FACTORS THAT CAUSE THE PROBLEM OF OBESITY AMONG ADULTS IN TAMAN SENTOSA, KLANG

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ABSTRACT

The objective of this research is to determine factors that cause the problem of obesity among adults in Taman Sentosa, Klang, Selangor. To accomplish the research's goals, the Ecological Model is applied in this study, with the independent variables (physical activity, eating habits and mental stress), and the dependent variable (Body Mass Index (BMI)) respectively. Convenience sampling was used in this study, which included screening participants based on their flexibility and willingness to complete the survey. The research only gathered 30 respondents due to time constraints. These data are derived from a Google Form questionnaire sent to residents of Taman Sentosa, Klang, Selangor, who had a body mass index (BMI) of 25 or above. The data was then transferred to the 27th version of the Statistical Package for Social Science (SPSS) for analysis. In summary, the researchers conduct four analyses: factor analysis, reliability analysis, descriptive analysis for demographic profile, and regression analysis. The reliability analysis revealed that the questionnaire was a reliable tool for measuring the study's goals. On top of that, regression analysis was performed and the results revealed that all of the hypotheses in this research are accepted, where all the factors that represented the independent variables have caused the obesity problem among adults in Taman Sentosa, Klang, Selangor.

PROBLEM STATEMENT

Obesity is interpreted as an abnormal or excessive accumulation of fat that poses a health risk (WHO, 2021). It is significant to maintain the weight in a healthy range based on the body mass index (BMI) to have a healthy life. A healthy life may contribute benefits both individually and collectively. Individually, a healthy body weight can prevent society from the diseases such as diabetes, cardiovascular diseases, hypertension and certain cancers. This will also assist them to have a quality mental healthy life rather than suffer from psychosocial problems like depression. Collectively, a person who has a healthy body weight can contribute healthy spirit and workforce that can enhance the productivity as well as the profit of a corporation.

The Body Mass Index (BMI) is generally used to measure body fats based on height and weight. A BMI range lies between 18.5 and 24.9 considered as healthy weight, a BMI range lies between 25.0 and 29.9 considered as overweight as well as a BMI lies above 30.0 considered as obese (CDC, 2020). Obesity is a health problem in all age groups, but the number of obese adults aged 18 and above has increased significantly. According to the World Health Organization (2021), Malaysia recorded the highest prevalence of obesity among adults which is 15.6% in South-East Asia. Based on the National Health and Morbidity Survey (2019), there is half of the Malaysian adult population are overweight or obese, with about 30.4% being overweight and 19.7% being obese.

Obesity has a major impact on health and is linked to the likelihood of developing non-communicable diseases (NCD) such as cancer and diabetes. NCD is a huge issue that can cause up to 70% of Malaysian early deaths each year (WHO, 2018). Based on the National Health and Morbidity Survey 2019, the number of adults who were obese with diabetes increased as much as 36.6% were from 13.4% to 18.3% over the past 4 years period from 2015 to 2019. Besides that, the prevalence of hypertension among adults stays at the same rate which is around 30% in 2019. Thus, in this study, we would like to investigate the factors that cause obesity among adults in Taman Sentosa, Klang, Selangor.

RESEARCH QUESTION

i. Does physical activity cause obesity among adults in Taman Sentosa, Klang, Selangor?
ii. Does eating habit causes obesity among adults in Taman Sentosa, Klang, Selangor?
iii. Does mental stress cause obesity among adults in Taman Sentosa, Klang, Selangor?

RESEARCH OBJECTIVE

i. To estimate whether physical activity causes obesity among adults in Taman Sentosa, Klang, Selangor.
ii. To determine whether eating habit causes obesity among adults in Taman Sentosa, Klang, Selangor.
iii. To analyze whether mental stress causes obesity among adults in Taman Sentosa, Klang, Selangor.

LITERATURE REVIEW

Underlying Theory

Ecological Model

Ecological models are gaining more and more recognition in the field of health promotion. The ecological model is a framework developed to understand all levels of society. The model addresses different levels of health determinants and interventions. The ecological model provides a specific framework to illustrate the interaction between behaviour in the actual environment and the environment (Newes-Adeyi et al., 2000).

