

# Prevalence, Pattern, Knowledge and Management of Constipation among Madonna University Students, Elele, Rivers State, Nigeria

Asawalam Amarachukwu, Egere Eustace. C, Nnamani Monica. N, Eniojukan Joshua. F\*

Department of Clinical Pharmacy and Pharmacy Practice Faculty of Pharmacy, Madonna University,  
Elele Campus Rivers State, Nigeria

\*Corresponding author

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## ABSTRACT

Functional constipation (FC) is a common bowel disorder that prevails worldwide and is a significant health problem among adolescent Nigerians.

This study aimed at determining the Prevalence, Patterns, Knowledge, and Management of constipation among undergraduate students of Madonna University Elele (MUE), Rivers State, Nigeria.

It was a cross-sectional survey of apparently healthy undergraduate students of MUE in the faculties of Pharmacy, Nursing and Medicine selected via multistage random sampling using a descriptive cross-sectional research design involving self-administered, validated, semi-structured questionnaire that addressed the study objectives. A total of 400 consenting regular students were used. The data generated were coded and analyzed using Statistical Package for Social Sciences (SPSS) version 23.0.

The prevalence of constipation was highest among nursing students (64.4%) followed by pharmacy students (52.8%) and least among Medical students (49.2%). Visiting the toilet twice a week was reported by (22.2%), (17.3%) and (20.5%) by pharmacy, nursing and medical students respectively. Level of awareness was 97%.. There was a significant difference ( $P < 0.05$ ) in knowledge of constipation being “a problem of passing fewer than three stool a week” among the respondents. Regarding knowledge of symptoms, over 60% of respondents identified “Fewer than three stools a week” ( $P > 0.05$ ). “Not eating enough fiber” was reported to be a major cause of constipation. “Adding fruits and vegetables, whole grains and other high fiber foods to diet” was reported as a major countermeasure for constipation. Self-medication was most prevalent among pharmacy students. To manage constipation, Pharmacy students were found to “visit pharmacy” most frequently (27.8%); nursing students used “herbal drugs” most frequently (20.2%). The uses of laxatives and Stool softeners were rated as “always effective” by pharmacy students.. The most common adverse effects reported as “always occurring” were “Farting” (44.9%) and “Diarrhea” (41.4%). There were significant associations between Gender, Age and level of study with level of awareness/knowledge; level of study and Age were also correlated with management, drug treatment, effectiveness and adverse effects there were significant associations between level of awareness / knowledge and prevalence and management of constipation.

There were notable gaps in awareness, knowledge and management of constipation among respondents requiring appropriate strategic educational intervention.

**Keywords:** Constipation, Prevalence, Patterns, Awareness, Knowledge, Management, Nigeria

## BACKGROUND

Functional constipation (FC) is a common bowel disorder that prevails worldwide. (Dantas et al, 2020; Barberio et al 2021; Lin et al, 2024; Brenner et al, 2024). It is reported to be characterized by the following syndrome: dry or hard stools; painful stool; blockage of rectum and needing help emptying the rectum;

stomach ache; bloating belly; no bowel movement; incomplete bowel evacuation; passing less stool than usual; having fewer than three bowel movements a week; nausea; loss of appetite. (Zhe Chen et al, 2022; Sachdev, 2023; Hemdi *et al.*, 2023; Derrow, 2023).

Constipation creates a negative impact on a patient's quality of life. This condition has demonstrated negative effects on the development of daily activities, causing damage to the physical and emotional well-being of individuals who are diagnosed with it. (Dantas et al 2020; Zhe Chen et al, 2022; Lin et al, 2024).

Constipation has also been reported to be an expensive and costly condition for health services. It was said to be the 6th most common gastrointestinal symptom prompting an ambulatory visit in the United States, reported to be responsible for more than 1.2 million office and emergency department visits annually and diagnosed more than 3.4 million times annually, making it the 4th most diagnosed gastrointestinal illness in the United States (Peery et al, 2022). Direct medical costs for constipation were estimated to be more than \$230 million per year and £162 million was reported to have been spent by NHS England on treating the condition between 2017 and 2018. (Disney, 2019).

Functional constipation (FC) is said to be a functional gastrointestinal disorder (FGID) that presents without organic lesions and physiological abnormalities and is diagnosed as per the Rome criteria (Vriesman et al, 2020). Compared to the non-uniform criteria with self-reported definitions, the Rome criteria have markedly improved the accuracy of the diagnosis of constipation and helped better estimate the prevalence of FC (Werth et al, 2019).

Causes of constipation can be divided into primary (slow transit or outlet obstruction) or secondary causes. Secondary causes can include simple dehydration or inadequate fluid intake, metabolic disturbances, medications, neurological disorders, myopathic disorders and structural abnormalities (Jani et al, 2018).

Most cases of constipation are not caused by a specific condition and it may be difficult to identify the exact cause. However, several factors have been found to increase the chances of having constipation. These include: a change in routine or lifestyle, not eating enough fibre, such as fruit, vegetables and cereals; ignoring the urge to pass stools; immobility or lack of exercise; not drinking enough fluids; being an older adult; being a woman; having a mental health condition such as depression, anxiety, stress or an eating disorder, certain medications like aluminium antacids, antidepressants, anti-epileptics, anti-psychotics etc.

(Derrow, 2023; Sachdev, 2023; NHS, 2023; NIDDKD, 2024; NHS, 2024).

Additional risk factors for constipation include lower socioeconomic status, low education rates, less self-reported physical activity, use of certain medications, stressful life events, physical and sexual abuse, and depression. (Bharucha et al, 2013).

The etiologies of constipation are manifold, dominated by functional constipation (95% of causes), which is recognized according to the Rome IV diagnostic criteria (Hyams et al, 2016; Ba et al, 2023). Its pathogenesis is multi-factorial: it involves intrinsic factors (genetic predispositions, low level of parental education, intestinal motility disorders, hormonal imbalances, psychological disorders and depression) (Hosseinzadeh et al, 2011). It also involves behavioural factors (low fiber consumption, food and drinking water, low level of physical activity, failure to respond to the need for defecation) and environmental factors (life events, drug side effects, or socio-economic factors) (Forootan et al, 2018).

Most constipation is self-managed by using widely available laxatives, dietary, and lifestyle modifications, with only a minority of individuals seeking health care. (Brenner et al 2024).

It is opined that a large fraction of patients with FC tend to self-medicate, which could affect the optimal timing of treatment and exacerbate the disease (Oh et al, 2020, Schiller 2019).

Women more often use laxatives and seek constipation health care than men. Among constipated individuals in the community, general and mental health functioning are worse than in healthy controls, and mental and

physical health scale scores are comparable with individuals with reflux, hypertension, diabetes, and depression. (Brenner et al 2024).

It can significantly impact an individual's quality of life and, if left unmanaged, may lead to various health complications (Diaz et al 2023).

Complications of constipation that have been listed in literature include Swollen tissues around the anus, also called hemorrhoids; torn tissues of the anus, also called anal fissures; hard stools backed up into the colon, also called fecal impaction; and exposed tissues of the rectum that have slipped out of the anal opening, also called rectal prolapse. Recently, it was reported that constipation is a significant risk factor for major adverse cardiac events, including heart attacks, strokes, and heart failure suggesting that constipation may contribute to cardiovascular disease in addition to other traditional risk factors (Marques et al 2024).

Studies available in the literature have yielded mixed results regarding the prevalence of constipation globally. No doubt, global data reveals that constipation is prevalent worldwide and it is a common functional bowel disorder in the community which has a varying prevalence across cross-sectional surveys (Dantas et al, 2020; Barberio et al 2021; Brigida et al, 2021; Zhe Chen et al, 2022; Lin et al, 2024).

Constipation has been reported with an estimated worldwide prevalence ranging from 1% to 80% due to the geographical and methodological divergences of the studies. Overall, the average prevalence of constipation in adults has been estimated at 16% worldwide, while reaching 34% among older adults, and with females being more prone to this condition (Sommers et al, 2019; Dantas et al, 2020; Oh et al, 2020; Zhe Chen et al, 2022).

Several other studies have returned high prevalence of constipation among the general population (Black et al, 2020; Barberio et al, 2021).

Higher prevalence rates have been recorded in African studies. Indeed, Africa is said to have the highest prevalence of functional constipation (31.4%) of any continent (Tran et al, 2023; Bellaiche et al, 2020).

In Nigeria, a study found a 27% prevalence of functional constipation among Nigerian adolescents, with a predominance in urban areas (29%;  $p > 0.05$ ) (Udoh et al, 2017). This means that almost a quarter of young people in Nigeria experience functional constipation.

Another study among apparently healthy adolescents in Sokoto, North-Western Nigeria, revealed a prevalence of 20.4% (Jiya Fatimah Bello et al, 2023).

In a recent study among adolescents in Secondary schools in Yenagoa, Nigeria, the prevalence of constipation was 18.8% (Binafeigha Ihekerenma et al, 2024).

Reports have it that the prevalence of constipation, even with uniform symptom-based criteria, still varies considerably among countries (Barberio et al 2021).

The status quo is that the prevalence of this disorder has been reported differently in different studies with significant heterogeneity between studies which persisted even when the same criteria were applied and similar methodologies used. Thus, environmental, cultural, ethnic, dietary, or genetic factors can influence reporting of symptoms.

