

Association between Eating Habits and Types of Food Intake with Functional Dyspepsia Among First-Year Clinical and First-Year Pre-Clinical Students in the Faculty of Medicine State Islamic University Jakarta

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ABSTRACT

Background: Functional dyspepsia is a common upper gastrointestinal symptoms without structural abnormalities. It can be experienced by all populations, including medical students due to certain eating habits and types of food intake. This study aimed to determine the association between eating habits and types of food intake with functional dyspepsia among first-year pre clinical and clinical students at the Faculty of Medicine, Syarif Hidayatullah State Islamic University (SIU) Jakarta.

Methods : This is a descriptive analytical cross-sectional study. Eating habits, type of food intake, and functional dyspepsia were assessed using a dietary questionnaire, the Food Frequency Questionnaire (FFQ), and Rome IV criteria functional dyspepsia questionnaire.

Results : Among 80 subjects are predominated female. Proportion of functional dyspepsia was 47.5% for preclinical and 65% for clinical students, respectively. The frequency of having main meals only 1-2 times/day were 70% in clinical students and 60% in pre-clinical students. Ratio between preclinical and clinical student not having dinner 55% vs. 20%, and not having breakfast 52.5% vs. 37.5%. The clinical students consumed more spicy food and irritating drinks and most of clinical and pre-clinical students have not consumed sour foods.

Conclusion: There was significant relationship between having main meals 1-2 times/day, not having breakfast and not having dinner with functional dyspepsia in first-year clinical and first year pre-clinical student. This is also relationship between eating spicy food and irritative drinks with functional dyspepsia in clinical students at the Syarif Hidayatullah Faculty of Medicine, SIU Jakarta.

KEYWORDS: Eating habits, first-year clinical students, first-year pre-clinical student, functional dyspepsia, types of food intake,

ARTICLE DETAILS

Published On:
04 July 2023

Available on:
<https://ijmscr.org/>

INTRODUCTION

Dyspepsia is one of the upper gastrointestinal tract symptoms which consist of pain or discomfort in the epigastrium, nausea, vomiting bloating, early satiety, belching, and a burning sensation in the chest. It is divided into organic and functional. Organic dyspepsia is dyspepsia with clear anatomic or underlying pathophysiological cause, such as peptic ulcer, cancer, or medicine consumption based on a specific disease, while functional dyspepsia is dyspepsia without no structural abnormalities of the stomach based upper gastrointestinal endoscopy.^{1,2} Meanwhile uninvestigated dyspepsia (UD) refers to patients with either new or possibly recurrent dyspepsia symptoms in whom no investigations have been undertaken. In the majority of cases of UD,

endoscopic studies have shown that subjects are affected by the functional type of dyspepsia.²

The Rome IV criteria define functional dyspepsia as any combination of 4 symptom postprandial fullness, early satiety, epigastric pain, and epigastric burning that are severe enough to interfere with the usual activities and occur at least 3 days per week over the last 3 months with an onset of at least 6 months in advance. From a survey conducted by the Indonesian Ministry of Health in 2015, the incidence of functional dyspepsia in Jakarta was 50%, and according to study on the general population, it is experienced among 15-30% of adults.³

Pathophysiological mechanisms underlying functional dyspepsia are delayed gastric emptying, impaired gastric

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accommodation to a meal, hypersensitivity to gastric distension, altered duodenal sensitivity to lipids or acids, altered antroduodenal motility and gastric electrical rhythm, unsuppressed postprandial phasic contractility in the proximal stomach, and autonomic nervous system-central nervous system dysregulation. Pathogenetic factors in FD are genetic predisposition, infection *Helicobacter pylori* or other organisms, inflammation, and psychosocial factors. Students at medical school are divided into pre-clinical and clinical stages. These periods lasted for 3.5 and 2 years, respectively. The pre-clinical students have very busy schedules, from lectures and group discussions to non-academic activities. Meanwhile, clinical students are also busy with ward visit, duty in polyclinics, and activities in operation room, discussion with adviser and tutor followed by a night guard at a teaching hospital. Those students at first-year need to adapt to campus life and the hospital, which often affects their meal schedule or eating habits and the type of food they consume daily. As a result, medical students have a high risk of experiencing functional dyspepsia

