



## GASTROINTESTINAL SYMPTOMS IN PATIENTS WITH DIABETES MELLITUS

\*A. B. Olokoba, \*\*M. Yusuf, \*\*K. A. Adekeye and \*\*S.A. Aderibigbe

\*Department of Medicine and \*\*Department of Epidemiology, University of Ilorin Teaching Hospital, Ilorin, Nigeria

Correspondence Address: Dr. A. B Olokoba, Gastroenterology Unit, Department of Medicine, University of Ilorin Teaching Hospital, PMB 1459, Ilorin, Kwara state, Nigeria. *E-mail:* drabolokoba@yahoo.com

### ABSTRACT

**Background:** Gastrointestinal symptoms are reportedly more common in patients with diabetes mellitus, and are attributed to autonomic dysfunction of the gastrointestinal tract. These symptoms are also frequent in individuals without diabetes mellitus.

**Objectives:** To determine whether gastrointestinal symptoms are more frequent in persons with diabetes mellitus compared with age and sex-matched controls, and to assess the association of these symptoms with blood sugar control.

**Methods:** Hospital-based case control study. Study was carried out in the diabetic clinic of the University of Ilorin Teaching Hospital, Ilorin from January to December, 2007. A structured and standardized interviewer administered questionnaire concerning gastrointestinal symptoms in the last 3 months, was administered to 212 consecutively recruited diabetic patients with age and sex-matched non-diabetic controls. Blood glucose control was assessed as an average of the 3 most recent fasting blood sugar.

**Results:** A total of 74 males and 138 females were interviewed in both the diabetic and control groups. The age ranged from 21 to 92 years with a mean of 59+/- 12.9 years. Early satiety was more frequent in diabetic patients than controls ( $p < 0.05$ ) whereas nausea, vomiting, and diarrhea was more in controls than diabetic patients ( $p < 0.05$ ). There was no difference in constipation, heartburn, epigastric pain, bloating, faecal incontinence, and gustatory sweating between cases and controls. Fifty one and half percent (51.5%) of the diabetic patients had poor glycaemic control. There was no correlation between gastrointestinal symptoms, the degree of glucose control, and the duration of disease except for epigastric pain. There was no age or sex predilection for gastrointestinal symptoms among diabetic patients. However, there was a female predilection for nausea and vomiting among controls.

**Conclusions:** Gastrointestinal symptoms in patients with DM are not different from non-diabetic controls except for early satiety which is more in DM patients, whereas nausea, vomiting and diarrhea was found to be more in non-diabetic controls.

**Keywords:** Gastrointestinal, Symptoms, Diabetes Mellitus

### INTRODUCTION

Gastrointestinal (GI) symptoms are reportedly common in diabetes mellitus (DM) and are usually attributed to autonomic neuropathy.<sup>1,2</sup> Autonomic

neuropathy is a frequent complication of long standing DM.<sup>3,4</sup> Autonomic symptoms are common in DM and can affect the GI, cardiovascular and neuroendocrine systems.<sup>5</sup> It has been reported that after 10-20 years of overt disease, 30-60 percent of patients



## Gastrointestinal symptoms in patients with DM

develop some clinical signs of some form of autonomic neuropathy, while 5 percent develop autonomic visceral neuropathy.<sup>6</sup> Autonomic neuropathy takes various forms such as oesophagopathy, gastroparesis, enteropathy and bile duct disorders.<sup>7</sup> GI symptoms in patients with DM are dysphagia, nausea, vomiting, abdominal pain, diarrhea, and constipation. These symptoms are also frequent in individuals without DM<sup>8</sup>. We, therefore, determined whether these GI symptoms are more frequent in Nigerians with DM compared with age and sex-matched controls, and also assessed the association of these GI symptoms with blood sugar control.

### PATIENTS AND METHODS

The study was approved by the Ethics and Research committee of the University of Ilorin Teaching Hospital, Ilorin, Nigeria. Written informed consent was obtained from each patient.

The study was a hospital-based case control study. The study was carried out in the diabetic clinic of the University of Ilorin Teaching Hospital, Ilorin from January to December, 2007. A structured and standardized interviewer administered questionnaire containing 15 questions concerning gastro-intestinal symptoms in the last 3 months, was administered to 212 consecutively recruited diabetic patients with 212 age and sex-matched non-diabetic controls. Controls were normal people without DM recruited from the community. Respondents on drugs which produce GI symptoms were excluded from the study.