There is scarcity of studies on FC among adolescents in Rivers State and Nigeria as a whole, hence making this study in Elele significant.

To the best of our knowledge, there have yet to be any previous studies in Elele to assess the prevalence and awareness of constipation. Therefore, it is essential to properly examine this topic due to the condition's uncertain prevalence and impact on individual's life and well-being.

This study was, therefore, conceived to investigate the correlates of constipation as a step to finding effective management for it.

## Specific Objectives

The specific objectives of the study were to determine, among MUE students:

1. The Prevalence and Patterns of constipation
2. The Awareness and Knowledge of constipation
3. The Practices of constipation management and effectiveness rating
4. The adverse drug effects experienced arising from management

## METHODOLOGY

### Study design

A descriptive cross-sectional research design was used for this study.

### Study location/setting

The study was carried out in Madonna University, Elele. The university is situated in Elele town in Ikwerre L.G.A of Rivers State, South-South Nigeria. It is a privately-owned Catholic tertiary institution and consists of 7 faculties.

This semi-urban campus combines rural and urban influences that affect students' lifestyles and dietary habits, relevant to constipation prevalence.

The campus environment, dotted by local eateries and markets, leads to high consumption of processed foods, potentially impacting FC. Facilities include libraries, study areas, and sports complexes, affecting both stress and physical health.

### Study population

The study targeted 2,068 students, aged 18 to 35 years, from the faculties of Pharmacy, Nursing and Medicine at Madonna University, Elele campus who were all regular undergraduate students.

### Sample size determination

The Taro Yamane formula was used to obtain the sample size for this study,

$$n = \frac{N}{1 + N(e^2)}$$

where:

- $n$  = sample size
- $N$  = population size
- $e$  = margin of error

For this study, the total population size ( $N$ ) is 2,086 students from the three faculties, and the margin of error ( $e$ ) is set at 5% (0.05). Using the Yamane formula results in a sample size of approximately 335

To account for potential non-responses and incomplete questionnaires, 400 questionnaires were distributed, ensuring an ample sample size for analyzing the correlates of constipation among the students.

## Data Collection Instrument / Technique

Data was collected using semi-structured questionnaire, which was self-administered, after establishing its reliability, by pre-test, and validity, as affirmed by 4 experts in the field. A satisfactory reliability index of 0.86 was obtained.

### Sampling technique

The study used a multistage sampling technique.

#### Stage 1: Selection of Faculties

Three faculties out of seven were selected by convenience sampling. These were Pharmacy, Nursing and Medicine

#### Stage 2: Selection of Study year

Year Two to Final year (500 or 600 as applicable) were chosen for the study

#### Stage 3: Selection of Participants

The number of students recruited at each level of study was determined by using proportionate sampling.

|       | Number of Participants |         |          |
|-------|------------------------|---------|----------|
| Level | Pharmacy               | Nursing | Medicine |
| 200   | 25                     | 25      | 30       |
| 300   | 40                     | 40      | 20       |
| 400   | 20                     | 20      | 30       |
| 500   | 45                     | 45      | 40       |
| 600   | -                      | -       | 20       |
| Total | 130                    | 130     | 140      |

This study employed the Convenient Sampling Technique, a non-probability sampling method that selects participants based on availability and willingness to participate.

### Data Analysis

Questionnaires were collated from respondents and coded in Microsoft excel, 2010. Coded data were imported into SPSS-23 for analysis. Responses of subjects were presented as frequency and percentages. Average knowledge scores of respondents on constipation were computed using descriptive statistics.

Associations between demographic data and level of awareness/knowledge; between demographic data and management of constipation; between levels of awareness /knowledge and prevalence and between levels of awareness /knowledge and how constipation is managed were determined using Chi-square test.  $P < 0.05$  was deemed to be statistically significant.

### Ethical issues

The aim and objectives of the study were adequately explained to each of the respondents. Participation in this study was voluntary. Anonymity of respondents were highly considered in this study as names of respondents were not used in any part of the study in order to protect the respondent's privacy and confidentiality.

Informed consent was duly sought and obtained from the study participants verbally. Administrative approval for the study was obtained from the Office of the Dean of Faculty and the Head of the department of Clinical Pharmacy and Pharmacy Practice of MUE.. Anonymity and confidentiality of information generated from the respondents including academic integrity were equally maintained throughout the study period.

## RESULTS

### Demographic Data of Respondents

A total of 400 questionnaires were distributed but 335 were retrieved and usable giving a return rate of 83.75%.

Of all the participants, 75.6% were females. Age distribution of the respondents showed that 40.8% were below the age of 20 years, 55.5% were between the ages of 21-25years while 3.7% were 26-30 years.

Nursing students had the highest (40.4%), closely followed by pharmacy (38.9%), and medicine (28.7%) in 500 level. Of the total respondents, there were 108 (32.23%) from Pharmacy; 104 (31.04%) from Nursing and 122 (36.42%) from Medicine. See Table 1.

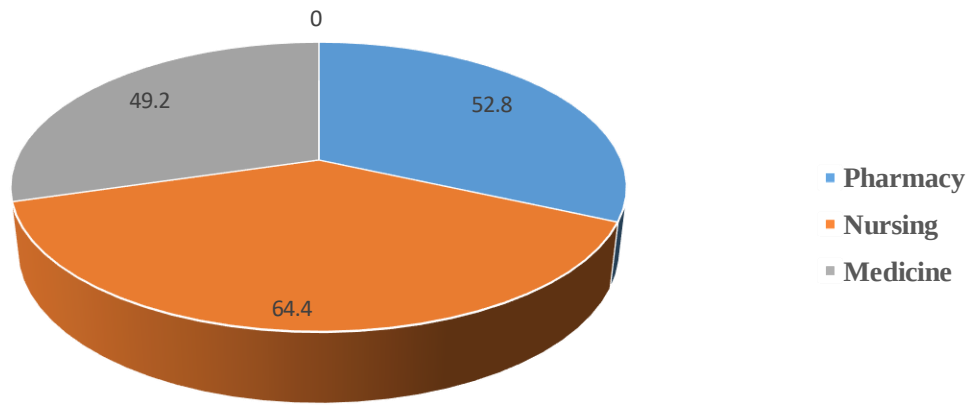
Table 1. Demographic Data of Respondents

| Characteristics    | Pharmacy |      | Nursing |      | Medicine |      |
|--------------------|----------|------|---------|------|----------|------|
|                    | Number   | %    | Number  | %    | Number   | %    |
| <b>Age (years)</b> |          |      |         |      |          |      |
| < 20               | 45       | 41.7 | 49      | 47.1 | 41       | 33.6 |
| 21 - 25            | 61       | 56.5 | 53      | 51.0 | 72       | 59.0 |
| 26 - 30            | 2        | 1.9  | 2       | 1.9  | 9        | 7.4  |
| >30                |          |      |         |      |          |      |
| <b>Gender</b>      |          |      |         |      |          |      |
| Male               | 35       | 32.4 | 17      | 16.3 | 30       | 24.6 |
| Female             | 73       | 67.6 | 87      | 83.7 | 92       | 75.4 |
| <b>Level</b>       |          |      |         |      |          |      |
| 200                | 20       | 18.5 | 21      | 20.2 | 30       | 24.6 |
| 300                | 32       | 29.6 | 30      | 28.8 | 15       | 12.3 |
| 400                | 14       | 13.0 | 11      | 10.6 | 25       | 20.5 |
| 500                | 42       | 38.9 | 42      | 40.4 | 35       | 28.7 |
| 600                |          |      |         |      | 17       | 13.9 |

### Prevalence and Pattern of constipation

#### Experienced constipation in the past 3 months

More of the medical students (64.4%) reported to have experienced constipation in the past 3 months. However, the frequency of “poop/visits” to toilet was more among nursing students (18.3%) who reported to have visited the toilet for more than three times within a week. There was a statistically significant difference ( $P < 0.05$ ) in the frequency of visits to the toilet among the studied participants. These are as shown in Figure 1, and table 2 below.



**Figure 1: Experienced constipation in the past 3 months**

**Table 2: Frequency of poop/visits to toilet by the students**

| Frequency                      | Pharmacy<br>n (%) | Nursing<br>n (%) | Medicine<br>n (%) | P value |
|--------------------------------|-------------------|------------------|-------------------|---------|
| Once a day                     | 14 (13.0)         | 10 (9.6)         | 27 (22.1)         | 0.0176* |
| Twice a day                    | 32 (29.6)         | 37 (35.6)        | 37 (30.3)         |         |
| Twice a week                   | 24 (22.2)         | 18 (17.3)        | 25 (20.5)         |         |
| Thrice a week                  | 31 (28.7)         | 20 (19.2)        | 22 (18.0)         |         |
| More than three<br>time a week | 7 (6.5)           | 19 (18.3)        | 11 (9.0)          |         |

### Awareness/ knowledge of constipation

All (100%) of the respondents from pharmacy were aware of constipation, closely followed by nursing 98.0%, and medicine 97.5% respectively. There was a significant difference ( $P < 0.05$ ) in knowledge of constipation “being a problem of passing fewer than three stool a week”, with nursing students having highest (60.6%) knowledge, followed by pharmacy (57.4%) and medicine (43.4%). Similarly, in terms of “difficult time to passing stool”, majority of the respondents (pharmacy 96.7%, nursing 94.2%, medicine 92.6%) had good knowledge ( $P < 0.05$ ). There was also significant difference ( $P = 0.0174$ ) in the knowledge of “feeling of having the rectum being blocked”, with highest knowledge from Pharmacy (90.7%), followed by medicine (75.4%) and nursing (56.7%). Medical students (75.4%) had a better knowledge of “the need to use the finger to pass stool”, followed by pharmacy (64.8%) and nursing (56.7%), this was very statistically significant ( $P = 0.0057$ ).

