https://doi.org/10.20473/mgi.v19i2.164–171

RELATIONSHIP OF SWEET CAFFEINATED BEVERAGES CONSUMPTION AND SLEEP QUALITY WITH NUTRITIONAL STATUS IN ADOLESCENTS

Fathiya Zalda[1], Putri Rahmah Alamsyah[1]
[1]Program Studi Gizi, Sekolah Tinggi Ilmu Kesehatan Mitra Keluarga, Bekasi 17113, Indonesia
*Email: fzalda.fz@gmail.com

ABSTRACT

Overnutrition is more common among adolescents. In Indonesia, lack of physical activity, poor quality of sleep due to daily schedules, and the consumption of sweet, fatty, and fast foods are the main contributing factors. This study aimed to analyze the relationship between the frequency of consumption of sweet caffeinated beverages and sleep quality with nutritional status in adolescents in high school 5 Tambun Selatan. This study used quantitative research with observational analysis using a cross-sectional design. The sample consisted of 101 individuals randomly chosen by a simple random sampling method. Data were collected using the Food Frequency Questionnaire and Pittsburgh Sleep Quality Index with the determination of the nutritional status of adolescents obtained from Z-score BMI/U. The Chi-Square test results indicated significant correlations exist between the frequency of sweet caffeinated beverages consumption and nutritional status (p=0.045) but no significant correlations were found between sleep quality and nutritional status (p=0.797) in adolescents in high school 5 Tambun Selatan.

Keywords*: adolescents, frequency of sweet caffeinated beverages consumption, nutritional status, sleep quality*

INTRODUCTION

Overnutrition is a common problem among adolescents (Utami, 2017). It occurs when there is an energy imbalance in the body caused by excessive food intake that is imbalanced by sufficient exercise, which leads to excessive fat storage and characterized by non-ideal body weight (Christianto, 2018). Overnutrition can have health consequences, including degenerative diseases such as diabetes, coronary heart disease, stroke, gallstones, and more. Overnutritioned adolescents have a 70% chance of becoming overweight or obese adults (Suryani et al., 2018).

Based on national Riset Kesehatan Dasar data, the prevalence of overweight and obesity among adolescents aged 16-18 years in Indonesia based on BMI/U has increased, namely overweight from 5.7% to 9.5% and obesity from 1.6% to 4% in the period 2013-2018. In West Java, the prevalence of overweight also increased from 6.2% to 10.9% and the prevalence of obesity increased from 1.4% to 4.5% among adolescents aged 16-18 years based on BMI/U. Meanwhile, according to the results of Riset Kesehatan Dasar West Java in 2018, the percentage of adolescents aged 16-18 years with overweight and obesity prevalence based on BMI/U in Bekasi Regency was 9.06% and 4.11%, respectively.

Lifestyle changes are of the factors leading to overnutrition among adolescents in Indonesia and include less physical activity, such as watching television and using gadgets excessively. Also, the consumption pattern of sweet, fatty, fast foods and beverages is a lifestyle of adolescents today. Adolescents prefer these foods compared to vegetables and fruits (Widianto et al., 2017). Caffeinated foods and beverages that are commonly available on the market are popular in current lifestyles. The consumption patterns of sugary foods and beverages among adolescents are influenced by the amount of pocket money that they receive from their parents. As the amount of pocket money increases, so does the amount of food and drink consumed (Sartika et al., 2022).

According to Rachmawati (2017), caffeine is found in coffee, carbonated drinks, tea, energy drinks, and chocolate drinks. Melizza et al. (2021) reported that coffee is one of the most popular beverages among the world's population. Recently,

 Received 05-10-2023, Accepted 15-01-2024, Published online 30-05-2024.

modern cafes have made coffee consumption not only limited to the elderly and adults, but younger generations have started making it a habit (Ardiani & Subrata, 2021). In 2016, the National Coffee Association reported that there was a notable increase in daily coffee consumption among adolescents between the ages of 18 and 24, from 36% to 40%.