Blood glucose control was assessed as an average of the 3 most recent fasting blood sugar done at an interval of 4 weeks. Their bio-data was obtained.

### Analysis

The data obtained were analysed using the statistical package for social sciences (SPSS, version 13.0) statistical software. Chi-squared was used to test association between discrete variables. The level of statistical significance was set at  $p$  is equal to or less than 0.05.

### RESULT

At the conclusion of the study, a total of 74 males and 138 females were interviewed in both the diabetic and control groups.

### Demographics of the respondents

#### Age

The age ranged from 21 to 92 years with a mean of  $59 \pm 12.9$  years for both the diabetic and control groups. (Table 1)

Table 1. Age groups of respondents

Age groups (Years)	DM group Frequency (n) (%)	Control group Frequency (n) (%)
20-29	7(3.3)	7(3.3)
30-39	14(6.6)	14(6.6)
40-49	29(13.7)	29(13.7)
50-59	64(30.2)	64(30.2)
60-69	59(27.8)	59(27.8)
70-79	29(13.7)	29(13.7)
80-89	9(4.2)	9(4.2)
90-99	1(0.5)	1(0.5)
Total	212(100.0)	212(100.0)

#### Sex distribution

There were a total of 74 males and 138 females in both the diabetic and control groups.

#### Prevalence of gastro-intestinal symptoms

The prevalence of early satiety was significantly higher in DM patients compared with controls (23.1% vs 11.3%,  $p=0.0012$ ). However, vomiting, nausea and diarrhoea were significantly higher in non-diabetic controls compared to DM patients (20.3% vs 4.2%,  $p=0.000$ ), (18.9% vs 9.4%,  $p=0.0053$ ), and (29.7% vs 8.0%,  $p=0.000$ ) respectively. There was no statistically significant difference in constipation, heartburn, epigastric pain, bloating, faecal incontinence, and gustatory sweating between DM patients and non-diabetic controls. (Table 2)

#### Blood sugar control

Fifty-one and half percent (51.5%) of diabetic patients had poor glycaemic control (mean FBS  $7.9 \pm 3.2$  mmol/L).



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Table 2. Gastrointestinal symptoms in respondents

GI symptoms	Cases (n)(%)	Control (n)(%)	Chi-squared	p-value
Early satiety	49(23.1)	24(11.3)	10.48	0.0012
Constipation	52(24.5)	66(31.1)	2.21	0.1372
Heart burn	19(9.0)	16(7.5)	0.31	0.5765
Epigastric pain	19(9.0)	13(6.1)	1.25	0.2641
Vomiting	9(4.2)	43(20.3)	25.15	0.0000
Nausea	20(9.4)	40(18.9)	7.77	0.0053
Diarrhoea	17(8.0)	63(29.7)	32.32	0.000
Bloating	15(7.1)	16(7.5)	0.03	0.8735
Faecal incontinence	3(1.4)	8(3.8)	2.21	0.1368
Gustatory sweating	19(9.0)	15(7.1)	0.58	0.4482

Table 3. Gastrointestinal symptoms versus duration of DM

GI symptoms	Duration		Chi-squared	p-value
	Short (<10years)	Long(>10years)		
Early satiety			0.91	0.34
Yes	32	17		
No	120	43		
Constipation			0.19	0.67
Yes	39	13		
No	113	47		
Heart burn			0.01	0.92
Yes	14	5		
No	138	54		
Epigastric pain			2.78	0.045
Yes	10	9		
No	142	51		
Vomiting			0.61	0.45
Yes	8	1		
No	143	58		
Nausea			0.00	0.96
Yes	15	5		
No	137	54		
Diarrhoea			0.03	0.78
Yes	13	4		
No	139	56		
Bloating			0.01	0.77
Yes	10	5		
No	141	56		
Faecal incontinence			2.49	0.07
Yes	1	2		
No	151	28		
Gustatory sweating			0.26	0.61
Yes	15	4		
No	136	57		

## Gastrointestinal symptoms in patients with DM

Correlation of gastro-intestinal symptoms with duration of disease in DM

Only epigastric pain was significantly correlated with the duration of disease in DM patients ( $p=0.0445$ ), the other symptoms were not ( $p>0.05$ ). (Table 3)

## DISCUSSION

Gastro-intestinal symptoms are reportedly common in DM, and are usually attributed to autonomic neuropathy, whereas symptoms suggestive of autonomic dysfunction may be common, they may frequently be due to other causes rather than to true autonomic neuropathy<sup>9</sup>.

