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ORIGINAL PAPER

Eating behavior and health-related quality of life among female students attending higher education during COVID-19 pandemic in Indonesia

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Abstract

Background: Female students attending higher education had lower Health-related Quality of Life (HRQOL) scores and their eating behavior, which is a key element of healthy lifestyle, had changed to become unhealthy as a result of the pandemic's mental effects. There has been no study assessing the asssociation between both during the pandemic in Indonesia, especially after controlling for other factors.

Objective : This study aimed to assess the association between eating behavior and HRQOL among female students attending higher education during Covid-19 Pandemic.

Methods: This was a cross-sectional online survey with 474 subjects aged 18 to 25. The Dutch Eating Behavior Questionnaire (DEBQ) was used to assess emotional, external, and restraint eating. HRQOL was measured using the SF-36 questionnaire, with the subscales Physical Component Summary (PCS) and Mental Component Summary (MCS). Additionally, sociodemographic data, screen time, sleep duration, nutritional status, and physical activity were collected. The data were analyzed using multiple linear regression.

Results: PCS was significantly associated with emotional eating (r = 0.279, p-value <0.001), external eating (r = 0.211, p-value <0.001), and restrain eating (r = 0.116, p-value = 0.012). Besides, emotional eating (r = 0.211, p-value <0.001) and external eating (r = 0.172, p-value <0.001) were also significantly associated with MCS score

Conclusion: During Covid-19 pandemic, the higher the emotional, external, and restraint eating behavior scores of the students, the higher their physical health-related quality of life. The higher the emotional and external eating behavior scores, the higher their mental health-related quality of life.

Keywords: eating behavior, HRQOL, female university students

Introduction

Quality of Life (QOL) is one of the terms commonly used to refer to "health".[1] A 2020 population-based cross-sectional study assessing the quality of life among productive age in Indonesia, showed that the prevalence of good QoL among productive age in the general population was lower than expected (54%) and needs to be improved.[2] However, the health care system and its practitioners do not fully take responsibility for all the QOL problems, and therefore a distinction is made with reference to health-related quality of life (HRQOL).[3] Students who perceive a higher quality of life make use of the numerous facilities and services available and integrate more successfully into social and academic settings.[4]

The 2022 cross-sectional study among degree students in Spain shows that females had lower HRQOL in overall health, vitality, social function, emotional and mental health than males. The

females demonstrated worse levels of general health perception, quality of life, depression symptoms, anxiety, stress, avoidance, and psychological inflexibility compared to males during the pandemic.[5] This could be explained by the fact that women may be subjected to a wider range of stressful life events than men.[6] Furthermore, women are more sensitive to social judgements, making them more vulnerable to worsening their subjective well-being conditions and affecting their HRQOL.[7] There are many factors influencing HRQOL in university students, such as nutrition problem. Inadequate nutrient intake leads to insufficient and unbalanced nutrition, which causes health impairment. Nutrition is as much a psychological need as it is a physical need. Individuals may eat more than usual when they are angry, stressed, or under pressure, as well as experiencing nutritional restriction and unhealthy eating behavior that have a negative impact on their health, and affecting their HRQOL.

Nutrition is as much a psychological need as it is a physical need. Individuals may eat more than usual when they are angry, stressed, or under pressure, as well as experiencing nutritional restriction and unhealthy eating, affecting their HRQOL.[8] A study among Iranian adolescents shows that food responsiveness and emotional eating are significantly associated with HRQOL.[9] University life is often defined as a highly stressful developmental period for young adults.[10] They are a distinct population in that their issues, burdens, and concerns differ from other populations.[11] Especially during the Pandemic, they face uncertain conditions related to academic and social life, financial concern, and emotional health. These circumstances going on for a period of time had some impacts on their psychological state.[12] These can induce risky behavior with unhealthy eating practice.[13] A study among university students in Jakarta reveals that 85% of the students practice emotional eating behavior.[14] Eating behavior, particularly restricted, emotional, and external eating among university students in Turkey increases significantly during Covid-19 pandemic.[8]

HRQOL aims to promote and maintain a healthy lifestyle while eating behavior is a key element of a healthy lifestyle. To date, studies about HRQOL and eating behavior among female university students have been done separately. As eating behavior of university students is noted to alter to become unfavorable during Covid-19 pandemic, their HRQOL may be affected too. Unfortunately, studies assessing the association of both, especially among female students attending higher education, are lacking. For these reasons, this study aimed to assess the association between eating behavior and HRQOL among female students attending higher education during Covid-19 pandemic.

