

The Correlation Between the Type, Quantity, and Frequency of Eating with Defecation Patterns and Muslim Students' Indigestion During Ramadan Fasting

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Keywords: Diet, Defecation Pattern, Indigestion.

Abstract: Introduction: Diet is a description of the regulation of the quantity, frequency, and type of food consumed daily by a person. The purpose of this study was to analyze the correlation between the type, quantity, and frequency of eating and the bowel pattern and digestive complaints of Muslim students during Ramadan fasting. Method: the research design used a cross-sectional study approach with type, number, and frequency of feeding as the independent variables and bowel pattern and indigestion as the dependent variables. The sample comprised of 107 college students. The data were collected by questionnaires and analyzed using the Chi-square test. Results and Analysis: The statistics test regarding food typed and defecation patterns obtained a p value of 0.000 at $\alpha \leq 0.05$. The quantity of food and defecation patterns obtained a p value of 0.577. The frequency of eating with defecation pattern obtained a p value of 0.778. The food types with indigestion obtained a p value of 0.015. The quantity of food and indigestion obtained a p value of 0.339. The frequency of eating with indigestion obtained a p value of 0.368. Discussion and Conclusion: There was a correlation between the type of food and bowel patterns and indigestion. There was no correlation between the number of meals and the frequency of eating with bowel patterns, and the same applied to the number of meals and the frequency of eating with digestive complaints.

1 INTRODUCTION

Students are at an adult age during which food consumed is very influential for the body's health. The body still needs the same nutritional intake both when fasting and not fasting. However, from the results of interviews, it is evident that students often consume spicy foods, foods containing sugar and salt, and fatty foods when fasting during Ramadan. Students rarely consume fruit during suhoor. Students also often experience diarrhea and complain about pain and nausea in their stomachs.

Research by Riawanti (2008) found that the average consumption of nutrition by students (9.8%) decreased during Ramadan, including energy, protein, fat, iron, vitamin C, and vitamin B. The World Health Organization (WHO) in 2009 discovered the percentage of gastritis occurrence in Indonesia was 40.8%. The occurrence of gastritis in some areas of Indonesia is quite high with the prevalence of 274,396 cases from 238,452,952 inhabitants. In Surabaya, the occurrence of gastritis

is 31.2% (Maulidiyah, 2006), whereas the prevalence of peptic ulcers (known as ulcer disease).

Indonesia was found in 6%–15%, especially at the age of 20–50 years (Suyono 2001). One way to overcome eating behaviors is to change the perception of individuals; this suggestion is based on the theory of the Health Belief Model (HBM), in which individuals perceive the vulnerability and seriousness of diseases. Such perceptions simultaneously increase individuals' awareness of the fact that a healthy diet can reduce symptoms of indigestion, hence prompting a change in the behavior of a person regarding their diet.

2 METHODS

This research design used a correlational research design with a cross-sectional approach. This research was conducted at a university in Surabaya city during Ramadan. The population in this research were 121 6th semester Muslim students and

the sample comprises of students that meet the inclusion and exclusion criteria. This study used total sampling, i.e. taking all members of the population as samples. Independent variables in this study are the type, quantity, and frequency of eating. The dependent variables are defecation patterns and indigestion. A questionnaire was used to collect data, which were analyzed using the Chi-square statistical test.

3 RESULTS

Most respondents in this research is female students aged 21–22 years old. According to the results in Table 2, it was discovered that most students choose the right food during Ramadan fasting.

Table 1 showed that the majority of the respondents choose correct food type and have normal defecation pattern. The result of statistical test using chi-square shows 0,000 p value. Therefore it can be concluded that there is a significant relation between food type and defecation patterns. The majority of the respondents with normal eating quantity have normal defecation pattern. The result of statistical test using *chi-square* shows 0577 *p value*, therefore it can be concluded that there is no significant relation between eating quantity and defecation patterns. Respondents with regular eating frequency have normal defecation pattern. The result of statistical test using chi-square shows 0,778 p value. Therefore it can be concluded that there is no significant between eating frequency and defecation patterns.

Based on table 2, it showed that food type which is correct often leads to the respondents having mild indigestions. The result of statistical test using *chi-square* shows 0,015 *p value*, therefore it can be concluded that there is significant relation between food type and indigestions. Also, the majority of respondents with normal eating quantity have mild indigestions. The result of statistical test using *chi-square* shows 0,339 *p value*, therefore it can be concluded that there is no significant relation between eating quantity and indigestions. Majority of the respondent with no indigestion showed regular eating frequency with statistical result of Chi-Square p value was 0.039. It can be concluded that there was no significant relation between eating frequency and indigestions.