From this study, the prevalence of early satiety was significantly higher in DM patients compared with controls (23.1% vs 11.3%,  $p=0.0012$ ). However, vomiting, nausea and diarrhoea were significantly higher in non-diabetic controls compared to DM patients (20.3% vs 4.2%,  $p=0.000$ ), (18.9% vs 9.4%,  $p=0.0053$ ), and (29.7% vs 8.0%,  $p=0.000$ ) respectively. There was no statistically significant difference in constipation, heartburn, epigastric pain, bloating, faecal incontinence, and gustatory sweating between DM patients and non-diabetic controls. The findings in this study differ from those of Onyekwere and Ogbera<sup>9</sup> in Lagos, Nigeria who found that GI symptoms: constipation, belching, epigastric pain, and diarrhea were commoner in Nigerians with DM compared with controls (42% vs 18%). They also found that these GI symptoms were not related to the degree of glycaemic control, but to duration of DM. Our findings also differs from that of Abid *et al*<sup>10</sup> who found that all GI symptoms: heartburn, dyspepsia, bowel-related abdominal pain, diarrhea, constipation and faecal incontinence were significantly more in Pakistanis with DM than non-diabetic controls. Similarly, Spangeus *et al*<sup>11</sup> found that Swedish patients with DM had more GI symptoms than their non-diabetic counterparts. However, Troncon *et al*<sup>12</sup> found dysphagia to be the only GI symptom significantly higher in Brazilian DM patients than controls whereas epigastric fullness, heartburn, and constipation were similar in DM patients and controls. Janatuinen *et al*<sup>13</sup> in Finland, found the prevalence of upper GI symptoms: abdominal pain, diarrhoea, and constipation were similar in DM patients compared with controls. Similarly, Wilms and Helmert<sup>14</sup> found fullness and heartburn to be similar in DM patients and controls among Germans. Maleki *et al*<sup>2</sup> in Minnesota, USA found that most of GI symptoms are similar in Americans with or without DM, except for a lower prevalence of heartburn and an increased

prevalence of constipation. The differences in the prevalence of GI symptoms reported in this study and others may be due to differences in diet, environmental factors, psychological stress of DM, and possibly other yet to be identified factors. Neuropathy alone may not account for GI symptoms in DM patients.<sup>9</sup>

No association was found between the degree of blood sugar control and the prevalence of GI symptoms. This is similar to the findings of Spangeus *et al*<sup>11</sup>, and Mjornheim *et al*<sup>5</sup> who did not find any association between GI symptoms and glycaemic control. Similarly, Enck *et al*<sup>6</sup>, and Onyekwere and Ogbera<sup>9</sup> did not find any association between GI symptoms and glycaemic control. However, this is contrary to the findings of Abid *et al*<sup>10</sup>, and Bytzer *et al*<sup>7</sup> who found that GI symptoms in their DM patients was associated with poor glycaemic control. From this study, 42.5% of DM patients had at least one GI symptom, while 60.6% of non-diabetic controls had at least one GI symptom. This is in contrast to the findings of Troncon *et al*<sup>12</sup> who found that the percentage of DM patients with at least one GI symptom was significantly higher than in controls. Similarly, Ko *et al*<sup>8</sup> found that up to 70% of Chinese DM patients had GI symptoms which was much higher than in their non-diabetic controls. There is no age or sex predilection for GI symptoms among DM patients ( $p>0.05$ ). However among non-diabetic controls, there is a female predilection for nausea and vomiting ( $p<0.05$ ). This is similar to the findings of Wilms and Helmert<sup>14</sup> who found that women who are non-diabetic suffered significantly more from fullness and nausea than men, and that there is no age predilection.

In conclusion, GI symptoms in Nigerians with DM are not different from controls except for early satiety which is more in DM patients, whereas nausea, vomiting and diarrhea are more in non-diabetic controls. These GI symptoms in DM patients are not related to age, sex or glycaemic control.

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