Methods

This study was an online survey using cross-sectional design. This study was conducted in Indonesia through a web-based application, *Limesurvey*®. The sampling method used was convenience sampling with the total subjects obtained was 474 female students attending higher education Indonesia, after being selected based on inclusion criteria, which was aged 18-25 years old female student attending higher education. The students with severe illness and/or disability, on a certain medication or diet, smokers, married, pregnant, and breastfeeding were excluded from this study. The data collection was done from September to October 2022, after receiving ethical clearance from Faculty of Medicine of Universitas Indonesia with approval number: KET 488/UN2.F1/ETIK/PPM.00.02/2022. Subjects were recruited via online advert through different channels (Instagram, WhatsApp, Twitter, and Telegram), which contained the study information sheet and direct link of the questionnaire. Since this was an online self-administered survey, the subjects filled the questionnaire by themselves at any time and place during the data collection period.

The subjects were asked to fill questionnaires about sociodemographic characteristics, screen time, sleep duration, nutritional status, as well as Indonesian version of the International Physical Activity Questionnaire Short Form (IPAQ-SF) to assess the physical activity, with validity level 0.40 and reliability 0.70-0.87. As for screen time, the

students were asked about their screen time increase during the pandemic. There were 6 indicators, namely screen time for streaming/watching entertainment videos, reading/watching news, interactive recreation, education, communication with friends/family, and social media use for non-communication purpose. Then they were categorized into 2, which were non-educational purpose and educational purpose screen time. The students with non-educational purpose screen time increments were summed based on the total of screen time they had an increase on.

Their eating behavior was obtained using validated Dutch Eating Behavior Questionnaire (DEBQ) Indonesia version, which assess 3 subscales of eating behavior, namely emotional, external, and restraint eating. The HRQOL was obtained using validated SF-36 Indonesia version questionnaire, which assess Physical Component Summary (PCS) and Mental Component Summary (MCS). All the tools have been validated to be used among Indonesian student population by previous studies. Pretesting for HRQOL and DEBQ were done before conducting this study using Cronbach Alpha test, with the results >0.6 for all the HRQOL subscales and 0.91 for overall DEBQ. It showed that all the tools used were reliable to be used in this study. DEBQ used a 5-point Likert-type scale, with a scoring system identified as follows: 1 = never, 2 = seldom, 3= sometimes, 4 = often, and 5 = very often. The assessment for each subscale was done by getting an average score. To obtain the average score, the item scores for each subscale were added as the total score. Then, it was divided by the number of subscale items to calculate score per subscale.

The SF-36 was made up of 36 items, divided into 8 subscales. The options of response are on a 2-, 3-, 5-, or 6-point scale. The physical component summary (PCS) score was generated using 21 items, and the Mental Component Summary (MCS) score is generated using 14 items. The PCS included items from four subscales: physical functioning (PF), role limitation due to physical health (RP), bodily pain (BP), and general health perception (GH). Role limitations due to emotional problems (RE), vitality (VT), mental health (MH), and social functioning (SF) subscales were all included in the MCS. The SF-36 also included a health transition (HT) item, which was not included in the composite score. The subscale score was calculated using the mean score of the items within the subscale. The mean score of the subscale scores within a component scale was computed to generate the PCS and MCS scores. The range of the score was 0 to the highest, 100.

