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ORIGINAL RESEARCH

Health behavior, stress and obesity among working age women in Myanmar

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Abstract

Aim: This study aimed to determine the prevalence of overweight and obesity and to investigate the association between socioeconomic factors, health behaviors, health literacy, knowledge, attitude, physical and mental health status, and overweight and obesity among working age women in Myanmar

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Methods: A cross-sectional study was conducted among 1,094 women aged 18 to 59 years old who were recruited by using multistage random sampling from 12 townships out of 6 districts among three states/regions. A structured questionnaire was developed and applied to assess the prevalence of overweight and obesity. Generalized Linear Mixed Model (GLMM) was performed to determine the association between dependent and independent variables after controlling the effects of covariates presenting adjusted OR and 95% confidence interval.

Results: More than half of the respondents were with overweight and obesity (51.28%; 95%CI: 48.31-54.23). The multivariable analysis indicated that factors significantly associated with overweight and obesity included; aged 31-59 years (Adjusted Odds Ratio (AOR) = 1.72, 95%CI:1.22-2.40), living without family (AOR= 2.07, 95%CI:1.20-3.57), average monthly income ≥200,000MMK (AOR= 1.38, 95%CI:1.05-1.82), parity≥1 (AOR= 1.61, 95%CI: 1.17- 2.23), high fat & protein consumption ≥5-days per week (AOR= 2.90, 95%CI:1.91-4.39), alcohol consumption (AOR= 2.53, 95%CI:1.91-3.36) and moderate-severe stress (AOR= 1.47, 95%CI:1.11-1.94).

Conclusion: More than half of working age women were with overweight and obesity. Socioeconomic status, health behavior and stress are the factors behind over nutrition. The findings provide relevant evidence to develop the appropriate policies and public health interventions in order to minimize the burden of overweight and obesity. Likewise, it is anticipated that this outcome would support the prevention of cardiovascular and other chronic diseases.

Keywords: *alcohol consumption, Generalized Linear Mixed Model, Myanmar, overweight and obesity.*

Conflicts of interest: None declared.

Ethical Consideration: Ethical Consideration was taken from Khon Kaen University Ethics Committee in Human Research (the approval number, HE632117) and Department of Medical Research, Yangon, Myanmar (Approval number Ethics/DMR/2020/109). A coding scheme was used and every document was destroyed on completion of research. Written consent was obtained from all participants prior to participation.

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Introduction

Globally, the prevalence of overweight and obesity have risen to nearly threefold since 1975 and as a result, more than 1.9 billion adults were overweight and over 650 million were obese (1). Moreover, in the low-and middle-income countries, over 115 million people are suffering from obesity related problems including non-communicable diseases (NCDs) like coronary heart disease, ischemic stroke, hypertension, diabetes mellitus and certain cancers such as endometrial carcinoma, colon cancer and breast cancer (2,3). Among the various risk factors responsible for the NCDs, obesity has been considered as one of the major risk factors (2,4).

Myanmar is among the 23 countries with high burden of NCDs (4). As a result of epidemiological and socioeconomic transition in the last few decades, NCDs have emerged as main public health issues in Myanmar. Therefore, it is now facing double burden of diseases (5,6). Moreover, women are highly affected by overweight and obesity as compared to men (7). Evidence shows that the prevalence of overweight and obesity is in increasing trend in Myanmar, particularly among women. The trend of overweight among women in Myanmar has been raised from 22% to 28.1% and obese women from 8.4% to 13.1% during the period between 2009 and 2015 (6,8).

Overweight and obesity have wide-range of genetic, socio-economic and behavioral factors, which consist of those who are women, urban residents, having high income, have low education, consuming high sugar daily, having deep fried foods, snacks, fatty foods, low fruits and vegetable intake, low physical activity, high stress and low health literacy level (8-15).

While the general risk factors for overweight and obesity are known, the magnitude and strength of association of the factors and their significance may vary depending on socioeconomic background, ethnic groups and the place where they reside (i.e. townships/states and regions). Hence, this study was conducted to assess the prevalence and the influence of socioeconomic factors, health behaviors, health literacy, knowledge, attitude, physical and mental health status on overweight and obesity among working age women (18-59 years) in Mandalay Region, Shan State and Mon State.

Methods

Study Population

A cross-sectional study was conducted in 2020. The study population was working age women aged 18-59 years old in Mandalay Region, Shan State and Mon State of Myanmar. The sample size was calculated by using the sample size estimation formula for the logistic regression analysis of Hsieh by taking references of previous study done on socio-demographic factors and overweight and obesity in India, which showed 63% proportion of overweight and obesity among those who had family history of NCD with 95% confidence interval and a margin error of 5% (16,17). So, the estimated sample size was 1,094. Firstly, Mandalay Region, Shan State and Mon State were randomly selected from 15 states and regions. After that, two districts of each state/region were randomly selected from 4 states/regions and then two townships were randomly selected from each district. Finally, one community was randomly selected from each township. Then, simple random sampling method was applied to select 1,094 individuals on the basis of proportionate to size of the population (PPS).

