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RESEARCH STUDY Open Access

Hubungan antara Pemilihan Makanan, Pola Konsumsi, Status Gizi dan Stres pada Mahasiswa Tahun Pertama Universitas di Surabaya

Association between Food Choice, Consumption Pattern, Nutritional Status, and Stress among The First-Year University Students in Surabaya

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ABSTRAK

Latar Belakang: Tren jenis pangan mengalami transisi selama pandemic covid-19. Perubahan jenis pilihan makanan mempengaruhi semua orang, termasuk mahasiswa tahun pertama tingkat universitas. Pemilihan makanan merupakan awal dari terbentuknya perubahan pola konsumsi. Mahasiswa melakukan pembelajaran secara daring dari rumah selama pandemi yang mengakibatkan mereka cenderung duduk di depan layar. Selain itu, pandemic juga dapat menimbulkan seseorang mengalami gangguan kesehatan mental seperti stres.
Tujuan: Menganalisis hubungan antara pemilihan makanan, pola konsumsi, status gizi dan stress pada mahasiswa tahun pertama universitas di Surabaya.
Metode: Penelitian ini menggunakan desain cross sectional dengan sampel sebanyak 123 mahasiswa tahun pertama universitas. Pengambilan sampel menggunakan metode simple random sampling. Data dikumpulkan melalui kuisioner mandiri secara online termasuk karakteristik responden, motif pemilihan makanan, pola konsumsi (skor dan tingkat konsumsi pangan), status gizi (berat dan tinggi badan), dan stress. Data yang terkumpul dianalisis menggunakan Uji Chi-Square.
Hasil: Hasil penelitian menunjukkan responden yang tergolong stres sebanyak 13 orang (10.57%). Penelitian ini menunjukkan adanya hubungan antara pemilihan makanan terkait kesehatan (p = 0,007), kemudahan (p = 0,016), skor konsumsi karbohidrat (p = 0,016) pada kelompok responden yang tergolong stres and tidak stres.
Kesimpulan: Penelitian ini menyimpulkan bahwa manajemen pengurangan stress dapat dioptimalkan dengan kesadaran terhadap pengaturan jumlah asupan makronutrien untuk mencegah terjadinya kasus obesitas pada kelompok mahasiswa.

Kata kunci: pemilihan makanan, pola konsumsi, status gizi, stress, mahasiswa

ABSTRACT

Background: The trend of food types has transitioned during the Covid-19 pandemic. The food transition trend affects all people, including the first-year students at university. The food transition is a basic of the diet pattern transition process. Students are obligated to study from home during the pandemic, which means they are more likely to sit in front of the screen. Meanwhile, the pandemic is related to the disturbance of mental health outcomes such as stress.
Objectives: This study was aimed to determine the relationship between food choices and consumption pattern, nutritional status, and stress among the first-year university students in Surabaya.
Methods: This research used a cross-sectional design with a sample of 123 first-year university students. Sampling using a simple random sampling method. Data was collected by self-reported online questionnaire including variables of respondents' characteristics, reason food choices, consumption pattern (score and level consumption of foods), nutritional status (body weight and height), and stress. Collected data were analyzed using the Chi-Square Test.
Results: The results showed that respondents who reported stress were 13 (10.57%) students. Our study found that the food choices (e.g., health and convenience) (p=0,007- 0.016), score of consumption of carbohydrates (p= 0,016) are significantly different between the one who reported stress and the one who did not report any stress.

Conclusions: The stress reduction management could be optimized by awareness of the macronutrient intake control to prevent overweight among university students.

Keywords: food choices, consumption pattern, nutritional status, stress, student.

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INTRODUCTION

One of the implications for the healthy students that determined long-term psychological outcomes and behavior responses was academic stress. The grade of students' education could be one of academic stressors in learning process (Hodselmans *et al.*, 2018; Ramachandiran and Dhanapal, 2018). If students studied in higher grade, they might be getting higher level of stress. Besides that, the students who were categorized stressful in academic process, they also might have an unhealthy lifestyle (Kim and Brown, 2018). Students' effort to adapt to the education system from senior high school to university could be a burden that puts them be stressful. Students of university would often encounter various stressors in daily activities. Students' pressure may come from poor time management, new social relationships, peer group competition, and high-grade achievement ambition. Stress could change an individual's biological and psychological that affect consumption patterns and preferences (Mohamed, Mahfouz and Badr, 2020). Students should adapt to a new system that has several challenges instead of during the Covid-19. The World Health Organization (WHO) has established a policy about physical distancing to prevent the covid-19 pandemic. The new regulation of the education process in Indonesia has changed from face-to-face in the class into online class meetings during pandemic situations (Fauziyyah, Awinda and Besral, 2021). Impacts from all changes of learning process might increase mental health problems among students during pandemic situation in many countries. Mental health symptoms such as stress, anxiety, and depression, increased during pandemics. The long-term pandemic has made students stressful and anxious because of online class meetings and high load daily activities.