Currently, caffeinated beverages are generally not consumed to fulfill the nutritional needs of the body, but rather to follow trends due to environmental influences and social media developments (Pramelani, 2020). Caffeinated beverages are commonly served in large glasses or cup with a volume ranging from 250 to 754 milliliters (Putri, 2022). The beverage has a minimum of 8.79 grams of sugar per 200 ml of cup (Rosanti, 2021). According to Kadita and Hartanti (2017), regular consumption of coffee with sugar and milk in large quantities can have an impact on daily energy intake. Moreover, these beverages often contain additional ingredients like palm sugar, jelly, boba or pudding. According to Min et al. (2017), boba, made from tapioca starch, contains 78 calories and 7 grams of sugar per 60 grams, jelly contains 212 calories and 12 grams of sugar per 50 grams, and pudding contains 54 calories and 18 grams of sugar per 80 grams.

Safitri et al. (2021), found that the calories in seven samples of boba milk tea had exceeded 300 kcal, which is almost equivalent to the calorie content of two portions (100 grams) of rice (360 kcal). Given that the Indonesian Dietary Guideline recommends limiting sugar consumption to 10% of total energy intake or a maximum of 200 kcal from sugar for a daily energy requirement of 2,000 kcal, drinking boba milk tea would result in an excess of 100 kcal in the body (Kemenkes, 2018). Similarly, the findings of Kim and Yong (2017) suggest that coffee consumption ≥3 times/day may potentially increase body mass index, with the effect being more pronounced in women. Manja et al. (2020) conducted research that indicates a significant relationship between caffeine consumption and obesity (p=0.000). The study found that excessive caffeine intake can contribute to weight gain and increase the risk of developing obesity.

In addition to caffeinated beverages, a person's nutritional status can be affected by sleep quality. A good quality of sleep is achieved when a person has sufficient sleep duration (Shakina et al., 2021). According to Keswara et al. (2019), the prevalence of poor sleep quality in Indonesian adolescents is 63%, with less than seven hours of sleep duration every night. Putra's (2017) study showed that poor sleep quality affects nutritional status due to increased consumption in a person. This relationship between sleep quality and body mass index is significant (p = 0.000), with Purnamasari et al. (2021) finding that there is a significant correlation between sleep quality and BMI. The study showed that samples with poor sleep quality predominantly had an overweight BMI, while samples with good sleep quality predominantly had a normal BMI.

The study aims to conduct research on the relationship between the frequency of consuming sweet caffeinated beverages and sleep quality with nutritional status in adolescents in Bekasi Regency, which is located at high school 5 Tambun Selatan, because there has been no research targeting high school students in Bekasi Regency, which has a high prevalence of obesity and overweight.

METHODS

The study was conducted as a quantitative research using an analytical observational design through a cross-sectional approach at high school 5 Tambun Selatan in March 2023. The Health Research Ethics Commission of Muhammadiyah Prof. Dr. Hamka University approved this research with number 03/23.03/02337. A sample of 101 individuals was used in the study by the simple random sampling technique based on the list of student's identification number. The participants of the study were students of high school 5 Tambun Selatan, who were between the ages of 15 and 18 years old, and who were willing to be research subjects by signing the informed consent form.

The study examined the independent variables of sweet caffeinated beverage consumption frequency and sleep quality, with nutritional status as the dependent variable. Subject characteristics (age, gender, grade, pocket money, and parents'

educational background) were used as supporting variables in this study.

The frequency of consumption of sweet caffeinated beverages was collected using a food frequency questionnaire (FFQ), which assessed the frequency of consumption over the past month. The FFQ includes a list of eight types of sweet caffeinated beverages. The form has been validated for high school 6 Tambun Selatan which is located in the same region. Consumption frequency was classified as frequently (>6 times/week) or rarely (1-6 times/week). This classification was based on modifications from research that also used a sample of high school students (Saidah et al., 2017). Sleep quality data were collected using the Pittsburgh Sleep Quality Index (PSQI), which assesses sleep quality over the past month. The PSQI questionnaire assessed seven components of sleep through nineteen questions. These components included subjective sleep quality, sleep latency, sleep duration, effective sleep duration, sleep disturbances, use of medication, and daytime concentration disturbances. A PSQI total score greater than five is considered poor, while a score of five or less is considered good (Pujiati, 2018).