The inclusion criteria of the respondents were: women living in the study area for at least one year, women of working age (18-59 years) and willing to participate in the study. The exclusion criteria were pregnant women, lactating women, physically and mentally ill women. The participants were requested to answer a structured questionnaire followed by interview and anthropometric measurements by trained interviewers.

Data Collection

A structured questionnaire was developed based on the research questions and relevant

literature. The questionnaire consisted of seven parts: Demographic and Socioeconomic Characteristics; Health Behavior; Health literacy; Knowledge; Attitude; Physical Health Status; and Mental Health Status. The questionnaires had been verified for content validation by 5 experts and revised to improve the validity. Moreover, the questionnaire was tested for reliability by calculating Cronbach's alpha among 30 participants in another region. The Cronbach's alpha coefficient was 0.857.

Measurement of outcome: Body height in centimeters (cm) and weight in kilograms (kg) were measured by using metering object and digital weighing instruments. Overweight and obesity defined as BMI ≥23 kg/m^2 by WHO (18) for Asian cut-off points was the main outcome of the study.

The respondents were asked to sign the written consent form if they were willing to participate in the study after obtaining ethical clearance and approval from the office of the Khon Kaen University ethics committee in human research (Reference No. HE632117). All confidentiality of data was fully assured. A structured questionnaire interview was conducted to collect the data from 1,094 respondents by 5 experienced interviewers who were trained and standardized for data collection skills.

Statistical Analysis

STATA version 14 (College Station, Texas, USA) was used for analysis. The categorical data were presented as frequency and percentage, whereas, the continuous data as mean standard deviation, median and range. GLMM was operated to model the random effects and correlations inside clusters. In the modeling, the residential area/township was set as the random effect. Bivariate analysis was performed to define the association of each independent variable with overweight and obesity. The variables were significant in the bivariate analysis with p-value <0.05 were proceeded for multivariate analysis. Results in the final model defined the magnitude of association with independent variables and overweight and obesity with an AOR and its 95% CI. GLMM was performed to control the clustering effects.

Results

Among the total of 1,094 respondents, about one third of them were in the age between 18-29 years and almost all of them were Buddhists (85.19%), most of the respondents were married (59.51%), 35.19% were dependent, and 39.49% had completed high school level education. The median of family size was 4 persons and 55.85% of women lived with a spouse. The median monthly income and expenditure were 150,000MMK and 100,000MMK respectively; however, 47.54% of women had enough saving and nearly half of women (44.15%) had 1-2 parity. The study revealed that 52.92% of participants did not consume fast food. However, women consuming fast food and sugar-sweetened beverage 1-4 days per week were 40.86% and 56.58% respectively. Women who did vigorous-intensity activity during recreation <5 days and ≥5 days per week were53.93% and 7.77% respectively. Women who did and moderate-intensity activity during recreation <5 days and ≥5 days per week were 53.02% and 14.17% respectively. Only 8.14% were current smoker, 12.98% were current alcohol consumers, and 15.08% were current betel chewers. About one third (33.18%) of participants had sufficient to excellent health literacy however, the respondents with problematic and inadequate health literacy were 18.55% and 48.27% respectively. More than half of them had good general knowledge (64.44%) but only 0.09% had good attitudes. Of the study participants, currently 92.41% of women had good health status, 68.83% did not have family history of overweight and obesity and 27.63% used contraception. More than half (61.33%) of them had moderate stress and 50.82% of women had mild depression (Table 1). As high as 31.63% of the working age women were obese and 19.65 % were overweight. Less than half were normal weight (44.70%) and only 4.02% were underweight (Table 2).

Table 1. The Characteristics of respondents

Characteristics	Frequency (n)	Percentage (%)
State/Region		
Mandalay	399	36.47
Shan	330	30.16
Mon	365	33.36
District		
Ya Mae Thinn	189	17.28
Meiktila	210	19.20
Taunggyi	197	18.01
Loilem	133	12.16
Mawlamyaing	171	15.63
Thaton	194	17.73
Socio-Economic Status		
Age		
18-29	344	31.44
30-30	274	25.05
40-49	257	23.49
50-59	219	20.02
Religion		
None	24	2.19
Buddhism	932	85.19
Christian	83	7.59
Muslim	20	.183
Hinduism	12	1.10
Other	23	2.10
Education Level		
No Formal Education	28	2.56
Primary School	103	9.41
Secondary School	235	21.48
High School	432	39.49
Bachelor Degree	283	25.87
Higher than Bachelor Degree	13	1.19
Marital status		
Single	334	30.53
Married	651	59.51
Divorced/Widowed/Separated	109	9.96
Occupation		
Agriculture and Livestock	33	3.02
Government staff	159	14.53
Own business	157	14.35
Private employee	139	12.71
Manual labor	221	20.20
Dependent	385	35.19
Family members		
less than and equal to 3	399	36.47
4-5	550	50.27
More than 5	145	13.25