Eating habits play an essential role in the emergence of functional dyspepsia. Pilichiewicz et al. reported that 15% of the population have functional dyspepsia due to irregular diet.⁴ Furthermore, Alzahrani's study in 2020 found among medical students in King Abdul Aziz university, Saudi Arabia, half of the students (50.5%) had meals regularly, but only 34.7% had breakfast every day, and 18.5% rarely had breakfast, as a result, the student had not having breakfast suffered dyspepsia⁵

In a study by Bassandra in 2014 in medical college in India, 16% of students experienced the symptoms due to irregular diet and stress.⁶ Meanwhile, Jaber et al. from Gulf Medical University, United Arab Emirates (UAE), reported that 43.8% of pre-clinical medical students experienced functional dyspepsia.⁷

The type of food they consume daily, such as spicy or sour food and irritating drinks such as coffee, tea, and soda can increase the risk of functional dyspepsia. Dewi discovered that 97.2% of the medical students at Hasanuddin University that consumed irritating food and drinks, causing dyspepsia syndrome.⁸ According to Goktas study, it was observed that fatty and spicy foods, as well as carbonated/soda drinks, cause functional dyspepsia.⁹ Meanwhile, Ulfe et al study at 4 medical faculties in Mexico reported that depression, sleeping difficulty, and coffee consumption were associated with dyspepsia syndrome.¹⁰

OBJECTIVE

This study aims to determine the relationship between dietary habits and type of food intake with functional dyspepsia in first-year clinical and first year pre-clinical students at the Faculty of Medicine, SIU Syarif Hidayatullah Jakarta.

METHODOLOGY

Study Participants

This was a descriptive-analytic cross-sectional study which was carried out between December 2021- Januari 2022, using purposive sampling. The study population was first-year pre-clinical and first year clinical students at the Faculty of Medicine SIU Syarif Hidayatullah Jakarta. Furthermore, the sample was subjects that met the inclusion and exclusion criteria.

Study Population

The inclusion criteria were first-year pre-clinical and clinical students at the Faculty of Medicine, SIU Syarif Hidayatullah was completed informed consent. Meanwhile, the exclusion criteria were subjects diagnosed with organic gastrointestinal disorders based on endoscopy, history of rectal bleeding, history of upper gastrointestinal bleeding, weight loss > 10% in the last 6 months, and history of gastrointestinal malignancy. The sample size based on purposive sampling included total 80 respondents, 40 respondent for each first-year pre-clinical and clinical students.

Assessment tools

In this study, information was obtained by filling out a self-administered and validated questionnaire using a multiple-choice model via Google Forms.

Part 1 of the questionnaire consist of the participants's identity. Part 2 identified the symptoms of functional dyspepsia in participants. This was conducted using a functional dyspepsia questionnaire based on Rome IV criteria.¹¹ Part 3 was the dietary questionnaire which consists of questions about eating habits, that already tested for validity and reliability. Finally, the part 4 was questionnaire about irritative foods and drinks using a modified FFQ (Food Frequency Questionnaire).¹² Almost all the question models were marked, with a checkbox provided to select an answer. It also contained an explanation of the aims, the expected benefits of this study and informed consent. The data was analyzed statistically using Microsoft Excel 2019 and SPSS ver. 24.0.

The Chi-square or Fishar test was used for the statistical analysis with the p-values less than 0.05 is statistically significant.

This study was carried out based on the Indonesian Medical Research Ethics Guidelines. It also received ethical clearance from the Medical Research Ethics Committee, Faculty of Medicine, Syarif Hidayatullah State Islamic University, Jakarta, Indonesia with registry number B-039/F12/KEPK/TL.00/11/2021. All data obtained were treated confidentially and used solely to this study

RESULTS

This study describe the respondent's characteristics, such as gender, current residence, and functional dyspepsia incidence

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in the last 3 months. Table 1 showed the characteristics of the subjects

Table 1. Characteristic of First-year Clinical and Pre-clinical Students based on Gender and the Current Residence in the Last 3 Months and proportion of functional dyspepsia

Characteristic	Category	Total (%)				Total (%)	
		Clinical students		Preclinical students			
		N	%	N	%	N	%
Gender	Male	15	37.5	14	35	29	36.3
	Female	25	62.5	26	65	51	63.7
Residence	House (With parents)	14	35	36	90	50	62.5
	Boarding house/rent (without parents)	26	65	4	10	30	37.5
Functional Dyspepsia	Positive	26	65	19	47.5	45	56.3
	Negative	14	35	21	52.5	35	43.7
Total		40	100	40	100	80	100

