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Dietary Behaviour and Mental Health Status among Students of Higher Education Institutes in Malaysia

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Abstract
This study explored students' eating behaviour and mental health status from higher education institutes (HEI) in Malaysia. A sequential mixed-method approach was employed. 438 participants were assessed using an online questionnaire cross-sectionally. In the second phase, selected participants were interviewed using a grounded theory approach. Findings indicated that 51% of the students were depressed, 67% were anxious, and 43% were stressed. Financial freedom emerged as a theme, including transportation and food choices explaining the significant association in the quantitative phase. Prospective intervention should focus on understanding the causal pathways that increase mental health issues among HEI students.

Keywords: ecological factors; eating behaviour; mental health; higher education institutes; mixed-method

1.0 Introduction
In the past decade, a steep increase in mental health disorders has been reported among students of higher education institutes (HEI) (Hernández-Torrano et al., 2020). Mental health includes emotional, psychological, and social well-being that affects the way a person thinks, feels and acts (CDC, 2021; WHO, 2022). Mental health status has worsened lately due to the COVID 19 outbreak, which has led to an increase in anxiety levels among these students (Sundarasen et al., 2020). The prevalence of mental health disorders in Malaysia is also on the rise, especially among adolescents and university students. The National Health and Morbidity Survey reported that the prevalence of depression among adolescents had increased by 2.5% in 2017 compared to 2012. Studies conducted among students in HEIs in Malaysia show coherent results of the high prevalence of anxiety among these students (Nurul Elyani Mohamad et al., 2021; Sundarasen et al., 2020).

An abrupt change in environment and dietary intake during this phase of life was highlighted as factors resulting in an increase in mental health issues among HEI students (Acharya et al., 2018; Demenech et al., 2021). This issue results in short-term outcomes such as poor college attendance and performance and long-term outcomes such as dysfunctional relationships, low rates of employment and income (Hernández-Torrano et al., 2020). Given the importance of this scenario, this study was designed to
i. assess the eating behaviour of the participants and their mental health status

ii. explore the ecological factors that influence the eating behaviour of the participants.

Most studies in this area may have reported the association between various socio-demographic factors and dietary intake among HEI students (Abdel Wahed & Hassan, 2017; Acharya et al., 2018). What these studies lack is an explanation on how these factors interact together in influencing the dietary intake of HEI students. Hence, a mixed-method was chosen to explore ecological factors that may have caused mental health issues among the studied population.

2.0 Literature Review

2.1 Mental Health as a Global Concern
The rising prevalence of mental health issues globally has led international organisations such as the United Nations to prioritise this issue by setting it as a major agenda under the Sustainable Development Goal 3: mental health and well-being (United Nations, 2019). Mental Health disorders include anxiety, stress and depression which often leads to suicide (Black et al., 2019; Duffy et al., 2019; Xiao et al., 2020). A recent report by World Health Organization technical group on Depression and Mental Health Disorders identified that 4.4.% and 3.6% of the global population were diagnosed as depressed and anxious. In addition, death due to suicide was reported to be 1.5% and is the highest among the population aged between 20 to 25years (World Health Organization, 2017). The majority (80%) of these deaths were from low- and middle-income countries (United Nations, 2019).

2.2 The Vulnerability of University and College Students to Mental Health
There has been a considerable amount of data in this country that coherently reports the high prevalence of anxiety, stress and depression among Malaysian college and university students (Kotera et al., 2021; Nurul Elyani Mohamad et al., 2021). The transition from a fully dependent life to an independent life, together with academic style transition increases the vulnerability among university students to mental health (Acharya et al., 2018; Demenech et al., 2021). Many individual and socio-demographic factors have been associated with mental health among university students globally (Abdel Wahed & Hassan, 2017; Hossain et al., 2019). The studies in Malaysia have identified race, gender, identity, sleeping quality, BMI, financial support, academic year of study, and area of study as predictors of mental health among university students (Kotera et al., 2021; Nurul Elyani Mohamad et al., 2021).