The previous study from the doctor association compiled self-reported about mental health with surveys. A former study's result reported that 63% respondents were having anxiety and experiencing depression at the same time during covid-19 pandemic (PDSKJI, 2020). The main factors (e.g., isolation and social distancing, unstable economic, stress, and depression) among health workers, stigma, and then discrimination as results occurred during covid-19 pandemic (Thakur and Jain, 2020). Psychological stress is associated with unhealthy dietary habits (e.g., skipping meals, limiting intake, or binge eating) that lead to weight gain and/or fat mass gain (Sinha, 2018). Stress is associated with increasing high-calorie foods such as junk food, snacks, and high palatable food (Allegri, Turconi and Cena, 2011). The former study showed a negative relationship between stress and diet quality among European adolescents aged 12 – 17 years old (De Vriendt *et al.*, 2012). The students have developed an unhealthy lifestyle and poor dietary habits such as excessive consumption of comfort foods as the common coping mechanisms of chronic psychological stress (Cena and Calder, 2020). Therefore, this study was aimed to determine relationships between food choices, consumption pattern, nutritional status, and stress among the first-year students in Universitas Airlangga, Surabaya.

METHOD

This study employed primary data obtained from the survey to 126 undergraduate students who studied as first year students in Universitas Airlangga, Surabaya. The students were then asked to fill the online self-report questionnaires that were collected between June – July 2021. As many as 123 respondents had complete data according to the research criteria. We included the respondents who completely filled out the online questionnaires, including characteristics of respondents, food choices, consumption pattern, nutritional status, and stress. Characteristics of the respondents included age, gender, regions of residence, surroundings, and level of family welfare. The regions of residence consisted of two categories, namely rural and urban areas. The surroundings were categorized as living with parents and living without parents. The level of family welfare was assessed using indicators analysis for household's fulfillment basic needs questionnaire according Central Statistics Agency (BPS) that consists of the 8 statements with two choices (i.e., yes that defined wealthy category and no that defined non-wealthy category). Moreover, the level of family welfare categorized in two groups, namely wealthy and non-wealthy.

The total scores were than categorized into wealthy (the ones who have fulfilled from 0 to 1 indicator that included into no choices and non-wealthy (the ones who have fulfilled more than or equal to 2 indicator that included into yes choices. The Food Choice Questionnaire aimed to determine the most importance respondents' food choice reasons during pandemic. The Food Choice Questionnaire (FCQ) which consisted of the 17 questions used four-point Likert scale (from 1 to 4) for each item. An answer of 1 represented "Not very important" for each question, while an answer of 4 represented "Very important". Moreover, we categorized reasons for food choices into health, mood, and convenience reasons, based on which score they were answered the most (Asma *et al.*, 2010). The calculation used the most importance ratings for reason food choices that chosen by respondents. For example, they categorized in "yes" for health reasons that represented the most importance reason food choices for respondents and "no" (the ones who represented other reason food choices as the most importance ones) (Januszewska, Pieniak and Verbeke, 2011). The consumption pattern was defined as score of consumption of daily macronutrients such as energy, carbohydrate, fat, and protein, and then we categorized it into three levels (e.g., less, normal, and over). The nutritional status was defined from the body mass index (BMI) categories using the Indonesian BMI cut-off points (Kemenkes RI, 2014). The BMI was calculated using body weight and body height. The stress measurement was defined from the score of DASS-21 questionnaire. The questionnaire consisted of 7 questions with scores from 0 to 3. The total scores were then categorized into non-stress (the ones who have scores of 0-14) and stress if they have score more than or equal to 15 (Salsabilla, 2015). Furthermore, we excluded those who had diagnosed of chronic diseases and taken a leaving of absence period from university.

