Relationship between Consumption of Caffeine and Food with Sleep Quality in Students of SMA Perguruan Al-Azhar Medan Year 2018

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Abstract: Sleep not only has an impact on physical and emotional development but also closely related to the cognitive functions of learning and attention. Consumption of caffeine and food can cause sleep disorders and poor sleep quality. This study was conducted to determine the relationship between the consumption of caffeine and food with sleep quality in students of SMA Perguruan Al-Azhar Medan. The methodology of this research is analytic with a cross-sectional design. Sleep quality was assessed by the Pittsburgh Sleep Quality Index (PSQI) questionnaire and consumption of caffeine and food was assessed by the Food Frequency Questionnaire (FFQ). The sampling technique is probability sampling using simple random sampling. 86 people (86%) had poor sleep quality and 14 people (14%) good sleep quality. Consumption of coffee, tea, energy drinks, rice, bread, sweet potatoes, noodles, beef, chicken, mutton, chicken eggs, fish, tempeh or tofu, nuts, full cream milk, cheese, vegetables, fruits, fast food , fried foods, soft drinks and sweet drinks with sleep quality have a value of $p > 0.05$. Consumption of vegetable oil, butter and coconut milk with sleep quality has a value of $p < 0.05$. This study shows there is a relationship between the consumption of vegetable oil, butter and coconut milk with the quality of sleep and there is no relationship between consumption of coffee, tea, energy drinks, rice, bread, sweet potatoes, noodles, beef, chicken, mutton, chicken eggs, fish, Tempe or tofu, nuts, full cream milk, cheese, vegetables, fruits, fast food, fried foods, soft drinks and sweet drinks with sleep quality.

1 INTRODUCTION

Sleep not only has an impact on physical and emotional development but also is closely related to the cognitive functions of learning and attention (Kaplan and Sadock, 2015). In 2011, the National Sleep Foundation in America, through its research, said that more than a third (36%) of young adults from the age of 18-29 were reported having difficulty getting up early. Nearly a quarter of young adults (22%) are often late for class or work because of difficulty getting up early. 40% of young adults also complain of drowsiness when working at least twice a week or more (Sulistiyani, 2012). Research in Indonesia on junior high school students aged 12-15 years in East Jakarta found the prevalence of sleep disorders was 62,9% using the Sleep Disturbance Scale for Children (SDSC) (Haryono, 2009).

Research in the United States shows that there are around 75-98% of adolescents who consume at least one caffeinated drink a day (NSF, 2006). The young generation in Indonesia, in the morning automatically orders various energy-enhancing drinks and caffeinated soda. This means that many young people in Indonesia have sleeping difficulties and poor quality of sleep patterns (Prasadja, 2009).

A study in the Journal of Clinical Sleep Medicine found that food consumed could actually affect sleep. Consumption of foods with a higher portion of saturated fat and sugar requires more time to fall asleep at night (Japardi, 2002). Consumption of energy drinks and sugary drinks is associated with poor sleep quality (St-Onge, 2016). The purpose of this study was to determine the relationship between the consumption of caffeine and food with sleep quality in students of SMA Perguruan Al-Azhar Medan.

2 METHODS

The design of this study is analytic with a cross-sectional approach. The population of this research is students of SMA Perguruan Al-Azhar Medan who are undergoing education at SMA Plus Al-Azhar Medan, students who live in the school hostel. Sampling uses probability sampling and simple random sampling. Data retrieval was carried out in an interview using a questionnaire. The Pittsburgh Sleep Quality Index (PSQI) questionnaire and the Food Frequency Questionnaire (FFQ) were used to retrieve data. Data analysis was done by Chi-Square test and data processing using SPSS.

3 RESULTS AND DISCUSSION

During this period, a total of 58 core biopsy actions were carried out. Of those, 43 were guided using CT scan and 15 patients were guided with the US. Table 1 describes the baseline characteristics of patients.

Table 1 Characteristic of respondents based on age.

Age	Frequency (People)	Percentage (%)
14	9	9
15	41	41
16	32	32
17	16	16
18	2	2

Table 1 shows that the majority of respondents are 15 years old as many as 41 students (41%) and the minority is 18 years old, 2 students (2%). Students aged 14 years consisted of 9 respondents (9%), 16 years consisted of 32 respondents (32%) and 17 years consisted of 16 respondents (16%).

