

# Symptoms and Prevalence of Constipation among Adult Population of Bangladesh

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## ABSTRACT

**Background:** Constipation is one of the most common gastrointestinal disorders. The prevalence of constipation is rapidly increasing globally. It has adverse effects on the patient's quality of life including productivity and results in a high financial hardship on the healthcare system. The aim of the study was to estimate the symptoms and prevalence of constipation among the adult population of Bangladesh.

**Materials and methods:** It was a cross-sectional observational study based on a structured questionnaire and a checklist. In this study, three criteria were used for the diagnosis of chronic constipation (self-reported perception, Rome III criteria, and Bristol's criteria). The study was conducted among 1,550 population between July 2019 and December 2019.

**Result:** The study population consisted of 1,550 respondents, among them 41.61% male and 58.39% female, and the mean age was  $32.71 \pm 9.72$  years. In the study, 12.2% of the population was categorized to have constipation according to self-reported perception, 11.2% according to Rome III, and 10.3% reported to have been suffering from constipation according to Bristol chart.

Female gender tends to have a greater prevalence than male. In multivariate analysis for constipation, betel nut chewer, alcohol consumer, diabetes mellitus, hypertension, GI surgery, and bronchial asthma were significantly ( $p < 0.001$ ) associated with constipation. According to Bristol's criteria, the most common stool form was Type III (sausage-shaped with cracked surface) among the Bangladeshi population in this study.

**Conclusion:** Chronic constipation is a common problem worldwide. The findings of this study suggest that there is a high prevalence of constipation among the general population of Bangladesh. Decreasing modifiable risk factors of constipation can reduce its prevalence and burden of the disease. Bangladesh is markedly deficient in literature citing constipation prevalence and determinants. These findings may commence a call for setting priority as one of the major public health problems and demanding attention for both at the clinical and community levels.

**Keywords:** Bangladesh, Bristol's criteria, Constipation, Prevalence, Rome III criteria, Self-reported perception.

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## INTRODUCTION

The contemporary lifestyle has led to huge changes in diseases pattern and it became more noticeable with the entrance of the current century.<sup>1</sup> Constipation is one of the most common gastrointestinal disorders faced in Inpatients and Outpatient Departments.<sup>2</sup>

Constipation is used to express a person's perception of altered bowel movement that includes hard stools, difficulty with defecation, and a sense of incomplete evacuation. Chronic constipation is defined as when a person reports symptoms of constipation for at least three consecutive months. Chronic constipation may cause severe health issues regarding economic load for the patients and the healthcare service systems.<sup>3,4</sup> The prevalence of constipation is rising day by day worldwide.<sup>5</sup> But it is still underappreciated and consulted only when severely sick.<sup>6,7</sup>

There is wide variation of prevalence of the constipation from one region to another worldwide.<sup>8</sup> In Europe, prevalence ranges from 1 to 81% in different ethnicity with a mean prevalence of 17%.<sup>9</sup> In the West, chronic constipation affected nearly 2–27% in Canada. In the United States, overall prevalence is 16%.<sup>3,10</sup> In Asia, China, India, and Japan reported a prevalence of 8, 17, and 28% respectively.<sup>11–13</sup> Considering the wide variation of the prevalence of constipation, recent studies are using Rome criteria of constipation, which are standardized for diagnosing functional gastrointestinal disorders. The latest version of this is Rome IV criteria and it was released in May 2016.<sup>14</sup>

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There are different causes of chronic constipation. Among them, metabolic and endocrine derangement, electrolyte imbalance, neurological and myopathic disturbances, colorectal mechanical obstructions, and use of specific medications are the secondary causes of constipation.<sup>15</sup> In clinical practice, a small number

of patients have these secondary causes. Among the types of constipation, functional constipation (FC) is the most common and it is diagnosed after the exclusion of alarm symptoms of constipation which includes anemia, significant weight loss, per rectal bleeding, or positive occult blood test (OBT), acute constipation, positive family history of colorectal carcinoma etc., and exclusion of secondary causes. There are three subgroups of functional constipation based on the pathophysiology. These are normal colonic transit (NCT), slow colonic transit (SCT), and rectal evacuation disorders.<sup>16</sup>

There are different factors associated with constipation. Previous studies revealed that female gender, poor diet habits, and lower socioeconomic status in addition to certain geographic regions, race, and ethnicity have associations with constipation. Data on constipation are scarce in Bangladesh. One population-based study trying to determine "Functional constipation - prevalence and lifestyle factors in a district of Bangladesh" showed 4.9% of the respondents experienced functional constipation.<sup>17</sup> Due to lacking uniform diagnostic criteria; there is a discrepancy in the reported rates. Bristol's chart and Rome III criteria are commonly used among gastroenterologists to diagnose constipation while some prefer using self-perception for constipation diagnosis in surveys.<sup>18,19</sup>

There is little data on the symptoms, prevalence and risk factors of constipation among adult population of Bangladesh. So, the present study evaluated the symptoms and prevalence of constipation among adult population of Bangladesh.

