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### Flatulence awareness among the masses and its affinity with daily foods along with anti-ulcerant drugs in Bangladesh

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#### ABSTRACT

**Objective:** To specify the current status of consciousness about flatulence and identify the effect of food and medicine used in gastritis status on it.

**Methods:** It was an in-depth interview based qualitative analysis. A series of questions were asked to 300 individuals from 110 families about their food habit, knowledge about flatulence, possible cause, self-medication and course-completion of drug.

**Results:** About 99.99% of respondents took rice, fish and vegetables as their main course, and 90% had self-medication, but only 2%–3% maintained the proper dose of drug. About 30% took antacid and the rest was the type of proton pump inhibitor, anti-ulcerant drugs.

**Conclusions:** This survey reveals that a significant percentage of people are suffering from flatulence. Proper guidelines for taking medication and the avoidance of oily food and fiber rich diet may reduce its frequencies. Therefore, it is urgent to originate public cognizance and education on the cause and remedied issues through regular crusade.

## 1. Introduction

The excessive accumulation of air or gas in the stomach or intestines, expelled from the anus is called flatulence. By its very nature, it is a subject of acute personal embarrassment. On an average, about 0.7–1 L intestinal gas are produced by human every day[1,2]. Particularly colon, at gastrointestinal tract, is the main place where flatus is mostly acquired, as a spin-off of bacterial fermentation[2]. Experiments reveal that 99% of the volume of flatus is drawn up by non-smelly gases[3]. The major elements of intestinal gas are confirmed to be the odorless gases, oxygen, nitrogen,

hydrogen, carbon dioxide and methane[4,5]. As an element of environmental air, nitrogen is not formed in the gut. Thus, nitrogen comprises the most part of excessive intestinal gas in aerophagic patients[6]. Carbon dioxide, hydrogen and methane are all formed in the gut and bestow 74% of the volume of flatus in normal subjects[7]. As hydrogen and methane are flammable, adequate amounts of these constituting flatus can be ignited[8]. For extending trace (< 1% volume), compounds are responsible for the smell in flatus. Previously, indole, skatole, ammonia and short chain fatty acids like compounds were thought to engender the smell of flatus. But recent experiments revealed that a combination of volatile sulfur compounds donates the major smell of flatus[3,9]. Even more, it is known that hydrogen sulfide, methyl mercaptan, dimethyl sulfide, dimethyl disulfide and dimethyl trisulfide are present in flatus. The benzopyrrole volatiles indole and skatole have a mothball smell, and therefore probably do not contribute greatly to the characteristic smell of flatus[10].

On the basis of the observation of tiny curved bacteria, both

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human and veterinary pathologists have accounted for the bacterial infections in gastric mucosa[11,12]. Later, these beings were brushed aside as irrelevant contaminants. In the year of 1947, when gastroscopy was first used, Jankowski deemed gastritis as one of the most debated diseases of the human body and claimed that the bacteriological etiology of chronic gastritis has not been convincingly proved in a single case[13]. In 1984, Marshall and Warren proposed that chronic idiopathic gastritis had a bacterial cause (*Helicobacter pylori*) and their hypothesis was met with great skepticism. However, within a few years, the association between *Helicobacter pylori* gastritis, peptic ulcer and gastric cancer came to be acknowledged and ultimately accepted[14].

The 2010 Dietary Guidelines for Americans emphasizes the benefits of a plant-based diet for better health. These recommendations include the consumption of legumes, such as beans, several times per week. It is known that some types of food have greater flatulent potential than others. Studies have shown that food with a high fiber content produces increased amounts of intestinal gases. A direct relation between the volume of flatus and the volume of beans consumed exists. The gas accountable for increased flatus volume of beans is primarily carbon dioxide[15]. On the contrary, it is known that flatulence can be reduced by an increasing content of carbohydrate in the diet[16].

In Bangladesh, the issue of the effect of medication used against gastric state and food on flatulence has not previously been inquired. To assure the potential kinship between foods as well as gastritis with flatulence in Bangladesh, it is requisite to ascertain the extent of the medications that are prescribed in gastric state and food consumed by the people and their effects on flatulence. Moreover, if the antiulcerant treatment and food-induced flatulence are identified, it might be possible to reduce such embarrassing situation. Therefore, the objectives of the current study were to examine the impact of medication used against gastric state and food on flatulence among a certain age group of patients and to investigate patients' reasons associated factors.