Additionally, the monthly household income was classified into three categories, namely low income (≤Rp.1,990,000), middle income (Rp.1,990,001 - Rp.4,799,000), and high income (≥Rp.4,800,000). The pocket money obtained by asking the students about their monthly pocket money adequacy and classified into poor, moderate, and good. The nutritional status was defined based on BMI classification for Asia-Pacific and categorized into underweight (<18.5 kg/m^2), normal (18.5-22.9 kg/m^2), and overweight/obese (≥23 kg/m^2). Lastly, the physical activity was obtained using Indonesian version of the International Physical Activity Questionnaire Short Form (IPAQ-SF) and categorized into low (MET<600), moderate (600≤MET<3.000), and high (MET≥3,000). Data quality assurance was done during data collection period through some activities, like pretesting, applying screening questions, duplication control, and applying CAPTCHA to avoid robots filling the questionnaire. The data obtained was then analyzed using SPSS 20, univariately to multivariate analysis.

Results

A total of 1280 responses were obtained. Among those responses, 749 responses were excluded with following reasons: 407 responses did not fill the online survey at all, 78 responses did not meet the inclusion criteria, 169 did not pass the screening questions, and 91 responses did not complete the screening questions. Additionally, there were 4 pairs of duplicated responses identified from the identical name, email address, and phone number. Therefore, there were 531 responses who met the inclusion criteria and passed the screening questions. Out of 531, 57 responses did not

complete the online survey and they were excluded as well. Finally, a total response included as subjects in this study was 474 subjects.

More than a half of the female students attending higher education in this study were in their 18-20 years of age (54.9%), mostly living in family with middle-monthly- income which was around Rp.1,990,001 - Rp.4,799,000 (39.2%), had a good adequacy of monthly pocket money (61.4%), and lived with their family. Additionally, almost all of them did not have part-time jobs or volunteering work during the Covid-19 pandemic (92%). Further, **Table 1** also shows that almost all of the subjects (98.5%) had an increased screen time for non-educational purposes during Covid-19 pandemic. These screen time included 5 indicators, which were streaming/ watching entertainment video, reading/ watching news, education purpose, communication with friends/ family, and social media use for non-communication purpose. While for educational purposes, 85.9% of the subjects had screen time increase. Almost half of the subjects had sleep duration below 7 hours per day (48.7%). Most of the subjects had normal nutritional status (47.5%), with moderate physical activity (41.4%) in the last 7 days.

Table 2 shows that the median of emotional eating (3.61) was higher than the medians of external eating and restraint eating, which ranged from 2.92 to 4.15. Furthermore, the average score for each eating behavior is displayed. Emotional eating received the highest score of 3.5. That is, emotional eating was the most prevalent eating behavior among all subjects.

The Physical Component Summary (PCS), which is determined from physical functioning, role limitation due to physical health, bodily pain, and general health perception, had a median score of 67.19, with a range of 56.09 to 79.37 in **Table 3**. The mean score of role limitation due to emotional problems, vitality, mental health, and social functioning were calculated resulting in a Mental Component Summary (MCS) score of 57.02, with a range of 43.25 to 70.53. Furthermore, physical functioning (95) had the highest median score of any subscale. The lowest were role limitation due to physical health and vitality, both with a median score of 50.

Table 4 shows the association between health-related quality of life and eating behavior that was analyzed using Spearman correlation test. Physical Component Summary (PCS) was significantly associated with emotional eating ($r = 0.279$, p-value <0.001), external eating ($r = 0.211$, p-value <0.001), and restrain eating ($r = 0.116$, p-value $= 0.012$). It showed that they have positive weak correlations. These results demonstrated that the higher emotional, external, and restraint eating behavior score, the higher their physical health related quality of life. Besides, emotional eating ($r = 0.211$, p-value <0.001) and external eating ($r = 0.172$, p-value <0.001) were also significantly associated with Mental Component Summary (MCS) score. It means that the higher their emotional and external eating behavior score, the higher their mental health related quality of life.