When stratified into faculties, knowledge level was 72.2%, 76% and 69.9% for Pharmacy, Nursing and Medical students respectively. Details of the knowledge of constipation are shown in Table 3 below.

**Table 3: Awareness/ knowledge of constipation**

| Knowledge of Constipation | Pharmacy<br>YES<br>% | Nursing<br>YES<br>% | Medicine<br>YES<br>% | Average<br>% | P value |
|---------------------------|----------------------|---------------------|----------------------|--------------|---------|
| Awareness of constipation | 100                  | 98.0                | 97.5                 | 98.5         | 0.324   |

|                                                                               |      |      |      |      |          |
|-------------------------------------------------------------------------------|------|------|------|------|----------|
| Constipation is a problem of passing stool                                    | 96.3 | 98.0 | 97.5 | 97.3 | 0.2234   |
| Passing fewer than three stool a week                                         | 57.4 | 60.6 | 43.4 | 53.8 | 0.0086** |
| Having a difficult time passing stool                                         | 96.3 | 94.2 | 92.6 | 94.4 | 0,0334*  |
| Occurs due to too much absorption of water from poop by colon/large intestine | 38.9 | 51.0 | 45.9 | 45.3 | 0.2126   |
| Average knowledge                                                             | 72.2 | 76.0 | 69.9 | 72.7 |          |

### Knowledge of Symptoms of Constipation

On average, 94.5%, 90.7% and 82.9% respondents recognized “Straining or pain when passing stool”, “Hard dry or lumpy stool” and “A feeling that the rectum is blocked” as symptoms of constipation respectively.

Table 4. Knowledge of Symptoms of Constipation

| Knowledge of symptoms                  | Pharmacy (%) | Nursing (%) | Medicine (%) | Average % | P value  |
|----------------------------------------|--------------|-------------|--------------|-----------|----------|
| Fewer than three stool a week          | 63.9         | 68.3        | 69.7         | 67.3      | 0.7029   |
| Hard dry or lumpy stool                | 92.6         | 94.2        | 85.2         | 90.7      | 0.1860   |
| Straining or pain when passing stool   | 96.3         | 96.2        | 91.0         | 94.5      | 0.1069   |
| A feeling that the rectum is blocked   | 90.7         | 76.0        | 82.0         | 82.9      | 0.0174*  |
| The need to use a finger to pass stool | 64.8         | 56.7        | 75.4         | 65.6      | 0.0057** |
| Feeling bloated and neglected          | 66.7         | 72.1        | 76.2         | 71.7      | 0.3894   |
| Average knowledge of symptoms          | 79.2         | 77.3        | 79.9         | 78.8      |          |

Where \* = Significant, \*\* = high significant, at  $p < 0.05$  (2 tail)

### Knowledge of causes of constipation

Knowledge of the causes of constipation is showed in Table 5. There was a highly statistically significant ( $P < 0.0001$ ) difference on “red meat” being a cause of constipation. Also, “being inactive and less exercise” ( $P < 0.05$ ) was stated as one of the causes of constipation with medical (61.5%), nursing (53.8%) and pharmacy (42.6%) students. “Not eating enough fiber” was also another major cause of constipation as opined by the participants across the various faculties (pharmacy 67.6%, nursing 84.6%, and medicine 75.4%); this was statistically significant ( $P < 0.05$ ). Similarly, “not drinking enough fluid” was a major cause of constipation, according to the student’s response from pharmacy (94.4%), nursing (92.3%) and medicine (65.5%). Other major cause of constipation as reported is “often ignoring the urge to go to toilet” with medicine (87.7%),

pharmacy (82.4%) and nursing students (80.8%). These were however not statistically significant ( $P > 0.05$ ). There were highly significant differences on “analgesic” ( $P = 0.0038$ ) and “antacids” ( $P = 0.0013$ ) being causes of constipation.

**Table 5: Knowledge of causes of constipation**

| Variables                               | Pharmacy<br>n(%) | Nursing<br>n(%) | Medical<br>n(%) | Average<br>% | P value   |
|-----------------------------------------|------------------|-----------------|-----------------|--------------|-----------|
| Red meat                                | 17 (15.7)        | 20 (19.2)       | 24 (19.7)       | 18,2         | 0.0001*** |
| Being inactive and less exercise        | 46 (42.6)        | 56 (53.8)       | 72 (61.5)       | 52.6         | 0.0436*   |
| Changing diet on daily routine          | 60 (55.6)        | 62 (59.6)       | 75 (61.5)       | 58.9         | 0.3003    |
| Not eating enough fiber                 | 73 (67.6)        | 88 (84.6)       | 92 (75.4)       | 75.9         | 0.0291*   |
| Milk and dairy product                  | 26 (24.1)        | 35 (33.7)       | 29 (23.8)       | 27.2         | 0.4365    |
| Not drinking enough fluid               | 102 (94.4)       | 96 (92.3)       | 80 (65.5)       | 84.1         | 0.0961    |
| Often ignoring the urge to go to toilet | 89 (82.4)        | 84 (80.8)       | 107 (87.7)      | 83.6         | 0.6833    |
| Analgesics                              | 25 (23.1)        | 22 (21.2)       | 46 (32.8)       | 25.7         | 0.0038**  |
| Antacids                                | 25 (23.1)        | 18 (17.3)       | 14 (11.5)       | 17.3         | 0.0013**  |
| Iron pills                              | 32 (29.6)        | 23 (22.1)       | 23 (18.9)       | 23.5         | 0.1568    |

Where \* = Significant, \*\* = high significant, \*\*\* = highly significant, at  $p < 0.05$  (2 tail)

### Knowledge of management of constipation

“Adding fruits and vegetables, whole grains and other high fiber foods to diet” was reported as a major countermeasure for constipation, with pharmacy student’s having the highest (96.3%) knowledge, closely followed by nursing (95.2%), and medicine (70.5%); this was statistically significant with ( $P < 0.0001$ ). “Drinking two or more extra glasses of water a day” was adjudged a countermeasure by nursing students (93.3%) pharmacy (92.6%) and medical students (73%); this was also statistically significantly different ( $P < 0.0001$ ).

“Avoid holding the urge to use the toilet” as a panacea for constipation was supported by 79.3% of respondents. When stratified into faculties, 76.9% pharmacy; 90.4% nursing and 70,5% medical students agreed. This was highly significant ( $P < 0.0001$ ).

“Making changes in diet, exercises or with use of non-prescription medicines” as a countermeasure for constipation was suggested by 66.4% of the respondents. Stratification revealed that pharmacy (60.2%), nursing (76%) and medical students (63.1%) in that proportion agreed with the suggestion. This was statistically significant ( $P = 0.008$ ).

“Eating fewer high fat foods like Eggs and Cheese” was also a constipation countermeasure opined by 54.5% of the respondents. Stratification revealed that 54.6% pharmacy; 54.8% nursing and 54.1% medical students supported the option. This was not statistically significant ( $P > 0.05$ ). See Table 6 for details.

**Table 6. Knowledge of management of constipation**

| Countermeasure variables                                       | Pharmacy | Nursing | Medical | Average | P value     |
|----------------------------------------------------------------|----------|---------|---------|---------|-------------|
| Add fruits, vegetables, whole grains and fiber to diet         | 96.3%    | 95.2%   | 70.5%   | 87.3%   | < 0.0001*** |
| Drinking two or more extra glasses of water a day              | 92.6%    | 93.3%   | 73%     | 86.3%   | < 0.0001*** |
| Avoid holding the urge to use the toilet                       | 76.9%    | 90.4%   | 70.5%   | 79.3%   | < 0.0001*** |
| Changes in diet or Exercise or with non-prescription medicines | 60.2%    | 76%     | 63.1%   | 66.4%   | 0.008**     |
| Eat fewer high fat foods like Eggs and Cheese                  | 54.6%    | 54.8%   | 54.1%   | 54.5%   | 0.412       |
| Average                                                        | 76.1     | 81.4    | 66.2    | 74.6%   | 0.0625      |

Where \*\* = high significant, \*\*\* = highly significant, at  $p < 0.05$  (2 tail)

### Management of constipation by the respondents

More (38.9%) of the pharmacy students “always indulged in self-medication” to manage their constipation; this was followed by medicine (34.4%) and nursing (24.0%). The nursing students always (18.3%) visited the hospital or clinic to manage their constipation. These were however not statistically significant ( $P > 0.05$ ). Pharmacy students were found to visit the pharmacy store most frequently (27.8%) to managing their constipation ( $P = 0.0086$ ). Statistically significant differences ( $P = < 0.0001$ ) were recorded in “always going to chemist” (medicine 27.0%, nursing 11.5%, pharmacy 9.3%), “drinking plenty of fluid” (nursing 90.4%, pharmacy 85.2%, medicine 55.7%), “eating vegetables and fruits” (nursing 87.5%, pharmacy 74.1%, medicine 55.7%), “use of stool softeners” (pharmacy 38.9%, nursing 34.4%, medicine 24.0%), and “multivitamin syrups” (medicine 36.5%, nursing 26.9%, pharmacy 15.7%). More of the nursing students (20.2%) reported using herbal drugs to manage their constipation ( $P > 0.05$ ). See Table 7.

