

## Article Type

## Differences In Patterns of Fiber Consumption and Physical Activity In Students With and Without Functional Constipation at Health Polytechnic, Tasikmalaya, Cirebon Area

### *Perbedaan Pola Konsumsi Serat Dan Aktivitas Fisik Pada Mahasiswa Dengan Dan Tanpa Konstipasi Fungsional Di Politeknik Kesehatan Tasikmalaya Wilayah Cirebon*

Yoga Adijaya<sup>1</sup>, Yovita Puri Subardjo<sup>1</sup>, Teguh Jati Prasetyo<sup>1\*</sup>

<sup>1</sup> Department of Nutrition, Faculty of Health Sciences, Universitas Jenderal Soedirman, Purwokerto, Indonesia

\* Email corresponding author: teguhjatiprasetyo@unsoed.ac.id

**Abstract:** *Infrequent fiber consumption patterns and light physical activity can cause functional constipation. The purpose of this study was to analyze differences in fiber consumption patterns and physical activity in students with and without functional constipation at the Tasikmalaya Health Polytechnic, Cirebon Region. This study uses a cross-sectional, using a stratified random sampling technique involving 100 students. Data collection using Rome III questionnaire, Food Frequency Questionnaire, and International Physical Activity Questionnaire. Bivariate analysis using Chi-Square test and Fisher's Exact test. The results showed that students with frequent fiber consumption patterns were 39% and rarely 61%, with Chi-square ( $p = 0.384$ ). While students with light physical activity were 89%, and 11% heavy, with the results of the Fisher's Exact ( $p = 0.053$ ). It can be concluded that this study shows that there is no significant difference between fiber consumption patterns and physical activity in students with and without functional constipation..*

**Key word:** Fiber consumption pattern, physical activity, functional constipation

## 1. INTRODUCTION

Constipation is a decrease in the frequency of defecation that occurs once every 3 days. This is usually accompanied by difficulty defecating, discomfort and even pain due to the hard or dense consistency of the feces. Constipation is classified into 2 categories, the first is primary constipation and the second is secondary constipation (1). Constipation prevalence data in Indonesia is 12% lower compared to China 15.2% and South Korea 16.7% (2). Functional constipation is caused by several factors, namely fiber consumption patterns and lack of physical activity. In the large intestine, fiber functions to bind water, this can form larger stools, thereby stimulating the nerves in the rectum which triggers the urge to defecate (3).

Sources of fiber that are easy to find and often consumed by people are fruit and vegetables. However, Indonesia National Health Research (Riskesmas) 2018 data shows that 95.5% of the Indonesian population consumes vegetables and fruit below the recommendations (4). The results of research on the consumption patterns of fiber sourced from fruit and vegetables among students found that 59.8% of medical students consumed more than 2 portions of fruit per day and 84.1% consumed more than 3 portions of vegetables per day. This is not in line with the recommendations for

balanced nutrition guidelines (5). According to previous study, there was a significant relationship between fiber consumption and functional constipation (6). Technological developments are currently increasingly advanced, giving access to everyone, especially students, to get things easily, such as shopping and buying food through digital platforms using online delivery services. This will cause a decrease in physical activity, throughout the world there is currently a Covid-19 pandemic. According to the results of research conducted on Sam Ratulangi University students during the pandemic based on the duration of physical activity, students tend to have light physical activity with a median value of 180 minutes with a range of 15 minutes to 16 hours in one week (7).

Insufficient physical activity can affect the physiological decline in smooth muscle in the large intestine. Smooth muscle is part of the digestive muscle so that if there is a physiological decline it will result in defecation disorders and slowed stool formation. This can make the stool hard and difficult to expel due to an increase in water in the large intestine. According to the research results, there is a significant relationship between physical activity and functional constipation (8). Apart from that, if constipation is not treated immediately, it will cause other diseases such as hemorrhoids, the formation of abnormal lumps, which are like sacs in the digestive tract in the large intestine (diverticula), and can even cause colon cancer. Based on the results of a preliminary research study, out of a total of 113 students at the Tasikmalaya Health Polytechnic in the Cirebon Region, it was found that 76% of students experienced constipation. This study aims to determine the differences between fiber consumption patterns and physical activity in students with and without functional constipation at the Tasikmalaya Health Polytechnic, Cirebon Region.

## **2. METHODS**

This research was an observational study using a cross-sectional design which was carried out in May - June 2022. This research involved 100 students of the Tasikmalaya Health Polytechnic, Cirebon Region. Subjects were selected using stratified random sampling according to the inclusion criteria, namely regular students of the Tasikmalaya Health Polytechnic, Cirebon Region, students who were willing to be research subjects, students who answered the questionnaire completely, were not taking medication regularly and the exclusion criteria were suffering from digestive tract cancer, irritable bowel syndrome, and hemorrhoids and has a history of diabetes mellitus.