## MATERIALS AND METHODS

The study was conducted at Savar, one of the largest Upzilla of Dhaka district in Bangladesh with technical support from the Department of Gastroenterology of Shaheed Suhrawardy Medical College and Hospital. Total 1,550 participants were randomly selected from July 2019 to December 2019. This area, Savar has a large industrial base and it is a leading export processing zone (EPZ) the country. People from all over the country stay and work in different garments, industrial and other installations in this area. It is therefore assumed that the study population was representative of the Bangladeshi population. All the apparently healthy individuals of either sex aged 18 years or above in mentioned area were included in this study. The data collected was done by face-to-face interviews of the respondents who met the selection criteria. The instruments for data collection were a validated structured questionnaire and a checklist (Rome III criteria, Bristol criteria and Self-reporting). Data collected was done by four trained personnel and medical officers. The researchers rechecked randomly selected data to verify the collected data. Informed written consent was obtained from every respondent and interviews were held in private. Collected relevant data were compiled on a master table first and then statistical analysis was done by using window-based software with Statistical Packages for Social Sciences (SPSS-25). Results were exhibited in tables, figures, and diagrams. The research protocol was approved by the National Research Ethics Committee (NERC) of Bangladesh Medical Research Council (BMRC) before starting the study.

## RESULT

The study population consisted of 1,550 respondents, 41.61% male, and 58.39% female. The majority (45%) of the study population belonged to the young age-group (<30 years) and the mean age was 32.71 ± 9.72 years. The male-to-female ratio was 1:1.4. Nearly

**Table 1:** Demographic details of the respondents in male and female

	Male (n = 645)	Female (n = 905)	Total (n = 1,550)
Age (Years)			
≤30	263 (40.8)	434 (48.0)	697 (45.0)
31–40	156 (24.2)	200 (22.1)	356 (23.0)
41–50	84 (13.0)	171 (18.9)	255 (16.4)
51–60	70 (10.9)	69 (7.6)	139 (9.0)
>61	72 (11.2)	31 (3.4)	103 (6.6)
Mean ± SD	33.88 ± 9.69	31.46 ± 9.60	32.71 ± 9.72
Marital status			
Married	510 (79.1)	766 (84.6)	1276 (82.3)
Unmarried	135 (20.9)	139 (15.4)	274 (17.7)
Occupation			
Government employee	41 (6.4)	31 (3.4)	72 (4.6)
Non-government employee	212 (32.9)	409 (45.2)	621 (40.1)
Student	35 (5.4)	17 (1.9)	52 (3.4)
Businessmen (Large)	150 (23.3)	0 (0.0)	150 (9.7)
Businessmen (Small)	40 (6.2)	0 (0.0)	40 (2.6)
Farming (landowner and farmer)	54 (8.4)	0 (0.0)	54 (3.5)
Agriculture worker	17 (2.6)	0 (0.0)	17 (1.1)
Driver	17 (2.6)	0 (0.0)	17 (1.1)
Housewife	0 (0.0)	372 (41.1)	372 (24.0)
Retired	56 (8.7)	65 (7.2)	121 (7.8)
Others	23 (3.6)	11 (1.2)	34 (2.2)
Religion			
Muslim	599 (92.9)	810 (89.5)	1410 (90.9)
Hindu	46 (7.1)	60 (6.6)	105 (6.8)
Christian	0 (0.0)	35 (3.9)	35 (2.3)
Monthly family income (Taka)			
5,000–10,000	455 (70.5)	636 (70.3)	1091 (70.4)
10,000–15,000	151 (23.4)	230 (25.4)	381 (24.6)
>15,000	39 (6.0)	39 (4.3)	78 (5.0)
Educational status			
Illiterate	124 (19.2)	217 (24.0)	341 (22.0)
Primary	90 (14.0)	98 (10.8)	188 (12.1)
High school	254 (39.4)	318 (35.1)	572 (36.9)
College	116 (18.0)	190 (21.0)	306 (19.7)
University	61 (9.5)	82 (9.1)	143 (9.2)

82.3% of the sample population was married, among them 79.1% were male and 84.6% were female. In regard to the occupation of the respondents majority was from non-government employees (40%), about 24% from housewife, and about 12% from business and the rest 24% constituted other occupations like students, government employees, drivers, farmers, agri-laborers and others. On educational background 9.2% graduate and above, 19.7% secondary education completed, 36.9% of the respondents were secondary education not completed, 12.1% primary education completed, and 22% are illiterate. Most of the study populations are Muslims (90.9%) and the rest are Hindu (6.8%) and Christian (2.3%). About 70% of the respondents reported to earning a monthly income of taka less than 10,000 (Table 1).

