STUDY OF GASTRO-OESOPHAGEAL REFLUX DISEASE AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS PRESENTING TO MEDICINE DEPARTMENT AT A TERTIARY CARE HOSPITAL: A DESCRIPTIVE CROSS-SECTIONAL STUDY

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ABSTRACT

Introduction

Gastro-oesophageal reflux disease is a chronic condition in which stomach contents regurgitates up into oesophagus causing symptoms like acidic taste in mouth, heart burn, bad breath and chronic cough. There is high prevalence of GERD in patients with Type 2 diabetes mellitus in the western countries, but such related data in our country are just few.

Objectives

To find out the prevalence of gastroesophageal reflux among patients with Type 2 Diabetes Mellitus attending Nobel Medical College Teaching Hospital.

Methodology

This was a descriptive cross-sectional study carried out in Department of Medicine of a tertiary care hospital from July 2020 to June 2021. Ethical approval was taken from Institutional Review Committee of Nobel Medical College Teaching Hospital (Reference number: 464/2020). Convenience sampling was done and data was collected from 191 patients presenting to the department. Collected data was entered, analysed in Statistical Package for the Social Sciences version 21 and documented for study. Point estimate at 95% Confidence Interval and descriptive statistics were interpreted as frequency, percentage, or as mean and standard deviations.

Result

Among 191 patients with type 2 diabetes, gastroesophageal reflux was seen in 78 (40.84%) (33.87-47.81 at 95% Confidence Interval) with more prevalent in male 42 (53.84%) than female 36 (46.15%). Mean duration of type 2 diabetes among reflux cases was 10.20± 5.40 years.

Conclusions

Gastroesophageal reflux was common associated condition among Diabetic patients.

KEYWORD

Diabetes Mellitus, Type 2, Dyslipidemias, Gastroesophageal Reflux

INTRODUCTION

Diabetes Mellitus (DM) is a group of metabolic disorder in which body doesn't produce enough or respond normally to insulin causing blood glucose level to be abnormally high over long period of time.[1] Numerous studies have shown that gastro-oesophageal disease (GERD) is a common phenomenon in Type 2 DM.[2] Gastro-oesophageal reflux disease (GERD) is a chronic condition in which stomach contents regurgitates up into oesophagus causing symptoms like acidic taste in mouth, heart burn, bad breath and chronic cough.[3] The prevalence of GERD has been increasing worldwide and its estimated prevalence is 7.6-19.4% in Central Asia.[4] Gastroesophageal reflux may be associated with neuropathy in patients with Diabetes Mellitus.[2] Similarly GERD is mostly associated with uncontrolled diabetic cases, that in long run leads to neuropathy causing delayed gastric emptying resulting into reflux.[5] Although GERD is not an important cause of morbidity and mortality in DM patients, it has major role affecting quality of life and employment status.[2]

Diabetes Mellitus is an endemic disease in Nepal and is arising as a big challenge. According to World Health Organisation, more than 436,000 people in Nepal are affected by diabetes and this number will rise to 1,328,000 by 2030.[6] The diabetic percentage has increased from 19.04% in 2002 to 25.9% in 2009 in Nepal and is continuously increasing.[7] Though many studies have shown that DM patients are with high incidence of GERD symptoms, there are very few such studies done in the context of Nepalese diabetic populations.[8]

The objective of this study was to find the prevalence of gastroesophageal reflux among patients with Type 2 Diabetes Mellitusat a tertiary care centre in Eastern Nepal.

METHODOLOGY

This was a descriptive cross-sectional study carried out in the Department of Medicine, Nobel Medical College Teaching Hospital over a period of one year from July 2020 to June 2021 after taking ethical clearance from the Institutional Review Committee (Reference number: 464/2020). All the patients within the age group of 20-84 years visiting medicine outpatient department were included in this study after taking informed consent. Patients taking anti acid medications, pregnant women, patients with history of peptic ulcer disease, gastric surgery, established GERD prior to DM, cardiovascular disease were excluded. The sample size was calculated as 160using convenience sampling method using confidence Interval of 95%, margin of error 6% and prevalence of GERD in diabetic patients as 18.4% based on previous study.[9] However, 191 cases were taken.

GERD was diagnosed using frequency scale for symptoms of GERD (FSSG) questionnaire. It includes 12 questions each of which carries scores as: never=0; occasionally=1; sometimes=2; often=3; always=4. Patients scoring at least score eight were considered positive for GERD.

Blood samples were collected from patients after overnight fasting of 12 hours and fasting plasma glucose was determined. Also 2 hours post prandial plasma glucose level was also taken. We also observed glycated haemoglobin (HbA1c) levels.

The World Health Organization definition of type 2 diabetes is either single raised glucose level with symptoms (polyuria, polydipsia), otherwise raised values on two occasions, of either:[10]

- fasting plasma glucose ≥ 7.0 mmol/l (126 mg/dl) or,
- with a glucose tolerance test, two hours after the oral dose a plasma glucose ≥ 11.1 mmol/l (200 mg/dl)

A glycatedhemoglobin (HbA1c) of ≥ 48 mmol/mol (≥ 6.5 %) is another method of diagnosing diabetes.