The results showed that most students were females, 62.5% were first year clinical students and 65% was first-year pre-clinical students, respectively. According to the residents, their distribution indicates that the majority of clinical students, making up 65%, lived in boarding or rented houses. This was because clinical students have a night shifts schedule and emergency calls, that requiring them to live near the hospital. Meanwhile, most of the pre-clinical students lived with their parents by 90%. The pre-clinical students lived with their parents due to the pandemic when

this study was conducted, and the learning was conducted remotely or online.

This study also found that 70% of clinical student and 60% of pre-clinical students had main meals at 1 or 2 times/day. Meanwhile, 92.3 % of clinical student 82.5 % of pre-clinical students often had lunch. The frequency of those that never had breakfast among clinical and pre-clinical students was 52.5% and 37.5%. Furthermore, 55% of clinical students and 20% of pre-clinical students never had dinner, as shown in Table 2.

Table 2. Frequency of Having Main Meals, Breakfast, Lunch, and Dinner Habits Last 3 Months in First-year Clinical and Pre-clinical Students

Variable	Category	Total (%)				Total	
		Clinical students		Pre-clinical students			
		N	%	N	%	N	%
Main meals Habits	1 time/day	14	35	14	35	3	5
	2 times/day	14	35	10	25	4	0
	3 times/day	11	27.5	15	37.5	5	2.5
	4 times/day	1	2.5	1	2.5		5
Breakfast Habits	Often	10	25	13	32.5	3	3.7
	Rarely	9	22.5	12	30	1	5.3
	Never	21	52.5	15	37.5	5	5
Lunch Habit	Often	37	92.5	33	82.5	0	7.5
	Rarely	1	2.5	4	10		25
	Never	2	5	3	7.5		25
Dinner Habit	Often	11	27.5	19	47.5	0	7.5
	Rarely	7	17.5	13	32	0	5
	Never	22	55	8	20	0	7.5
Total		40	100	40	100	0	30

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Table 3. Frequency of Spicy, Sour Foods, and Irritative Drinks Consumption Last 3 Months in First-year Clinical and Pre-clinical Students

Variable	Category	Total (%)				Total	
		Clinical Students		Preclinical Students			
		N	%	N	%	N	%
Frequency of Eating Spicy Food	>1 time/day	15	37.5	1	2.5	16	0.2
	1x times/day	8	20	1	2.5	9	11.3
	1-3 times/week	6	15	2	5	8	10
	4-6 times/week	1	2.5	1	2.5	2	2.5
	1-3 times/month	3	7.5	17	42.5	20	25
	Never	7	17.5	18	45	25	31.3
Frequency of Eating Sour Foods	>1 time/day	0	0	0	0	0	0
	1x times/day	0	0	1	2.5	1	1.25
	1-3 times/week	3	7.5	4	17.5	8	10
	4-6 times/week	1	2.5	1	2.5	3	3.75
	1-3 times/month	9	22.5	14	35	21	26.25
	Never	27	67.5	20	50	26	32.5
Frequency of Drinking Irritative Beverages	>1 time/day	9	22.5	2	5	11	13.8
	1x times/day	13	32.5	3	7.5	16	20
	1-3 times/week	5	12.5	6	15	11	13.8
	4-6 times/week	2	5	3	7.5	5	6.3
	1-3 times/month	4	10	10	25	20	25
	Never	7	17.5	16	40	37	46.3
Total		40	100	40	100	80	100

clinical students consumed more spicy food by 82.5%, while more pre-clinical students, at 45%, have never eaten spicy food. Most clinical and pre-clinical students have never eaten sour foods by 67.5% and 50%. Clinical students consume more irritating drinks by 82.5%, while pre-clinical students were more likely not to consume irritative drinks by 40%, as shown in Table 3.

Table 4 showed that 100% of first-year clinical students had main meals 1-2 times/day experienced functional dyspepsia. Furthermore, this was also present in 80% and 50% of students that never had breakfast and dinner. As a result,

substantial correlation was found between having main meals 1-2 times per day and never having breakfast or dinner with functional dyspepsia in clinical students (p-value = 0.000).