**Table 7: Management of constipation by the respondents**

| Variables             | Pharmacy N = 108 |                 |             | Nursing N = 104 |                 |             | Medicine N = 122 |                 |             | P value    |
|-----------------------|------------------|-----------------|-------------|-----------------|-----------------|-------------|------------------|-----------------|-------------|------------|
|                       | Always n(%)      | Sometimes n (%) | Never n (%) | Always n(%)     | Sometimes n (%) | Never n (%) | Always n(%)      | Sometimes n (%) | Never n (%) |            |
| Self medication       | 42 (38.9)        | 41 (38.0)       | 25 (23.1)   | 25 (24.0)       | 49 (47.1)       | 30 (28.8)   | 42 (34.4)        | 48 (39.3)       | 32 (25.2)   | 0.2237     |
| Go to hospital/clinic | 12 (11.1)        | 41 (38.0)       | 55 (50.9)   | 19 (18.3)       | 40 (38.5)       | 45 (43.3)   | 17 (13.9)        | 59 (48.4)       | 46 (37.7)   | 0.1904     |
| Go to chemist         | 10 (9.3)         | 27 (25.0)       | 71 (65.7)   | 12 (11.5)       | 43 (41.3)       | 49 (47.1)   | 33 (27.0)        | 22 (18.0)       | 67 (54.9)   | <0.0001*** |

|                             |           |           |           |           |           |           |           |           |           |               |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------------|
| Go to pharmacy              | 30 (27.8) | 43 (39.8) | 35 (32.4) | 23 (22.1) | 49 (47.1) | 32 (30.8) | 21 (17.2) | 39 (32.0) | 62 (50.8) | 0.0086**      |
| Use herbal drugs            | 7 (6.5)   | 22 (20.7) | 79 (73.1) | 5 (4.8)   | 21 (20.2) | 78 (75.0) | 10 (8.2)  | 17 (13.9) | 95 (37.9) | 0.1282        |
| Drink plenty fluids         | 92 (85.2) | 9 (8.3)   | 7 (6.5)   | 94 (90.4) | 5 (4.8)   | 5 (4.8)   | 68 (55.7) | 11 (9.0)  | 43 (35.2) | <0.0001***    |
| Eat vegetables and fruits   | 80 (74.1) | 14 (13.0) | 14 (13.0) | 91 (87.5) | 10 (9.6)  | 3 (2.9)   | 72 (59.0) | 19 (15.6) | 31 (25.4) | <0.0001***    |
| Apply hot water to the anus | 8 (7.4)   | 14 (13.0) | 86 (79.6) | 13 (12.5) | 17 (16.3) | 74 (71.2) | 15 (12.3) | 15 (12.3) | 92 (75.4) | 0.5689        |
| Laxatives                   | 67 (62.0) | 17 (15.7) | 24 (22.2) | 46 (44.2) | 28 (26.9) | 30 (28.8) | 42 (34.4) | 31 (25.4) | 49 (40.2) | 0.0007**<br>* |
| Stool softeners             | 58 (53.7) | 24 (22.7) | 26 (24.1) | 39 (37.5) | 26 (25.0) | 39 (37.5) | 28 (23.0) | 37 (30.3) | 57 (46.7) | <0.0001***    |
| Liquid paraffin             | 33 (30.6) | 24 (22.2) | 51 (47.2) | 26 (25.0) | 17 (16.3) | 61 (58.7) | 17 (13.9) | 24 (19.7) | 81 (66.4) | 0.0181*       |
| Bisacodyl                   | 22 (20.4) | 27 (25.0) | 59 (54.6) | 9 (8.7)   | 18 (17.3) | 77 (74.0) | 18 (14.8) | 43 (35.2) | 61 (50.0) | 0.0013**      |
| Antacids                    | 19 (17.6) | 19 (17.6) | 70 (64.8) | 20 (19.2) | 30 (28.8) | 54 (51.9) | 34 (27.9) | 30 (24.6) | 58 (47.5) | 0.0503        |
| Multivitamin in syrups      | 17 (15.7) | 17 (15.7) | 74 (68.5) | 28 (26.9) | 38 (36.5) | 38 (36.5) | 15 (12.3) | 38 (31.1) | 35 (28.7) | <0.0001***    |

Where \* = Significant, \*\* = high significant, \*\*\* = highly significant, at  $p < 0.05$  (2 tail)

The most prevalent health seeking behaviour was “Self-medication” involving about a third of the population on the average; this behaviour was most prevalent among pharmacy students, followed by medicine and then nursing students although not statistically significant ( $P = 0.2237$ ).

The next favoured care -seeking behaviour was “visit to the pharmacy” involving 22.4% of respondents across the different faculties on average; although most common among pharmacy students ( $P = 0.0086^{**}$ ).

On the average, only 15.9% and 14.4% of the respondents would seek for care at the “Chemist” and “Hospital/Clinic” respectively ( $P < 0.05$ ).

Regarding the countermeasures the respondents “always adopted” whenever they experienced constipation, “Drink plenty fluids” (77.1%) and “Eat vegetables and fruits” (73.5%) were the most prevalent. Less than half of the respondents always used “Laxatives” (46.9%) and “Stool softeners” (38.1%). Less than 15% always used “Bisacodyl” (14.6%) and “Apply hot water to the anus” (10.7%).

### Rating of the effectiveness of treatment

In Table 8 is revealed how the respondents rated the effectiveness of the drugs used for treating constipation.

The use of laxatives was rated as “always effective” by 63.0% . 41.3% and 40.2% of pharmacy, nursing and medical students respectively ( $P < 0.0001$ ). Similarly, the use of stool softeners was rated as “always effective”

by 51.9%, 36.5% and 26.2% of pharmacy, nursing and medical students respectively ( $P=0.0005$ ). Bisacodyl was rated as “always effective” by 18.5%, 13.5% and 18.0% of pharmacy, nursing and medical students respectively ( $P=0.1732$ ).

**Table 8: Rating of the effectiveness of treatment**

| Medication<br>s         | Pharmacy N = 108 |                        |                | Nursing N = 104 |                        |                | Medicine N =122 |                        |                | P value    |
|-------------------------|------------------|------------------------|----------------|-----------------|------------------------|----------------|-----------------|------------------------|----------------|------------|
|                         | Always<br>n(%)   | Some<br>times<br>n (%) | Never<br>n (%) | Always<br>n(%)  | Some<br>times<br>n (%) | Never<br>n (%) | Always<br>n(%)  | Somet<br>imes<br>n (%) | Never<br>n (%) |            |
| Laxatives               | 68<br>(63.0)     | 29<br>(26.9)           | 11<br>(10.2)   | 49<br>(47.1)    | 43<br>(41.3)           | 12<br>(11.5)   | 49<br>(40.2)    | 38<br>(31.1)           | 35<br>(28.7)   | <0.0001*** |
| Stool<br>softeners      | 56<br>(51.9)     | 35<br>(32.4)           | 17<br>(15.2)   | 38<br>(36.5)    | 47<br>(45.2)           | 19<br>(18.3)   | 32<br>(26.2)    | 73<br>(59.8)           | 17<br>(13.9)   | 0.0005***  |
| Liquid<br>paraffin      | 34<br>(31.5)     | 45<br>(41.7)           | 29<br>(26.9)   | 21<br>(20.2)    | 47<br>(45.2)           | 36<br>(34.6)   | 23<br>(18.9)    | 49<br>(40.2)           | 50<br>(41.0)   | 0.0835     |
| Bisacodyl               | 20<br>(18.5)     | 53<br>(49.1)           | 35<br>(32.4)   | 14<br>(13.5)    | 39<br>(37.5)           | 51<br>(49.0)   | 22<br>(18.0)    | 50<br>(41.0)           | 50<br>(41.0)   | 0.1732     |
| Antacids                | 12<br>(11.1)     | 43<br>(39.8)           | 53<br>(49.1)   | 21<br>(20.2)    | 47<br>(45.2)           | 36<br>(34.6)   | 26<br>(21.3)    | 57<br>(46.7)           | 39<br>(32.0)   | 0.0496*    |
| Multivitami<br>n syrups | 9 (8.3)          | 37<br>(34.3)           | 62<br>(57.4)   | 28<br>(26.9)    | 37<br>(35.6)           | 39<br>(37.5)   | 16<br>(13.1)    | 57<br>(46.7)           | 49<br>(40.2)   | 0.0003***  |

Where \* = Significant, \*\*\* = highly significant, at  $p < 0.05$  (2 tail)

### Adverse effects experienced with the use of the medications

“Farting” was the most prevalent adverse effect experienced by 41.7%, 46.2% and 46.7% of pharmacy, nursing and medical students respectively. This was closely followed by “diarrhea” as experienced by 45.4%, 34.6% and 44.3% of pharmacy, nursing and medical students respectively. “Tummy cramps” was always experienced by 38.9%, 29.8% and 27.9% of pharmacy, nursing and medical students respectively. “Nausea” was always experienced by 25.0%, 24.0% and 36.9% of pharmacy, nursing and medical students respectively. See Table 9 for details.