Characteristics	Frequency (n)	Percentage (%)
Whom they live with		
Parents	357	32.63
Spouse	611	55.85
Relatives	50	4.57
Alone	30	2.74
Friend	17	1.55
Others	29	2.65
Monthly income (MMKs)		
<100,000	373	34.10
100,000-200,000	337	30.80
≥200,000	384	35.10
Monthly expenditure (MMKs)		
<100,000	402	36.75
100,000-200,000	431	39.40
≥200,000	261	23.86
Financial situation		
Not Enough	165	15.08
Not Enough with debt	174	15.90
Enough with saving	520	47.54
Enough with no saving	235	21.48
Parity		
0	395	36.11
1-2	483	44.15
>2	216	19.74
Health Behavior		
Frequency of fast food consumed per week (days)		
Nil	579	52.92
1-4	447	40.86
≥5	68	6.22
Frequency of sugar-sweetened beverage consumed per week (days)		
Nil	142	12.98
1-4	619	56.58
≥5	333	30.44
Frequency of high fat protein consumed per week (days)		
Nil	272	24.86
1-4	671	61.33
≥5	151	13.80
Frequency of vigorous-intensity activity during recreation per week (days)		
Nil	419	38.30
<5	590	53.93
≥5	85	7.77
Frequency of moderate-intensity activity during recreation per week (days)		
Nil	359	32.82

Characteristics	Frequency (n)	Percentage (%)
<5	580	53.02
≥5	155	14.17
Smoking		
Never	798	72.94
Former	207	18.92
Current	89	8.14
Alcohol Drinking		
Never	714	65.27
Former	238	21.76
Current	142	12.98
Betel Chewing		
Never	801	73.22
Former	128	11.70
Current	165	15.08
Health Literacy of overweight and obesity		
Inadequate	528	48.27
Problematic	203	18.55
Sufficient	203	18.55
Excellent	160	14.63
Knowledge		
Level of knowledge on overweight and obesity		
Poor (0.0-5.9) <60%	156	14.26
Fair (6-7.9) 60-79%	233	21.30
Good (8-10) ≥80%	705	64.44
Attitude		
Level of attitude on overweight and obesity		
Poor attitude (10-29) <60%	779	71.21
Moderate attitude (30-39) 60-79%	314	28.70
Good attitude (40-50) ≥80%	1	0.09
Physical health status		
Health status		
Healthy	1,011	92.41
Unhealthy	83	7.59
Family history of overweight/obesity		
Yes	341	31.17
No	753	68.83
Use of contraception		
Yes	244	27.63
No	639	72.37
Mental Health Status		
Stress		
Mild (1-13)	367	33.55
Moderate (14-26)	671	61.33
Severe (27-40)	56	5.12
Depression		
Mild (0-16)	556	50.82
Moderate (16-23)	316	28.88

Characteristics	Frequency (n)	Percentage (%)
Severe (24-60)	222	20.29
Total	1094	100.0

Table 2. Overweight and Obesity of Women

Characteristics	Number of women (%)	95% CI
Underweight (<18.5 kg/m^2)	44 (4.02)	3.00-5.36
Normal Weight (18.5-22.99 kg/m^2)	489 (44.70)	41.77-47.66
Overweight (23.0-24.99 kg/m^2)	215 (19.65)	17.40-22.11
Obesity (≥25 kg/m^2)	346 (31.63)	28.93-34.45
Mean ±SD	24.25 ± 4.54	
Median (Min: Max)	23.01 (14.81: 45.23)	

The multivariable analysis for associated factors of overweight and obesity were identified by using the Generalized Linear Mixed Model (GLMM) to control the clustering effect of the sampling selection of the participants. Factors that were significantly associated with overweight and obesity of participants included; age 31-59 years (adj.OR=1.72; 95%CI: 1.22-2.40), living with family (adj.OR= 2.07; 95%CI: 1.20-3.57), average monthly income ≥ 200,000 (adj.OR= 1.38; 95%CI: 1.05-1.82), parity ≥1 (adj.OR= 1.61; 95%CI: 1.17-2.23), high fat protein consumption ≥5 days per week (adj.OR= 2.90; 95%CI: 1.91-4.39), did not drink alcohol (adj.OR= 2.53; 95%CI: 1.91-3.36) and moderate and severe stress (adj.OR= 1.47; 95%CI: 1.11-1.94) (Table 3).