Nutritional status was determined by calculation of the BMI/U z-score using the WHO AnthroPlus software based on direct measurement of the weight and height of the subjects using calibrated digital scales and microtoise. Nutritional status was classified into two categories: overnourished (z-score BMI/U >+1 SD) and not overnourished (z-score BMI/U -3 SD to +1 SD).

Microsoft Excel 2016 and SPSS version 22.0 were used for data processing and analysis. Editing, coding, processing, and cleaning were the primary stages of data processing in this study. This study used univariate and bivariate analysis. Univariate analysis was used to determine the frequency distribution of subject characteristics (age, gender, grade, pocket money, parents' educational background), frequency of sweet caffeinated beverages consumption, sleep quality, and students' nutritional status. Bivariate analysis was used to determine the relationship between two studied variables: frequency of consuming sweet caffeinated beverages with nutritional status, as well as sleep quality with nutritional status, using the Chi-Square test.

RESULTS AND DISCUSSION

The characteristics of the subjects, including age, gender, grade, pocket money, and the educational background of their parents, are shown in Table 1. According to the table, the majority of students were 17 years old (34.7%) and the majority were female (59.4%). Grade XII students dominated the sample (34.7%), and college graduates constituted the highest percentage in terms of parental education (59.4%). Students with pocket money ≥Rp.20,000 were 78.2% and students with pocket money <Rp.20,000 were 21.8%.

Table 1. Subject Characteristics

Subject Characteristics	n	(%)
Age		
15 years old	21	20.8
16 years old	34	33.7
17 years old	35	34.7
18 years old	11	10.9
Gender		
Male	41	40.6
Female	60	59.4
Grade		
X	33	32.7
XI	33	32.7
XII	35	34.7
Pocket Money		
High (≥Rp.20.000)	79	78.2
Low (<Rp.20.000)	22	21.8
Parents' Educational Background		
Elementary School	3	3.0
Junior High School	2	2.0
Senior High School	36	35.6
College Graduate	60	59.4
Total	101	100.0

The majority of students in SMAN 5 Tambun Selatan receive a high category of pocket money, an amount of pocket money ≥Rp. 20.000 per day. Pocket money is one of the factors associated with overnutrition, and the amount received may influence purchasing behavior by increasing the purchase of snacks or food due to the higher amount of pocket money provided (Sartika et al., 2022).

Regarding the educational background of the parents, most of them (59.4%) have graduated from

university, while 35.6% have finished senior high school, 3% only completed elementary school and 2% completed junior high school. Education is one benchmark of knowledge about nutritious food and proper preparation of food. Parents' comprehension of fulfilling their children's nutrition improves with higher education levels (Juliantara & Purwo, 2021).

Table 2. Frequency Distribution of Sweet Caffeinated Beverages Consumption, Sleep Quality, and Nutritional Status among SMAN 5 Tambun Selatan Students

Variable	n	(%)
Frequency of Sweet Caffeinated Beverages Consumption		
Frequently (>6 times/week)	51	50.5
Rarely (1-6 times/week)	50	49.5
Sleep Quality		
Good (Score ≤5)	34	33.7
Poor (Score >5)	67	66.3
Nutritional Status		
Overnourished (BMI/U >+1 SD)	31	30.7
Not Overnourished (BMI/U -3 SD sd +1 SD)	70	69.3
Total	101	100.0

According to Table 2, 50.5% of students consume sweet caffeinated beverages frequently (>6 times/week) and 49.5% of students consumed sweet caffeinated beverages rarely (1-6 times/ week). The consumption of caffeinated sugary beverages among adolescents had risen due to the variety of beverage products that currently contain caffeine, such as energy drinks and soda, in addition to coffee and tea (Gera et al., 2016). The availability of sweet caffeinated beverages is also supported by advertising that claims these beverages can increase energy and inhibit aging, so these sweet caffeinated beverage products are popular among adolescents, which results in high caffeine intake among adolescents (Temple et al., 2017).