2.3 Dietary Influence on Mental Health
Dietary patterns have been reported to modulate inflammatory states which may either reduce or increase levels of anxiety, stress and depression (Tolkien et al., 2019). Studies show that limiting the intake of fast food, moderate intake of good fats and high intake of fruits, vegetables and fibre helps in reducing inflammation in the body which may lead to better mood, reduced stress and increased cognitive function (Tolkien et al., 2019; Firth et al., 2020). Understanding the dietary behaviour of the university students will help us to identify nutrition intake or behaviour among these students that result in an increase in anxiety, stress and depression. However, dietary intake is a complex process, and it is influenced by an individual and socio-demographic factors such as the individual itself, family, peers, food availability, geographical location, policies, etc. (Mason et al., 2020). This leads to the importance of employing a mixed-methods study.

3.0 Methodology
This is a sequential mixed-methods study designed to collect data using questionnaires and in-depth interviews. The first phase assessed eating behaviour and mental health status using a cross-sectional design. Inclusion criteria included students from all HEI in Malaysia and from diploma, bachelors, and postgraduate studies. Participants who were diagnosed with chronic medical issues like diabetes, kidney failure and mental health disorders previously were excluded.

Ethical permission was obtained before data collection. Online questionnaires were distributed via multiple social media platforms such as WhatsApp, Telegram, and Facebook. Data collection was conducted virtually due to movement control order during the pandemic. Selected participants from the first phase who agreed to be interviewed were included in the second phase. All interviews were transcribed verbatim. Quantitative data were analysed using SPSS version 20. Descriptive and logistic regression were used to analyse the quantitative data, while thematic analysis was used to organise transcribes into themes and codes (Braun & Clarke, 2006). The Bronfenbrenner's bioecological model (Guy-Evan, 2020) was used to explain the influence of various ecological factors on the eating behaviour of participants who were reported to be anxious, stressed or depressed according to the screening results obtained from DASS. This study design and methods is presented in figure 1.

4.0 Findings

4.1 Characteristics of Total Participants According to Demographic and Mental Health Category
A total of 438 students participated in this study. The majority of the participants (80.4%, n=352) were between 18 to 22 years old, in which 82% (n- 361) were females, and 74% (n= 326) were from the Malay ethnic group. There were only 1.6% (n=7) of participants from the postgraduate level compared to 12.1%(n=53) from diploma and 86.3% (n=378) from bachelor's level. Most of the participants were from public universities (n=363, 82.9%).

Nearly half of the population were studying from home (51.4 %, n=225), while the remaining participants were located at rented houses and colleges. Most participants were from the lower-income group, 65.3% (283). Only 2.7% (n=12) were married. The majority of the participants were in the normal weight category (56.6%, n=248), while 6.6% were obese (n=29).