Table 3. Multivariable Analysis of Factors Associated with overweight and obesity by using the GLMM

Characteristics	No	%O/B	Crude OR	Adjusted OR	95%CI	p-value
Age (years)						0.002
18-30	344	38.95	1	1		
31-59	750	56.93	2.07	1.72	1.22-2.40	
Whom you live with						0.009
With family	1018	50.00	1	1		
Without family	76	68.42	2.17	2.07	1.20-3.57	
Average monthly income (MMK)						0.023
<200,000	710	47.46	1	1		
≥ 200,000	384	58.33	1.55	1.38	1.05-1.82	
Parity						0.004
0	395	40.51	1	1		
≥1	699	57.37	1.98	1.61	1.17-2.23	
High fat protein consumption per week (days)						<0.001
<5	943	47.40	1	1		
≥5	151	75.50	3.42	2.90	1.91-4.39	
Alcohol Consumption						<0.001
Yes	380	36.05	1	1		
No	714	59.38	2.59	2.53	1.91-3.36	
Stress						0.007
Low	367	41.42	1	1		

Characteristics	No	%O/B	Crude OR	Adjusted OR	95%CI	p-value
Moderate to severe	727	56.26	1.82	1.47	1.11-1.94	

*As the participants were selected from different geographical areas, GLMM was performed to control the clustering effect.

Discussion

Our study showed that the combined prevalence of overweight and obesity (BMI ≥ 23 kg/m^2) among working age women in Myanmar was 51.28 % in which overweight (BMI ≥23.0-24.99 kg/m^2) was 19.65% and obesity (BMI≥25 kg/m^2) was 31.63% respectively. The prevalence of overweight in this study was lower but obesity was higher as compared to 2015-16 Myanmar Demographic Health Survey (MDHS) and Myanmar national STEP survey of risk factors for NCDs conducted in 2009 (3, 19). The observed difference between this study and others in Myanmar may be due to different cut-off points. In a study conducted in Malaysia by using the same cut off point of BMI ≥25 kg/m^2, the prevalence of overweight and obesity in women was similar to the results of the current study (20). However, compared to other studies using the same cut off point (BMI ≥ 23 kg/m^2), the combined prevalence of overweight and obesity from the current study was higher than in Bangladesh and India (21,22). This high prevalence of overweight and obesity among working age women in Myanmar bears risks for chronic non-communicable diseases such as ischemic heart diseases, cancer, hypertension, diabetes, stroke and reproductive health diseases (14).

Our multivariate analysis revealed that the factors associated with overweight and obesity were significantly associated with overweight and obesity among women aged 31-59-year-old. With the trend of increasing age, people follow sedentary lifestyle, less physical activities, not control over dietary habit and less willingness to reduce body weight regardless of their health status led to gain excessive body weight (14-24). The study demonstrated that participants who lived without family were more likely to be overweight and obese as compared to those living with family. It may be due to the women those living alone consume convenient and unbalanced dietary intake such as fast food and also is related with higher intake of high carbohydrate and fatty foods (25,26). The study revealed that average monthly income was significantly associated with overweight and obesity, as those whose monthly income was (≥ 200,000 MMK) were1.38 times more likely to be overweight and obese than those whose average monthly income was (<200,000 MMK). It can be assumed that females with high income follow sedentary lifestyle and consume more fast foods which can lead to overweight and obesity among them (27). Regarding the parity, women with ≥1 pregnancy were 1.61 times more likely to be overweight and obesity than women with no parity. Most of the women gain weight during and after the pregnancy and reduction in ovulation cycles in multiparous women can stimulate to accumulate more fat among them (28). Moreover, the study revealed that protein with high fat consumption was significantly associated with overweight and obesity where, those who consumed ≥5 days per week were more likely to be overweight and obese as compared to those who consumed < 5 days per week. It might be that high fat foods contain cholesterol, saturated fatty acids and also dietary fat prompts the overconsumption and increase weight through high calories (29). Regarding the alcohol consumption, the women who did not consume the alcohol were more likely to be overweight and obesity than those who consumed alcohol in this study. In comparison with my descriptive study, only 12.98% of women were current drinkers. Light to moderate amount of alcohol consumption was less likely to be associated with overweight and obesity in this study. Also,

women drinkers appear to be substitute alcohol for their daily dietary intake without increasing more calories (24). Moreover, moderate and severe stress was significantly associated with overweight and obesity than those who has low stress level, and more likely to be overweight and obesity. A possible explanation for this finding could be physiologic mechanisms might play a role, such as stress-induced cortisol secretion, which increases lipogenesis, so increasing the likelihood of being obese (29).

Study limitations

This study had some limitations. Firstly, this study was conducted among working age women (18 to 59 years old) living in Mandalay Region, Shan State and Mon State. So, it cannot be generalized to all working age women in Myanmar. Secondly, this study was dependent on the participants' answers to the structured questionnaires. Therefore, memory recalling and interviewer relationship bias could not be excluded. Finally, as this is cross-sectional study it does not allow establishing the causality of association therefore further longitudinal studies are needed. In addition, COVID-19 related travel restrictions have caused delayed in the data collection period.