Based on the analysis, students of high school 5 Tambun Selatan who frequently consumed sweetened beverages with caffeine were more than those who rarely consumed sweetened beverages with caffeine. According to the researcher's observation, this could be related to the existence of modern coffee shops nearby and the availability of these beverages in school canteens and minimarkets, so that adolescents can easily access these sweet caffeinated beverages. The most widely consumed caffeinated sweetened beverage is brewed tea with sugar. This beverage is readily available at home and is also offered in school canteens, making it the easiest beverage for students to access.

According to Table 2, 66.3% of students have poor sleep quality while the remaining 33.7% have good sleep quality. Several factors, such as health status, lifestyle, diet, environmental factors, and academic stress, affect an individual's sleep quality. The environmental factor, especially a noisy environment, can make it difficult for individuals to sleep and lead to a desire to gather with friends and engage in activities until late at night (Foulkes et al., 2019).

Based on the analysis, most students at high school 5 Tambun Selatan have a poor sleep quality. According to the researcher, this is due to the high level of activity at school. Sonda et al. (2021) conducted a study by interviewing high school students and found that they are heavily involved in learning, assignments, extracurricular activities, and are active members of school organizations, so the findings of this study are supported by previous research. In addition to school activities, some students engage in nightly activities such as using the gadgets and watching Korean-drama, so the activities during the day make students have difficulty sleeping.

According to Table 2, 30.7% of students with a z-score BMI/U >+1 SD had one nutritional status distribution, while 69.3% of students within a z-score BMI/U range of -3 SD to +1SD had another. Many adolescents are currently overnourished. Causal factors contributing to overnutrition include genetics, age, gender, sleep duration, insufficient physical activity, unhealthy dietary habits, environmental factors, socioeconomic status, and parental education (Rachmayani et al., 2018). However, based on the results of the analysis, most students in high school 5 Tambun Selatan were not overnourished.

Researchers have identified several factors that influence students who are not overweight. One of them is parental education, which is a key indicator of knowledge about good nutrition and

proper food handling. Parents with higher levels of education are well-prepared to understand and ensure their children's nutritional needs are met (Juliantara & Purwo, 2021).

Another reason why adolescents are not overweight is their lack of knowledge about dietary patterns and behaviors. The food pattern is related to the type, amount and composition of food consumed daily (Sambo et al., 2020). Meanwhile, nowadays adolescent eating behaviors refer to unhealthy behaviors where adolescents are afraid of looking fat, so they tend to follow strict diets, reduce food intake by skipping breakfast, and endure hunger (Pujiati et al., 2015).

The results showing the association between the frequency of sweet caffeinated beverages consumption and sleep quality with nutritional status among students of high school 5 Tambun Selatan can be seen in Table 3.

Table 3. Association between Frequency of Sweet Caffeinated Beverages Consumption and Sleep Quality with Nutritional Status

Variable	Nutritional Status				*p value*
	Overnourished		Not Overnourished		
	n	(%)	n	(%)	
Frequency of Sweet Caffeinated Beverage Consumption					
Frequently	11	21.6	40	78.4	0.045
Rarely	20	40.0	30	60.0	
Sleep Quality					
Good	11	32.4	23	67.6	0.797
Poor	20	29.9	47	70.1	

Based on Table 3, the Chi-Square test analysis revealed a significant association between the frequency of consumption of sweet caffeinated beverages and the nutritional status of high school 5 Tambun Selatan students (p=0.045). Meanwhile the majority of students who frequently consume sweet caffeinated beverages are not overnourished. This study is similar to the research in Bandung which found that the consumption of sweet caffeinated beverages does not affect students' weight because sweet caffeinated beverages are consumed just enough or increase students' energy intake, but not until consumed excessively. The most commonly consumed sweet caffeinated beverages in this study were packaged tea and brewed tea (Akhriani et al., 2016).