Table 1: The analysis of relation between food type, eating quantity, eating frequency with defecation pattern on muslim students during ramadhan fasting.

No.	Analysis	<i>P Value</i>
1.	Food type	0.000
2.	Eating quantity	0.577
3.	Eating frequency	0.778

Table 2: The analysis of relation between food type, eating quantity, eating frequency with indigestions on muslim student during ramadhan fasting.

No.	Analysis	<i>P Value</i>
1.	Food type	0.015
2.	Eating quantity	0.339
3.	Eating frequency	0.368

4 DISCUSSION

4.1 The Relationship between Food Type and Defecation Patterns

The results from the Chi-square analysis indicated that there was a significant relationship between food type and defecation patterns ($p < 0.05$). The pattern of food consumption is the composition of the type and amount of food consumed by a person or group at a certain time (Khomsan, 2010). A healthy diet should pay attention to nutritional adequacy rates, in terms of carbohydrates, proteins, fats, and minerals (Supratman et al., 2013). During fasting, the diet should still follow the pattern of healthy and balanced foods (four sehat and five sempurna) in accordance with the needs of the calories required for each individual. Intake of carbohydrates, proteins, fats, vitamins and minerals in the month of fasting must remain complete. Diet (food) is a major factor affecting defecation, especially fiber. An important role of fiber is the elimination of feces by increasing its volume to help the defecation process (Miguel et al., 2004).

Research conducted by Ambarita (2014) indicates that there is a significant relationship between fiber intake and the frequency of defecation. Yang et al. (2012) also proved that there is a relationship between fiber intake and the frequency of defecation. Foods that contain lots of fiber will also increase intestine movements, smoothing the feces so it is easier to move through the colon, increasing the frequency of defecation. In addition, the quantity and types of foods that are consumed each day also affect defecation patterns,

such as spicy foods, unhygienic foods, and some contain irritants that may irritate the gastric mucosa and intestine, hence increasing intestine motility (Funnell & Koutoukidis, 2005).

Dietary fiber will affect the defecation process by facilitating the passage of food through the digestive system (Eswaran et al., 2013). Fiber can be obtained through vegetables and fruit (Khomsan, 2009).

4.2 The Relationship between the Quantity of Food Eaten and Defecation Patterns

Based on the results of this study, it was determined that there is no relationship between the quantity of food consumed and defecation patterns. This can be caused by other factors that have a dominant relation to defecation pattern. Every individual requires a number of nutrients to live healthy and sustain life. Therefore, the amount of nutrients obtained through food consumption must be sufficient to perform activities and maintain the immune system. According to the Ministry of Health (2005) the portion of food eaten each day should follow the general guidelines of balanced nutrition; the dishes are comprised of staple foods (3–5 servings per day), side dishes (2–3 servings per day), vegetables (2–3 servings per day) and fruit (3–5 servings per day).

Nutritional needs are the minimum number of nutrients that must be consumed through food intake. A deficiency in, or excess intake of, nutrients compared to normal requirements for an extended time can endanger health. Fiber is a non-nutrient substance that belongs to one type of group of polysaccharides or complex carbohydrates (Soelistijani, 2002). Lubis (2009) stated that dietary fiber is a component of complex carbohydrates that cannot be digested via digestive enzymes, but can be digested by micro-bacteria digestion. Fiber consumption deficiency can lead to diseases such as constipation, hemorrhoids, and colon cancer.

Fiber works to stimulate intestinal tract activity to release feces regularly. Fiber in the feces can also absorb a lot of water, thus making the feces soft and preventing constipation (Waluyo & Irianto, 2007). Sari et al. (2016) proved that there is no significant relation between fiber consumption and defecation patterns. The higher the consumption of dietary fiber smoother the defecation process will be, avoiding straining. A theory by Beck (2011) suggests that the consistency of feces depends on the amount of fiber consumed. Adequate fiber intake will facilitate the defecation process because fiber can retain moisture

in the feces by drawing water osmotically and stimulating the peristalsis of the colon through stretching.