Conclusion

The study found a high prevalence of overweight and obesity and very low levels of good attitudes regarding excess body weight among working-age women in Myanmar. Socioeconomic and behavioral risk factors of overweight and obesity were identified and this finding will be used as evidence to develop the appropriate policies and public health interventions. These will address the problems in reducing overweight and obesity that can further lead to prevent non-communicable diseases. There is also a need for urgent intervention targeted to women with information, education and communication (IEC).

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Annex I - Questionnaires

Health literacy and overweight and obesity among working age women in Myanmar: A cross sectional analytical study

Please circle the answer or fill in the blanks for explanations the truth.

Participant ID ☐☐☐
Date--------/--------/--

Part 1. Demographic and Socioeconomic Characteristics

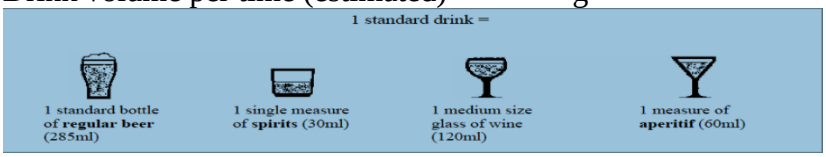
Information		**For Researcher**
1	How old are you? |__|__| years (completed year)	SD1 |__|__|
2	What is your ethnic? ( ) 1. Barma ( ) 2. Mon ( ) 3. Karen ( ) 4. Rakhine ( ) 5. Kachin ( ) 6. Shan ( ) 7. Pa Oh ( ) 8. Other please specify ----------	SD2 |__|
3	What is your religion? ( ) 1. None ( ) 2. Buddhism ( ) 3.Christian ( ) 4. Muslim ( ) 5. Hinduism ( ) 6. Ghost ( ) 7. Others please specify ----------	SD3 |__|
4	What is the highest level of education you completed? ( ) 1. No formal education ( ) 2. Primary ( ) 3. Secondary ( ) 4. High school or equivalence ( ) 5. Bachelor degree or equivalence ( ) 6. Higher than bachelor degree	SD4 |__|
5	What is your marital status? ( ) 1. Single ( ) 2. Married ( ) 3. Divorced/Widowed/Separated	SD5 |__|
6	What is your major occupation? ( ) 1. Agriculture and Livestock ( ) 2. Government staff ( ) 3. Own business ( ) 4. Private employee ( ) 5. Manual labor ( ) 6. Dependent ( ) 7. Others please specify----------	SD6 |__|
7	What is your family type? ( )1. Nuclear ( ) 2. Extended	F1 |__|

Information		For Researcher
	( )3. Others please specify ----------	
8	What is your family size (family members)? |__|__| persons	F2 |__|__|
9	Do you stay with whom? ( ) 1. Parents ( )2. Spouse ( )3. Relatives ( )4. Alone ( )5. Friend ( )6. Others please specify ----------	F3 |__|
10	What is your average monthly income? ----------MMK	E1 --------
11	What is your average monthly expense? ----------MMK	E2 --------
12	What is your average family monthly income? ----------MMK	E3 --------
13	What is your average family monthly expense? ----------MMK	E4 --------
14	What is your financial situation? ( ) 1. Not Enough ( ) 2. Not Enough with debt ( ) 3. Enough with no saving ( ) 4. Enough with saving	E5 |__|
15	What is your parity? |__|__| (leave 0 if you are single)	M1 |__|__|
16	How many children do you have? |__|__|	M2 |__|__|

Part 2: Health Behaviors

No	Information	No	1-2 days	3-4 days	5-6 days	7 days	Code
2.1 Dietary pattern: In 1 week, how often do you							
1	Consume fast food such as pizza, Hamburger, Sandwiches, Doughnuts?	**1**	**2**	**3**	**4**	**5**	D1|__|
2	Consume sugar-sweetened beverage such as coca cola, Pepsi, coffee with milk, energy drink, and fruit juice?	**1**	**2**	**3**	**4**	**5**	D2|__|
3	Eat sweet fruits such as durian, mango, pineapple, grapes, and banana?	**1**	**2**	**3**	**4**	**5**	D3|__|
4	Eat fruits that not sweet such as dragon fruit, kiwi, lime, lemon?	**1**	**2**	**3**	**4**	**5**	D4|__|
5	Eat vegetables that contain starch such as potatoes, sweet potatoes, taro, corn and pumpkin?	**1**	**2**	**3**	**4**	**5**	D5|__|
6	Eat vegetables that not contain starch such as carrot, cabbage, cauliflower, mushrooms?	**1**	**2**	**3**	**4**	**5**	D6|__|
7	Eat protein such as lean meat, chicken, eggs, soy products like tofu?	**1**	**2**	**3**	**4**	**5**	D7|__|
8	Eat protein with high fat such as cheese, nuts, seeds, streaky pork?	**1**	**2**	**3**	**4**	**5**	D8|__|
9	Eat protein from vegetable such as bean, pea, lentils, chickpeas, cauliflower, tofu?	**1**	**2**	**3**	**4**	**5**	D9|__|
10	Eat food cooked with animal oil?	**1**	**2**	**3**	**4**	**5**	D10|__|
11	Eat food cooked with vegetable oil?	**1**	**2**	**3**	**4**	**5**	D11|__|
2.2 Physical activity							