Table 2 Characteristic of respondents by gender.

Gender	Frequency (People)	Percentage (%)
Female	50	50
Male	50	50

Table 2 shows that female respondents consisted of 50 students (50%) and male consisting of 50 students (50%).

Table 3 Sleep quality of respondents.

Sleep quality	Frequency (People)	Percentage (%)
Poor	86	86
Good	14	14

Table 3 shows the majority of respondents, namely 86 students (86%) had poor sleep quality and 14 students (14%) had good sleep quality.

Table 4 Relationship between consumption of drinks containing caffeine with sleep quality

Caffeine source		Sleep quality				Total	
		Poor		Good			
		n	%	n	%	n	%
Coffee	Rarely	76	76	13	13	89	89
	Often	10	10	1	1	11	11
Total		86	86	14	14	100	100
Tea	Rarely	49	49	9	9	58	58
	Often	37	37	5	5	42	42
Total		86	86	14	14	100	100
Energy drink	Rarely	59	59	10	10	69	69
	Often	27	27	4	4	31	31
Total		86	86	14	14	100	100

Table 4 shows that 86 people (86%) had poor sleep quality and 14 good sleep quality. 89 people (89%) consumed coffee rarely and 11 people (11%) often. The p-value is 0,619. 58 people (58%) consumed tea rarely and 42 people (42%) often. The p-value is 0,607. 69 people (69%) consumed energy drinks rarely and 31 people (31%) often. The p-value is 0,832.

Table 5 Relationship between carbohydrate consumption and sleep quality.

Carbohydrate source		Sleep quality				Total		p
		Poor		Good				
		n	%	n	%	n	%	
1. Rice	Rarely	4	4	0	0	4	4	
	Often	2	82	14	14	96	96	0,410
Jumlah		6	86	14	4	100	100	
2. Bread	Rarely	45	45	7	7	52	52	
	Often	41	41	7	7	48	48	0,872
Jumlah		86	86	14	14	100	100	
3. Sweet potato	Rarely	86	86 6	14	14 4	100 0	100 0	.a
Jumlah		86	86	14	14	100	100	
4. Noodles	Rarely	76	76	14	14	90	90	
	Often	10	10	0	0	10	10	0,179
Total		86	86	14	14	100	100	

Table 5 shows that 86 people (86%) had poor sleep quality and 14 people (14%) good sleep quality. 4 people (4%) consume rice rarely and 96 people (96%) often. The p-value is 0,410. 52 people (52%) consume bread rarely and 48 people (48%) often. The p-value is 0,872. The p-value for sweet potatoes is not calculated because sweet potatoes are constant because all respondents, 100 people (100%) consume sweet potatoes rarely. 90 people (90%) consume noodles rarely and 10 people (10%) often. The p-value is 0,179.

Table 6 Relationship between protein consumption and sleep quality

Protein source		Sleep quality				Total		p
		Poor		Good				
			%	N	%	n	%	
1. Beef	Rarely	2	82	13	13	95	95	
	Often	4	4	1	1	5	5	0,692
Total		86	86	14	14	100	100	
2. Chicken	Rarely	41	41	4	4	45	45	
	Often	45	45	10	10	55	55	0,183
Total		86	86	14	14	100	100	
3. Mutton	Rarely	85	85	13	13	98	98	
	Often	1	1	1	1	2	2	0,138
Total		86	86	14	4	100	100	
4. Chicken egg	Rarely	46	46	9	9	55	55	

	Often	0	40	5	5	45	45	0,451
Total		86	86	14	14	100	100	
5. Fish	Rarely	19	19	5	5	24	24	0,268
	Often	67	67	9	9	76	76	
Total		86	86	14	14	100	100	
6. Tempe or Tofu	Rarely	71	71	10	10	81	81	
	Often	15	15	4	4	19	19	0,325
Total		86	86	14	14	100	100	
7. Nuts	Rarely	77	77	10	10	87	87	
	Often	9	9	4	4	13	13	0,062
Total		86	86	14	14	100	100	

Table 6 shows that 86 people (86%) had poor sleep quality and 14 people (14%) good sleep quality. 95 people (95%) consume beef rarely and 5 people (5%) often. The p-value is 0,692. 45 people (45%) consume chicken rarely and 55 people (55%) often. The value of p is 0,183. 98 people (98%) consume mutton rarely and 2 people (2%) often. The value of p is 0,138. 55 people (55%) consume chicken eggs rarely and 45 people (45%) often. The value of p is 0,451. 24 people (24%) consume fish rarely and 76 people (76%) often. The p-value is 0,268. 81 people (81%) consume Tempe or tofu rarely and 19 people (19%) often. The value of p is 0,325. 87 people (87%) consume nuts rarely and 13 people (13%) often. The p-value is 0,062.