Ecological models have multiple effects on healthy behaviours, including intrapersonal or individual level, interpersonal level, organizational level, community level, and policy level. Interpersonal or individual level refers to personal characteristics, such as knowledge, attitude, behaviour, self-concept, skills, and development history. The interpersonal level refers to formal and informal social networks and social support systems, including family, workgroup, and friendship networks. The organizational level is a social institution with organizational characteristics which includes formal or informal operating rules and regulations. The community level defines the relationship between organizations, institutions, and information networks within the scope. The policy level is local, state, national and global laws and policies. (American Health College Association, n.d).

Previous Studies

Body Mass Index

In the previous studies, all the researchers used Body Mass Index (BMI) to calculate the rate of overweight and obesity. The researchers investigate that obese and overweight risk is caused by socio-demographic, physical activity, eating behaviour, perceived stress as well as sleep quality.

Socio-demography

Tan et al. (2011) and Mohd Sidik et al. (2021) concluded that females, particularly those with children, are more likely to be obese than males. This is due to changes in hormone levels that control food intake and weight growth during and after pregnancy. Furthermore, Tan et al. (2011) observed that the higher one's educational degree, the lower one's risk of obesity or overweight in the study. This is because education helps people select healthier lives by increasing their understanding of the link between lifestyle factors and health outcomes. On the other hand, individuals with a family history of health issues such as hypertension, diabetes, stroke and coronary heart disease are 4.8% more vulnerable to obesity health risks (Tan et al., 2011). Furthermore, Nirmala et al. (2018) stated that adolescents from high-income families are more likely to be obese than those from low-income families because their higher purchasing power allows them to purchase refined and calorie-dense foods. However, studies by Richardson et al. (2015) and Alagappan et al. (2019) discovered that low-income individuals and families are disproportionately burdened with stress and severe obesity. As a consequence, adolescent from a low socioeconomic class (SES) household endangers children's mental and psychological health.

Physical Activities

Persistent exercise was more likely to have long-term benefits (Alagappan et al., 2019). However, the researcher mentioned aerobic fitness is not supported in the study's finding since aerobic fitness is controlled in part by heredity and may not accurately represent one's level of daily physical activity. Tan et al. (2011) stated the distance to the closest recreational facility influences an individual's physical activity. According to the study's findings, adolescents who did not take part in any physical exercise had health problems and then were obese (Nirmala et al., 2018). Oo et al. (2019) also mentioned that a lack of activity leads to abdominal fat build-up, which may lead to increased leptin production and consequent sympathetic system activation. To reduce the risk of obesity, the encouragement of friends to participate in sports was a significant motivator (Sogari et al., 2018).

Eating Behaviour

The study demonstrated that missing breakfast, eating insufficient amounts of green leafy vegetables and fruit, and eating junk food

regularly significantly increase the probability of becoming obese. Meanwhile, constantly eating while watching TV raised the risk of obesity twofold (Nirmala et al., 2018; Boswell et al., 2019). Overweight and obese students increase their consumption of junk food with high sodium content, as well as their calorie intake, which causes fat storage in adipocytes and, as a result, increased production of cytokines, leading to endothelial damage and vasoconstriction. Regarding that, Sogari et al. (2018) and Wan Mohamed Radzi et al. (2019) emphasised that university is an important time for young people in terms of dietary choices and their association with weight growth. Only two previous studies have shown that parental feeding behaviour is one of the variables that contribute to obesity (Sogari et al., 2018; Boswell et al., 2019). The study's findings revealed that parents' nutrition education and eating slowness are connected with a lower incidence of obesity (Boswell et al., 2019). As a result, individual, family, social, and academic settings all have an impact on eating patterns.

Perceived Behaviour

According to previous studies, stress is another major element that has been discovered to be positively connected with obesity and overweight. Stress is an unpleasant emotional experience that is accompanied by physiological, behavioural, and even molecular changes. Indeed, stress can influence the majority of individuals emotionally, and there is evidence that stress has a role in the development of some forms of depression (Wan Mohamed Radzi et al., 2019). According to the findings, subjective stress, suicidal ideation, and physical health quality of life exhibited substantial and unfavourable correlations with BMI in men (Mohd Sidik et al., 2021). In contrast, among female individuals, "stressful life events" were a significant predictor of BMI. Females are more emotionally susceptible to social pressures that have a deleterious metabolic impact.