After adjustment with sociodemographic characteristics and lifestyle behavior (**Table 5**), emotional eating, household income, pocket money, living arrangement, job, and nutritional status were significant to be the predictors of physical health related quality of life among female students attending tertiary education in the Covid-19 pandemic after being adjusted. The model implies that for every one-point increment of emotional eating and external eating score, the MCS score increased by 2.414 and 2.667 point, respectively. Moreover, with every increment of age category level, the MCS score increased by 2.884 which means that the subjects aged 21 -25 years old had better mental health than the subjects aged 18-20 years old. Additionally, with every increment of the pocket money level and living arrangement, the MCS score increased by 6.143 point and 2.678 point, respectively. The same goes for living arrangements, where the subjects who lived with their family had better mental health among the groups. The table also shows that every increase of living arrangement level, the MCS score increased by 3.000 points.

Table 1. Sociodemographic Characteristics and lifestyle behavior of the Subjects (N = 474)

Characteristics	n	%
Age		
18- 20 years old	260	54.9
21 – 25 years old	214	45.1
Monthly Household Income		
Low income	150	31.6
Middle income	186	39.2
High income	138	29.1
Monthly Pocket Money Adequacy		
Poor	22	4.6
Moderate	161	34
Good	291	61.4
Living Arrangement		
Living alone	102	21.5
Living with friends	28	5.9
Living with family	344	72.6
Having a Job		
Yes	38	8
No	436	92
Screen Time Increase		
Educational Purpose		
Yes	407	85.9
No	67	14.1
Non-Educational		
Yes	467	98.5
No	7	1.5
Sleep Duration		
< 7 h/day	231	48.7
7 – < 8 h/day	193	40.7
8 – < 9h/day	40	8.4
≥ 9h/day	10	2.1
Nutritional Status		
Underweight	110	23.2
Normal	225	47.5
Overweight/ Obese	139	29.3
Physical Activity		
Low	194	40.9
Moderate	196	41.4
High	84	17.7

Monthly household income category: low: ≤ Rp.1,990,000/month, middle: Rp.1,990,001 – Rp.4,799,000/month, and high: ≥ Rp.4,800,000/month; monthly pocket money adequacy Physical activity category: low (MET<600), moderate (600≤MET<3.000), and high (MET≥3,000).

Table 2 Eating behavior of the subjects (N = 474)

Sub-Scales	Median (Q1-Q3)	Mean
Emotional eating	3.61 (2.92 – 4.15)	3.5
External eating	2.7 (2.3 – 3.1)	2.7
Restraint eating	3.3 (2.7 – 4.1)	3.3

Table 3 Health-related quality of life of the subjects (N=474)

Sub-Scales	Median (Q1-Q3)
Physical Component Summary (PCS)	67.19 (56.09 – 79.37)
Physical functioning (PF)	95 (80 - 100)
Role limitation due to physical health (RP)	50 (25 - 75)
Bodily pain (BP)	67.5 (55 – 87.5)
General health perception (GH)	60 (50 - 70)
Mental Component Summary (MCS)	57.02 (43.25 – 70.53)
Role limitations due to emotional problems (RE)	66.67 (33.33 - 100)
Vitality (VT)	50 (40 - 60)
Mental health (MH)	60 (48 - 68)
Social functioning (SF)	62.5 (50 - 75)

Table 4 Correlation between HRQOL and Eating Behavior (N = 474)

Dependent Variable	Independent Variable	r value	p-value
HRQOL	Eating Behavior		
PCS	Emotional eating	0.297	<0.001**
	External eating	0.211	<0.001**
	Restraint eating	0.116	0.012*
MCS	Emotional eating	0.211	<0.001**
	External eating	0.172	<0.001**
	Restraint eating	0.068	0.141

Statistical analysis used Spearman correlation.