In this study, 100% of pre-clinical students with the having main meals habits only 1-2 times/day experienced functional dyspepsia. Dyspepsia was more common in clinical students that never had breakfast or never had dinner at 80% and 50%, respectively. A significant relationship was obtained between having main meals only 1-2 times/day, and rarely or never having dinner with functional dyspepsia in first-year pre-clinical students (p-value = 0.000).

Table 4 . Relationship of Having Main Meals, Breakfast, Lunch, and Dinner Habits with Functional Dyspepsia in First-year Clinical and Pre-clinical Students

Variable	Category	Clinical Functional Dyspepsia				Total	p-value * < 0.05 significant
		Yes		No			
		N	%	N	%	N	

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Main Habits	meals	1 time/day	17	66	0	0	17	42.5	0.000*
		2 times/day	9	34	0	0	9	22.5	
		3 times/day	0	0	11	79	11	27.5	
		4 times/day	0	0	3	21	3	7.5	
Breakfast Habit	Often	1	4	12	86	13	32.5	0.000*	
	Rarely	4	16	1	7	5	12.5		
	Never	21	80	1	7	22	55		
Lunch Habit	Often	24	92	13	93	37	92.5	0.737	
	Rarely	1	4	0	0	1	2.5		
	Never	1	4	1	7	2	5		
Dinner Habit	Often	8	30	3	22	11	27.5	0.006*	
	Rarely	5	20	2	14	7	17.5		
	Never	13	50	9	64	22	55		
Total			26	100	14	100	40	100	

**Pre-clinical Students
Functional Dyspepsia**

		Yes		No					
		N	%	N	%	N	%		
Main Habits	meals	1 time/day	11	58	3	14	14	35	0.000*
		2 times/day	8	42	2	10	10	25	
		3 times/day	0	0	15	71	15	37.5	
		4 times/day	0	0	1	8	1	2.5	
Breakfast Habits	Often	15	79	18	86	33	82.5	0.000*	
	Rarely	3	16	1	4	4	10		
	Never	1	5	2	10	3	7.5		
Lunch Habit	Often	15	79	18	86	33	82.5	0.470	
	Rarely	3	16	1	4	4	10		
	Never	1	5	2	10	3	7.5		
Dinner Habit	Often	2	10	17	81	19	47.5	0.000*	
	Rarely	10	53	3	14	13	32.5		
	Never	7	37	1	5	8	20		
Total		19	100	21	100	40	100		

Additionally, Table 5 below showed that 100 % of first-year clinical students consuming spicy food for 1 or more times/day experienced functional dyspepsia. Therefore, there was a significant relationship between students consuming spicy food and functional dyspepsia (p-value = 0.000). Functional dyspepsia was also experienced at 100% of first-

year clinical students that consumed irritative drinks. As a result, there was a significant relationship between irritative drinks and functional dyspepsia (p-value = 0.002). Meanwhile, there was no relationship between the consumption frequency of spicy, sour, and irritating drinks and functional dyspepsia in first-year pre-clinical student.

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Table 5. Relationship Distribution of Frequency of Spicy, Sour Food, and Irritative Drinks Consumption with Functional Dyspepsia in First-year Clinical and Pre-clinical Students

Variable	Category	Clinical Students Functional Dyspepsia				Total		<i>p</i> - value *signifi- cant <i>p</i> <0.05
		Yes		No		N	%	
		N	%	N	0%			
Frequency of Eating Spicy Food	>1 time/day	22	85	0	0	22	55	0.000*
	1x time/day	4	15	0	0	4	10	
	1-3 times/week	0	0	0	0	0	0	
	4-6 times/week	0	0	2	14	2	5	
	1-3 times/month	0	0	5	36	5	12.5	
	Never	0	0	7	50	7	17.5	
Frequency of Eating Acidic Foods	>1 time/day	0	0	0	0	0	0	0.465
	1x time/day	0	0	0	0	0	0	
	1-3 times/week	2	8	1	7	3	7.5	
	4-6 times/week	0	0	1	7	1	2.5	
	1-3 times/month	7	27	2	14	9	22.5	
	Never	17	65	10	72	27	67.5	
Frequency of Drinking Irritative Beverages	>1 time/day	9	26	0	0	9	22.5	0.002*
	1x time/day	11	74	2	14	13	32.5	
	1-3 times/week	3	12	2	14	5	12.5	
	4-6 times/week	1	4	1	7	2	5	
	1-3 times/month	0	0	4	29	4	10	
	Never	2	8	5	36	7	17.5	
Total		26	100	14	100	40	100	