According to the study results, students who infrequently consume caffeinated sweetened beverages were more likely to be overweight or obese. This is not only due to the consumption of sweetened beverages, but also to the consumption of sweet foods, fatty foods, and instant or fast foods, which are very popular among adolescents. According to the 2018 Riset Kesehatan Dasar data, the consumption of sweet foods between the age of 15-19 years in Indonesia ranks fourth after the age group below compared to other age groups. In addition, the consumption of fatty foods for this age group in Indonesia was the highest among all age groups. Furthermore, the 2018 Riset Kesehatan Dasar survey also reported that the proportion of instant food consumption habits at the age of 15-19 years in Indonesia ranks second after the age group 10-14 years compared to other age groups.

Fast food is widely accessible but lacks the essential nutrients necessary for adolescents, which makes it nutritionally insufficient and unable to provide adequate satiety, which can increase the risk of overnutrition and other health problems (Pamelia, 2018). Sulistyowati et al. (2019) found that there was a significant relationship between the consumption of fast food and the nutritional status of high school students in high school X, East Jakarta. The study involved an analysis of students' food consumption containing high energy, which identified pizza, burgers, nuggets, sausage, hot dogs, fries, fried chicken, and instant noodles as the most common choices. Interviews with respondents suggested that these foods are appealing because of their flavors, affordability, and rapid preparation. Nowadays, adolescents enjoy convenient access to fast food due to the fast processing and serving methods and the proliferation of places that offer these foods and beverages, such as restaurants, supermarkets, mini-markets, and fringe food and beverage places (Ufrida & Sugeng, 2022).

Based on Table 3, the Chi-Square test analysis indicated no significant association between sleep quality and nutritional status among students of high school 5 Tambun Selatan (p=0.797). The majority of students have good or poor sleep quality and are not overnourished. This

is similar to the research of Nabawiyah et al. (2021) which states that there is no association between sleep quality and nutritional status in santriwati at Pesantren Gontor Putri 1 where it is stated that santriwati have the habit of sleeping after 10.00 PM. The survey results show that the typical student has similar sleep patterns to the aforementioned statement.

Another study conducted by Rodhiyah (2022) found that there was no significant association between sleep quality and nutritional status among students of Tarbiyah Islamiyah Islamic Boarding School in Tanjung Agung. Similarly, Fibriana's (2019) study also revealed no association between sleep quality and nutritional status. However, this study does not line up with the findings of Khasan's (2017) study that there is an association between sleep quality and nutritional status. Inadequate sleep in adolescents disrupts the balance of leptin and ghrelin hormones, leading to an increase in ghrelin and appetite, ultimately affecting their nutritional status.

Several factors affect nutritional status. These include stress, physical activity, environment, genetics, and diseases, which have not been studied. Genetics of parents are among the factors that impact nutritional status. The research conducted by Maritasari and Resmiati (2019) indicates that obesity is more common in students who have both parents who are obese, compared to students who have one parent who is obese or both parents who are not obese. In addition, diseases can also have an impact on nutritional status. This is in line with the study of Nurwijayanti et al. (2019), which shows that there is a significant association between infectious diseases and nutritional status because the presence of infectious diseases worsens the nutritional status of individuals.

Academic stress among adolescents also affects nutritional status. According to research carried out by Indrasti et al. (2022), there exists a positive correlation between academic stress and obesity. Stress is linked to overeating tendencies, in which individuals tend to consume more food than usual when stressed, thus triggering changes in nutritional status (Wijayanti et al., 2019). This is one of the limitations of the study because it did not analyze through other factors besides sweet caffeinated beverages consumption and sleep quality to nutritional status.

CONCLUSION

There exists a significant association between frequency consumption of sweet caffeinated beverages and nutritional status with a p-value of 0.045 and there is no association between sleep quality and nutritional status with a p-value of 0.797 in students of high school 5 Tambun Selatan. Future researchers should continue research by developing variables and pay attention to other factors related to research variables supported by appropriate instruments such as the use of Semi Quantitative Food Frequency Questionnaire to assess energy intake and nutrients specifically in individuals.