HRQOL: Health Related Quality of Life; PCS: Physical Component Summary; MCS: Mental Component Summary

*Significance level at p-value <0.05; **Significance level at p-value <0.01

Table 5. Multiple Linear Regression Analysis of HRQOL (N=474)

Parameter	Unadjusted Model						Adjusted Model					
	[a]PCS			[b]MCS			[a]PCS			[b]MCS		
	B	95% CI	p-value	B	95% CI	p-value	B	95% CI	p-value	B	95% CI	p-value
Constant							5.692	-12.940 – 24.325		2.191	-17.717 – 22.09	
Eating behavior score												
Emotional eating	5.372	3.828 – 6.917	<0.001**	4.136	2.347 – 5.926	<0.001**	3.750	1.920 – 5.579	<0.001**	2.414	0.289 – 4.538	0.026*
External eating	4.722	2.669 – 6.775	<0.001**	4.649	2.319 – 6.979	<0.001**	1.879	-0.362 – 4.120	0.100	2.677	0.051 – 5.302	0.046*
Restraint eating	1.801	0.230 – 3.371	0.230	1.151	-0.628 – 2.930	0.204	1.575	-0.107 – 3.257	0.066	1.588	-0.380 – 3.557	0.114
Age	-	-	-	3.497	0.105 – 6.889	0.105	-	-	-	2.884	-0.356 – 6.124	0.081*
Monthly household income	4.187	2.406 – 5.967	<0.001**	3.020	0.984 – 5.057	0.004	3.001	1.295 – 4.708	0.001*	1.610	-0.385 – 3.605	0.114
Pocket money	5.622	3.238 – 8.007	<0.001**	6.350	3.658 – 9.042	<0.001**	4.875	2.601 – 7.149	<0.001**	6.143	3.474 – 8.813	<0.001**
Living arrangement	2.502	0.798 – 4.207	0.004*	2.751	0.826 – 4.676	0.005*	2.615	1.042 – 4.187	0.001*	2.678	0.831 – 4.526	0.005*
Job	6.566	1.377 – 11.754	0.013*	-	-	-	4.885	-0.108 – 9.662	0.045*	-	-	-
Non-Educational Screen Time	- 8.520	- 20.252 – 3.212	0.154	- 9.093	-22.340 – 4.154	0.178	-3.418	-14.188 – 7.352	0.533	-4.253	-16.847 – 8.341	0.507

[a]Dependent variable: PCS score

The multiple linear regression equation is given by: PCS (score) = 5.692 + 3.750 (emotional eating) + 3.001 (monthly household income) + 4.875 (pocket money) + 2.615 (living arrangement) + 4.885 (job) + 2.218 (nutritional status), depending on emotional eating in score, Household income level (1 = low income, 2 = middle income, 3 = high income), Pocket money level (1 = poor, 2 = moderate, 3 = good), and living arrangement level (1 = living alone, 2 = living with friends, 3 = living with family), Job (1 = yes, 2 = no), and nutritional status (1 = underweight, 2 = normal, 3 = overweight/obese) of the subjects

*Significance level at P-value <0.05; **Significance level at P-value <0.01

R square = 20.2%, P-value = <0.01 analyzed with multiple linear regression using enter method

[b]Dependent variable: MCS score

The multiple linear regression equation is given by: MCS (score) = 2.191 + 2.414 (emotional eating) + 2.677 (external eating) + 2.884 (age) + 6.143 (pocket money) + 2.678 (living arrangement) + 1.192 (nutritional status) depending on emotional eating in score, external eating in score, age (1 = 18-20 years old, 2 = 21-25 years old), pocket money level (1 = poor, 2 = moderate, 3 = good), living arrangement level (1 = living alone, 2 = living with friends, 3 = living with family), and nutritional status (1 = underweight, 2 = normal, 3 = overweight/obese) of the subjects *Significance level at P-value <0.05; **Significance level at P-value <0.01

R square = 12%, P-value = <0.01 analyzed with multiple linear regression using enter method