Among 438 participants, most of them reported presenting anxiety,67% (n=293), followed by depression, 51% (n=224) and stress, 43% (n=188). According to the table given, majority of 18-22 years old participants had anxiety (81.2%, n=238), 79.9% (n=179) were depressed, and 80% were stressed (n=151). Female participants had the highest prevalence of stress (85.6%, n=161), followed by anxiety (84.3%, n=247) and depression (82.6%, n=185). More than half (77.1%) of the Malay participants reported having stress (77.1%, n=145). High percentage of stress was also reported in Participants in the bachelor's degree group (88.8%, n=167). Participants from public universities reported a high prevalence of anxiety (85.7%, n=251) compared to other HEI. Students that study at home reported to be more depressed (54.9%, n=123) compared to those staying in college or rented premises. Participants from lower-income reported higher anxiety (63.1%, n=185) compared to those from middle and lower-income. These results are shown in Table 1.
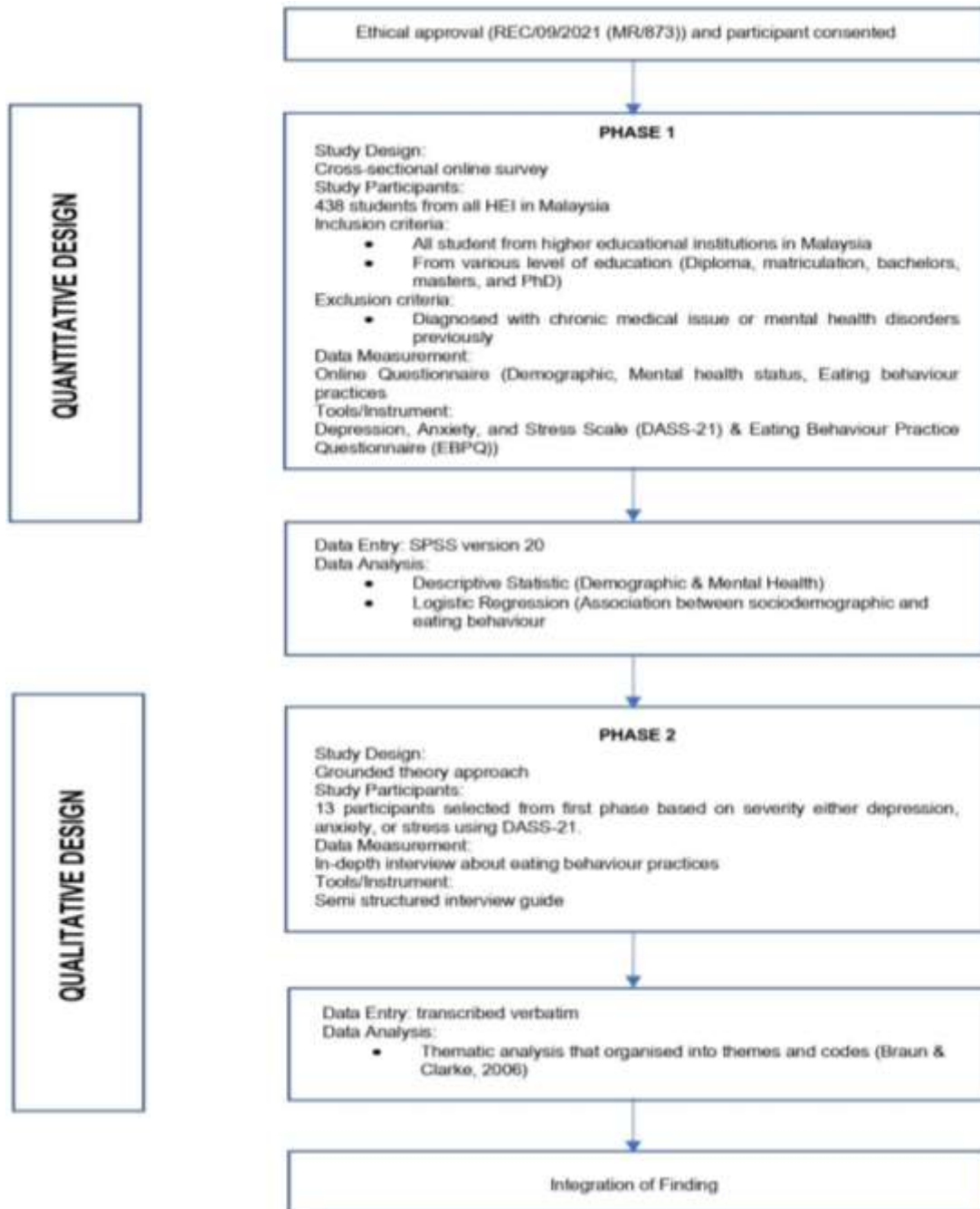

Fig. 1: Mixed-method embedded design for this study

Table 1. Characteristics of Participants According to Demographic and Mental Health Category