REFERENCE

Akhriani, M., Eriza, F., & Fuadiyah, N.K. (2016). The Relationship between Sugar-Sweetened Beverage Consumption and the Incidence of Overweight in Adolescents at SMP Negeri 1 Bandung. *Indonesian Journal of Human Nutrition*, *3*(1), 29-40. doi:10.21776/ub.ijhn.2016.003.01.4

Ardiani, N.K.N., & Subrata, I. M. (2021). Associated Factors with Sleep Quality of Students Who Consume Coffee at the Faculty of Medicine Udayana University. *Archive of Community Health*, *8*(2), 372. doi: 10.24843/ACH.2021.v08.i02.p12

Christianto, D.A. (2018). Relationship between Physical Activity and the Incidence of Obesity Based on Body Mass Index in Banjaroyo Village. *Medical Scientific Periodical Duta Wacana Journal*, *3*(2), 78. doi: 10.21460/bikdw.v3i2.97

Fibriana, D. (2019). *The Relationship between Sleep Quality and Nutritional Status in Medical Students of Brawijaya University (thesis)*. Brawijaya University, Malang.

Foulkes, L., D. McMillan., DClinPsych., & A.M. Gregory. (2019). A Bad Night's Sleep on Campus: An Interview Study of First-Year University Students with Poor Sleep Quality. *Journal of the National Sleep Foundation, 5*, 280-287. doi: 10.1016/j.sleh.2019.01.003

Gera, M., Swati, K., & Piyush, G. (2016). Caffeine Intake Among Adolescents in Delhi. *Indian*

Journal of Community Medicine, *41*(2), 151-153. doi: 10.4103/0970-0218.173501

Indrasti, O.D., Oktia, W.K.H., & Natalia, D.P. (2022). Academic Stress, Diet, and Physical Activity with the Incidence of Adolescent Obesity during the Pandemic. *Indonesian Journal of Public Health and Nutrition, 2*(2), 215-221. doi: 10.15294/IJPHN.V2I2.52092

Juliantara, R., & Purwo, S.N. (2021). The Relationship between Parents' Education Level and Parents' Employment Status on Undernutrition in Adolescents at SMPN 8 Samarinda. *Borneo Student Research*, *2*(3), 2031-2037.

Kadita, F., & Hartanti, S.W. (2017). Relationship of Coffee Consumption and Screen-Time with Sleep Duration and Nutritional Status in Adults. *Journal of Nutrition College, 6*(4), 301-306. doi: 10.14710/jnc.v6i4.18665

Kemenkes. (2018). What is the recommended daily intake of sugar, salt and fat? Accessed from https://p2ptm.kemkes.go.id/infographic-p2ptm/hipertensi-penyakit-jantung-dan-pembuluh-darah/page/15/berapa-anjuran-konsumsi-gula-garam-dan-lemak-per-harinya?

Keswara, U.R., Syuhada, N., & Wahyudi, W.T. (2019). Gadget Use Behavior with Sleep Quality in Adolescents. *Holistic Health Journal, 13*(3), 233-9. doi: 10.33024/hjk.v13i3.1599

Khasan, N. (2017). *Relationship between Sleep Quality and Nutritional Status in High School Children (thesis).* Trisakti University, Jakarta.

Kim, J.H., & Yong, S.P. (2017). Light Coffee Consumption is Protective Against Sarcopenia, but Frequent Coffee Consumption is Associated with Obesity in Korean Adults. *Nutrition Research*, *41*, 97–102. doi: 10.1016/j.nutres.2017.04.004

Manja, P., Marlenywati & Mardjan. (2020). Relationship between Caffeine Consumption, Screen Time, Duration of Sleep, Exercise Habits with Obesity in Students of Faculty of Health Sciences, University of Muhammadiyah Pontianak. *Journal of Students and Health Research*, *7*(1), 1–9.