## 2. Materials and methods

The work was a qualitative interview-based study, conducted in Manikganj, Dhaka, Bangladesh (geographical coordinates are 23°51'19" N, 90°0'45" E) during May to August, 2015. In accordance with the International Conference on Harmonization Good Clinical Practice guideline and the Declaration of Helsinki and its further amendments, the survey was conducted[17]. The study protocol was reviewed and approved by the Bangladesh Medical Research Council. A total of 300 peoples from 110 families belonging to the same district participated in this survey.

### 2.1. Selection and description of participants

Bengali-speaking individuals, having an age limit of 45 years old were the objectives. Since gastritis or the flatulence problem was mostly occurring after the age of 30, the participants were restricted to the age limit of above 45 years. The samples were obtained based on ergodicity in each step. The sampling constituted two-steps: firstly, a family was randomly selected under the district and secondly, a family member. In case of unavailability of the samples, he or she was substituted by another randomly selected person in the household or another randomly selected household. Here, wise selection was done to find out the number of family members, facing the flatulence or gastritis. Once the respondent was keyed out, an appointment was fixed to conduct the interview in their house.

### 2.2. Technical information

The intention of this study was cleared and a verbal consent form was issued by the participants, before the interview. A questionnaire (Table 1) was placed by the interviewer to the individual respondents and their answers contained data sheet were amassed. The questionnaire was made up into three distinct sections. The first section was asked for morphological and geographical data, including age, gender, ethnic group, educational level and monthly income *etc.* In the second and third sections, a series of questions with certain answer sets were used to ask about their diet plan, overweight, the intake of any snack *etc.* and medication used in gastric state, prescribing personnel, rational use and their possible effect on flatulence *etc.* respectively. Here, the predefined answer was set in such an order that the respondent reads all the possible answers for reducing the selection bias of the first displayed answer. The data were then quantified and all of the options given in the other category were identified and collated. Data collected from the participants were compiled and tabulated. The tabulated data were arranged as percent values for understanding and analyzed precisely to have a defined ratiocination. Here, personal interview was done in aid of better understanding of every required information and getting the most accurate data. Besides, according to the data collection, the research was observed that if the patients were taken the prescribed medicines on the exact time (before meal or after meal) as recommended in the prescriptions or if they have any idea about the importance of taking medicines on the exact time recommended.

### 2.3. Statistics

All the answered data of each question were coded individually and analyzed Using the SPSS version 21 for Windows (Chicago,

IL, USA). Eventually, parametric and non-parametric statistical tests were used, if required. The analysis included frequencies of discrete variables and descriptive statistics (mean  $\pm$  SD) for continuous variables. The association among categorical variables was carried out using *Chi-square* and Fisher's exact tests. Independent-sample *t-test* and One-way ANOVA were used to compare means of all groups. Spearman's rho test was used to assess the correlation if appropriate. A *P* value of less than 0.05 was considered significant throughout the analysis.

**Table 1**

Questionnaire of flatulence awareness among the masses and its affinity with daily foods along with anti-ulcerant drugs in Bangladesh.

Questions	Responses
How long have you noticed a problem with flatulence?	Less than 6 months Less than 1 year More than 1 year
Frequency of flatulence	Not too frequent Frequent
Are you conscious of swallowing air?	Yes No
History of dietary habit	Rice Vegetable Sweet Others
Do you consult your doctor for this flatus?	Yes No
Do you face any embarrassment?	Yes No
Do you know what the reason behind flatulence is?	Yes No
Heartburn or regurgitation?	Present Not present
Abdominal pain or abdominal distension?	Present Not present
Who told you to take this medicine?	Doctor Village doctor Medical assistants Local people Others
Symptoms of anxiety, panic disorder or emotional upset?	Present Not present
Symptoms of irritable bowel syndrome?	Not present Abdominal pain or cramping A bloated feeling Gas Diarrhea or constipation-sometimes alternating bouts of constipation and diarrhea Mucus in the stool
Symptoms of gallstones?	Not present Pain in the upper abdomen and upper back and the pain lasting for several hours Nausea Vomiting Other gastrointestinal problems including bloating, indigestion and heartburn
Symptoms of peptic ulcer?	Not present Present
Other signs and symptoms	The vomiting of blood (red or black) Dark blood in stools (black or tarry) Nausea or vomiting Unexplained weight loss Appetite changes