Characteristics	Total n (%)	Depression		Anxiety		Stress	
		Yes n= 224	No n= 214	Yes n= 293	No n= 145	Yes n= 188	No n= 250
		n (%)		n (%)		n (%)	
Ages							
18-22	352 (80.4)	179(79.9)	173(80.8)	238(81.2)	114(78.6)	151(80.3)	201(80.4)
23 and older	86 (19.6)	45(20.1)	41(19.2)	55(18.8)	31(21.4)	37(19.7)	49(19.6)
Gender							
Male	77 (17.6)	39(17.4)	38(17.8)	46(15.7)	31(21.4)	27(14.4)	50(20.0)
Female	361 (82.4)	185(82.6)	176(82.2)	247(84.3)	114(78.6)	161(85.6)	200(80.0)
Ethnic group							
Malay	326 (74.4)	169(75.4)	157(73.4)	222(75.8)	104(71.7)	145(77.1)	181(72.4)
Non-Malay	112 (25.6)	55(24.6)	57(26.6)	71(24.2)	41(28.3)	43(22.9)	69(27.6)
Educational Level							
Diploma or less	53 (12.1)	20(8.9)	33(15.4)	29(9.9)	24(16.6)	16(8.5)	37(14.8)
Bachelor's degree	378 (86.3)	200(89.3)	178(83.2)	259(88.4)	119(82.1)	167(88.8)	211(84.4)
Master's degree and above	7 (1.6)	4(1.8)	3(1.4)	5(1.7)	2(1.4)	5(2.7)	2(0.8)
University							
Matriculation College	6 (1.4)	3(1.3)	3(1.4)	3(1.0)	3(2.1)	2(1.1)	4(1.6)
Polytechnic	14 (3.2)	2(0.9)	12(5.6)	6(2.0)	8(5.5)	3(1.6)	11(4.4)
Private University	55 (12.6)	28(12.5)	27(12.6)	33(11.3)	22(15.2)	22(11.7)	33(13.2)
Public University	363 (82.9)	191(85.3)	172(80.4)	251(85.7)	112(77.2)	161(85.6)	202(80.8)
Location							
College/ Rented House	213 (48.6)	101(45.1)	112(52.3)	137(46.8)	76(52.4)	87(46.3)	126(50.4)
Home	225 (51.4)	123(54.9)	102(47.7)	156(53.2)	69(47.6)	101(53.7)	124(49.6)
Income^(							
Lower	286 (65.3)	142(63.4)	144(67.3)	185(63.1)	101(69.7)	119(63.3)	167(66.8)
Middle	115 (26.3)	56(25.0)	59(27.6)	81(27.6)	34(23.4)	49(26.1')	66(26.4)
Upper	37 (8.4)	26(11.6)	11(5.1)	27(9.2)	10(6.9)	20(10.6)	17(6.8)
Body Mass Index (BMI)(kg/m²)							
Underweight	87 (19.9)	40(17.9)	47(22.0)	60(20.5)	27(18.6)	37(19.7)	50(20.0)
Normal	248 (56.6)	127(56.7)	121(56.5)	163(55.6)	85(58.6)	107(56.9)	141(56.4)
Overweight	74 (16.9)	40(17.9)	34(15.9)	49(16.7)	25(17.2)	31(16.5)	43(17.2)
Obese	29 (6.6)	17(7.6)	12(5.6)	21(7.2)	8(5.5)	13(6.9)	16(6.4)

4.2 Distribution of Participants According to Dietary Behaviour

The classification of dietary behaviours of the participants is displayed in Table 2. Almost all the participants (92.2%, n=404) do not have emotional eating behaviours. Only 3.9% (n=17) of the participants practised healthy eating and 2.1% (n=9) practised low-fat eating. The data shows that 98.2% of the participants reported not eating outside and 96.8% reported not indulging in sweets. Only 5.7% of the participants reported skipping meals and indulge in snacking respectively. Most of them reported not planning their food intake (n=419, 95.7%).

Table 2. Distribution of Participants According to Dietary Behaviour Classifications

Eating behaviour	Presence n (%)	Absence n (%)
Emotional eating	34(7.8)	404(92.2)
Healthy eating	17(3.9)	421(96.1)
Eating outside	8(1.8)	430(98.2)
Sweets	14(3.2)	424(96.8)
Meal skipping	25(5.7)	413(94.3)
Snacking	25(5.7)	413(94.3)
Low-fat eating	9(2.1)	429(97.9)
Planning food	19(4.3)	419(95.7)

4.3 Association Between Socio-Demographic Factors and Dietary Behaviours Among Students in Higher Education Institutes (HEI) in Malaysia

Table 3.1 & 3.2 displays the association between socio-demographic and dietary behaviours among students in HEI in Malaysia. The results show a significant association between gender and eating outside compared to other socio-demographic factors (p=0.03). Males were more likely to eat outside compared to females (AOR=5.35; 95%CI=1.16-24.7; p=0.03). Income status has been significantly associated with emotional eating, meal skipping and snacking behaviours compared to other eating behaviours (p=0.01, 0.02, 0.03,

respectively). Those from lower-income status have higher risk to indulge in emotional eating compared to those from middle- and high-income status (AOR=0.29, 95% CI=0.12 to 0.78; p=0.01).

