith, M., Pankaj, M., Pawar, A., Modi, A. and Sumariya, R. “Medication adherence to anti-diabetic therapy in patients with type 2 diabetes mellitus”. International journal of pharmacy and pharmaceutical science. 2014;6(2):564-570.

8. Struijs,J.N., Bann, C.A., Schellevis, F.G., Westert, G.P. and Bos,G.AM.V.D. (2006) “Comorbidity in patients with diabetes mellitus:impact on medical health care utilization”, BMC Health services research, doi:101186/1472-6963-6-84. Available from: http://www.biomedcentral.com/1472-6963-6-84.

9. Al-Mahmood AK, Ismail AA, AR Faridah, WB Wan Mohamad. Insulin Sensitivity and Secretory Status of a Healthy Malay Population. Malaysian Journal of Medical Sciences. 2006;13(2):37-44. PMID:22589603, PMCID:PMC3349483

10. Shamna, M. and Kathikeyan, M. (2011) “Prescription pattern of anti-diabetic drugs in the outpatient departments of hospitals in Malappuram district, Kerala”, J Basic Clin Physiol Pharmacol, vol. 22, no. 4, pp. 141-143.