## Prevalence of Constipation

Out of 1,550 participants screened for constipation using the questionnaire (Rome III Criteria), 173 cases were found to be constipated and 1,377 individuals are non-constipated. Age-wise distribution showed that the majority of individuals associated with constipation belong to the young age-group (<30) years. The prevalence of constipation among respondents was 11.2% according to Rome III in this study, 12.2% was categorized to have constipation according to self-reported perception; but in contrast, 10.3% reported to have been suffering from constipation according to Bristol chart (Table 2).

Among 1,550 respondents, most people 1,326 (85.5%) passed predominantly Bristol Type III stool; followed by 159 (10.3%), Type II, other stool forms were: 54 (3.5%) Type IV and 11(0.7%) Type V (Table 3).

**Table 2:** Prevalence of constipation

	Frequency (n)	Percentage (%)
Total population	1,550	
Constipation (Bristol criteria)	159	10.3
Constipation (Rome III criteria)	173	11.2
Constipation (Self-reporting)	189	12.2

**Table 3:** Distribution of the patients according to Bristol stool chart

	Frequency (n)	Percentage (%)
Type II Sausage-shaped but lumpy. Uncomfortable to pass (Constipation)	159	10.3
Type III Like a sausage or snake but with cracks on its surface (Healthy stools)	1,326	85.5
Type IV Like a sausage or snake, smooth and soft (Healthy stools)	54	3.5
Type V Soft blobs with clear-cut-edges, passes easily (Precursor to diarrhea)	11	0.7

**Table 4:** Bivariate analysis for significant risk factors for constipation

Risk factors	Constipation (n = 173)	Non-constipation (n = 1,377)	OR	p-value
Betel nut chewer	71 (41.0)	327 (23.7)	2.23 (1.61–3.10)	<0.001
Alcohol consumer	15 (8.7)	12 (0.9)	10.79 (4.96–23.48)	<0.001
Dietary habit (Non-vegetarian)	6 (3.5)	65 (4.7)	0.72 (0.31–1.69)	0.458
Smoking	36 (20.8)	210 (15.3)	1.46 (0.98–2.16)	0.059
Daily water intake (<6 cups daily)	5 (2.9)	45 (3.3)	0.88 (0.34–2.25)	0.791
Voluntary physical activity (sedentary)	63 (36.4)	559 (40.6)	0.83 (0.60–1.16)	0.290
BMI (Obese)	12 (6.9)	112 (8.1)	0.84 (0.45–1.56)	0.584
Liver disease	0 (0.0)	24 (1.7)		0.100
Thyroid disorder	5 (2.9)	18 (1.3)	2.24 (0.82–6.13)	0.169
Diabetes mellitus	35 (20.2)	77 (5.6)	4.28 (2.76–6.62)	<0.001
Hypertension	31 (17.9)	92 (6.7)	3.04 (1.95–4.74)	<0.001
IBS	0 (0.0)	11 (0.8)		0.238
GI surgery	51 (29.5)	227 (16.5)	2.11 (1.48–3.02)	<0.001
IHD	1 (0.6)	11 (0.8)	0.72 (0.09–5.62)	0.755
Bronchial asthma	20 (11.6)	18 (1.3)	9.86 (5.10–19.06)	<0.001

Bold figure indicates statistically significant as  $p$ -value < 0.05

## Risk Factors of Constipation

Bivariate analysis for constipation as a dependent variable was done separately for all three criteria. Betel nut chewers, alcohol consumption, diabetes mellitus, hypertension, GI surgery, and bronchial asthma were associated with constipation by all three methods (Table 4).

## Multivariate Analysis for Constipation

Betel nut chewers, alcohol consumption, diabetes mellitus, hypertension, GI surgery, and bronchial asthma were associated with constipation (Table 5).

## DISCUSSION

The study estimated the prevalence and symptoms of constipation among the general population of Bangladesh. Constipation can be defined as a decreased number of defecations per week, other symptoms, for example, sensation of incomplete evacuation, abdominal bloating, straining, elongated or failed attempts to defecate, hard stools, and sometimes necessity of digital disimpaction.<sup>20</sup> Constipation is usually subjective and is termed when people have reduced frequency of stools or strain during defecation.