Table 3.1. Association Between Socio Demographic and Dietary Behaviours(Emotional Eating, Healthy Eating, Eating Outside, Sweets) Among Students in Higher Education Institutes in Malaysia

Characteristics	Emotional Eating			Healthy Eating			Eating Outside			Sweets		
	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI
Ages 18-22 23 and older (ref.)	0.689	1.20	0.49-2.94	0.496	1.52	0.46-5.04	0.107	3.59	0.76-17.1	0.210	2.27	0.63-8.15
Gender Male Female (ref.)	0.864	0.92	0.35-2.43	0.126	2.33	0.79-6.89	**0.03***	5.35	1.16-24.7	0.222	2.13	0.63-7.20
Race Malay Others (ref.)	0.160	1.76	0.80-3.88	0.697	1.24	0.42-3.97	0.385	0.43	0.07-2.87	0.376	1.73	0.51-5.85
Educational Level Bachelor's degree Others (ref.)	0.193	0.42	0.11-1.55	0.845	0.87	0.21-3.64	0.486	0.41	0.03-4.99	0.680	0.70	0.13-3.85
University Public University Others (ref.)	0.858	1.10	0.38-3.17	0.780	1.21	0.33-4.47	0.513	1.94	0.27-14.2	0.346	0.70	0.48-9.24
Location College/Rented house Home (ref.)	0.552	1.25	0.60-2.60	0.532	1.39	0.50-3.86	0.989	0.97	0.22-4.43	0.066	0.32	0.09-1.08
Income Lower (ref.) Middle/high	**0.01***	0.29	0.12-0.78	0.153	0.39	0.11-1.42	0.996	1.6×10^{-8}	0.000	0.061	0.14	0.02-1.10
Marital status Married Single (ref.)	0.566	1.94	0.20-18.8	-	1.1×10^8	1.1×10^8	-	9.5×10^7	9.5×10^7	-	1.2×10^8	1.2×10^8
Body Mass Index (BMI)(kg/m²) Normal Underweight/ overweight	0.332	0.69	0.33-1.46	0.120	0.40	0.13-1.27	0.342	0.45	0.09-2.35	0.361	0.68	0.17-1.92

*p<0.05

Table 3.2. Association Between Socio Demographic and Dietary Behaviours(Meal Skipping, Snacking, Low-Fat Eating, Planning for Food) Among Students in Higher Education Institutes in Malaysia

Characteristics	Meal Skipping			Snacking			Low-Fat Eating			Planning for Food		
	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI
Ages 18-22 23 and older (ref.)	0.599	1.32	0.47-3.75	0.534	1.38	0.50-3.76	0.565	1.63	0.31-8.61	0.082	2.55	0.89-7.32
Gender Male Female (ref.)	0.088	2.25	0.89-5.70	0.085	2.32	0.89-6.02	0.256	2.39	0.53-10.7	0.924	1.06	0.32-3.56
Race Malay Others (ref.)	0.551	1.332	0.52-3.39	0.603	1.29	0.50-3.34	0.514	0.57	0.10-3.14	0.382	1.59	0.56-4.49
Educational Level Bachelor's degree Others (ref.)	0.930	1.06	0.31-3.61	0.059	0.13	0.02-1.08	0.573	0.50	0.05-5.55	0.753	0.80	0.19-3.23
University Public University Others (ref.)	0.717	0.79	0.23-2.78	0.543	1.45	0.44-4.77	0.538	1.81	0.27-11.9	0.195	2.19	0.67-7.13