Maritasari, D.W., & Resmiati. (2019). The Relationship between Genetics, Food Intake, and Sedentary Behavior with the Incidence of Obesity in High School Students in Tanah Abang District, Central Jakarta. *Medika Saintika Health Journal*, *10*(1), 45-58. doi: 10.30633/jkms.v10i1.308

Melizza, N., Anggraini, D.K., Nur, L.M., Yoyok, B.P., Faqih, R., Erma, W.M., & Fitria, K. (2021). Prevalence of Coffee Consumption and its Relationship with Blood Pressure. *Faletehan Health Journal, 8*(1), 10-15.

Min, J.E., Green, D, B.., & Kim, L. (2017). Calories and Sugars in Boba Milk Tea: Implications for Obesity Risk in Asian Pacific Islanders. *Food Science and Nutrition*, *5*(1), 38–45. doi: 10.1002/fsn3.362

Nabawiyah, H., Zid, A.K., Amalia, Y.D., Mira, D.N. (2021). The Relationship between Diet, Physical Activity, Sleep Quality with the Nutritional Status of Santriwati at Pondok Modern Darussalam Gontor Putri 1. *Darussalam Nutrition Journal*, *5*(1), 78-89.

Nurwijayanti., Panca. R., & Intan, F. (2019). Analysis of Knowledge, Infectious Diseases, Diet on Nutritional Status in Adolescents at STIKes Surya Mitra Husada Kediri. *KH Nutrition Journal*, *1*(2), 70-75.

Pamelia, I. (2018). Adolescent Fast Food Consumption Behavior and its Impact on Health. *IKESMA Journal, 14,* 144-153. doi: 10.19184/ikesma.v14i2.10459

Pujiati., Arneliwati., & Siti, R. (2015). Relationship between Eating Behavior and Nutritional Status in Adolescent Females. *JOM, 2*(2), 1345-1352.

Pujiati. (2018). *Overview of Sleep Quality in Adolescents with Obesity at Manaratul Islam Foundation, South Jakarta* (thesis). Syarif Hidayatullah Islamic University, Jakarta.

Purnamasari, N.D.P., M. Widnyana, Ni Komang, A.J.A., & Ni Luh, N.A. (2021). The Relationship Between Sleep Quality and Body Mass Index in Students at the Faculty of Medicine, Udayana University. *Indonesian Physiotherapy Scientific Magazine*, *9*(1), 18-22. doi: 10.24843/MIFI.2021.V09.I01.P04

Putra, T. E. (2017). *The Relationship between Sleep Duration and Quality with Overweight in Students of Alma Ata University Yogyakarta (thesis).* Alma Ata Yogyakarta University, Yogyakarta.

Putri, P.A. (2022). The Relationship between Consumption Patterns of High-Calorie Foods and Coffee, Sleep Duration, and Stress Levels with Nutritional Status in Final Year Students. *Journal of Public Health Nutrition Media*, *11*(2), 464-474. doi: 10.20473/mgk.v11i2.2022.464-474

Pramelani. (2020). Factors of Interest in Contemporary Coffee Drinks on Buying Interest of Young Consumers. *Scientific Journal of Management, 15*(1), 121 -129. doi: 10.33369/insight.15.1.121-129

Rachmawati, D. (2017). *The Effect of Giving Robusta Coffee Drinks, Milk, and Mixture of both on the Quality of Sleep of Semester VII Students of Muhammadiyah Purwokerto University (thesis).* Muhammadiyah Purwokerto University, Purwokerto.

Rachmayani, S.A., Muri, K., & Vitria, M. (2018). Relationship between Nutrient Intake and Nutritional Status of Adolescent Female at SMK Ciawi Bogor. *Indonesian Journal of Human Nutrition*, *5*(2), 125-130. doi: 10.21776/ub.ijhn.2018.005.02.6

Riskesdas. (2018). *Riskesdas National Report 2018.* Jakarta: Health Research and Development Organization.

Riskesdas. (2018). *West Java Province Riskesdas Report 2018.* Jakarta: Health Research and Development Organization.