No	Information	No	1-2 days	3-4 days	5-6 days	7 days	Code
Activity at work							
12	How often do you do vigorous-intensity activity that causes large increases in breathing or heart rate like [carrying or lifting heavy loads, digging or construction work] for at least 10 minutes continuously at work?	**1**	**2**	**3**	**4**	**5**	P1|__|
13	How often do you do moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking [or carrying light loads] for at least 10 minutes continuously at work?	**1**	**2**	**3**	**4**	**5**	P2 |__|
Travel to and from places							
14	How often do you walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places?	**1**	**2**	**3**	**4**	**5**	P3 |__|
Recreational activities							
15	How often do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running or football] for at least 10 minutes continuously?	**1**	**2**	**3**	**4**	**5**	P4 |__|
16	How often do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking, [cycling, swimming, and volleyball] for at least 10 minutes continuously?	**1**	**2**	**3**	**4**	**5**	P5 |__|
2.3 Leisure time							
17	During the leisure time, what do you do? (Remark: More than 1 answer is possible. Please circle all the possible answers.) L1.a Watching Television 1. Yes 2. No L1.b Using internet 1. Yes 2. No L1.c Playing internet games 1. Yes 2. No L1.d Playing guitar 1. Yes 2. No L1.e Listening music 1. Yes 2. No L1.f Sing the songs 1. Yes 2. No L1.g Others(specify) ----------						L1a |__| L1b |__| L1c |__| L1d |__| L1e |__| L1f |__| L1g |__|
18	TV watching hours /day (self-estimated) ---------- hours						L2 |__|
19	Internet media watching hours /day (self-estimated) ----------hours						L3 |__|
2.4 Sleep pattern							
20	In average how many hours per day do you sleep? ---- hours						SL1 |__|
21	During sleeping, do you get sound sleep? ------days per week						SL2 |__|
2.5 Smoking							

No	Information	No	1-2 days	3-4 days	5-6 days	7 days	Code
22	Have you ever smoked? [ ]1. Never smoke (**Skip to Question 27)** [ ]2. Former smoking [ ]3. Current smoking						S1 |__|
23	What is the most common type of cigarette you use? [ ]1. cigar [ ]2. cheroot [ ]3. cigarette [ ]4. tobacco for betel quit [ ]5. Others(specify)----------						S2 |__|
24	How often do you smoke? ----------days per week						S3 |__|
25	How many cigarettes do you smoke per day? ----------pcs						S4 |__|
26	How much do you spend for smoking per month? ----------MMK						S5 |__|
2.6 Alcohol drinking							
27	Have you ever consumed an alcoholic beverage in the past 1month? [ ] 1. Never Drink (Skip to Question 32) [ ] 2. Former Drinker [ ]3. Current Drinker (drinking any alcohol product in past 30 days)						A1|__|
28	How often do you drink alcohol? ……. days per week						A2 |__|
29	What is the most common type of alcohol you drink? [ ]1. Beer [ ]2.Whiskey [ ]3. Rice alcohol [ ]4.wine [ ]5. Others (specify) ----------						A3 |__|
30	Drink volume per time (estimated) ----------g  1 standard drink=10 gram of pure alcohol						A4 |__|
31	How much do you spend for alcohol drinking per month? ----------MMK						A5 |__|
2.7 Betel chewing							
32	Have you ever betel chewing in the past 12 months? [ ]1. Never chew (Skip to Part 3) [ ]2. Former chewer [ ]3. Current chewer						B1 |__|
33	Have often do you chewed?..... days/ week						B2 |__|
34	What is the most common type of betel you chew? [ ]1. Signal [ ] 2.92 [ ]3. tobacco leaf [ ]4.100 [ ]5. Others(specify), ----------						B3 |__|
35	How many chews in a day? ----------chews						B4 |__|
36	How much do you spend for betel chewing per month? ----------MMK						B5 |__|

Part 3: Health Literacy

HC = Health care; DP = Disease Prevention; HP = Health Promotion
Please mark √ in ( ) or fill in the blanks for explanation the truth.