The collected data were then analyzed and presented in a frequency distribution. We also employed the inferential statistical analysis to see the relationship between variables using Chi-Square test. The statistical significance was determined if the p-value was $\leq \alpha$ (0.05). All analyzes were performed using an SPSS version 20. This study has received an approval from the Ethics Commission of the Faculty of Dentistry, Universitas Airlangga, Surabaya, number 273/HRECC.FODM/VI/2021 on May 31, 2021.

RESULT AND DISCUSSION

Respondents Characteristics

The new regulation in the education system, specifically related to the delivering knowledge process, has changed drastically, namely from face-to-face in the class into the online class meetings. The online class meetings have benefits such as an unlimited place to conduct the knowledge delivering process from the lecturer to the students. Therefore, the benefit related to the place affects the students' residential preference. Students who are not originally from the city where the university is located prefer to go back home to live with their families to avoid rental fees.

Table 1. Respondent Characteristics

Variable	Total		Not Stress		Stress [x]		*p*-value
Age (mean, SD)	19.0	0.9	19.0	0.9	19	0.9	0.627
Gender (n, %)							
Male	20	16.3	17	85.0	3	15.0	0.422
Female	103	83.7	93	90.3	10	9.7	
Region of residences (n, %)							
Rural	27	22.0	25	92.6	2	7.4	0.731
Urban	96	78.0	85	88.5	11	11.5	
Surroundings [a] (n, %)							
A company of parents	117	95.1	106	90.6	11	9.4	0.122
Not company of parents	6	4.9	4	66.7	2	33.3	
Level of family welfare (n, %)							
Rich	101	82.1	89	88.1	12	11.9	0.460
Poor	22	17.9	21	95.5	1	4.5	
Reasons for food choices							
Health (n, %)							
No	34	27.6	26	76.5	8	23.5	0.007*
Yes	89	72.4	84	94.4	5	5.6	
Mood (n, %)							
No	95	77.2	87	91.6	8	8.4	0.170
Yes	28	22.8	23	82.1	5	17.9	
Convenience (n, %)							

Variable	Total		Not Stress		Stress [x]		*p*-value
No	117	95.1	107	91.5	10	8.5	0.016*
Yes	6	4.9	3	50.0	3	50.0	
Body Mass Index (mean, SD)	21.6	3.8	21.5	3.7	22.4	4.8	0.396
Weight (mean, SD)	55.5	11.7	55.2	11.6	58.2	13.1	0.383
Height (mean, SD)	160.2	8.2	160.1	8.2	161.1	8.5	0.673
Nutritional status [b] (n, %)							
Underweight	26	21.1	23	88.5	3	11.5	0.630
Normal	77	62.6	68	88.3	9	11.7	
Obese	20	16.3	19	95.0	1	5.0	

Note: SD, Standard Deviation. * Significant p-value was < 0.05. † Stress was defined as respondents who have a DASS-21 score > 14. [a] Surroundings were defined as into two categories, namely living with parents and living without parents (living alone or living with an extended family). [b] Nutritional status was defined as categorical data from the BMI with Indonesian BMI cut-off points.

Table 1 shows the respondents' characteristics of 123 students. The respondents who are categorized as stress are 13(10.6%) students and non-stress are 110(89.4%) of total respondents. The respondents' mean of age is 19 (1) years old, majority of whom are female students as many as 103(83.7%) people. Majority of the respondents are living in urban regions and living with parents. As many as 101(82.1%) of the respondents' parents are categorized as wealthy families. People who are in the middle to lower economic level tend to have a high level of stress during the Covid-19 pandemic (Nurwahid and Anggraeni, 2020). Our study's result was in line with the previous studies' results that majority of the wealthy respondents were in non-stress category.

Food Choices Reason

The motivations of food choices were defined from three aspects, such as healthy reason, mood, and convenience reason. Adolescents are particularly vulnerable to food choices, such as instant food preferences and uncontrolled food consumptions (Yusinta, 2020). The former study's results in the Yogyakarta region showed that the participants considered health as the most significant element in food choices, followed by food composition, price, and ethics (Wahyuningtyas, Wisnusanti, and Kusuma, 2020). Meanwhile, health and sensory appeal are the main motives of food choices in Finland (Roos, Lehto and Ray, 2012) and health, natural content, and price are the important motives of food choices in the United States of America (Pula, Parks and Ross, 2014). The previous studies' results were in line with our study's result. Moreover, majority of the respondents (89(72.4%)) in our study's results prefer health as the main aspect for food choices. Other side, respondents preferred mood as the main aspect (28(22.8%)), and convenience as the main aspect for respondents (6(4.9%)). Respondents who categorized non-stress and chosen health as main aspect got higher (84(94.4%), $p = 0.007$) than stress respondents. The mood aspects in non-stress respondents got higher (23(82.1%), $p = 0.170$) than stress respondents. While convenience aspect in both respondents got same amount (3(50.0%), $p = 0.016$). The respondents' food choices (e.g., health and convenience reasons) show the significantly different results between the one categorized as stress and the one who are not ($p = 0.007$-0.016).