**Table 1, (continued)**

Questions	Responses
Symptoms of giardia infection?	Not present Watery, sometimes foul-smelling diarrhea, or alternated with soft and greasy stools Fatigue or malaise Abdominal cramps and bloating Weight loss Belching gas with a bad taste Nausea
Are you currently trying to follow a diet plan in order to better control your flatulence?	Yes, I have a plan and I am trying to follow. No, I am not following a plan but I am conscious of how food affects. No, I really do not pay attention to how food affects.
Are you not currently following a diet or meal plan to better control your blood flatus and maybe this is something you plan to do in the future?	I am already following a diet or meal plan. Yes, I plan to start within the next month. Yes, I plan to start within the next six months. No, I have no plans right now for starting to follow a diet or meal plan.
Overeat? By overeating, we mean eating until you fell stuffed or too full.	Never 1 time a month or less 2-3 times per month 1-3 times a week 4-6 times a week 1 or more times per day
Eating unplanned snacks? That is, how often do you find yourself snacking on foods then thinking "I wish I had not eaten that"	Never 1 time a month or less 2-3 times per month 1-3 times a week 4-6 times a week 1 or more times per day
Making poor food choices? That is, how often do you find that you have eaten a particular food then thought "I wish I had not eaten that?"	Never 1 time a month or less 2-3 times per month 1-3 times a week 4-6 times a week 1 or more times per day
Has your doctor prescribed any medicine for you?	Yes No
How often are you supposed to take these?	I do not take for my flatulence. Occasionally as needed Once per day Twice per day Three or more times per day
What kind of drugs are you taking?	Antacid PPI Others

PPI: Proton pump inhibitor.

### 3. Results

The study involved 300 participants from 110 distinct families who were taking medication for gastritis and suffering more or less flatulence problem. Data revealed that among the respondents, 45% were aware about their flatulence problem and their fact of embarrassment. Interestingly, 75% of the participants are facing regular flatulence like discomfort. The questionnaire contained a previous flatulence history or family issue questions and this was surprisingly noted that about 50% of the members from each family were frequently facing a flatulence problem that was remarkable. Studies found that among the respondents, 90% of them had a self-medication strategy during their disease state and the rest of them did not use any medication or leftover of the medication. Hence, around

10% of the participants' responses had a consultation with doctors when they were facing such frequent flatulence. Regarding food habits, 90% participants disclosed that they had rice, fried food and vegetables like items for their breakfast. Only 10% had taken bread and vegetables for their first meal of the day. Approximately 99.9% participants took rice, fish and vegetables for their lunch. For dinner, 87% took rice and fish, on the other hand, only 10%–15% took bread for their first choices. Besides, taking 3 meals a day, participants also ensured that they had an over diet tendency too. Among them, 80% responded to have a 7 to 8 times, overeating tendency in a month and 65% respondents had snacks or fried food, after eating, even 4 to 5 times in a month. Some participants were reported to have knowledge about the reason of flatulence and it constitutes 78% of the total respondents. When, the possible mechanism of using drugs was a concern, surprisingly less than 1% participants assured their knowledge about the possible pathway. Aside the food intake, the medication also had an effect on flatulence especially medication used in gastric state. Maximum 60% of the respondents claimed that they took PPI medication. About 30% used antacid and 10% respondents took H<sub>2</sub>-blocker group drugs as self-medication strategies. For antacid grouped drug, the preparation of antacid tablet was maximally used, claimed by the respondents. About 90% of the participants used antacid plus dried aluminum hydroxide gel, magnesium hydroxide and simeticone combining tablet preparation, where only 7% used liquid antacid preparation and rest of them used only the antacid tablets. Surprisingly, around in 95% cases, food consumption can cause flatulence, claimed by the respondents. Lastly, 2%–3% patients took the proper dose of medication along with full courses, but 95%–98% participants thought of taking medicine only when they felt discomfort and a single dose can make them comfortable. Not only this, only 75% respondents knewed the exact time recommended for medicines intake. But the rest of the respondents did not have any idea. Besides, the self-medication, 65% patients suffering from gastric induced flatulence were reducing oily food via changing their food habit in order to reduce their discomfort.