Quality of sleep

Nirmala et al. (2018) identified a lack of sleep as being connected with a greater incidence of obesity based on the study findings. As a consequence, men are more likely to be prone to sleep deprivation, with greater sympathetic nervous system activity, while middle-aged females had a stronger cortisol response upon waking in insomnia. Poor sleep quality has been identified as an additional risk factor that relates to obesity (Sun et al., 2016). According to a comprehensive analysis of sleep research including children and adolescents, the optimum sleep duration for individuals aged 10 and above was at least 9 hours per day. However, owing to the wide variation in sleep patterns between nations, this may not be relevant to Asian countries such as Malaysia (Alagappan et al., 2019).

METHODOLOGY

Research Framework

To achieve the study's objectives, the researchers use the Ecological Model in this study, with the Body Mass Index as the dependent variable and independent variables such as socio-demographic, eating behaviour, physical activity, perceived stress and sleep quality as the dependent variables. Through primary and secondary preventive measures, a model-oriented approach may concurrently address the determinants of obesity at the individual, home, family, community, and society levels.

Figure 1 below illustrates the theoretical research framework in this study, where the dependent variable [Body Mass Index (BMI)] is located on the right side and the independent variable (physical activity, eating habit and mental stress) are located on the left side.
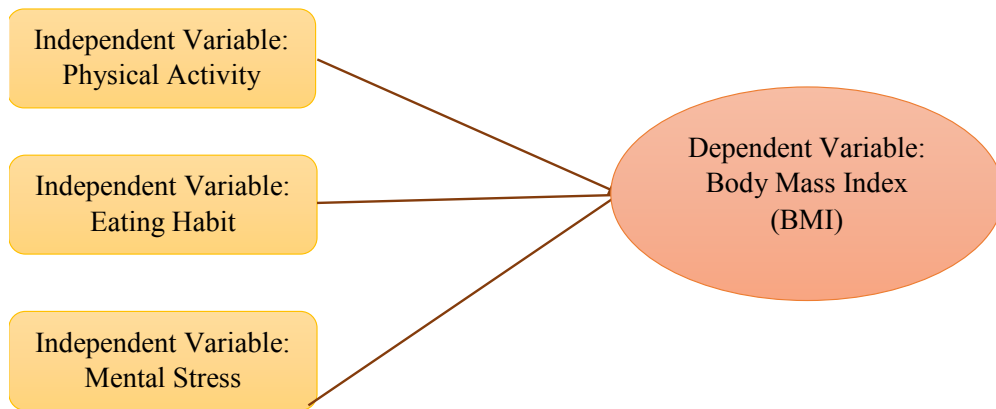
Figure 1 Research framework

Research Design

Quantitative methods have been applied to examine the established hypothesis in this study. The method applied to calculate the sample size in this study is the rule of thumb. It is on account of the researchers is unable to gather the precise data for the population size in Taman Sentosa, Klang, Selangor. There are four variables to be measured in this study which has to include one dependent variable and three independent variables. There are 80 respondents in the sample size of this study. The type of sampling used in this study is convenience sampling. Hence, the respondents in different demographics such as age, gender, ethnics, level of education, monthly income and status of marriage will be randomly selected in this study. However, the weight and height will be asked in the questionnaire in an attempt to filter those respondents who are in the range of underweight and normal weight.

The researchers applied primary data and secondary data which are two different sorts of data sources in the study. The primary data for this research was gathered via Google form. It is an e-survey approach that designed and delivered the questionnaire by using the internet. The URL link of the questionnaire was disseminated through social media and targeted only the citizens of Taman Sentosa, Klang, Malaysia who suffered from the problem of obesity. The data gathered by Google form was automatically saved in Google Drive. It has exported to the Statistical Package for Social Science (SPSS) Version 27 afterwards to process the result of data analysis. Aside from that, secondary data refer to the journal, article, literature, and previous research that were used in this study in an attempt to collect the information as well.