Rodhiyah, W.H. (2022). *The Relationship between Sleep Quality and Nutritional Status in Santri Pondok Pesantren Tarbiyah Islamiyah Tanjung Agung (thesis).* Islam Negeri Syarif Hidayatullah Jakarta University, Jakarta.

Rosanti, D. (2021). *Relationship between Consumption of Supplementary Sugar, Fat, Physical Activity, and Sleep Duration with Overweight Status of Adolescent Female at SMAN 12 Jakarta during the COVID19 Pandemic (thesis).*Pembangunan Veteran Jakarta University, Jakarta.

Safitri, R.A., Sunarti, Annisa, P., & Yuni H. (2021). Nutritional Content in the Popular Drink "Boba Milk Tea". *Gorontalo Journal of Public Health, 4*(1), 55-61. doi: 10.32662/gjph.v4i1.1443

Saidah, F., Sugeng, M., & Galeh, S. P. (2017). Relationship between Sugar-Sweetened Beverage Consumption Habits and the Incidence of Overweight in Adolescents at Institut Indonesia Semarang High School. *Nutrition and Health Journal, 9*(22), 150-157.

Sambo, M., Firda, C., & Godelifa, M. (2020). Relationship between Diet and Nutritional Status in Pre-school Children. *Sandi Husada Health Scientific Journal, 9*(1), 423-429. doi: 10.35816/jiskh.v11i1.316

Sartika, W., Sara. H., Siti. Q., & Sellia. J. (2022). The Effect of Pocket Money on the Incidence of Overnutrition in Adolescents during the Covid-19 Pandemic. *Journal of Healthcare Technology and Medicine*, *8*(1), 400-405. doi: 10.33143/jhtm.v8i1.1999

Shakina, A.H., Aisyah, F.S., & Syifa, N. (2021). Relationship between Caffeinated Beverage Consumption and Sleep Patterns of Students at Universities of Indonesia. *Journal of the Public Health Community*, *3*(2), 14–25.

Sonda, I.M.P., Windy, M.V., & Frelly, V.K. (2021). Sleep Quality and Achievement Index of Class XII Students of SMA Negeri 1 Manado during the Covid-19 Pandemic. *Journal of Community and Tropical Medicine*, *9*(2), 334-340.

Sulistyowati, Y., Yeni, A., & Titik, W. (2019). There is a Relationship between Fast Food Consumption and the Incidence of Overnutrition in Urban Adolescents. *Public Health Journal*, *3*(1), 83-89.

Suryani, I., Nitta, I., & G.A. Dewi. (2018). *Nutrition Course Materials: Dietetics of Non-Communicable Diseases*. Jakarta: Indonesian Ministry of Health.

Temple, J.L., Christophe, B.,Steven, E.L., Jason, D.C., Joslyn, A.W., & Miriam, A.M. (2017). The Safety of Ingested Caffeine: A Comprehensive Review. *Frontiers in Psychiatry*, *8*(80), 1-19. doi:10.3389/fpsyt.2017.00080

Ufrida, K., & Sugeng, H. (2022). Fast Food Consumerism as a Lifestyle of Adolescents in Surabaya City: A Case Study of High School Students of Muhammadiyah 4 Surabaya City. *Journal of Sociological Analysis, 11*(1), 137-156. doi: 10.20961/jas.v11i1.57134

Utami, N.A. (2017). *The Relationship of Diet and Physical Activity to the Incidence of Overweight and Obesity in Adolescents (thesis).* Diponegoro University, Semarang.

Widianto, F., Sigit, M., & Poppy, F. (2017). Adolescents can Prevent Overnutrition by Increasing Self-Efficacy and Vegetable-Fruit Consumption. *Indonesian Journal of Nursing Practices*, *1*(2), 16–22. doi: 10.18196/ijnp.v1i2.3434

Wijayanti, A., Ani, M., & Hartanti, S.W. (2019). Relationship between Stress, Eating Behavior, and Nutrient Intake with Nutritional Status in Final Year Students. *Journal of Nutrition College*, *8*(1), 1-8. doi: 10.14710/jnc.v8i1.23807