4.3 The Relationship between the Frequency of Eating and Defecation Patterns

The results of this study indicated that there is no significant relationship between the frequency of eating with defecation patterns. The frequency of eating consists of the main meal frequency, i.e. breakfast, lunch, and dinner. However, this is certainly different during Ramadan. When we are fasting during Ramadan, most Muslims will have two meals, i.e. suhoor (at dawn) and iftar, so the fasting duration ranges from 11 to 18 hours each day (Azizi 2010). Eating suhoor is preceded by drinking a glass of milk, then eating a balanced menu and a large portion of food. During suhoor, it is recommended to eat a high protein content, so that food stays in the stomach for longer. Digestion and protein absorption also lasts longer than foods with high carbohydrate levels (Sekarindah 2002).

Dietary pattern during fasting that need to be considered is the pattern of eating when breaking the fast (iftar). There are lots of people who eat during iftar, no longer called the nutritional value of food consumed (Sugung, 2013). Breaking the fast should be done with care, taking a sweet drink and eating date palm fruit or with fruits. Sweet foods contain carbohydrates that are easily absorbed and can immediately raise blood sugar levels, hence transforming into calories to recover energy after a day with no food and (Sekarindah 2002). A lot of people use Ramadan to lose weight. Losing weight can be done as long as the need for calories remains fulfilled. If we only consume vegetables and fruit, it will lead to illness (Idris 2000). The American Dietetic Association (ADA) in Muthmainnah (2013) recommend that the value of adult fiber adequacy is 20–35 grams per day. A lack of fiber in food eaten daily can cause abnormalities in the processing of feces causing constipation. The average fiber consumption in Indonesia has still not reached the ideal amount of fiber consumption per day. The average fiber consumption in Indonesia is 10.5 grams per day (July 2001). The study by Sari et al. (2016) proves that the average fiber consumption of respondents is 15.47 grams per day, whereas the ideal fiber consumption value recommended by the ADA is 20–35 grams per day. Regarding the consumption of fiber, respondents only reached half of the recommended ideal requirements.

4.4 The Relationship between Food Types and Indigestion

Based on the results of this study, it was found that there is a significant relationship between food types and indigestion. Types of food are very important for emptying the stomach. A large amount of food will produce a large number of kimus. The exceeding amount of kimus in the duodenum will slow the process of emptying the stomach. Suratun (2010) stated that spicy and acidic foods will stimulate the stomach wall to remove stomach acid that can cause injury to the wall of the stomach. Foods that contain a lot of carbohydrates leave the stomach within a few hours. Protein-rich foods last longer. They leave the stomach slower, and the slowest discharged foods after eating are fatty foods (Sherwood 2001).

Acidic foods are foods that stimulate the digestive organs and can directly erode gastric mucosa. Acidic foods stimulate excessive stomach acid secretion and can stimulate increased motility or peristalsis of the digestive organs, leading to inflammation of the wound on the walls of the digestive organs (Susanti, et al., 2011). Research conducted by Susanti et al. (2011) indicated that consuming spicy and sour foods affected the onset of symptoms in the stomach. Another study conducted by Angkow et al. (2014) demonstrated that there is a significant relationship between types of food and the occurrence of gastritis. Research by Pratiwi (2013) indicated that there is a significant relationship between types of eating with gastritis occurrence. The results of this study showed that respondents liked spicy and sour foods. Irritating foods such as spicy foods can cause injury to the stomach wall (Sediaoetama, 2008). Notoatmodjo (2007) believes that consuming spicy and acidic foods can cause excessive heat and pain in the pit of the stomach, accompanied by nausea and vomiting.

4.5 The Relationship between Food Types and Indigestion

Based on the results of this study, it was found that there is no significant relationship between the quantity of food consumed and indigestion. When insufficient food was consumed, non-fulfillment was evident, caused by an inadequate number of calories. This resulted in a lower fulfillment of energy and other nutrients required by the body. A poor diet is seen in terms of quantity, type, and function, and, in the long term, causes non-fulfillment of the body's need for nutritional elements (including carbohydrates, proteins, and fats).