No.	Action Area	Domain		Very Difficult	Fairly Difficult	Fairly Easy	Very Easy
1	**Access to information**	HC	Find information on the causes of overweight and obesity	1	2	3	4
2			Find information about how to eat proper food for not to get overweight and obesity	1	2	3	4
3			Find information on how to reduce your body weight if you are overweight or obesity	1	2	3	4
4		DP	Find out information on how to manage stress, depression that could cause overweight and obesity	1	2	3	4
5			Find information about how to manage unhealthy behavior such as smoking and drinking alcohol that can cause overweight and obesity	1	2	3	4
6		HP	Find information on how to promote healthy activities such as exercise	1	2	3	4
7			Find out how to practice at home, working place and community to stay fit and healthy	1	2	3	4
8	**Understand information**	HC	Understand the information on causes of overweight and obesity	1	2	3	4
9			Understand the information on how to eat proper food for not to get overweight and obesity	1	2	3	4
10			Understand the information on how to reduce your body weight if you are overweight or obesity	1	2	3	4
11		DP	Understand the information on how to manage stress, depression that could cause overweight and obesity	1	2	3	4
12			Understand the information on how to manage unhealthy behavior such as smoking and drinking alcohol that can cause overweight and obesity	1	2	3	4
13		HP	Understand the information on how to promote healthy activities such as exercise	1	2	3	4
14			Understand the information on how to practice at home,	1	2	3	4

No.	Action Area	Domain		Very Difficult	Fairly Difficult	Fairly Easy	Very Easy
			working place and community to stay fit and healthy				
15	**Appraise information**	HC	Judge the causes of overweight and obesity	1	2	3	4
16			Judge the correctness of the information how to eat proper food for not to get overweight and obesity	1	2	3	4
17			Judge correctness of the information how to reduce your body weight if you are overweight or obesity	1	2	3	4
18		DP	Judge measures to manage stress, depression that could cause overweight and obesity	1	2	3	4
19			Judge the correctness of the information on how to manage unhealthy behavior such as smoking and drinking alcohol that can cause overweight and obesity	1	2	3	4
20		HP	Justified information on how to promote healthy activities such as exercise	1	2	3	4
21			Justified appropriate practice to stay fit and healthy at home, working place and community,	1	2	3	4
22	**Making Decision**	HC	Decide to prevent overweight and obesity by yourself based on information	1	2	3	4
23			Decide to eat proper food to prevent overweight and obesity	1	2	3	4
24			Decide to take actions to reduce your body weight if you are overweight or obesity	1	2	3	4
25		DP	Decide to manage stress, depression that could cause overweight and obesity	1	2	3	4
26			Decide to manage unhealthy behaviors such as smoking and drinking alcohol that can cause overweight and obesity	1	2	3	4
27		HP	Decide to do activities such as exercise to promote the health	1	2	3	4

No.	Action Area	Domain		Very Difficult	Fairly Difficult	Fairly Easy	Very Easy
28			Decide to practice to stay fit and healthy at home, working place and community.	1	2	3	4

Part 4: Knowledge

Please mark √ in ( ) or fill in the blanks for explanation the truth.

No	Information	Answer		For researcher
		Yes	No	
1	BMI can be used to define overweight and obesity.	1	2	D1 |__|
2	Eating more vegetables could cause overweight and obesity.	1	2	D2 |__|
3	Drinks soda such as Coca Cola, Pepsi and Fanta could help burning fat which is good for those with hyperlipidemia.	1	2	D3 |__|
4	Animal fats are more beneficial than vegetable oil.	1	2	D4 |__|
5	Overweight and obesity can be lowered by medicine only.	1	2	D5 |__|
6	Reading the nutritional labeling before buying foods could help reducing overweight and obesity.	1	2	D6 |__|
7	Breast cancer is related with obesity.	1	2	D7 |__|
8	Overweight and obesity increases the risk of type2 diabetes but not hypertension and heart diseases.	1	2	D8 |__|
9	Obesity is not related with irregular periods and infertile.	1	2	D9 |__|
10	Obesity is not related with bones and joints problems	1	2	D10 |__|

Part 5: Attitude

Positive items	Score
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Please mark √ in ( ) or fill in the blanks for explanation the truth.

No	Opinion	Answer					For researcher
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1	Overweight and obesity are unhealthy.	1	2	3	4	5	E1 |__|
2	Obesity makes females look ugly.	1	2	3	4	5	E2 |__|
3	Overweight and obesity among male is acceptable.	1	2	3	4	5	E3 |__|
4	Obesity reduces self-esteem and self-confidence.	1	2	3	4	5	E4 |__|
5	It is hard to control weight.	1	2	3	4	5	E5 |__|

No	Opinion	Answer					For researcher
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
6	Overweight / obese people are lazy.	1	2	3	4	5	E6 |__|
7	Obesity is my serious problems.	1	2	3	4	5	E7 |__|
8	Overweight and obesity is genetic, therefore we could not prevent it.	1	2	3	4	5	E8 |__|
9	Medicine is the best measure to reduce obesity.	1	2	3	4	5	E9 |__|
10	Behavior modification with long term monitoring is the healthiest measures to prevent and control obesity.	1	2	3	4	5	E10 |__|