**Table 9: Adverse effects experienced with the use of the medications**

| Adverse<br>effects | Pharmacy N = 108   |                        |                | Nursing N = 104 |                        |                | Medicine N =122    |                        |                | P value |
|--------------------|--------------------|------------------------|----------------|-----------------|------------------------|----------------|--------------------|------------------------|----------------|---------|
|                    | Alway<br>s<br>n(%) | Some<br>times<br>n (%) | Never<br>n (%) | Alway<br>s n(%) | Some<br>times<br>n (%) | Never<br>n (%) | Alway<br>s<br>n(%) | Somet<br>imes<br>n (%) | Never<br>n (%) |         |
| Bloating           | 33<br>(30.6)       | 37<br>(34.3)           | 38<br>(35.2)   | 39<br>(37.5)    | 33<br>(31.7)           | 32<br>(30.8)   | 32<br>(26.2)       | 56<br>(45.9)           | 34<br>(27.9)   | 0.1471  |
| Tummy<br>cramps    | 42<br>(38.9)       | 37<br>(34.3)           | 29<br>(26.9)   | 31<br>(29.8)    | 49<br>(47.1)           | 24<br>(23.1)   | 34<br>(27.9)       | 63<br>(51.6)           | 25<br>(20.5)   | 0.1120  |
| Farting            | 45<br>(41.7)       | 36<br>(33.3)           | 27<br>(25.0)   | 48<br>(46.2)    | 36<br>(34.6)           | 20<br>(19.2)   | 57<br>(46.7)       | 36<br>(26.2)           | 33<br>(27.0)   | 0.4934  |
| Dehydration        | 23<br>(21.3)       | 42<br>(38.9)           | 43<br>(39.8)   | 35<br>(33.7)    | 34<br>(32.7)           | 34<br>(32.7)   | 35<br>(28.7)       | 51<br>(41.8)           | 36<br>(29.5)   | 0.2148  |
| Diarrhea           | 49<br>(45.4)       | 27<br>(25.0)           | 32<br>(29.6)   | 36<br>(34.6)    | 34<br>(32.7)           | 34<br>(32.7)   | 54<br>(44.3)       | 32<br>(26.2)           | 36<br>(29.5)   | 0.5040  |

|          |              |              |              |              |              |              |              |              |              |        |
|----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|
| Nausea   | 27<br>(25.0) | 39<br>(26.1) | 42<br>(38.9) | 25<br>(24.0) | 41<br>(39.4) | 38<br>(36.5) | 45<br>(36.9) | 42<br>(34.4) | 35<br>(28.7) | 0.1708 |
| Vomiting | 20<br>(18.5) | 36<br>(33.3) | 52<br>(48.1) | 16<br>(15.4) | 31<br>(29.8) | 57<br>(54.8) | 26<br>(21.3) | 46<br>(37.7) | 50<br>(41.0) | 0.3579 |

### Correlation between demographic data and Awareness / Knowledge

Data revealed a negative association between Awareness / Knowledge and Gender ( $r = -0.219$ ;  $P = 0.025$ ) among nursing students. Data showed a negative association between Awareness / Knowledge and Age ( $r = -0.242$ ;  $P = 0.011$ ) for pharmacy students. Furthermore, there was a negative association between Awareness / Knowledge and Level of study among pharmacy students ( $r = -0.290$ ;  $P = 0.002$ ). There were no significant associations among medical students See Table 10 for details.

**Table 10: Correlation between demographic data and level of Awareness / Knowledge**

| Variables | Pharmacy           |                | Nursing            |                | Medicine           |                |
|-----------|--------------------|----------------|--------------------|----------------|--------------------|----------------|
|           | Correlation factor | <i>P</i> value | Correlation factor | <i>P</i> value | Correlation factor | <i>P</i> value |
| Gender    | -0.054             | 0.575          | -0.219             | 0.025*         | -0.029             | 0.747          |
| Age       | -0.242             | 0.011*         | 0.013              | 0.893          | 0.036              | 0.691          |
| Level     | -0.290             | 0.002*         | -0.045             | 0.650          | 0.024              | 0.791          |

Where \* = Significant, at  $p < 0.05$  (2 tail)

### Correlation between demographic data and management of constipation/drug treatment/Effectiveness / dosing / adverse effects experienced

Data in table 11 revealed the following correlations. Among pharmacy students; there was a significant negative association between level of study and management of constipation ( $r = -0.235$ ;  $P = 0.014$ ); significant but negative association between Age and drug treatment ( $r = -0.252$ ;  $P = 0.009$ ); significant and negative association between the level of study and drug treatment of constipation ( $r = -0.200$ ;  $P = 0.038$ ); significant but negative association between Age and effectiveness of constipation treatment ( $r = -0.255$ ;  $P = 0.008$ ); significant but negative association between level of study and effectiveness of treatment ( $r = -0.371$ ;  $P = 0.000$ ).

Among nursing students, data revealed significant but positive association between level of study and effectiveness of treatment ( $r = 0.232$ ;  $P = 0.018$ ); significant positive association of Age and adverse effects experienced during treatment of constipation ( $r = 0.246$ ;  $P = 0.012$ ); significant positive association of level of study and adverse effects experienced during treatment of constipation ( $r = 0.194$ ;  $P = 0.048$ ).

There were no significant associations among medicine students. See Table 11.

**Table 11 Correlation between demographic data and management of constipation/drug treatment/Effectiveness / dosing / adverse effects experienced**

| Variables         | Pharmacy           |                | Nursing            |                | Medicine           |                |
|-------------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|
|                   | Correlation factor | <i>P</i> value | Correlation factor | <i>P</i> value | Correlation factor | <i>P</i> value |
| <b>Management</b> |                    |                |                    |                |                    |                |
| Gender            | -0.028             | 0.776          | 0.003              | 0.975          | 0.004              | 0.968          |
| Age               | -0.182             | 0.059          | 0.089              | 0.370          | 0.033              | 0.715          |

|                        |        |        |        |        |        |       |
|------------------------|--------|--------|--------|--------|--------|-------|
| Level                  | -0.235 | 0.014* | 0.005  | 0.963  | 0.121  | 0.183 |
| <b>Drug treatment</b>  |        |        |        |        |        |       |
| Gender                 | -0.055 | 0.568  | -0.015 | 0.877  | -0.158 | 0.081 |
| Age                    | -0.252 | 0.009* | -0.042 | 0.670  | 0.157  | 0.084 |
| Level                  | -0.200 | 0.038* | -0.151 | 0.127  | 0.088  | 0.336 |
| <b>Effectiveness</b>   |        |        |        |        |        |       |
| Gender                 | -0.102 | 0.282  | -0.560 | 0.572  | 0.086  | 0.346 |
| Age                    | -0.255 | 0.008* | -0.151 | 0.125  | 0.055  | 0.550 |
| Level                  | -0.371 | 0.000* | 0.232  | 0.018* | 0.044  | 0.634 |
| <b>Adverse effects</b> |        |        |        |        |        |       |
| Gender                 | -0.075 | 0.438  | 0.054  | 0.585  | -0.010 | 0.914 |
| Age                    | 0.047  | 0.629  | 0.246  | 0.012* | 0.022  | 0.811 |
| Level                  | -0.011 | 0.907  | 0.194  | 0.048* | 0.012  | 0.893 |

### Relationship between level of awareness / knowledge and prevalence / pattern of constipation

Data in Table 12 revealed, among Nursing students, weak and negative association between awareness / knowledge and “passing fewer than three stools a week” ( $r = -0.230$ ;  $P = 0.019$ ) and also weak and negative association between awareness / knowledge and “Symptoms of fewer than three stools a week” ( $r = -0.205$ ;  $P = 0.037^*$ )

Among medical students, data showed a weak and negative association between awareness / knowledge and “need to use finger to pass stool” ( $r = -0.194$ ;  $P = 0.032$ ).

**Table 12 Correlation between level of awareness / knowledge and pattern of constipation**

| Variables                                                                     | Pharmacy           |         | Nursing            |         | Medicine           |         |
|-------------------------------------------------------------------------------|--------------------|---------|--------------------|---------|--------------------|---------|
|                                                                               | Correlation factor | P value | Correlation factor | P value | Correlation factor | P value |
| Awareness of constipation                                                     | -                  | -       | -0.104             | 0.293   | -0.126             | 0.167   |
| Constipation is a problem of passing stool                                    | 0.000              | 1.000   | -0.128             | 0.195   | 0.015              | 0.872   |
| Passing fewer than three stools a week                                        | -0.032             | 0.745   | -0.230             | 0.019*  | 0.106              | 0.247   |
| Having a difficult time passing stool                                         | -0.005             | 0.956   | -0.012             | 0.907   | 0.042              | 0.644   |
| Occurs due to too much absorption of water from poop by colon/large intestine | 0.164              | 0.090   | -0.126             | 0.201   | 0.032              | 0.722   |
| Symptoms of fewer than                                                        | 0.167              | 0.084   | -0.205             | 0.037*  | -0.039             | 0.670   |

|                                        |        |       |        |       |        |        |
|----------------------------------------|--------|-------|--------|-------|--------|--------|
| three stools a week                    |        |       |        |       |        |        |
| Hard dry or lumpy stool                | -0.075 | 0.442 | -0.012 | 0.907 | -0.134 | 0.142  |
| Straining or pain when passing stool   | 0.005  | 0.963 | -0.149 | 0.132 | -0.055 | 0.545  |
| A feeling that the rectum is blocked   | 0.047  | 0.631 | -0.136 | 0.169 | 0.026  | 0.775  |
| The need to use a finger to pass stool | 0.134  | 0.167 | -0.041 | 0.680 | -0.194 | 0.032* |
| Feeling bloated and neglected          | 0.118  | 0.228 | -0.014 | 0.886 | 0.016  | 0.872  |

Where \* = Significant, at  $P < 0.05$  (2 tail)

### Correlation between levels of awareness/knowledge and how constipation is managed / drug treatment/Effectiveness / dosing / adverse effects experienced

Data in Table 13 revealed that, among pharmacy students there was a positive but significant association between “awareness / knowledge” and “constipation management by Chemist” ( $r=287$ ;  $P = 0.03$ ); and a positive association between “awareness / knowledge” and “management of constipation using herbal drugs” ( $r = 0.206$ ;  $P = 0.032$ ).