According to the Health Department (2005) daily portions of food should follow a balance of nutrients, consisting of staple foods (3–5 portions per day), side dish (2–3 portions per day), vegetables (2–3 portions per day) and fruit (3–5 portions per day). The consumption behavior of a person, a family, or a society is influenced by insight and perspective and other factors related to appropriate actions. On the other hand, nutrition is very useful for maintaining health and preventing disease. The lack of nutrients issue has lately caused the occurrence of diseases due to incorrect diets, such as overeating or eating a less-balanced diet. A study conducted by Pratiwi (2013) indicated that there was no significant relationship between quantity of food and gastritis. Another research study conducted by Putri et al. (2010) in which the frequency of food quantities were analyzed, 100% of respondents consumed less food than the body needed and the analysis results concluded that there is a dietary relationship with the occurrence of gastritis. The results showed that most respondents had less carbohydrate, protein, and fat. The lower nutritional value of carbohydrates can be caused by the intake of less food than the body needs. Carbohydrates are nutritional elements that provide the main energy; the recommended carbohydrate requirement is 60% of total calories with a breakdown of 90% other than sugar, and 10% sugar. Carbohydrate deficiencies in food consumption can lead to a state of malnutrition.

Lower protein intakes can be caused by eating a smaller quantity of food that is less than the body requires and less varied types of food. Protein is a nutrient that works for the growth and maintenance of skin and nails, regulates fluid balance, the formation of antibodies, and energy sources. Lack of protein causes many problems such as weight loss, weakness, muscle tissue shrinkage, and edema (Erfandi 2009).

Lack of fat of respondents is caused by lack of food intake in the body. The respondents' preference for types of food as a source of fat is less varied. Basically, fat serves as a source and energy reserve. Fat is stored in the tissue under the skin (Pratiwi, 2013). Fat deficiency can cause neurological and vision problems, reproductive failure, and disorders of the skin, kidneys, and liver (Erfandi, 2009). Lower intake of carbohydrates, fats, and proteins will result in non-fulfillment of the functions of these nutritional elements.

4.6 The Relationship between the Frequency of Eating and Indigestion

Based on the results of this study, it was determined that there is no significant relationship between the frequency of eating and indigestion. The main factors causing disturbances in the digestive system are the patterns of food consumption and body nutrition intake, as these are unfulfilled. In addition, factors that can affect the occurrence of indigestion are an irregular and unsuitable diet. Digestive disorders that often arise are gastritis and ulcers. Typical symptoms of gastritis and peptic ulcers are pain or discomfort in the area of the epigastrium or upper abdomen, bloating after eating, a full stomach and feeling full quickly, nausea, vomiting, and frequent burping. This set of symptoms is often referred to as dyspepsia syndrome (Sofro & Anurogo, 2013).

The frequency of eating can be used as an indicator of eating regularity. Eating regularity is related to the production of stomach acid, to which gastric acid is a contributing factor for gastritis and peptic ulcers. Irregular eating schedules will cause the stomach to struggle to adapt, so the acid production of the stomach becomes uncontrolled, leading to symptoms of dyspepsia. Eating more frequently (more than twice per day) can relieve gastric work so the production of stomach acid is not excessive; it must accommodate incoming foods in excessive amounts, thus preventing dyspepsia (Djojongrat 2009).

The frequency of irregular eating affects the occurrence of indigestion, but in this study there was no significant relationship between the frequency of eating with indigestion where $p > 0.05$. The results of this study differ from research conducted by Susanti (2011) in which the frequency and regularity of eating was associated with the risk of digestive symptoms. Other research conducted by Angkow et al. (2014) indicates that there is a significant relationship between the frequency of eating with the occurrence of gastritis. People who have an irregular diet are susceptible to disease. When stomach should be filled but is left empty or meals are overdue, gastric acid will digest the mucosal layer of the stomach, because when the stomach is empty, intestinal peristaltic movements occur intensively, stimulating an increase in acid production causing pain in the epigastrium (Ikawati, 2010). The results of research by Nasution (2001) states there is no significant relationship between the frequency of eating with gastritis. From the results it

can be concluded that there is no difference in the frequency of eating more than twice a day with less than twice a day. The stomach will continue to produce stomach acid every time in small amounts after 4–6 hours after meals. If a person is late eating by 2–3 hours, more and more stomach acid is produced. Eating more than twice a day, interspersed with the consumption of food interludes, can keep stomach acid under control (Octaviani, 2011).

5 CONCLUSIONS

The more precise the type of food selected, the more normal the defecation pattern of the respondent and no indigestion. The quantity of food eaten does not have a significant relationship with defecation patterns. Regarding the frequency of eating, there is no significant relationship with defecation patterns. Furthermore, quantity of food eaten does not have a significant relationship with indigestion. There was also no significant relationship between the frequency of eating and indigestion.

The researchers can give examples of amounts for the number of food portions to obtain more accurate results.

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