The questionnaire was the data collection instrument. The questionnaire was split into three parts and conducted in English. In Part 1, the demographic information of the respondents was presented. It includes the age, gender, ethnics, level of education, monthly income and status of marriage. In Part 2, the dependent variables (Weight and Height) needs to be self-filled and the researchers categorize them according to weight status (underweight, normal weight, overweight and obese) after calculating their body mass index. In Part 3, a total number of 15 questions regarding the daily life activities was measured using the Likert scale in five points: (5) always, (4) very often, (3) sometimes, (2) rarely, and (1) never. It has included three independent variables (Physical Activities, Eating Habits and Mental Stress) where 5 questions represent each independent variable. Figure 2 shows the flow chart of the survey.
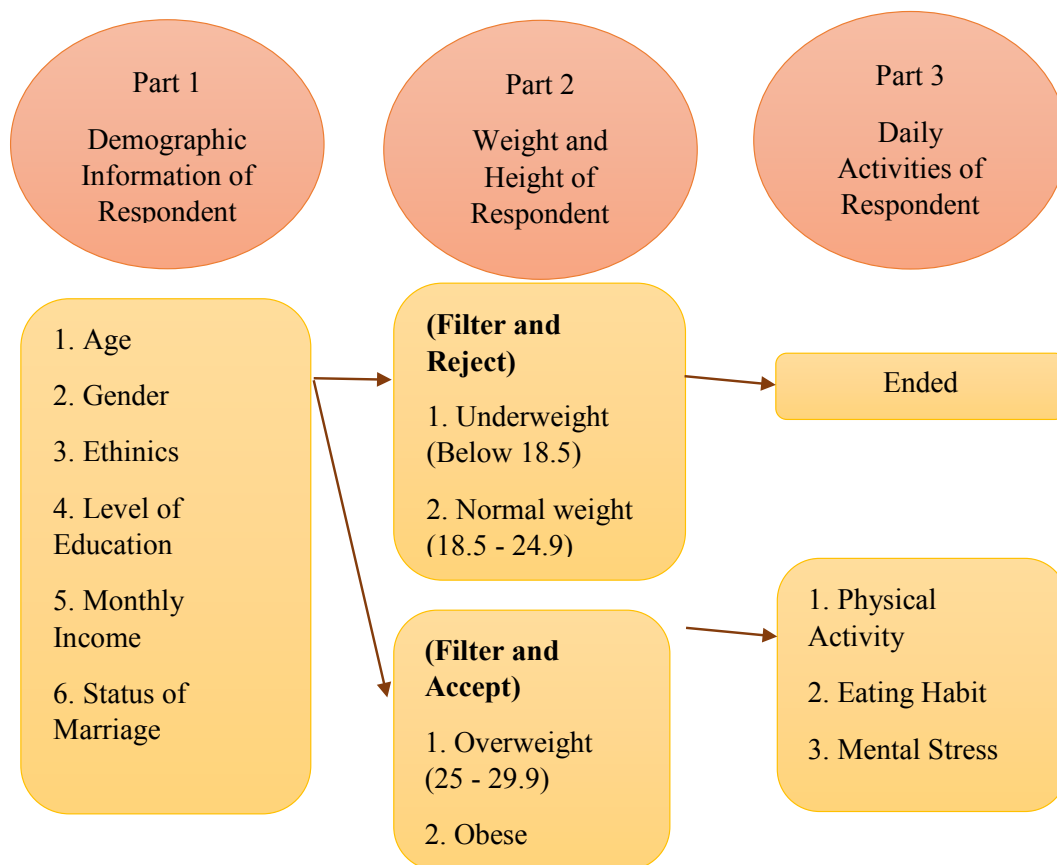
Figure 2 Survey flow chart

Physical Activity

The questionnaire from Craig et al. (2017), Nirmala et al. (2018) and KFL&A Public Health (2020) were used after restructuring to suit the study. The five items contained are evaluated by the Likert scale in five points: (5) always, (4) very often, (3) sometimes, (2) rarely, and (1) never.