This study used a food frequency questionnaire to determine dietary fiber sources during the last month, an International physical activity questionnaire to determine physical activity during the last week and a Rome III questionnaire to determine functional constipation. Data analysis was carried out using descriptive analysis to see a description of the subject's characteristics, chi-square test to determine differences in fiber consumption patterns and Fisher's exact test to determine differences in physical activity. Data processing and analysis was carried out using the SPSS version 22 computer program. Data analysis in this study included univariate and bivariate analysis. This research has received ethical approval by Ethic Commission, Faculty of Health Sciences, Universitas Jenderal Soedirman with number 758/EC/KEPK/V/2022.

### 3. RESULTS

#### Subject Characteristics

Univariate analysis in this study explains the description of subjects according to age, gender, characteristics of fiber consumption patterns and characteristics of physical activity at the Tasikmalaya Health Polytechnic, Cirebon Region. Based on Table 1, it was found that 81% were women and 19% were men. The average age of the subjects was 19 years. Characteristics of fiber consumption patterns showed that 39 subjects (39%) were in the frequent category and 61 subjects (61%) were in the rare category. Characteristics of physical activity showed that 89 subjects (89%) had light physical activity and 11 subjects (11%) had heavy physical activity and the median value of subject physical activity was 731.25 MET.

**Table 1. Subject characteristics according to gender, age, fiber consumption patterns and physical activity at the Tasikmalaya Health Polytechnic, Cirebon Region**

Characteristics	Number of Subjects (n=100)	Percentage (%)
<b>Gender</b>		
Male	19	19
Female	81	81
<b>Age</b>		
17 - 22 y.o	100	100
Mean	19	-
Min	17	-
Max	22	-
<b>Fiber consumption patterns</b>		
Often	39	39
Rarely	61	61
<b>Physical activity</b>		
Light	89	89
Heavy	11	11
Median	731,25	-
Min	106	-
Max	13,062	-

#### Fiber sources that subjects often and rarely consume

**Table 2. The source of fiber that the subject often consumes**

No	The source of fiber	Mean (g)
	<b>Fruits</b>	
1	Avocado	9.8
2	Grape	9.75
3	Apel	9.55
4	Dragon Fruit	9.4
5	Water guava	9.3
	<b>Vegetables</b>	
1	Spinach	17.35
2	Broccoli	16.9
3	Beans	16.3
4	Caisim	14.9
5	Long beans	14.7
	<b>Grains and legumes</b>	
1	Corn	9,85

Based on Table 2, it shows that the sources of fiber that respondents often consume with an average value of  $\geq 8.1$  include the fruit category, namely avocado, grapes, apples, dragon fruit and water guava, for the vegetable category, namely spinach, broccoli, beans, caisins and peanuts. long, while the grains and legumes category is corn.

**Tabel 3. The source of fiber that the subject rarely consumes**

No	The source of fiber	Mean (g)
<b>Fruits</b>		
1	Soursop	7,7
2	Mangosteen	6,5
3	Durian	6,25
4	Sapodilla	6,25
5	Rambutan	6,15
<b>Grains and legumes</b>		
1	Soybeans	7,7
2	Green Peanuts	7,4
3	Cereals	6,95
4	Oatmeal	6,35
5	Brown rice	5,78

Based on Table 3, it shows that the sources of fiber that are rarely consumed by respondents with an average value of  $<8.1$  from the fruit category include soursop, mangosteen, durian, sapodilla and rambutan, while the grains and nuts category is soybeans, peanuts. greens, cereals, oatmeal, and brown rice.

### **Differences Between Fiber Consumption Patterns and Physical Activity in Subjects With and Without Functional Constipation**

Based on Table 4, the fiber consumption pattern variable shows that 69.2% of subjects with frequent fiber consumption patterns experienced constipation and 30.8% did not experience constipation. Meanwhile, 60.7% of subjects with an infrequent fiber consumption pattern experienced constipation and 39.3% did not experience constipation.

The physical activity variable shows that 67.4% of subjects with light physical activity experienced constipation and 32.4% did not experience constipation. Meanwhile, 36.4% of subjects with heavy physical activity experienced constipation and 63.6% did not experience constipation.