#### 4. Discussion

There has been nearly no exhaustive meditating of patients purporting to excrete excessive rectal gas, instead of lactose, fiber or oily food content which cause the highest baseline for flatulence, that is why medicos commonly take an irrational access to ailments of flatulence, as an explanation of current data, by the care received by the patient described in this report. Flatulence may be connected to an assortment of symptoms, including distressing like indication aside from the embarrassment and unease. This study explains the relationship between intestinal gas with food consumed and medicine taken at the gastric state by a specific district in Bangladesh, though, the emphasis is placed upon the effects of daily food and self-medicated drug during the gastritis state in producing excessive intestinal gas. It could be speculated

that for overcoming such problem, self-consciousness about the food habit and lifestyle is needed. It is emphasized that oily or fiber-rich food and antacid like drug preparation does not remove the problem of flatulence in man, and the change in their lifestyle is necessary. The present study reveals that almost 50% or more members from each family are suffering from flatulence problem that is a concern. Moreover, 75% of them are frequently facing flatulence problem. Biochemical, clinical and microbiological studies have greatly enhanced noesis about the reason of intestinal gas and their relationships with dietary elements have been accomplished. Hence, most of this information may be little known to food chemists and physicians, who are arguably the best perspective to offer amended choices for the easement of this distressing trouble. There are throttled amount of data on flatulence and their remedies as well as the issue of embarrassment. In most of the case studies, patients are more comfortable to take self-medication instead of physician's consultation. During the studies, only 10% participants has confirmed their reference about the consultation with physicians when they faced a flatulence problem. The issue of flatulence is much more embarrassed than the abdominal discomfort or intake of fiber-rich food, oily food and gastric medicines. Most of the people think that this is neither a disease nor a consequence, while it's just a normal physiological condition which does not need any treatment or else and the percentage of the data reveals that. As rice is the staple food in Bangladesh, most of the people take rice, fried food and dietary fiber-rich vegetables. Studies show that 90% people take rice, fried food and vegetables for breakfast and near about 99.99% take them for lunch. Maybe all these assist to elevate the chance of flatulence at their daily lives. Further evidence of these plebeians is provided by the number of responses to the reasons of frequent flatulence (78%). Alongside these regular daily food, medications used in gastritis are also responsible for such kind of unease. The evidence showed that most of the respondents claim about self-medicating of PPI drugs. About 60% participants take a PPI like drug combination for their gastritis state which elevates the frequencies of such discomfortable phenomena. MgOH containing antacid preparation are also in the pipeline. About 30% participants raise tick mark to this aluminum hydroxide, magnesium hydroxide and simethicone drug combination. As these are OTC drugs, their frequent use also may evoke their excessive intestinal gas producing capacities.

Meanwhile, in our present study, the majority of the participants 90%–95% mentioned that they only use medication while suffering from gastritis or feeling discomfort. Not only that, this majority percentage is satisfied with a single dose, which support the frequency of intestinal gases. The results of this study suggest that there is a role for patient education on the proper use of prescribed medications and the necessity of complete course. Since frequent visits to the physicians are associated with several obstacles in Bangladesh, proper food and drug instruction and patient education are necessary. The visit to pharmacy can provide opportunities for patient education.

The present study would suggest that there is a significant proportion of lack of knowledge and apathy for taking medicine or physician's guideline in several areas of Bangladesh. Most importantly, flatulence may be disease consequences or indication of debased diet intake that anomalously evoke intestinal gases as well as discomfort. Due to a social embarrassment issue, most of them are reluctant to take doctor's advice or are apathetic for course completion. However, current research clearly indicates patients concern or education may be an effective way to minimize such kind of uneasiness. Therefore, it is essential that all aspects of possible remedies and patients' counseling should further be investigated within Bangladesh.

Flatulence is a trouble about which individuals are usually self-effacing and its scale is therefore, arduous to appraise. It appears to be a problem that makes the people concern, although the level diverges substantially with individuals and is borne upon by the prompt surroundings. It is likely that most mortals endure from extravagant intestinal gas caused some endeavor at dietary regulation as dietary abstinence is the only certain fashion to forestall this problem. It may enforce unacceptable confinement on the individual pertained. The legume intake in the western world and the grandness of these foods as sources of protein for an appreciable symmetry of the world's population are clear exonerations for the continuance of study in this area as part of a unified plan of research on food safety and lineament. This survey found that due to antacid taken in the gastritis state as an OTC drug, most of the people don't complete their course or even don't know about the causes or remedies of such embarrassment. Of the options for overcoming the problems referred above, the most favorable appear to be the utilization of proper medication and patient education in all aspects, as well as proper food conduct. In all cases, the effectiveness of the procedures should be screened by regular studies and observed in the former area.

### Conflict of interest statement

We declare that we have no conflict of interest.

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