Respondents' health awareness is higher than others as the main aspect in the diet pattern that followed during the Covid-19 pandemic especially food choices. Children who are living with their parents are more likely to eat the same food as their parents (Alawiyah and Prasodjo, 2017)The food ingredients and menu served at home are usually prepared by the cook's choice, which is the mother, in particular. The mother's food choice is mainly the health aspect with natural ingredients (Alawiyah and Prasodjo, 2017). On the other hand, the second important aspect of food choices in this study was convenience reason ($p = 0{,}016$). A study of mothers in Cisarua village, Purwakarta, reported that the main motive for food choices chosen by the mothers was psychological motives (i.e., sensory appeal, convenience, mood, familiarity, and ethical issues). Convenience was defined as the ease of food supply and food accessibility for their children at that location (Alawiyah and Prasodjo, 2017).

Table 2. Score and level of Food Consumption by Outcome

Variable	Total		Not Stress		Stress †		*p*-value
Score consumption of foods							
Energy (mean, SD)	1775.1	932.9	1725.0	870.57	2199.0	1321.5	0.083
Carbohydrate (mean, SD)	298.4	149.7	287.3	134.5	392.8	230.0	0.016*
Fat (mean, SD)	31.8	24.5	31.4	23.9	34.8	30.8	0.644
Protein (mean, SD)	79.8	51.1	78.7	49.9	89.8	61.6	0.461
Level consumption of foods [a]							
Energy (n, %)							0.101
Less	84	68.3	73	86.9	11	13.1	
Enough	18	14.6	18	100.0	0	0.0	
Over	21	17.1	19	90.5	2	9.5	
Carbohydrate (n, %)							0.423
Less	77	62.6	67	87.0	10	13.0	
Enough	23	18.7	22	95.7	1	4.3	
Over	23	18.7	21	91.3	2	8.7	
Fat (n, %)							0.392
Less	105	85.4	93	88.6	12	11.4	
Enough	10	8.1	9	90.0	1	10.0	
Over	8	6.5	8	100.0	0	0.0	
Protein (n, %)							0.442
Less	46	37.4	39	84.8	7	15.2	
Enough	27	22.0	25	92.6	2	7.4	
Over	50	40.7	46	92.0	4	8.0	

Note: SD, Standard Deviation; * Significant p-value: <0.05. † Stress is defined as respondents who have a DASS 21 score more than 14. [a] Level consumption of food is defined as the category of adequacy of daily macronutrient consumption.

Table 2 demonstrates score of food consumption, and level of food consumption among respondents by the outcome categories. The score of food consumption among stress respondents are higher than that of the non-stress respondents. However, only score of food consumption for carbohydrate significantly different between the stress and non-stress respondents ($p = 0.016$).

Body Mass Index and Nutritional Status

The body mass index was defined from two aspects, namely weight (in kilogram) and height (in meter squared) (Widiantini and Tafal, 2014). The result of this study showed that there was no association between BMI and the one categorized as stress and the one who is not ($p = 0.396$). The former study's result in Pelita Harapan University showed that there was no association between stress level and the BMI of medicine students during the covid-19 pandemic (Saher, 2021). The previous study's results also showed that there was no association between stress level and body mass index of medicine students at Universitas Islam Bandung (Permatasari, R. K., Sukarya, W. S., & Yulianto, 2019). The mean body mass index among stress respondents was higher (22.4(4.8), $p = 0.396$) than the mean of that of the non-stress respondents. However, the difference was not significantly different. Numbers of body mass index could increase in the condition that the cortisol level decreased whereas muscle mass breakdown and energy storage increased in bodies (Riskawati, Prabowo and Rasyid, 2020). Stress would gradually affect respondents' food patterns followed by an increased risk of obesity and body weight (Firmanurochim, W., Romadhon, Y. A., Mahmuda, I. N. N., & Dasuki, 2021).