**Table 4. Bivariate Analysis between Independent Variables and Constipation**

	Constipation		Total	p
	Yes	No		
	n (%)	n (%)	n (%)	
<b>Fiber consumption patterns</b>				0.384
Often	27 (69,2)	12 (30,8)	39 (100)	
Rarely	37 (60,7)	24 (39,3)	61 (100)	
<b>Physical activity</b>				0.053
Light	60 (67,4)	29 (32,6)	89 (100)	
Heavy	4 (36,4)	7 (63,6)	11 (100)	

## 4. DISCUSSION

Teenagers often skip breakfast, have irregular meal times, often consume fast food, and rarely consume fruit and vegetables. Teenagers' erratic eating patterns are a risk factor for health problems in teenagers, namely constipation (9). This supports the results of research on differences in fiber consumption patterns in students with and without functional constipation at the Tasikmalaya Health Polytechnic, Cirebon Region, with fiber consumption patterns rarely experiencing constipation of 60.7%. The results of analysis using the Chi-Square test in this study obtained a value of  $p = 0.384 (> 0.05)$ , which indicates that there was no significant difference in the fiber consumption patterns of students with and without functional constipation. This research was in line with research which shows there was no significant relationship between fiber consumption and functional constipation in Hasanuddin University medical students ( $p = 0.100$ ) (10).

Apart from that, there is no significant difference in the fiber consumption patterns of students with and without functional constipation because the risk factors that cause functional constipation do not only come from fiber consumption patterns, but also fluid intake, nutritional status and stress levels (Thea, Sudiarti & Djokosujono, 2020). The fiber consumption pattern is frequent if the subject can meet his daily fiber needs. Based on the recommended nutritional adequacy figure for teenagers, it is 29-37 grams/day, or the equivalent of consuming 2-3 portions of fruit and 2-4 portions of vegetables per day. (11). The results of the study showed that the sources of fiber that subjects often consumed included the fruit category, namely avocado, grapes, apples, dragon fruit and water guava, the vegetables category namely spinach, broccoli, beans, caisins and long beans, while the grains and nuts category legumes namely corn. The average fiber content frequently consumed by subjects was <6 grams, which is included in the low category. This is in accordance with 2018 Riskesdas data, Indonesian people still do not consume enough fiber. Sources of fiber that are easily found by people are fruit and vegetables, but as many as 95.5% of Indonesian people do not consume enough fruit and vegetables (4).

The majority of sources of fiber that subjects rarely consume come from grains and nuts. According to the Balanced Nutrition Guidelines, grains and nuts are high in fiber (12). This might cause the subject's fiber needs to not be met. This statement is in accordance with research results which state that fiber consumption patterns are less able to influence the defecation process, resulting in functional constipation (13). One of the benefits of fiber is to prevent constipation. Fiber has the ability to bind water in the colon, making the stool volume larger, so it can stimulate the nerves in the rectum and cause the desire to defecate. Apart from that, fiber functions to soften the consistency of feces and shorten transit time in the intestine, so that it can facilitate defecation (14). The results showed that 67.4% of respondents with light physical activity experienced constipation and 36.4% did not experience constipation. Meanwhile, 63.6% of respondents with heavy physical activity experienced constipation and 39.3% did not experience constipation. The results of the Fisher's Exact test analysis on the difference in physical activity of students with and without functional constipation, obtained a value of  $p = 0.053$ , which shows there was no significant difference. This research was in line with research on students at the Faculty of Medicine, University of North Sumatra which stated that there was no significant relationship between physical activity and constipation (15).

Light physical activity can cause the smooth muscle of the large intestine to experience a decrease in physiological function which results in disruption of bowel movements. When the smooth muscle in the large intestine is disturbed, it will result in a suboptimal digestive process. This process inhibits the formation of feces in the large intestine and rectum (16). This was because the longer the feces stay in the large intestine, the more water was absorbed by the large intestine so that the feces become hard and cause constipation (17). The median value of the subject's physical activity was 731.25 METs, which is included in the light category. Metabolic Equivalent of Task (MET), is a unit that measures the ratio of the amount of energy required by body mass when carrying out physical activity. The results of this study showed that there was no significant difference in the physical activity of students with and without functional constipation. One of the factors influencing subjects' light physical activity at the Tasikmalaya Health Polytechnic, Cirebon Region, could be caused by learning carried out using hybrid learning, which resulted in some subjects having to study from home during the Covid-19 pandemic. This causes a decrease in physical activity. The research results showed that there was a decrease in physical activity during the Covid-19 pandemic (18). Light physical activity can cause the abdominal muscles to be less than optimal in the defecation process. To prevent this, sufficient physical activity is needed so that intra-abdominal pressure increases and peristaltic stimulation occurs in the intestine to facilitate the defecation process. Sufficient physical activity can stimulate colonic motility and speed up the transit time of feces from the gastrointestinal tract to the rectum, thereby reducing the risk of constipation (19).

## **5. CONCLUSION**

The results of this study show that there is no significant difference between fiber consumption patterns and physical activity in students with and without functional constipation at the Tasikmalaya Health Polytechnic, Cirebon Region. Subjects should meet their daily fiber needs, which is around 29-37 g/day or the equivalent of 2-3 portions of fruit and 2-4 portions of vegetables every day, and maintain good physical activity, by doing physical activity for at least 30 minutes every day or at least 3 times a week. Do types of physical activity that are easy to do and that you like.

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