		Preclinical students Functional Dyspepsia						
		Yes		No				
		N	%	N	%	N	%	
Frequency of Eating Spicy Food	>1 time/day	1	5.3	0	0	1	2.5	0.671
	1x time/day	1	5.3	0	0	1	2.5	
	1-3 times/week	1	5.3	1	4.8	2	5	
	4-6 times/week	0	0	1	4.8	1	2.5	
	1-3 times/month	8	42	9	43	17	42.5	
	Never	8	42	10	48	18	45	
Frequency of Eating Acidic Foods	>1 time/day	0	0	0	0	0	0	0.494
	1x time/day	1	5.3	0	0	1	2.5	
	1-3 times/week	2	10	2	10	4	10	
	4-6 times/week	0	0	1	4	1	2.5	
	1-3 times/month	7	37	7	33	14	35	
	Never	9	47	11	52	20	50	
Frequency of Drinking	>1 time/day	1	5	1	4	2	5	0.984
	1x time/day	1	5%	2	10	3	7.5	

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Irritative Beverages	1-3 times/week	3	15%	3	14	6	15
	4-6 times/week	2	11%	2	10	4	10
	1-3 times/month	6	32%	5	24	11	27.5
	Never	6	32%	8	38	14	35
Total		19	100	21	100	40	100

DISCUSSION

The results showed that 65% and 47.5% of first-year clinical and pre-clinical students experienced functional dyspepsia. These were similar to the study by Jaber et al. from the UAE, which stated that 43.8% of pre-clinical medical students experienced functional dyspepsia.⁷ In 2019, Irfan's study in pre-clinical students at the Faculty of Medicine, SIU Syarif Hidayatullah Jakarta, yielded higher outcomes, as there were 73.3% of individuals with dyspepsia syndrome.¹⁵ This results was rather different with Li's study in China also discovered that it was more common in pre-clinical than in clinical students.¹⁵

The increased frequency of dyspepsia can be attributed to the clinical students busy schedules, which include polyclinic visits and operations from morning to night. Therefore, the diet becomes more irregular than in the pre-clinical students, leading to a higher risk of experiencing functional dyspepsia. Since preclinical students continue to attend online courses from their parents' residences, their eating habits and food intake remains better.

In this study, the female is more common than male. Female group has the higher rate of dyspepsia because of their lifestyle by high consumption of fatty food, NSAID, and cigarettes, and also stress in medical school. Several studies showed differences in gastric emptying and visceral hypersensitivity between males and females.^{11,14,15} According to the Ministry of Health's balanced nutrition guidelines, a good daily diet includes eating breakfast, lunch, dinner, and snacks.¹⁶ Xu et al. stated that the ideal diet is three times of main meals with 2 additional meals a day.¹⁷

The dietary habits in this study was measured from three factors, namely the frequency of having main meals, breakfast, lunch, and dinner habits. First-year clinical and pre-clinical students only having main meals 1-2 times/day, which correlates significantly with functional dyspepsia. These results follow the research of Basandra in 2014, which stated that 16% of the students experienced functional dyspepsia caused by irregular diets and stress levels.⁶ Similarly, a study by Tiana discovered that 79.2% of students from the Faculty of Medicine, Krida Wacana Christian University, having irregular diet experience dyspepsia.¹⁸ However, a previous study from Irfan on SIU medical students reported no relationship between dietary habits and dyspepsia.¹⁴ Furthermore, a good diet is related to an adequate having main meal interval of approximately 6-7 hours. The time between meals determines the activity of filling and emptying the stomach.^{13,19} There will be excessive acid production when a

person eats 2-3 hours late from the predetermined meal time, which can result in functional dyspepsia.¹⁹

This study obtained a significant relationship between never eating dinner and breakfast with functional dyspepsia in first-year clinical and pre-clinical students of the Faculty of Medicine, SIU Syarif Hidayatullah Jakarta. This is due to the dense activities of clinical students starting from the polyclinics visits followed by the operating schedule from 07.00 a.m to 04.00 p.m. It continued with night shifts according to schedule, hence most students only had lunch. The lecture, which starts very early, at 7 a.m., makes pre-clinical students not have time for breakfast. Hassanzadeh from Iran observed that a small but frequent diet could reduce the risk of functional dyspepsia.²⁰