Table 7 Relationship between fat consumption a sleep quality.

Fat source		Sleep quality				Total		p
		Poor		Good				
		n	%	n	%	n	%	
1. Full cream milk	Rarely	9	49	8	8	57	57	
	Often	37	37	6	6	43	43	0,991
Total		86	86	14	14	100	100	
2. Vegetable oil	Rarely	66	66	7	7	73	73	
	Often	20	20	7	7	27	27	0,037
Total		86	86	14	14	100	100	
3. Cheese	Rarely	77	77	10	10	87	87	0,062
	Often	9	9	4	4	13	13	
Total		86	86	14	14	100	100	
4. Butter	Rarely	81	81	10	10	91	91	0,006
	Often	5	5	4	4	9	9	
Total		46	86	14	4	100	100	
5.Coconut milk	Rarely	70	70	7		77	77	0,010
	Often	6	16	7	7	23	23	
Total		86	86	14	14	100	100	

Table 7 shows that 86 people (86%) had poor sleep quality and 14 people (14%) good sleep quality. 57 people (57%) consume full cream milk rarely and 43 people (43%) often. The p-value is 0,991. 73 people (73%) consume vegetable oil rarely and 27 people (27%) often. The p-value is 0,037. 87 people (87%) consume cheese rarely and 13 people (13%) often. The p-value is 0,062. 91 people (91%) consume butter rarely and 9 people (9%) often. The p-value is 0,006. 77 people (77%) consume coconut milk rarely and 23 people (23%) often. The value of p is 0,010.

Table 8 Relationship between fiber consumption and sleep quality.

Fiber source		Sleep quality				Total		p
		Poor		Good				
		n	%	n	%		%	
1. Vegetables	Rarely	25	25	1	1	1	26	0,083
	Often	61	61	13	13	13	74	
Total		86	86	14	14	14	100	
2. Fruits	Rarely	64	64	8	8	8	72	
	Often	22	22	6	6	6	28	0,182
Total		86	86	14	14	14	100	

Table 8 shows that 86 people (86%) had poor sleep quality and 14 people (14%) good sleep quality. 26 people (26%) consume vegetables rarely and 74 people (74%) often. The p-value is 0,083. 72 people (72%) consume fruits rarely and 28 people (28%) often. The value of p is 0,182.

Table 9: Relationship between beverage consumption and sleep quality

Beverage source		Sleep quality				Total	
		Poor		Good			
		n	%	n	%	N	%
1. Softdrink	Rarely	58	8	11	11	69	69
	Often	28	28	3	3	31	31
Total		86	86	14	14	100	100
2. Sweet drink	Rarely	37	37	6	6	43	43
	Often	49	49	8	8	57	
Total		86	86	14	14	100	100

Table 9 shows that 86 people (86%) had poor sleep quality and 14 people (14%) good sleep quality. 69 people (69%) rarely consume soft drinks and 31 people (31%) often. The value of p is 0,404. 43 people (43%) rarely consume sweet drinks and 57 people (57%) often. The p-value is 0,991.

From the results of this study, it was found that 86 people (86%) had poor sleep quality and 14 people (14%) had good sleep quality. This is in accordance with a study conducted by the National Sleep Foundation in America which showed that one-third (36%) of young adults from the age of 18-29 years had difficulty getting up early, a quarter of young adults (22%) were often late for work or class because it is difficult to get up early and 40% of young adults also complain of drowsiness when working at least twice a week or more because they experience sleep disorders (Sulistiyani, 2012).

Research conducted in Indonesia shows that junior high school students aged 12-15 years in East Jakarta found a prevalence of sleep disorders of 62,9% (Haryono, 2009). This is because adolescents and young adults experience a number of changes that often reduce sleep time such as lifestyle demands, school and social activities that suppress the time available to sleep (Lumantow et al., 2016).