Among nursing students, data revealed a negative association between awareness / knowledge and “effectiveness of antacid in treating constipation” ( $r = - 0.283$ ;  $P = 0.001$ ); negative association between awareness / knowledge and “adverse effects of dehydration” ( $r = - 0.253$ ;  $P = 0.010$ ).

Among medical students, data revealed a negative association between awareness / knowledge and “use of herbal drugs in management of constipation” ( $r = - 0.211$ ;  $P = 0.019$ ); negative association between awareness / knowledge and “application of hot water to the anus for managing constipation” ( $r = - 0.244$ ;  $P = 0.007^*$ ); significant negative association between awareness / knowledge and Bisacodyl treatment of constipation ( $r = - 0.185$ ;  $P = 0.041^*$ ).

**Table 13 Correlation between level of awareness/knowledge and how constipation is managed / drug treatment/Effectiveness / dosing / adverse effects experienced**

| Variables                 | Pharmacy           |         | Nursing            |         | Medicine           |         |
|---------------------------|--------------------|---------|--------------------|---------|--------------------|---------|
|                           | Correlation factor | P value | Correlation factor | P value | Correlation factor | P value |
| <b>Management</b>         |                    |         |                    |         |                    |         |
| Self-medication           | -0.183             | 0.058   | -0.143             | 0.148   | -0.143             | 0.116   |
| Go to hospital/clinic     | 0.083              | 0.396   | 0.091              | 0.359   | -0.160             | 0.078   |
| Go to chemist             | 0.287              | 0.003*  | -0.061             | 0.535   | -0.490             | 0.592   |
| Go to pharmacy            | 0.037              | 0.946   | -0.033             | 0.741   | -0.151             | 0.097   |
| Use herbal drugs          | 0.206              | 0.032*  | -0.126             | 0.202   | -0.211             | 0.019*  |
| Drink plenty fluids       | 0.65               | 0.501   | 0.069              | 0.489   | 0.012              | 0.892   |
| Eat vegetables and fruits | -0.101             | 0.297   | 0.053              | 0.595   | -0.106             | 0.245   |
| Apply hot water to        | 0.017              | 0.859   | -0.050             | 0.613   | -0.244             | 0.007*  |

|                        |        |       |        |        |        |        |
|------------------------|--------|-------|--------|--------|--------|--------|
| the anus               |        |       |        |        |        |        |
| <b>Drug treatment</b>  |        |       |        |        |        |        |
| Laxatives              | -0.092 | 0.341 | -0.046 | 0.640  | -0.158 | 0.083  |
| Stool softeners        | 0.000  | 1.000 | 0.011  | 0.909  | -0.085 | 0.350  |
| Liquid paraffin        | 0.012  | 0.904 | 0.143  | 0.149  | 0.024  | 0.796  |
| Bisacodyl              | -0.096 | 0.322 | 0.168  | 0.089  | -0.185 | 0.041* |
| Antacids               | -0.086 | 0.379 | -0.163 | 0.098  | -0.152 | 0.094  |
| Multivitamin syrups    | 0.061  | 0.530 | 0.005  | 0.958  | -0.117 | 0.201  |
| <b>Effectiveness</b>   |        |       |        |        |        |        |
| Laxatives              | -0.159 | 1.000 | -0.095 | 0.339  | -0.175 | 0.054  |
| Stool softeners        | 0.035  | 0.723 | -0.025 | 0.801  | -0.090 | 0.322  |
| Liquid paraffin        | -0.007 | 0.945 | -0.007 | 0.943  | -0.157 | 0.084  |
| Bisacodyl              | -0.095 | 0.330 | -0.137 | 0.165  | -0.089 | 0.332  |
| Antacids               | -0.053 | 0.588 | -0.283 | 0.001* | 0.049  | 0.603  |
| Multivitamin syrups    | 0.103  | 0.290 | -0.169 | 0.088  | 0.082  | 0.357  |
| <b>Adverse effects</b> |        |       |        |        |        |        |
| Bloating               | -0.082 | 0.399 | -0.080 | 0.417  | -0.027 | 0.767  |
| Tummy cramps           | -0.057 | 0.556 | -0.144 | 0.146  | 0.009  | 0.926  |
| Farting                | -0.013 | 0.896 | -0.183 | 0.062  | 0.610  | 0.911  |
| Dehydration            | 0.107  | 0.268 | -0.253 | 0.010* | -0.173 | 0.056  |
| Diarrhea               | -0.054 | 0.580 | -0.066 | 0.504  | -0.137 | 0.134  |
| Nausea                 | 0.019  | 0.842 | -0.176 | 0.073  | -0.175 | 0.054  |
| Vomiting               | 0.080  | 0.408 | -0.050 | 0.557  | -0.054 | 0.552  |

Where \* = Significant, at  $P < 0.05$  (2 tail)

## DISCUSSION

### Demographic Data of Respondents

This study focused specifically on the prevalence, awareness, knowledge and management of Constipation among adolescent students of MUE in the faculties of Pharmacy, Nursing and Medicine. A total of 335 respondents were involved with about one-third from each of the three faculties.

There were more Females; most respondents were in the 21-25 years age range and in the 5<sup>th</sup> year of study.

In a recent study among 603 apparently healthy adolescent students, slightly more males (54.2%) aged 10 - 19 years attending public schools and mostly in senior secondary class category (54.1%) were encountered (Jiya et al., 2023).

A study in Bangladesh among 1550 respondents encountered more females (58.39%), mean age of  $32.71 \pm 9.72$  and mostly high school graduates (572 (36.9%)) (Ghosh et al., 2023).

A study among 1058 residents in Cotonou involved more males (54.3%), mean age of 29 years, mainly crafts/traders (48.6%), students (39.3%) at the level of secondary school (50.5%) (Sehonou et al., 2018).

The involvement of demographic factors like gender, age, economic, race etc, has been documented in various literature studies (Brenner et al, 2024; Barry and Sybele, 2021; Dantas et al, 2020; Diaz et al, 2023).

### **Prevalence and Patterns of constipation**

The study estimated the prevalence of Constipation among the 3 categories of undergraduate students of MUE. Data revealed a prevalence of 52.8%, 64.4% and 49.2% respectively among pharmacy, nursing and medical students. This level of prevalence is quite high and even higher than most literature values although a wide variation of prevalence of constipation from one region to another has been variously documented in the literature.

Global studies have actually yielded mixed results regarding the prevalence of constipation.

For instance, a questionnaire survey in Canada reported a prevalence rate of 16.7% (Pare et al, 2001) as against a reported prevalence of 2.8% in urban and 0.8% rural dwellers on the Jos Plateau, Nigeria (Daniyam et al, 2011).

Cottone et al (2014) in a prospective study in Italy reported a prevalence rate of 24% whereas Schmidt and Santos (2015) in Brasil reported prevalence of 16% in their study in the city of Londrina.

Ranasinghe et al (2016) reported a prevalence of 6.7% among adolescents in Sri Lanka as against the study report among adolescent Nigerians which posted a prevalence rate of 27% (29% in Urban and 26% in Rural areas) (Ekong et al, 2017).

A study among the general population in Cotonou, Benin Republic, reported a prevalence rate of 48.5% (self-reported) and 24.2% (functional, defined by Rome IV criteria) (Sehonou et al, 2018).

Alhassan et al (2019) reported a prevalence of 4.4% in central region of Saudi Arabia; whereas Dantas et al (2020) in a community-based study in Brasil posted a constipation prevalence of 35.4%.

Brigida et al (2021) in a systematic review and meta-analysis reported that the pooled prevalence of functional constipation was 15.3%; whereas, in another systematic review and meta-analysis, Salari et al (2023) reported overall prevalence of constipation in older adults was 18.9%; the highest prevalence of constipation of 32.3% among older adults in Africa at 32.3% and the lowest in Asia at 13.6%.

More recently, Binafeigha Ihekerenma et al (2024) posted the prevalence of constipation of 18.8% among adolescent Secondary School Students in Yenagoa, Nigeria whilst Alshareef et al (2024) in a general population survey in Saudi Arabia reported a Prevalence 71.2%.

### **Pattern**

The frequency of poop/visits to toilet in this study varied from 11.3% for more than three times a week to 31.8% for twice a day.