Discussion

During the pandemic situation, the students were having online learning which allowed them to have more screen time compared to before the pandemic. There was an increase of screen time for both educational and non-educational purposes. The same finding was stated in a previous study where more than a half of the college students had increment screen time for entertainment and attending online class during Covid-19 pandemic situation.[15] In this study, more than half of the students had less than 7 hours of sleep per day. It could be due to late night tasking, browsing on social media, chatting, and checking online news from mobile devices. Our finding showed that more than half of the subjects had normal nutrition status. This is in agreement to a study in Bangladesh and Canada that also assessed the nutritional status by self-reported measurement in the Covid-19 Pandemic.[16,17] Furthermore, The result showed that most of the students had moderate physical activity for at least 10 minutes each day. This same result was found in a study by Lesmana *et al*[18], which mentioned that most of their subjects (university students) had moderate physical activity. During the pandemic, there were many ways to increase physical activity during that time, such as yoga, aerobics, treadmills, static bike, and sports that can be done in the house. Besides, activities like doing home chores and walking in the house are also physical activity and can increase physical fitness.[19]

This study shows that the eating behavior of the subjects tended to be emotional eating among those three eating behaviors. Similar result was found in a study from Turkey, which shown that the university female students tend to have emotional eating behavior during the Covid-19 Pandemic. A study assessing the level of depression, anxiety, and stress of college students in Indonesia during the Covid-19 pandemic concluded that the majority of college students suffer from moderate depression, severe anxiety, and severe stress.[20] Especially in the Covid-19 pandemic situation, the female students tent to perceive higher stress due to some pressures because they were more likely to ruminate during stressful situations and had a lower sense of mastery over their lives, which could lead to emotional eating as their coping mechanism.[21]

In this study, it is shown that PCS had a higher score than MCS. This is in line with the result of the previous studies conducted among university students, that physical and psychological health were the highest and lowest scoring domains, respectively.[22,23] In addition, pandemic situation might affect the mental health of female students generally more than to their physical health, which could lower the mental health score. In the Mental Component Summary, Role limitations due to emotional problems (RE) and Vitality (VT) were the highest and the lowest subscales of MCS. The exact same result was found in a study at a university in Croatia.[24] It might because of they were more likely to feel tired easily, passionless, and unenergized. This might be because of the burdens they carried in the pandemic situation. Female students showed more impairment in the areas of daily physical activity restrictions (physical functioning), energy (vitality), and physical pain, which may be related to physical traits specific to the female gender, as well as a burden from an overload of traditionally female activities and greater emotional sensitivity (role limitations caused by emotional problems, mental health, and the mental component).[25]

The multivariate model of this study states that after adjusting other variables, it was reported that the higher the emotional, external, and restraint eating behavior scores of the students, the higher their physical health-related quality of life. The higher the emotional and external eating behavior scores, the higher their mental health-related quality of life. These findings are contradictive from the existing theory which explains the negative influences of the three eating behavior to quality of life of healthy people.[26-29.] However, a study by Frayn *et al.*[30] states that many individuals maintain a normal weight even though they engage in emotional eating. In addition, emotional eating has been linked to a need to reduce the effects of stress. Following consumption, hormones are released to reduce stress, which increases the desire for comfort foods, perpetuating emotional eating habits. Thus, emotional eating can increase their mental health-related quality of life.[31] External

eating refers to the tendency to eat when exposed to food-related cues such as the sight, smell, or taste of food, even in the absence of physiological hunger. The link between external eating and emotional eating may have theoretical justifications. For instance, it has been proposed that environment and emotions may work together to influence overeating because anxiety has been shown to improve how overweight people respond to outside cues.[32] However, in the long-term, emotional eating and restraint eating could bring damage to physical and psychological health. Unlike emotional and external eating, restraint eating only positively correlated with PCS. Another study in China reported that restricted eaters tend to reduce energy intake to maintain or lose weight, which causes them to prefer low-calorie foods like vegetables or fruits and limit high-calorie foods like cereals and tubers or domestic animals and poultry.[33] Thus, it can help them to increase and maintain their physical health.