Continued Table 3.2											
Location											
College/Rented house	0.428	0.71	0.30-1.66	0.129	1.97	0.82-4.71	0.344	0.49	0.11-2.14	0.810	0.89	0.34-2.32
Home (ref.)											
Income											
Lower (ref.)	**0.02***	0.24	0.07-0.83	**0.03***	0.29	0.10-0.90	0.123	0.19	0.02-1.57	0.102	0.35	0.10-1.24
Middle/high											
Marital status											
Married	-	2.3×10^8	2.3×10^8	-	3.2×10^8	3.2×10^8	-	6.4×10^8	6.4×10^8	0.585	1.92	0.19-19.91
Single (ref.)											
Body Mass Index(BMI)(kg/m²)											
Normal	0.518	1.32	0.57-3.01	0.419	0.70	0.30-1.66	0.086	0.158	0.02-1.30	0.700	0.83	0.31-2.19
Underweight/ overweight											

*p<0.05

Table 3.1. Association Between Socio Demographic and Dietary Behaviours(Emotional Eating, Healthy Eating, Eating Outside, Sweets) Among Students in Higher Education Institutes in Malaysia

Characteristics	Emotional Eating			Healthy Eating			Eating Outside			Sweets		
	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI
Ages												
18-22	0.689	1.20	0.49-2.94	0.496	1.52	0.46-5.04	0.107	3.59	0.76-17.1	0.210	2.27	0.63-8.15
23 and older (ref.)												
Gender												
Male	0.864	0.92	0.35-2.43	0.126	2.33	0.79-6.89	**0.03***	5.35	1.16-24.7	0.222	2.13	0.63-7.20
Female (ref.)												
Race												
Malay	0.160	1.76	0.80-3.88	0.697	1.24	0.42-3.97	0.385	0.43	0.07-2.87	0.376	1.73	0.51-5.85
Others (ref.)												
Educational Level												
Bachelor's degree	0.193	0.42	0.11-1.55	0.845	0.87	0.21-3.64	0.486	0.41	0.03-4.99	0.680	0.70	0.13-3.85
Others (ref.)												
University												
Public University	0.858	1.10	0.38-3.17	0.780	1.21	0.33-4.47	0.513	1.94	0.27-14.2	0.346	0.70	0.48-9.24
Others (ref.)												
Location												
College/Rented house	0.552	1.25	0.60-2.60	0.532	1.39	0.50-3.86	0.989	0.97	0.22-4.43	0.066	0.32	0.09-1.08
Home (ref.)												
Income												
Lower (ref.)	**0.01***	0.29	0.12-0.78	0.153	0.39	0.11-1.42	0.996	1.6×10^{-8}	0.000	0.061	0.14	0.02-1.10
Middle/high												

Characteristics	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI
Marital status												
Married	0.566	1.94	0.20-18.8	-	1.1×10^8	1.1×10^8	-	9.5×10^7	9.5×10^7	-	1.2×10^8	1.2×10^8
Single (ref.)												
Body Mass Index (BMI)(kg/m²)												
Normal	0.332	0.69	0.33-1.46	0.120	0.40	0.13-1.27	0.342	0.45	0.09-2.35	0.361	0.68	0.17-1.92
Underweight/ overweight												

*p<0.05

Table 3.2. Association Between Socio Demographic and Dietary Behaviours(Meal Skipping, Snacking, Low-Fat Eating, Planning for Food) Among Students in Higher Education Institutes in Malaysia