Table 2 Measurement items of Physical Activity

No.	Description	Author(s)
1.	I reach my destination by motor vehicle. (Eg: car and motorcycle)	Craig et al. (2017)
2.	I sit out the aerobic activity. (Eg: jogging, running, swimming, dancing and basketball)	Nirmala et al. (2018)
3.	I take the elevator instead of the stairs.	KFL&A Public Health (2020)
4.	All the housework is mostly done by my maid, husband or children.	Craig et al. (2017)
5.	No doubt I sit most of the time at my workplace, no stretching while sitting and no getting up to walk now and then.	Craig et al. (2017)

Eating Habits

The questionnaire from Schlundt et al. (2003), Nirmala et al. (2018) and Boswell et al. (2019) were used after being restructured to suit the study. The five items contained are evaluated by the Likert scale in five points: (5) always, (4) very often, (3) sometimes, (2) rarely, and (1) never.

Table 3 Measurement items of Eating Habit

No.	Description	Author(s)
1.	I eat fast food.	Nirmala et al. (2018)
2.	I drink sugary beverages.	Nirmala et al. (2018)
3.	I having supper.	Schlundt et al. (2003)
4.	I skip breakfast.	Nirmala et al. (2018)
5.	I eat quickly and greedily.	Boswell et al. (2019)

Mental Stress

The questionnaire from Anniko et al. (2018), Nirmala et al. (2018) and Begum et al. (2010) was used after being restructured to suit the study. The five items contained are evaluated by the Likert scale in five points: (5) always, (4) very often, (3) sometimes, (2) rarely, and (1) never.

Table 4 Measurement items of Mental Stress

No.	Description	Author(s)
1.	I lack sleep.	Nirmala et al. (2018)
2.	I do not have enough time.	Anniko et al. (2018)
3.	I strive hard to meet my future goals.	Anniko et al. (2018)
4.	I have arguments with my family members.	Anniko et al. (2018)
5.	I keep silent when I am down.	Begum et al. (2010)

PILOT STUDY

Factor Analysis

Factor analysis is a statistical data reduction and analysis methodology that aims to explain the relationship between the dependent variable [Body Mass Index (BMI) and independents variables (Physical Activity, Eating Habit and Mental Stress) in this research (Hall, n.d.).

Table 5 Total variance explained

Total Variance Explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.578	34.863	34.863	2.559	15.991	15.991
2	1.983	12.394	47.257	2.536	15.848	31.840
3	1.611	10.068	57.325	2.453	15.329	47.169
4	1.271	7.941	65.266	2.119	13.242	60.411
5	1.071	6.691	71.957	1.847	11.546	71.957
6	.899	5.620	77.577			
7	.729	4.555	82.132			
8	.613	3.829	85.961			
9	.553	3.456	89.417			
10	.440	2.749	92.166			
11	.323	2.021	94.188			
12	.310	1.938	96.126			
13	.241	1.505	97.632			
14	.232	1.447	99.079			
15	.120	.749	99.828			
16	.028	.172	100.000			

Table 5 shows the total variance explained by each component identified from the responses by the respondent. Since the Eigenvalue is set as 1, any component as an eigenvalue of 1 and above shows the component in the questionnaire can explain the changes in the variance. There are 5 components that have an Eigenvalue of 1 and above. Therefore, there are 5 components. Component 1 explains 15.991%, component 2 shows an explanation of 15.848%, component 3 with an explanation value of 15.329%, component 4 and 5 respectively can explain 13.242% and 11.546% respectively.

Reliability Analysis

Table 6 Reliability statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
.926	4

Table 6 shows the reliability statistics of the questionnaire. The questionnaire was initially distributed to 30 respondents to check its reliability in measuring the objectives of the study. The study revealed that the Cronbach Alpha of 0.926. The estimated value of Cronbach Alpha is greater than 0.6. Thus, it can be concluded that the questionnaire was a reliable instrument to measure the objectives of this study.

METHOD OF ANALYSIS

The data analysis of this study was carried out by using the Statistical Package for Social Science (SPSS) version 27. Descriptive analysis and regression analysis was used to evaluate the data of this study. In detail, the descriptive analysis is related to the data of demographic information and the regression analysis is related to the data of variables of this study.

Hypothesis

Hypotheses formed in this study are shown below:

H1: Physical activity causes the problem of obesity among adults in Taman Sentosa, Klang, Selangor.