Also the same fasting blood sample was used for estimation of total cholesterol, triglycerides, HDL cholesterol, LDL cholesterol and VLDL cholesterol.

All patients were examined for associated complications of diabetes. Patients were consulted by an ophthalmologist for retinopathy. Urine albumin levels were measured over 24 hour and if albumin in urine was > 30 mg/dl, nephropathy was diagnosed, unless there was evidence of nephritic syndrome or chronic renal failure. Neuropathy was determined by sensory abnormalities including hypo-reflexia of deep tendon, vibration hyposensitivity and orthostatic hypotension.

Data was entered and analysed in Statistical Package for the Social Sciences version 21. Point estimate at 95% Confidence Interval and descriptive statistics were interpreted as frequency, percentage, or as mean and standard deviations.

RESULTS

Among 191 type 2 diabetic patients (male-102, female-89) who were included in this study, GERD was observed in 78 (40.84%) (33.87-47.81 at 95% Confidence Interval). These 78 individuals aged 20-84 years (mean age 53.15±12.43 years) with GERD were then studied. Among these patients, 36 (46.15%) were females and 42 (53.84%) were males. Among the studied cases, 52 (66.66%) gave history of smoking, 40 (51.28%) were hypertensive and 56 (71.79%) were found to have dyslipidemia. (Figure 4) Similarly, mean duration of type 2 diabetes among GERD cases was 10.20± 5.40 years. Mean HbA1c level in GERD cases was 10.58±2.51 %.

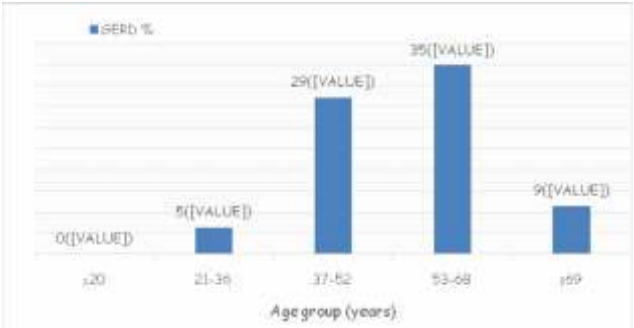


Figure 1: GERD frequency according to different age groups.(n=78)

In this study, GERD was more prevalent in with age group 53-68 years (Figure 1).

In this study, maximum GERD cases were seen in patients at their 2-8 years duration from onset of diabetes (Figure 2).

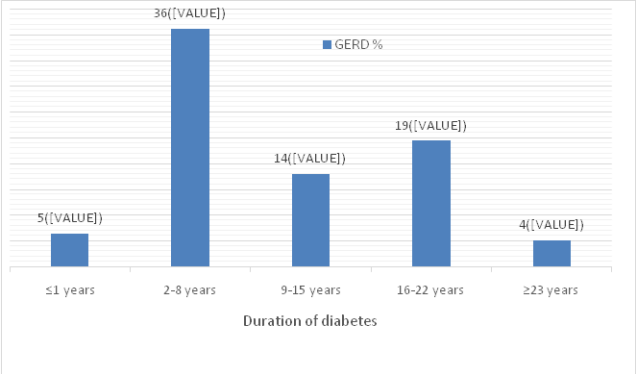


Figure 2: GERD frequency according to duration of diabetes.(n=78)

It was observed that there was linear rise in GERD frequency with the rise in HbA1c level in this study. (Figure 3)

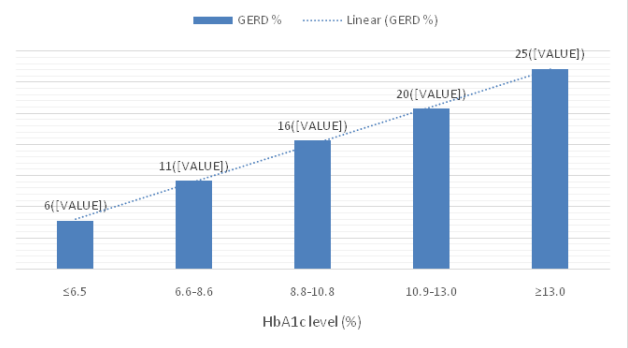
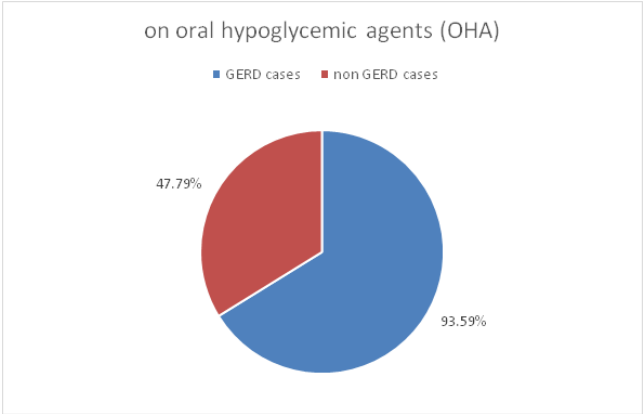


Figure 3: GERD frequency according to HbA1c levels.(n=78)

Table 1: Associated risk factors in GERD cases (n=78).