Moreover, Table 1 showed that there was no association between nutritional status and outcome categories ($p = 0.630$). In line with our study's result, there was no association between stress and nutritional status of nutrition students in Surakarta (Nurkhopipah, 2017). Other results of study also showed that there was no association between stress and nutritional status for undergraduate students conducting their thesis (Angesti and Manikam, 2020). The previous studies' result was in line with our study. Changes of body weight among undergraduates' thesis students could affect their stress level. Final results of changes nutritional status would impact respondents' stress, and they might do binge eating or lose their appetite (Nurkhopipah, 2017).

Score and Level Consumption of Foods

Inappropriate food choices could increase the risk of abdominal obesity related with consumed high carbohydrate and fat (Trisna, I., & Hamid, 2008). Students who lived in population with poor quality life would impact their dietary habits. This result study showed that there was an association between score of consumption of food for carbohydrate and outcome categories. Meanwhile, other aspects of the score of consumption of food

(e.g., energy, fat, and protein) were in no association with outcome categories. Table 1 also showed that the majority of level consumption of food such as energy (73(86.9%)), carbohydrate (67(87.0%)), fat (93(88.6%)), and protein (39(84.8%)) were non-stress respondents categorized on daily inadequate macronutrient intake. These were not capable with the Minister of Health of the Republic Indonesia law which defined the latest nutritional adequacy rate for the Indonesian nation. The respondents' level consumption of food (e.g., carbohydrate, fat, and protein) showed the significantly different results between the one categorized as stress and the one who was not (p = 0.392–0.423).

Stress could affect food intake through two aspects, namely decrease or increase in intake of food (Fitrianingrum, D., Wardhani, S., Mushthafiyah, N., Mulyawati, S., Larasati, W., Nurshavira, A., Azhar, E., Salsabila, S., Lestari, Y., & Mardiana, 2021). Moreover, stress could affect total intake calorie used for activities (Gurdani Yogisutanti, Hari Kusnanto, Lientje Setyawati, 2015). The process of production of energy located in human body is through combustion macronutrients such as carbohydrates, proteins, and fats. Therefore, human body needs efficient nutrients for supporting their requirements (Hasmawati, Usman and Umar, 2021). The previous study in Universitas Muhammadiyah Pare-Pare showed that the importance of consuming carbohydrates for any function, such as maintaining muscle mass and body weight and also enhancing digestive metabolism (Hasmawati, Usman and Umar, 2021). Person categorized as stress have paid less attention to their diets and physical activities, and as results, weight gain and fat mass. Increasing daily macronutrient intake (i.e., energy, carbohydrate, fat, and protein) tends to occur in certain condition such as stressful, high workload, tasks as indicators for the difference average energy intake (Hasmawati, Usman and Umar, 2021).

The limitation of this study was indirectly measurement by the researcher, such as latest respondents' weight and height. Moreover, the majority result of this study (e.g., anthropometrics data) had under-reported followed by self-reported from respondents. The solution of this limitation was direct measurement for minimizing bias of this study. Besides that, indirect supervision from the research regarding the validation of study results by the respondents, and also could enhance bias of this study. Meanwhile, the advantage of this study was innovated new analyzed data such as association between daily intake and stress categories added by mediator variable (i.e., consumption patterns).

CONCLUSION

Conclusions of this study were that the majority of respondents included in non-stress respondents. The majority of respondents were female students. Majority of respondents living in urban region and living with parents and living with parents. The majority of respondents' parents are categorized as wealthy families. The main food choice reason based on this study was health and convenience aspects that supported for their consumption patterns. Moreover, the majority of respondents' body mass index were categorized in normal. The majority score consumption of food intake was higher in stress respondents than non-stress respondents. The majority level consumption of food (i.e., energy, carbohydrate, fat, and protein) was categorized in daily inadequate intake. This study showed that the significant relationship between reasons food choice (i.e., health and convenience reason), score of food consumption (i.e., carbohydrate) with outcome categories. Therefore, recommendations are optimizing level daily intake of each macronutrient with choosing and enhancing healthy food. Moreover, the important one is the stress reduction management from each individual, so that optimizing awareness of the macronutrient intakes control to prevent overweight in young generation.

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