After being adjusted with other factors, female university students with higher scores of emotional eating, living in households with higher monthly income, having good amount of pocket money, living with their family, not working, and having better nutritional status, had better physical HRQOL. While higher emotional eating score, higher external eating score, being in 21-25 years old group, having enough pocket money, living with family, and having better nutritional status showed better mental HRQOL. A study by Naim *et al.* that higher pocket money and monthly household income affected HRQOL of the students after being adjusted.[4] Socioeconomic factors play big roles in affecting both eating behavior and HRQOL. Family financial support, as a direct measure of Socio-economic status (SES), is essential in a student's life.[34] Moreover, the students who did not have any work or doing volunteering in the Covid-19 pandemic had better a better physical HRQOL.

Furthermore, the age group 21-25 years old had better mental health related quality of life. A study by Syakila, *et al.*[11], showed that the students aged 21-25 years old, specifically, had the better psychological quality of life. It's because they are expected to be more mature in handling their life better, thus perceiving a better psychological quality.[11] It can also be expressed that age has predictive effects on student's health-related quality of life.[35] In the present study, the students with emotional and external eating, better socio-economy status, and higher nutritional status had better HRQOL. Overweight/obese subjects have better HRQOL, specifically mental health. This can be associated with eating behavior. Emotional and external eating lead to overeating, which has been linked to weight gain and a higher body mass index.[36] emotional and external eaters tent to consume foods high in sugar, fat, and salt excessively as their coping mechanism to hinder stress.[37] Thus, making their mental health HRQOL better. Nonetheless, a high BMI causing better HRQOL suggests that 'healthy people with obesity' may be on the verge of an unhealthy future.[38]

Additionally, a previous study in Indonesia concluded that female university students had psychological health problem due to pandemic situation.[39] Another study among female university students in Turkey shows a similar result suggesting higher emotional and external eating during Covid-19 pandemic situation. It was due to negative emotions such as anxiety, stress, anger, sadness, depressed feelings that cause an increase in BMI in the long term and hence obesity.[40] Furthermore, a previous study concluded that 71% of young Saudi women were reported to have moderate stress, and 12.5% reported severe stress. It resembles information from surveys conducted during the COVID-19 pandemic in Saudi Arabia, Spain, India, and China.[41] Thus, in this study, the students also might have stress due to pandemic situation and lead them to emotional and external eating behavior.

The present study was the large survey observing HRQOL and eating behavior among female students attending higher education during Covid-19 Pandemic that provides new insight about the determinant factors of HRQOL, which is still limited being examined in Indonesia. The result of this study can be used as a guide for government or the universities in Indonesia to develop a program or recommendation related with quality of life and eating behavior especially for female students. Since the sociodemographic of

this study was quite homogenous and reached the female students from several domiciles in Indonesia, the findings of this study can be generalized in healthy female students attending higher education in Indonesia population. This study had some limitations. Firstly, the cross-sectional study design only showed the correlation between variables and could not provide a causal relationship between the factors and HRQOL. The second one is this study did not assess the food intake of the students and only evaluated eating behaviors via a self-report subjective questionnaire which may introduce reporting bias in this study.

Although this study showed that emotional, external, and restraint eating had increase HRQOL during the Covid-19 Pandemic, it's not recommended to keep these eating behaviors for long-term period as it can negatively affect physical and mental health, such as weight gain, eating disorder, and psychological issues. Stress management needs to be learned to hinder these eating behaviors to become coping mechanisms.

This study can be used for ministry of health collaborating with ministry of higher education and academic practitioners in making the strategy to provide better lives through healthcare and public health intervention specifically for female students attending higher education and the general population. Future research is needed to to develop an intervention study focusing on HRQOL and eating behavior is needed especially among the female college students, specifically variables that are related to health and nutrition. Moreover, we suggest conducting interview-based data collection.

Conclusion

During Covid-19 pandemic, the higher the emotional, external, and restraint eating behavior scores of the students, the higher their physical health-related quality of life, means they had better condition of their body which allowed them to function their body well and had better fitness to move or do their activity during the Covid-19 pandemic. The higher the emotional and external eating behavior scores, the higher their mental health-related quality of life, means they have more stable mental well-being that can help them to cope with psychological stress and handle their life better during the Covid-19 pandemic.

Conflict of Interest

The authors declare that there is no conflict of interest regarding this article.

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