Characteristics	Meal Skipping			Snacking			Low-Fat Eating			Planning for Food		
	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI
Ages												
18-22	0.599	1.32	0.47-3.75	0.534	1.38	0.50-3.76	0.565	1.63	0.31-8.61	0.082	2.55	0.89-7.32
23 and older (ref.)												
Gender												
Male	0.088	2.25	0.89-5.70	0.085	2.32	0.89-6.02	0.256	2.39	0.53-10.7	0.924	1.06	0.32-3.56
Female (ref.)												
Race												
Malay	0.551	1.332	0.52-3.39	0.603	1.29	0.50-3.34	0.514	0.57	0.10-3.14	0.382	1.59	0.56-4.49
Others (ref.)												
Educational Level												
Bachelor's degree	0.930	1.06	0.31-3.61	0.059	0.13	0.02-1.08	0.573	0.50	0.05-5.55	0.753	0.80	0.19-3.23
Others (ref.)												
University												
Public University	0.717	0.79	0.23-2.78	0.543	1.45	0.44-4.77	0.538	1.81	0.27-11.9	0.195	2.19	0.67-7.13
Others (ref.)												
Continued Table 3.2												
Location												
College/Rented house	0.428	0.71	0.30-1.66	0.129	1.97	0.82-4.71	0.344	0.49	0.11-2.14	0.810	0.89	0.34-2.32
Home (ref.)												
Income												
Lower (ref.)	**0.02***	0.24	0.07-0.83	**0.03***	0.29	0.10-0.90	0.123	0.19	0.02-1.57	0.102	0.35	0.10-1.24
Middle/high												
Marital status												
Married	-	2.3×10^8	2.3×10^8	-	3.2×10^8	3.2×10^8	-	6.4×10^8	6.4×10^8	0.585	1.92	0.19-19.91
Single (ref.)												
Body Mass Index(BMI)(kg/m²)												
Normal	0.518	1.32	0.57-3.01	0.419	0.70	0.30-1.66	0.086	0.158	0.02-1.30	0.700	0.83	0.31-2.19
Underweight/ overweight												

*p<0.05

4.4 Characteristics of participants that were involved in phase two

In phase two of the study, 13 participants from the first phase of the study were included. The majority of the participants were female (n=12) and only one was male. Most of the participants were Malays (*n = 12*), had 1-4 siblings (*n = 11*) and were currently at college/rented house (*n = 9)*. Only two participants (15.4%) were from the upper-income class group and the remaining were from the lower- (*n = 5*) and the middle-income (*n = 6*) class group. Five participants received additional income from scholarships or loans while others did not (*n = 8*). Half of the participants (*n = 7*) had normal BMI, three of them were underweight and two were overweight and one was obese.

4.5 Ecological influence on dietary behaviour of HEI students with depression, anxiety and stress

The interview probed on ecological factors that influence the participants' eating practices. Themes and codes that emerged from the interviews were arranged according to the layers in the Bronfenbrenner's Bioecological Model (Guy-Evan, 2020). This model is divided into five layers starting from microsystem, mesosystem, ecosystem, macrosystem and chronosystem.

4.5.1 Microsystem
4.5.1.1 Individual preference
Individual preferences have an impact on the participants' eating habits. Food that looks appetising, appealing, clean, and tastes good is preferred by participants (e.g., sweets and less salty). According to the interviews, participants prefer to eat the same menu most of the time since they are more comfortable eating familiar food. Participants also stated that they avoid restaurants or food vendors where they had had unsatisfactory meals. One of the participants narrated that she disliked the food served in the college cafeteria hence resulting in her to eat out.

"Whenever I go there (cafeteria), the options that I like are limited. They tend to sell fried foods…. I don't like those foods. So, I prefer to go out to eat sometimes."

(Participant 13)

4.5.1.2 Family and peers
According to the interviews, the individuals' eating habits are influenced by their families and peers. Participants will usually eat whatever their mothers provide as they don't have much choice at home. The data indicated that the participants rarely eat with their families because they were always occupied with online classes and assignments, and their parents had busy work schedules. Most participants explained that they frequently eat something their sibling or friend ordered when they dine out together.

4.5.2 Exosystem
4.5.2.1 Education system and university policy
The transition of teaching and learning in the academic area resulted in a significant shift in participants behavior as they adapted to the new system. During the movement control order period, Online Distance Learning (ODL) was useful in allowing students to learn from their own homes. However, students skipped meals and changed their eating habits as a result of the significant change in their schedule. This is because most assignments and exams were conducted online. One participant expressed that the change is schedule resulted in her skipping meals;

"I have always started my day with breakfast since I was little. But, since the pandemic and the ODL, most of my classes starts at 8 am. So, lately, I tend to skip breakfast."

(Participant 7)

Participants also reported to consume instant meals frequently due to restricted movement, no cooking regulations, and limited food options in the colleges. Many participants expressed disappointment with the limited selection and high cost of vegetables and fruits, resulting in lower consumption of these food groups.

"I like to eat fruits with yoghurt (at home). But now, I am unable to eat those often since there is no refrigerator here."