This study also discovered a significant relationship between eating spicy food and functional dyspepsia in clinical students. This is inline with Ivan's study in 2011, which stated that the stomach and intestines would be stimulated due to excessive consumption of spicy food. This situation causes burning sensations, heartburn, and nausea.²¹ Furthermore, spicy food can cause the stomach to lose epithelial cells in its mucous lining. According to Bortolotti et al., capsaicin is the active component of spicy foods (chili) and has an effect through the activation of c-afferent fibers. This causes gastric sensitization, which increases gastric acid production.^{22,23} Although in this study, there was no significant relationship between spicy food consumption and functional dyspepsia in first-year pre-clinical students. It also did not exist between acidic foods and functional dyspepsia in clinical and pre-clinical students. These were not similar with Dewi study which reported that 97.2% of Hasanuddin University medical students consumed irritating food and drinks, causing dyspepsia syndrome.⁹ This can happen because most pre-clinical students prefer spicy food and have almost the same frequency between those with and without functional dyspepsia.

The results also show a significant relationship between the consumption of irritative drinks and functional dyspepsia in clinical students. It was caused by more consumption of irritating drinks such as coffee, tea, or carbonated drinks, especially drinking coffee while doing assignments for the next day or during night shifts at the hospital, as it stimulates acid secretion in the stomach. Research conducted by Alkhondi in Iran stated that coffee causes functional dyspepsia in 60% of patients.²⁴ It contains caffeine, a secretagogue substance that causes the gastric mucosa's antrum to secrete the gastrin hormone, which has the effect of

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secreting highly acidic juice from the fundus of stomach.^{14,24} Furthermore, soft drinks contain gas, and excessive gas in the stomach can aggravate the work of the stomach. They also have a pH between 1-2 which is acidic, irritating the gastric mucosa.^{25,26,27} Functional dyspepsia can develop from the ingestion of spicy, sour, or other irritating foods and drinks more than once per week for at least six months.^{26,27}

This study discovered no significant relationship between the frequency of drinking irritative beverages and functional dyspepsia in pre-clinical students. They disliked irritating drinks and sour foods such as salad, pickles, yogurt, and others. This can be influenced by the availability of food in the student's environment, including the dishes served at home or in nearby restaurants, which are predominantly hot and spicy but not sour food.

CONCLUSION

Students at the medical school consist of pre-clinical and clinical. The pre-clinical students have very busy schedules in the form of lectures, group discussions and non-academic activities, while the activities of clinical students are visits ward, duty in polyclinic, as well as the operating room, discussion with adviser or tutor, followed by night shifts at the hospital. Therefore, their first year generally need to adapt to life in the campus or hospital, which often affects their meal schedule and the type of food consumed daily.

Dietary habits and types of food intake play an essential role in the emergence of functional dyspepsia. Having main meals 3 times a day regularly can reduce the risk of this dyspepsia. This is also made possible by selecting the type of food intake by avoiding spicy, sour foods and irritating drinks such as coffee, tea, and soda.

It can be concluded that from all respondents, The proportion of pre-clinical and clinical students with functional dyspepsia was 47.5% and 65%, respectively. The most gender is female, with main meals habits only 1-2 times/day for both clinical and pre-clinical students. First-year clinical and pre-clinical students of the Faculty of Medicine, SIU Syarif Hidayatullah Jakarta often have lunch but do not have dinner or breakfast. Meanwhile, clinical students consume more spicy food and irritative drinks than pre-clinical students.

There is a significant relationship between having main meals only 1-2 times a day and never having breakfast and dinner with functional dyspepsia in first-year pre-clinical and clinical students. There also significant relationship between spicy food and irritative drink consumption in clinical student. Meanwhile, this does not exist between all types of food intake and functional dyspepsia in pre-clinical student. Preclinical and clinical students should eat regularly three times a day and for clinical student had to avoid irritative drink to prevent functional dyspepsia. Future studies should be done to evaluate risk factors of functional dyspepsia with larger subjects.

Acknowledgements

The author are grateful to those who dedicated their time and participation to this study.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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