H2: Eating habit causes the problem of obesity among adults in Taman Sentosa, Klang, Selangor.

H3: Mental stress causes the problem of obesity among adults in Taman Sentosa, Klang, Selangor.

FINDINGS

Characteristics of the Respondents

Table 7 Demographic information of respondents

Demographic Information	Categories	Frequencies	Percentages (%)
Age	18 – 24 years old	9	30.0
	25 – 34 years old	5	16.7
	35 – 44 years old	5	16.7
	45 – 54 years old	5	16.7
	55 – 64 years old	6	20.0
	65 years old and above	0	0
	Total:	**30**	**100**
Gender	Male	17	56.7
	Female	13	43.3
	Total:	**30**	**100**
Ethnics	Malay	4	13.3
	Chinese	14	46.7
	Indian	10	33.3
	Others	2	6.7
	Total:	**30**	**100**

Level of Education	UPSR	1	3.3
	PMR/PT3	4	13.3
	SPM	11	36.7
	STPM/ Matriculation/ Foundation/	4	13.3
	Diploma	9	30.0
	Bachelor Degree	1	3.3
	Master Degree		
	Total:	**30**	**100**
Monthly Income	Below RM2000	14	46.7
	RM2001 – RM4000	9	30.0
	RM4001 – RM5000	4	13.3
	RM5001 or above	3	10.0
	Total:	**30**	**100**
Status of Marriage	Single	16	53.3
	Married	12	40.0
	Divorced	2	6.7
	Widowed	0	0
	Total	**30**	**100**

Table 7 shows the demographic information of respondents in the survey of this study. There are no respondents aged 65 and above in the survey. The respondents from 18 to 24 years old have recorded the highest percentage among others (30%). It has been followed by the respondents from 55 to 64 years old (20%). There are three categories of age which are 25 to 34, 35 to 44 and 45 to 55 have recorded the same percentage (16.7%). Moreover, the majority of the gender in this survey is male (56.7%) compared to female (43.3%). Furthermore, the Chinese (46.7%) is the largest ethnics in this survey, followed by the Indian (33.3%), Malay (13.3%) and others (6.7%). Meanwhile, the education level of respondents at the SPM level (36.7%) has recorded the highest among others while the education level of respondents at bachelor's degree (30%) is the second high in the record. The following ranked record is PMR/PT3 and the STPM/ Matriculation/ Foundation/ Diploma where they have the same percentage (13.3%). The UPSR and the Master Degree also experienced the same percentage

(3.3%). Additionally, most of the respondents have a monthly income that is below RM2,000 (46.7%), followed by RM2,001 to RM4,000 (30%), RM4,001 to RM5,000 (13.3%) and RM5,001 or above (10%). Lastly, no respondent was categorized as a widow (0%) and only 2 respondents were divorced (6.7%). More than half the respondents are in the status of single (53.3%) and some respondents have already married (40%).

Regression Analysis

In this study, regression analysis is a set of statistical approaches applied for estimating associations between the dependent variable [Body Mass Index (BMI)] and independent variables (Physical Activity, Eating Habit and Mental Stress) (CFI, 2021). It is a reliable approach to determining which variables influence a certain issue. The process of performing a regression enables researchers to accurately establish which elements are most important, which elements can be disregarded and how these elements influence each other.

Table 8 Model summary of regression analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.949[a]	.901	.890	.15900

a. Predictors: (Constant), Mental Stress, Eating Habits, Physical Activities

Table 8 shows the R Square value shown is 0.901. It means that there are 90.1% changes in the problem of obesity among adults in Taman Sentosa, Klang, Selangor was caused by physical activity, eating habits and mental stress meanwhile 9.9% was caused by other factors.

Table 9 Stability of the model used

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.009	3	2.003	79.237	.000[b]
	Residual	.657	26	.025		
	Total	6.667	29			

a. Dependent Variable: Body Mass Index

b. Predictors: (Constant), Mental Stress, Eating Habits, Physical Activities

In Table 9 the stability of the model is used as presented. The estimated F value of 79.237 was significant at a 5% significant level (Sig = 000). Hence, it can conclude that the model is stable and the regression can be used for forecasting.