(Participant 1)

Participants who lived at home, had more healthful and diverse meal options. As a result, the daily meal consumption of participants who dine at home and those who eat at colleges differed.

4.5.2.2 Financial Freedom
Having sufficient funds has an indirect impact on participants' eating habits. According to the findings, those who own cars are more likely to eat out anywhere they want than people who don't. Those with higher financial freedom can also order food through Grab Food or Food Panda, which involves an additional fee for delivery. Students with a good financial situation ate trendy foods like Japanese and Korean cuisine regularly.

4.5.3 Macrosystem
4.5.3.1 Cultural and religious beliefs.
Participants explained that most of their food choices were aligned with their religious teaching. For the Muslims, most of them are particular in choosing food that is labelled "halal". They abide by their religious teaching on haram and halal food and eating habits.

5.0 Discussion
The rising prevalence of mental health issues globally resulted in the adoption of this area into the sustainable development goals by the United Nations (United Nations, 2019). The high prevalence of mental health issues among students in the HEI calls for drastic

prevention as these populations will be entering the workforce in the near future. This study was conducted to assess the mental health status and eating behaviour of HEI students and further explore factors that influence the eating behaviour of the participants.

This study indicated that 51% of the total study population were depressed, while 67% were anxious and 43% were stressed. The number of anxious participants seems higher in this study compared to a previous study that was also conducted nationwide with 954 students (Sundarasen et al., 2020). The latter study reported that 30% of the study population was anxious. This may be a result of using different diagnostic tools. In this study, DASS was used to measure the anxiety level while in the compared study, Zung Anxiety Index was used. In addition, the previous study was conducted in early 2020, when the COVID 19 pandemic broke globally, whereas this study was conducted in mid-2021 in which it has been a year since students had been going through remote studying mode. Moreover, the movement control order (MCO) that was going on for more than a year would have resulted in the students building up more stress and anxiousness.

The result of this study also indicated that the prevalence of depression, anxiety and stress was higher among females and those from lower income families. This finding is in line with the nationwide study that was conducted by the National Health and Morbidity survey in 2015 (Institute for Public Health (IPH), 2015). A concrete causal pathway could not be explained on the reason why women are more vulnerable to mental health disorders. However, studies have reported hormonal change, low self-esteem and high tendency of body shame and lack of gender equities as factors that might influence the mental state of women (Riecher-Rössler, 2017).

Income status has been significantly associated with emotional eating, meal skipping and snacking behaviours in this study. Those from lower-income have a higher risk in indulging in emotional eating. These findings were consistent with other studies that concluded emotional eating was associated among participants with financial constraints (Langer et al., 2018; Rosenqvist et al., 2022). Lab induced stress indicated that those from lower socioeconomic groups are more prone to react by consuming highly palatable food (Langer et al., 2018).

The findings from the qualitative analysis highlighted students' eating behaviour is influenced by having transportation, having money to pay for food delivery and the type of food available. This finding ties up well with the financial status of a student. Those who have more financial freedom will be able to have their own transport, dine in better restaurants or spend on food delivery. The high prevalence of anxiety and depression in this study is also explained in the qualitative findings. Students have reported trying hard to cope with the new mode of study that requires them to be online for long hours to attend lectures and to finish their assessments and assignments. This busy schedule resulted in them missing breakfast and skipping meals. These findings have also been reported in a recent study in the country (Kotera et al., 2021; Nurul Elyani Mohamad et al., 2021).

6.0 Conclusion & Recommendation

Limitation of this study would be a self-administered questionnaire. However, this was the best method to conduct this study given the movement control order that was imposed several times last year. The mixed-method conducted in this study is definitely a strength as it allows us to explain the findings from the quantitative measurements. Future research should focus on prospective and experimental methods to further understand the causal pathways that increase mental health issues. The result of this study indicates that intervention should focus on delivering coping strategies to HEI students on how to manage their workload and study style. Consideration should be taken on financial status and also the availability of proper food in college.

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Paper Contribution to Related Field of Study

The results of this study can be used as a baseline for future intervention or prospective research to identify targeted treatment for those diagnosed with mental health issues. Clinicians may suggest dietary practices that can be practiced by those with mental health issues to improve their condition.

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