Parameters	n(%)
Dyslipidemia	56 (71.79%)
Smoking	52 (66.66%)
Hypertension	40 (51.28%)

In this study, most of GERD cases were having dyslipidemia 56 (71.79%). Many of them were smokers 52 (66.66%) and hypertension was prevalent in 40 (51.28%).



Our study showed that the use of pharmacological therapy is associated with increased risk of GERD in patients with type 2 DM.

DISCUSSION

The prevalence of gastroesophageal reflux among type 2 diabetic patients in our hospital was 40.84% which was high as compared to 22% in the similar study by Tandukar.[8] This high prevalence of GERD could be due to the sedentary lifestyle of people and uncontrolled blood glucose level and is comparable to a study done by Wang X et al. among US population where a prevalence of 40.70% was reported.[2] However, a study among China population by Sun H et al. reported lower prevalence of GERD in T2DM which was 16% which may be due to better health care system in China and people are very much concern about their lifestyle and health.[11]

Likewise, a similar study by Wong *et al*. showed relatively lower prevalence of GERD in general Asian population (approximately 3 to 7%).[12] Previous studies have shown DM type2 as a risk factor for GERD.[13] In our study, the prevalence of GERD was not associated with the age of diabetic patients similar to the study by Nishida *et al*.[14] But one analysis showed the prevalence of GERD significantly higher in younger patients and also reported that risk decreases by about 0.74 fold over 10 years. The reason being decreased oesophageal mucus sensation in elderly patients with GERD so that it may be asymptomatic even with severe endoscopic disease.[13] Pathophysiological factors such as obesity, dyslipidemia, hypertension and peripheral neuropathy were shown to be associated with the higher prevalence of GERD in T2DM patients.[14-16] Similar findings were observed in our study. But some studies does not show this relation.[2]In our study, duration of DM did not show any relation to the occurrence of GERD.

Study done by Bytzer*et al.* reported that GERD was associated with DM complications but not with current glycemia control measured by HbA1c levels and a later study from the same group suggested that GERD was associated with both poor glycemic control and DM complications.[17] This is in agreement with the present study which showed GERD was associated with uncontrolled diabetes as supported by strong association with higher HbA1c level.

Our study showed that the use of pharmacological therapy is associated with increased risk of GERD in patients with type 2 DM which was also shown by Nishida *et al*.[14] However, we could not identify what particular type of pharmacologic therapy is associated with the development of GERD, because many patients with type 2 DM took two or more Oral Hypoglycemic Agents (OHA) while in hospital. Reflux symptoms as an adverse event of OHA have not yet been reported and should be examined in detail in future studies.

A study by Fass et al. showed that proton pump inhibitor (PPI) (used against acid production) failure was associated with type 2 DM, which led to GERD despite medications being used.[18] But in our study data regarding of use of PPI

was not taken, which limited our view regarding relation between PPI and type 2 DM.

A study by Huihui*et al*. have shown that prevalence of GERD in DM type 2 patients is mainly due to psychiatric factors, not by pathophysiological factors.[14]

The pathophysiology behind GERD in diabetic points towards uncontrolled blood glucose level over a long period of time. Over time, high blood glucose level can damage the vagus nerve that controls the muscles involved in breaking up food in the stomach and moving it through the gastrointestinal tract.[19] Food then moves slowly from the stomach to the small intestine or stops moving altogether. This results in delayed gastric emptying (or gastroparesis). The increase in gastric contents then increases intragastric pressure which eventually exceeds the pressure of lower oesophageal sphincter which results into reflux.

Whatever may be the cause and association, the incidence of GERD has been increasing and requires true attention.

CONCLUSION

The prevalence of GERD in type 2 diabetic patients visiting our tertiary care hospital was high. GERD was mostly associated with uncontrolled diabetes and older age groups.

RECOMMENDATION

The improvement of lifestyle-related factors, maintaining a good HbA1c by diet control, insulin therapy and ideal body weight are important in preventing GERD in DM patients. Our study also showed that microvascular complications related to diabetes were seen in more number in patients with GERD, so we could replace OHA agents with insulin therapy as insulin quickly brings down blood glucose level and prevents diabetic complications. Though GERD is not causing mortality, it seriously affects quality of life of DM patients. Therefore, every preventive measures at every possible steps have to be taken to control GERD.

LIMITATION OF THE STUDY

Small sample size to support the prevalence and sampling bias could be the limitation of this study. This is based on data collected in a single centre which becomes centre biased with limited information. And most importantly, the data collection was done at the time of COVID pandemic, which limited the data collection. We used a questionnaire and clinical parameters to identify the disease but, endoscopy is the ideal method.

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CONFLICT OF INTEREST

None.

FINANCIAL DISCLOSURE

self-funding

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