In this study chi-square test was used to analyze data. If the value of p <0,05 it can be concluded that there is a significant relationship between the consumption of caffeine and food with the quality of sleep in students of SMA Perguruan Al-Azhar Medan. The results of data analysis showed that consumption of drinks containing caffeine, namely coffee, tea, and energy drinks did not have a significant relationship with sleep quality because of the value of p> 0,05. Consumption of carbohydrate

sources, namely rice, bread, sweet potatoes, and noodles does not have a significant relationship with sleep quality because of the value of p> 0,05. Consumption of protein sources, namely beef, chicken, mutton, chicken eggs, fish, tempeh or tofu and beans does not have a significant relationship with sleep quality because of the value of p> 0,05. The consumption of fat sources, namely full cream milk and cheese does not have a significant relationship with sleep quality because of the value of p> 0,05. Consumption of fiber sources, namely vegetables and fruits, snacks, fast food and fried foods and sources of drinks, soft drinks and sweet drinks have no significant relationship with sleep quality because of the value of p> 0,05.

This is contrary to a study that showed that caffeine binds to cell receptors in the brain and prevents the reception of fatigue signals produced by adenosine to keep individuals awake and alert. The use of caffeine disrupts sleep patterns and long-term use can cause poor sleep quality and long-term adverse health effects (Snel and Lorist, 2011). According to the American Society for Nutrition, diets high in carbohydrates have lower sleep onset latency (SOL). The effect of high carbohydrates on changes in the stage of sleep is related to an increase in serotonin synthesis. A low carbohydrate diet is associated with difficulty maintaining sleep.

Consumption of a diet low in protein will limit serotonin production and this will lead to longer sleep onset latency (SOL). This will cause someone to need a longer time to fall asleep at night. Other studies show that consumption of fiber sources will promote sleep because it increases melatonin concentration and improves sleep quality (St-Onge et al., 2016). A study shows that too much sugar in the diet will increase blood sugar levels. This will cause someone to get out of bed and go to the bathroom all night to urinate and produce sleep patterns that are inconsistent (NHLBI, 2011).

However, a study shows that caffeine consumption should be no more than 200 mg per day so as not to experience sleep disorders. Cannot consume caffeine at least 4 hours before going to bed. The consumption of the last major meal every day 2 to 3 hours before going to bed will not provide a sleep disorder (Wendte et al., 2003). Eat balanced foods both for health and overall well-being. This is because someone will have more energy during the day and sleep better at night so as not to experience sleep disturbances (Sediaoetama, 2008).

A study also showed that moderate caffeine intake was not associated with health risks. Three 8 oz. cup of coffee (250 milligrams of caffeine) per day is considered a moderate amount of caffeine. Six or more 8 oz. coffee cups per day is considered excessive caffeine intake and will have an effect. In addition to consumption of caffeine and food, alcohol, smoking, psychological disorders, health problems, drugs and environmental factors such as noise, lights that are too bright and temperatures that are too cold or hot will cause sleep disturbances (NSF, 2006).

A study also shows that it is still unknown whether sleep affects food intake or food intake that affects sleep. Control foods that contain fat, protein and carbohydrates and high-energy foods do not cause acute changes in sleep architecture (St-Onge, 2016).

4 CONCLUSION AND SUGGESTION

Based on the results of the study, the researcher can conclude that the demographic characteristics of students in SMA Perguruan AL-Azhar Medan in this study were 50 people (50%) women and 50 people (50%) men. The majority of respondents are 15 years old, as many as 41 students (41%). 86 students (86%) had poor sleep quality and 14 students (14%) good sleep quality. There is no significant relationship between consumption of coffee, tea, energy drinks, rice, bread, sweet potatoes, noodles, beef, chicken, mutton, chicken eggs, fish, Tempe or tofu, nuts, full cream milk, cheese, vegetables , fruits, fast food, fried foods, soft drinks and sweet drinks with sleep quality (p> 0.05). There was a significant relationship between consumption of vegetable oil, butter and coconut milk with sleep quality (p <0.05). Students are expected to be able to evaluate the consumption of caffeine and food and reduce consumption of vegetable oil, butter, and coconut milk in order to get good quality sleep. The school can use the results of this study to regulate the food of students at school.

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