Literature studies revealed that normal bowel habits vary from person to person. Whereas some adults go to the toilet more than once a day, others may only go every 3 or 4 days. Similarly, some infants pass stools several times a day, while others reportedly only pass them a few times a week. (NHS, 2023; NIDDKD, 2024).

Past studies have generally shown that the frequency of defecation varies by race and gender.

A study conducted in the United States on a total of 5164 adults with self-reported normal bowel habits, revealed that approximately 95% of individuals had a weekly bowel frequency ranging between 3 and 21

movements. The study also revealed that Men reported normal bowel habits more frequently than women (Mitsuhashi et al, 2018).

Summarily, the prevalence of functional constipation has been revealed to be highly variable among epidemiological surveys.

This variability in the prevalence and pattern of constipation has been opined to be a consequence of different diagnostic criteria, data collection techniques used, the subjective nature of the definition of constipation and differences in populations, because of various factors such as age groups, culture, diet and environment (Werth et al., 2019; Rao et al., 2016; Rao and Camilleri, 2016).

Thus, environmental, cultural, ethnic, dietary, or genetic factors can influence reporting of symptoms. Future studies should aim to elucidate reasons for this geographical variability.

### **Awareness/ knowledge of constipation**

This study showed very high levels of awareness of constipation among pharmacy students (100%), nursing students (98.0%) and medical students (97.5%) in MUE. This result is not surprising as the students were in medically related fields and possibly had been taught aspects of disease conditions like constipation. This result is higher than the 70% awareness level as revealed by two studies (Hemdi *et al.*, 2023; Ahmed *et al.*, 2020); 74.4% was reported by Alshareef et al, (2024) in a general population survey in Saudi Arabia.

Regarding knowledge of constipation, this study revealed some significant details. There was a significant difference ( $P < 0.05$ ) in awareness of constipation being “a problem of passing fewer than three stool a week”, with nursing students having highest (60.6%) knowledge, followed by pharmacy (57.4%) and then medical (43.4%) students. However, in terms of “difficult time to passing stool”, majority of the respondents (pharmacy 96.7%, nursing 94.2%, and medical 92.6%) had good knowledge  $P < 0.05$ ). There was also significant difference ( $P = 0.0174$ ) in the knowledge of “feeling of having the rectum being blocked”, with highest knowledge from Pharmacy 90.7%, medicine 75.4% and nursing 56.7% respectively. Medical students (75.4%) had a better knowledge of “the need to use the finger to pass stool”, followed by pharmacy 64.8%, and nursing 56.7%), this was very statistically significant ( $P = 0.0057$ ).

Nursing students (51.0%) had highest knowledge of constipation being due to “too much absorption of water from poop by colon/large intestine”, followed by medicine students (45.9%) and pharmacy students (38.9%).

What comes forth from these data is that there are concerning gaps in the knowledge of the respondents in this study and startling significant differences among the 3 classes of respondents. The gaps in knowledge require to be strategically filled. General health education should be carried out to update their knowledge.

### **Knowledge of Symptoms of Constipation**

Constipation is commonly defined as a stool frequency of fewer than three bowel movements per week. In addition to decreased frequency, patients often have a range of associated symptoms, including difficulty passing stools, hard stools, incomplete elimination, straining, or painful bowel movements (Sadler et al., 2022; Lacy et al., 2016).

In this study, respondents indicated most frequently “a problem of having a difficult time passing stool (straining / painful)” (94.5%), Hard dry or lumpy stool (90.7%), a feeling of rectum being blocked (82.9%), Feeling bloated and neglected (71.7%), a problem of passing fewer than three stools in a week (67.3%) and the need to use the finger to pass stool (65.6%) as markers of constipation. These are consistent with the literature.

In most literature studies and reviews, constipation is defined as a stool frequency of fewer than three bowel movements per week. In addition to decreased frequency, patients are often reported to have a constellation of associated symptoms, including difficulty passing stools, passage of dry / hard stools, incomplete evacuation,

straining, or painful bowel movements, time-consuming defecation (Werth et al., 2019; Song et al., 2019; Dimidi et al., 2019).

Data from this study has revealed that the knowledge of constipation symptoms is quite adequate and in line with what is known in literature.

This is, however, not a true reflection of the very high level of awareness and knowledge of the disease earlier recorded.

What is further revealed from these data is that there are concerning gaps in the knowledge of symptoms among the respondents in this study, some of which are significant among the 3 classes of respondents. The gaps in knowledge require to be strategically filled also.

It is well understood that when individuals are aware of constipation symptoms and understand the importance of addressing them promptly, they are more likely to seek medical advice and follow recommended treatment plans. This can prevent the development of more serious complications and improve overall quality of life.

### **Knowledge of causes of constipation**

The current study revealed that respondents had a good knowledge of the causes of constipation consistent with the literature.

Various studies have indicated that constipation is a multifaceted issue with causes ranging from lifestyle factors like "low fiber intake", "lack of exercise", "Changes in life or routine", "Not enough fiber and fluids in the diet", "Over- use of laxatives", "not eating enough fibre, such as fruit, vegetables and cereals, a change in routine or lifestyle, such as a change in eating habits, having limited privacy when using the toilet, ignoring the urge to pass stools, immobility or lack of exercise, not drinking enough fluids, having a high temperature (fever), being underweight or overweight, anxiety or depression, psychiatric problems to medical conditions and medications. (Brenner et al., 2024; NHS, 2023; NIDDKD, 2024; Hasler et al., 2019; Zhang et al., 2023).

A better understanding of the underlying causes of constipation, such as insufficient fiber intake, dehydration, lack of physical activity, and certain medications, empowers individuals to make lifestyle changes that can prevent or alleviate constipation.

### **Knowledge of management of constipation**

When the respondents were asked on how constipation can be managed, majority of the pharmacy respondents opined that "adding fruits, vegetables, whole grains and fiber to diet (96.3%) closely followed by "by drinking two or more extra glasses of water a day (92.6%) and "avoiding holding the urge to use the toilet (76.9%). Other management suggestions included "Changes in diet or Exercise or with non-prescription medicines (60.2%), and "Eat fewer high fat foods like Eggs and Cheese (54.6%).

In comparison, majority of the nursing respondents opined that approaches to constipation management requires "adding fruits, vegetables, whole grains and fiber to diet (95.2%) closely followed by "by drinking two or more extra glasses of water a day (93.3%) and "avoiding holding the urge to use the toilet (90.4%). Other management suggestions include "Changes in diet or Exercise or with non-prescription medicines (76%), and "Eat fewer high fat foods like Eggs and Cheese (54.8%).

Medicine respondents suggested "by drinking two or more extra glasses of water a day (73%); adding fruits, vegetables, whole grains and fiber to diet (70.5%); "avoiding holding the urge to use the toilet (70.5%); "Changes in diet or Exercise or with non-prescription medicines (63.1%); "Eat fewer high fat foods like Eggs and Cheese (54.1%).

A significant proportion of pharmacy respondents laid greatest emphasis on "adding fruits, vegetables, whole grains and fiber to diet (96.3%) and "by drinking two or more extra glasses of water a day (92.6%).

Nursing respondents laid greatest emphasis on “adding fruits, vegetables , whole grains and fiber to diet (95.2%), “by drinking two or more extra glasses of water a day (93.3%) and “avoiding holding the urge to use the toilet” (90.4%).

On the other hand, Medicine respondents laid greatest emphasis on “by drinking two or more extra glasses of water a day (73%); adding fruits, vegetables , whole grains and fiber to diet (70.5%); “avoiding holding the urge to use the toilet (70.5%).

These data are in agreement with the universal management approaches to constipation (Brenner et al, 2024; Zhang et al., 2023; Nag et al, 2020; Young et al., 2024).

The variations may simply be a reflection of the individual attitude or perception. In general, the respondents have a high knowledge of the countermeasures for constipation. But there is always room for knowledge upgrade through appropriate intervention strategies which is so advised.

However, the study highlights a need for strategic training and policy interventions to bridge the gaps in participants’ knowledge and management practices. The findings will also serve as a crucial framework for developing evidence-based strategies and interventions aimed at enhancing management of constipation among MUE students as identifying the knowledge gaps of constipation can inform the design of effective interventions.

Summarily, awareness and knowledge play a crucial role in influencing the prevalence of constipation. Higher levels of awareness and understanding about the condition, its causes, and management can lead to earlier detection and treatment, potentially reducing the number of individuals experiencing prolonged or severe constipation.

Public health campaigns and educational initiatives can play a vital role in increasing overall awareness and promoting healthy behaviors that can help prevent constipation. There is a fundamental premise that knowledge exerts a positive influence on attitudes, and these attitudes, in turn, shape individual practices (Khalid et al, 2022).

Moreover, a relatively higher health awareness is opined to readily facilitate the dissemination and adoption of health-related information and practices. Therefore, the heightened awareness among the respondents in this study can be instrumental in effectively promoting health education and interventions.

## **Management of constipation by the respondents**

### **Health Seeking Behaviour of Respondents**

In this study, the most prevalent health seeking behaviour was Self-medication; on the average, about a third of the population practiced self-medication. This behaviour was most prevalent among pharmacy students, followed by medicine and then nursing students although the difference is not statistically significant ( $P=0.2237$ ). This is similar to other literature reports (Wald et al., 2008; Rao and Darren, 2021).