Table 10 Regression result

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.584	.128		-4.551	.000
	Physical Activities	.300	.080	.402	3.768	.001
	Eating Habits	.309	.064	.428	4.799	.000
	Mental Stress	.171	.078	.223	2.180	.039

a. Dependent Variable: Body Mass Index

Table 10 reveals the regression result was presented. As discussed earlier, the dependent variable is Body Mass Index (BMI) meanwhile the independent variables are physical activities, eating habits and mental stress.

Since all questions were reversed, it reveal that the physical activities showed a negative relationship with the Body Mass Index (BMI). As physical activity decreases, the Body Mass Index (BMI) will decrease. Physical activity was found to be significant at a 5% significant level with an estimated t value of 3.768 (Sig=0.001). Therefore, the statement of hypothesis 1 (H1) which is that physical activity causes the problem of obesity among adults in Taman Sentosa, Klang, Selangor was accepted but it showed an inverse relationship.

Next, the regression analysis proves that eating habits showed a positive relationship with the Body Mass Index (BMI). As eating habits reduce, the Body Mass Index (BMI) will rise. Eating habit was found to be significant at a 5% significant level with an estimated t value of 4.799 (Sig=0.000). Hence, the statement of hypothesis 2 (H2) which is that eating habit causes the problem of obesity among adults in Taman Sentosa, Klang, Selangor was accessible.

Last but not least, the regression analysis pinpointed that mental stress showed a positive relationship with the Body Mass Index (BMI). As mental stress shrink, the Body Mass Index (BMI) will reduce. Mental stress was found to be significant at a 5% significant level with an estimated t value of 2.180 (Sig=0.039). Thus, the statement of hypothesis 3 (H3) which is that mental stress causes the problem of obesity among adults in Taman Sentosa, Klang, Selangor is accepted.

In conclusion, all variables in this study can be declared as significant in interpreting and clarifying changes in the problem of obesity among adults in Taman Sentosa, Klang, Selangor.

CONCLUSION

Based on the result of Hypothesis 1, it is supported with the past research conducted by Tan et al. (2011), Nirmala et al. (2018), Sogari et al. (2018), Alagappan et al. (2019) and Oo et al. (2019) which found that physical activity associated with the problem of obesity. Indeed, most of the houses in Taman Sentosa, Klang, Selangor have at least one motor vehicle, thus, they seldom reach the destination by foot. Moreover, the distance from Taman Sentosa, Klang, Selangor to the nearest park with recreational facilities, "Taman Rakyat," is approximately 4 kilometres. As a result, this may be an excuse for adults' lack of exercise, which contributes to the obesity problem. In conclusion, lack of physical activity will cause the problem of obesity.

Based on the result of hypothesis 2, bad habit eating is associated with the problem of obesity which is consistent with the past studies conducted by Nirmala et al. (2018), Sogari et al. (2018), Boswell et al. (2019) and Wan Mohamed Radzi et al. (2019). Without a doubt, the adults in Taman Sentosa are frequently for skipping breakfast daily. This is due to a lack of time to prepare breakfast. Meanwhile, adults in Taman Sentosa frequently order fast food because it is convenient and saves time when compared to preparing a meal themselves. Indeed, there are many fast-food restaurants nearby Taman Sentosa, Klang, Selangor, including McDonald's, KFC, Pizza Hut, and Burger King. Furthermore, the majority of adults in Taman Sentosa have supper habits, as they will meet friends at the Mamak at midnight. In conclusion, poor eating habits lead to obesity.

The findings in hypothesis 3 are aligned with the past research conducted by Wan Mohamed Radzi et al. (2019) and Mohd Sidik et al. (2021) which found that mental stress will lead to the problem of obesity. The adults are obese in Taman Sentosa most probably because of lack of sleep. Their sleeping hours

may be insufficient due to insomnia, stress as well as an individual's lifestyle. Furthermore, they believe they do not have enough time, which produces mental stress as a result of stressful life events such as academic and career troubles, and they are working hard to accomplish their future ambitions. Not only that, but disagreements with family members cause mental stress because they affect someone's emotions. As a result, it is fairly usual for people who are under a lot of emotional stress to resort to food for consolation. In conclusion, a high level of mental stress will lead to the problem of obesity.

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