In this study, the majority of the study population was in the younger age-group (<30 years). Studies from Singapore revealed that constipation in the form of hard stool was more in older adults over 40 years, but constipation in the sense of straining was more in the younger age-group, 18–29 years.<sup>21</sup> Older age-group are more affected by constipation due to their different comorbidities and side effects of different medication.<sup>22</sup>

Regarding gender, males were 41.61% and females were 58.39%. Females were more prevalent than males. In the USA, Females were 2.2 times more likely to be affected by constipation than males.<sup>23</sup> Association of constipation with the female gender is well established in the literature.<sup>24</sup> However, it is difficult to establish the exact causative mechanism, but contributing factors like hormonal causes and dietary patterns have been illustrated.<sup>23,25</sup>

There are many clinical diagnostic criteria for constipation resulting in a huge variation in its prevalence.<sup>26</sup> The present study

**Table 5:** Multiple logistic regression analysis for being constipation

Risk factors	Constipation (n = 173)	Non-constipation (n = 1,377)	OR	p-value
Betel nut chewer	71 (41.0)	327 (23.7)	0.63 (0.43–0.97)	<b>0.019</b>
Alcohol consumer	15 (8.7)	12 (0.9)	0.13 (0.05–0.31)	<b>&lt;0.001</b>
Diabetes mellitus	35 (20.2)	77 (5.6)	0.30 (0.16–0.56)	<b>&lt;0.001</b>
GI surgery	51 (29.5)	227 (16.5)	0.57 (0.38–0.84)	<b>0.005</b>
Bronchial asthma	20 (11.6)	18 (1.3)	0.10 (0.05–0.21)	<b>&lt;0.001</b>

Bold figure indicates statistically significant as  $p$ -value < 0.05

obtained a self-reported prevalence of constipation of 12.2%. On application of the Rome III criteria, the rate was 11.2%, while estimation through the Bristol stool chart, obtained a lower rate of 10.3%. These statistics show little variation. However, since there is no single gold standard diagnostic method available, there is a need to discuss the pros and cons of the other methods used. Self-reporting method is especially individual-based and depends on the extent of the self-perception of people in the frequency of stools and the amount of straining depending on one's bowel habits as the reference standard. Hence, there is a risk of over-reporting the symptoms although it might be considered to be normal resulting in an overestimation of results. Johanson in his review of the epidemiology of constipation demonstrated a prevalence ranging from 3 to 27%, mostly from NHS and NHANES surveys using either self-reported or Rome I/II criteria and thereby attributed the variance to the different diagnostic criteria and concluded by stating self-reporting method has a risk of attaining higher prevalence rates.<sup>27</sup>

There are different etiological and risk factors for constipation. In this study, Logistic regression analysis showed a significant risk for constipation with betel nut chewers, alcohol consumption, diabetes mellitus, hypertension, GI Surgery, and bronchial asthma ( $p < 0.05$ ).

Betel nut chewing is very common in this Southeast Asia. In our study, the study population was mostly from an industrial region, where most of them are workers. Betel nut chewing and alcohol consumption increased the capacity to work. So betel nut chewing and alcohol consumption is comparatively more prevalent in this population group. There is no clear evidence that betel nut chewing and alcohol consumption causes constipation, rather betel nut chewing improves bowel movement.<sup>28,29</sup> Surgery is a known risk factor for constipation. This may be due to a different medications, opioid analgesics, and a sedentary lifestyle after surgery. Epidemiological studies revealed that abdominal and anorectal surgery were significantly associated with an increased risk of chronic constipation.<sup>30</sup>

From the perspective of comorbidities, diabetes mellitus was associated with chronic constipation (4.7–11.8%).<sup>31</sup> Diabetes mellitus may cause constipation by complications like autonomic neuropathy. Hypertensive patients use different medications including calcium channel blockers and patient suffering from bronchial asthma lead a sedentary life and use medications that contribute to developing constipation.<sup>32</sup>

## CONCLUSION

Chronic constipation is a common problem globally. The study findings suggest a high prevalence of constipation among the general population of Bangladesh. Decreasing modifiable risk factors of constipation can reduce its prevalence and burden of

the disease. Bangladesh is markedly deficient in literature citing constipation prevalence and determinants. The findings of this study have important implications for future research. It has highlighted the magnitude of the disorder and has provided a pathway for designing larger population-based studies to assess its epidemiology, etiological characteristics, environmental risk factors, and the quality of life of people with constipation in Bangladesh.

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