The next favoured care -seeking behaviour was “visit to the pharmacy” involving a little above one fifth of the respondents (22.4%) across the different faculties on average. This behaviour was also most common among pharmacy students and it is statistically significant ( $P=0.0086^{**}$ ).

The greater exposure to pharmacology and pharmacotherapeutics of pharmacy students by virtue of their undergraduate curriculum may account for the preponderant practice of self-medication.

Further, only about one-tenth of the respondents would seek for care at the Chemist and Hospital/Clinic on average. Going to the Chemist was mostly favoured by medicine students followed by nursing students. Going to the Hospital / Clinic was mostly preferred by nursing students followed by medicine students. Pharmacy students tended to shy away from seeking care for constipation from the Chemist and Hospital/Clinic perhaps because of their superior knowledge and greater involvement in self-medication.

A literature study had previously revealed that only a few respondents (4.7%) had seen a doctor for their condition (Akio et al., 2016). Further, it is widely reported that most constipation is self-managed by using widely available laxatives, dietary, and lifestyle modifications, with only a minority of individuals seeking health care (Brenner et al., 2024). This appears to be the picture among the respondents in this study.

On the whole, in this study, it would appear that the respondents were not paying enough attention to the management of constipation; taking it with levity. They need to know that improper management of basic functional constipation may evolve into chronic constipation and that if not adequately controlled, can lead to potentially life-threatening complications, including fecal impaction and bowel obstruction (Fosnes et al., 2012; Shah et al., 2018). Less recognized is the possible impact of chronic constipation on other comorbid conditions, for example, cardiovascular disease, where events such as syncope, atrial fibrillation, and exacerbation of heart failure following excessive straining have been described (Ishiyama et al., 2019).

### **Constipation Countermeasures utilized by Respondents**

In this study, the most common action taken to manage constipation among the respondents was lifestyle change including drinking plenty of fluids (77.1%) and Eating vegetables and fruits (73.5%) ( $p < 0.0001$ ).

Less than half (46.9%) of the respondents used laxatives ( $P = 0.0007^{***}$ ) and only 38.1% used stool softeners ( $P < 0.0001$ ) to manage constipation.

A minority of the respondents (10.7%) preferred to apply hot water to the anus to get relief.  $P = 0.5689$ .

Similar reports have been documented in the literature. For example, in China, most patients with self-defined constipation reported that lifestyle change was the most common action taken to manage constipation, including eating healthier foods or drinking more water, increasing activity or exercise, and defecating in the morning (Song et al., 2019).

Further, approximately 40% of patients with constipation in the United States self-treat with laxatives (Wald et al., 2008; Rao and Darren, 2021).

It is widely opined that, in many cases, it's possible to relieve the symptoms by making dietary and lifestyle changes. Thus, changes to diet and lifestyle are often recommended as the first treatment for constipation. Usually, this will improve the condition without the need for medication.

Some self-help methods of treating constipation have been advised which include: dietary and lifestyle modifications, increasing daily intake of fibre; adding some bulking agents, such as wheat bran, to the diet to help make stools softer and easier to pass; avoiding dehydration by drinking plenty of water; and exercising more regularly (NHS, 2023; NIDDKD, 2024; Diaz et al., 2023).

A tailored therapeutic approach aims to enhance the quality of life by achieving regular, comfortable, and sustainable bowel movements for patients with constipation. A collaborative approach executed by an inter-professional team promotes a more holistic and effective response to this common and potentially debilitating condition (Diaz et al., 2023).

### **Rating of the effectiveness of treatment**

When asked to rate the effectiveness of treatment modalities used, one-half of the respondents affirmed that laxatives were always effective ( $P < 0.0001^*$ ). Much less than half of the respondents (38.2%) rated "Stool softeners" as "always effective". About a fifth (23.5%) of respondents rated liquid paraffin as "always effective". Bisacodyl was rated as always effective by 16.7% of respondents.

Interestingly, a US study had reported 47% of 533 adults with chronic constipation were not completely satisfied with laxatives or fibre, 82% of which was related to dissatisfaction with efficacy. Another US study found that, of 1223 adults with chronic constipation, only 40% were satisfied with OTC laxatives. Further, a

European study of 793 adults with chronic constipation found that only 28% were satisfied with laxatives used with 44% being neutral and 28% dissatisfied.

Our results must be considered within the context of potential limitations. The reported effectiveness were merely subjective. Thus, the findings are merely suggestive and not evidence-based.

### **Adverse effects experienced with the use of the medications**

In this study, the most common adverse effects reported as “always occurring” were “Farting” (44.9%) and “Diarrhea” (41.4%); this was not statistically significant when stratified into faculties.

Tummy cramps (32.2%), Bloating (31.4%), Nausea (28.6%), Dehydration(27.9%) and Vomiting (18.4%) were further reported as adverse effects that were always occurring. Stratification by faculty produced no significant differences. Albeit, data provides an updated description of the prevalence of ADRs among the cohort of respondents.

These reported adverse effects in our study align well with literature reports. A recent study had revealed that diarrhea, nausea, bloating, and abdominal pain were common adverse events, with no serious adverse events reported (Rao and Darren, 2021).

### **Correlations**

This study revealed some unique but significant associations.

We investigated the relationship between Demographic data and level of awareness/knowledge or constipation management and also the relationship between level of awareness/knowledge and prevalence or management of constipation.

Data revealed significant linkages between Gender, Age and level of study and level of awareness/knowledge.

Further, our findings revealed significant linkages between level of study or Age and management, drug treatment, effectiveness and adverse effects.

Data also revealed significant associations between level of awareness / knowledge and prevalence or management.

1. There was a negative correlation between level of awareness /knowledge and effectiveness of antacid in treating constipation ( $r = - 0.283$ ;  $P = 0.001$ ).
2. There was a negative association between level of awareness / knowledge and adverse effects of dehydration ( $r = - 0.253$ ;  $P = 0.010$ )
3. There was a negative association between level of awareness / knowledge and use of herbal drugs in management of constipation ( $r = - 0.211$ ;  $P = 0.019$ ).
4. There was a negative association between level of awareness / knowledge and application of hot water to the anus for managing constipation ( $r = - 0.244$ ;  $P = 0.007^*$ ).
5. There was a significant negative association between level of awareness / knowledge and Bisacodyl treatment of constipation ( $r = - 0.185$ ;  $P = 0.041^*$ ).

Most of these findings are very similar to various literature reports. Prevalence has been linked with Age (Alshareef et al, 2024; Hemdi et al 2023; Ahmed et al, 2020; Alhassan et al, 2019; Bharucha and Wald, 2019; Sehonou et al, 2018; Forootan et al, 2018).

Prevalence has been linked with Gender (Bharucha and Wald, 2019; Alhassan et al, 2019; Sehonou et al, 2018; Mitsuhashi et al, 2018).

Prevalence has also been linked with level of study/education status (Hemdi et al, 2023; Mitsuhashi et al, 2018; Bharucha et al, 2013).

### **Limitations**

Several limitations should be considered when interpreting the results of this study. Firstly, the study employed a self-administered questionnaire, which predisposes to response bias and self-reporting inaccuracies due to an inadequate provision for precise quantification. Secondly, the cross-sectional design of the study does not allow for establishing causal relationships between variables. Thirdly, the study was conducted among undergraduate students in the medical or health-related field ab initio with high level of relevant education . Additionally, the study did not delve into other potential factors influencing prevalence, knowledge, attitudes, and practices, such as cultural or socioeconomic factors.

### **CONCLUSION**

This study focused specifically on the prevalence and knowledge of Constipation among adolescent students of MUE in the faculties of Pharmacy, Nursing and Medicine. The prevalence of constipation reported in this study was quite high and with varied patterns. Data revealed a high level of awareness and knowledge of constipation. with identified gaps The respondents' knowledge of the symptoms, causes, and management of constipation was adequate. When stratified into faculties, there were areas of significant differences identified.

The health seeking behaviour of the respondents was appropriate. A high level of self medication was revealed. Also, appropriate countermeasures for constipation were applied by the respondents to manage constipation.

A high level of effectiveness and safety of laxatives used for constipation management was revealed. Nevertheless, there were gaps in the knowledge and health seeking behaviours of the respondents which require strategic intervention to fill. A cursory look into the undergraduate curricular may need to be carried out as educational intervention strategy. Strategic health education is still needed to optimize knowledge and management of constipation among MUE students. .

This study provides an updated description of the knowledge of constipation and its management among MUE students.

It is hoped that these findings will inform the efforts of other researchers seeking to address knowledge gaps regarding symptoms, causes, countermeasures for constipation and other interventions aimed at improving its management.

Our findings must, however, be considered within the context of potential limitations. Further validation with more rigorously designed studies is warranted. Future studies should aim to elucidate reasons for the geographical variabilities and more FC-related risk factors require further investigation.

The findings of this study may provide valuable insights for improving the management of constipation among MUE students, potentially leading to better health outcomes and enhanced quality of life for this population.

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### **Conflict Of Interest**

The authors declare no conflict of interest

## Author Contributions

Study concept and design: AA, EJF, EEC

Study Supervision: EJF , NMN

Data acquisition and analysis, : AA, NMN

Data Interpretation: AA, EJF, EEC

Drafting of the manuscript: AA, NMN

Critical revision of the manuscript for important intellectual content: EJF, EEC

Approval of final manuscript: All authors.

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