Part 6: Physical Health status

	Information	For researcher
1	How do you rate your current health status? 1 2 3 4 5 6 7 8 9 10 Very sick ... Very Healthy	PHS1 |__|
2	Do you suffer any acute illness during last 2 weeks? [ ]1. No [ ]2. Yes my problems is ……..	PHS 2 |__|
3	Do you have any chronic diseases? [ ]1. No (If No, skip to Question7) [ ]2. Yes	PHS 3 |__|
4	What chronic diseases are you suffering? PHS4.a.Hypertension ( ) 1.No ( ) 2.Yes PHS4.b.Diabetes Mellitus ( ) 1.No ( ) 2.Yes PHS4.c.Stroke ( ) 1.No ( ) 2.Yes PHS4.d.Muscle pain ( ) 1.No ( ) 2.Yes PHS4.e.Heart disease ( ) 1.No ( ) 2.Yes PHS4.f.Tuberculosis ( ) 1.No ( ) 2.Yes PHS4.g.Malaria ( ) 1.No ( ) 2.Yes PHS4.h.STD ( ) 1.No ( ) 2.Yes PHS4.i.Skin diseases ( ) 1.No ( ) 2.Yes PHS4.j.Others (specify), ----------	 PHS4a|__| PHS4b|__| PHS4c|__| PHS4d|__| PHS4e|__| PHS4f|__| PHS4g|__| PHS4h|__| PHS4i|__| PHS4j |__|
5	Do you take regular treatment for your chronic disease? [ ]1.Yes [ ]2.No [ ]3. Others (specify), ----------	PHS5 |__|
6	Where do you get treatment for your disease? [ ]1.Drug Store [ ]2.Health personals [ ]3.Private clinic [ ]4.NGOs [ ]5.UHC [ ]6.Public Hospital [ ]7.Others (specify), ----------	PHS6 |__|
7	Did you have any hospitalization during the past one year? [ ]1. Yes for ---------- days	PHS7 |__|

	Information	For researcher
	[ ]2. No	
8	Did you have any accidents during the past one year? [ ]1. Yes [ ]2. No	PHS8 |__|
9	Do your family have history of overweight/obesity? 1.Yes 2.No If "Yes" choose any of follow; (can answer more than one) FH1.a Mother 1. Yes 2. No FH1.b Father 1. Yes 2. No FH1.c Grandparents 1. Yes 2. No FH1.d Siblings 1. Yes 2. No	FH1|__| FH1a |__| FH1b |__| FH1c |__| FH1d |__|
10	Do your family have history of hypertension? 1.Yes 2.No If "Yes" choose any of follow; (can answer more than one) FH2.a Mother 1. Yes 2. No FH2.b Father 1. Yes 2. No FH2.c Grandparents 1. Yes 2. No FH2.d Siblings 1. Yes 2. No	FH2 |__| FH2a |__| FH2b |__| FH2c |__| FH2d |__|
11	Do your family have history of diabetes mellitus? 1.Yes 2.No If "Yes" choose any of follow; (can answer more than one) FH 3.a Mother 1. Yes 2. No FH 3.b Father 1. Yes 2. No FH 3.c Grandparents 1. Yes 2. No FH 3.d Siblings 1. Yes 2. No	FH 3|__| FH3a |__| FH3b |__| FH3c |__| FH3d |__|
12	What is your reproductive health status? 1.Not in menopause period. 2. In menopause period (If menopause, skip to Part 7)	RH1 |__|
13	Do you use contraception? 1.Yes 2. No If "Yes" choose any of follow RH2.a Oral contraception 1. Yes 2. No RH2.b Injection 1. Yes 2. No RH2.c Others please specify……..	RH2 |__| RH2a |__| RH2b |__| RH2c |__|

Part 7: Mental health status

7.1 Stress Relating Factors by Perceived Stress Scale (PSS)

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way.

No	Information In the last month,	Never	Almost never	Some-times	Fairly often	Very often
1	How often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2	How often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3	How often have you felt nervous and "stressed"?	0	1	2	3	4
4	How often have you felt confident about your ability to handle your personal problems?	4	3	2	1	0
5	In the last month, how often have you felt that things were going your way?	4	3	2	1	0
6	How often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7	How often have you been able to control irritations in your life?	4	3	2	1	0
8	How often have you felt that you were on top of things?	4	3	2	1	0
9	How often have you been angered because of things that were outside of your control?	0	1	2	3	4
10	How often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4
Total Stress score		s1----------				
Stress		1. No 2. Yes		s2----------		

7.2 Depression index

Below is a list of some of the ways you may have felt or behaved. Please indicate how often you have felt this way during the past week. Respond to all items.

No	Place a check mark (!) in the appropriate column. During the past week.	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)
1	I was bothered by things that usually don't bother me.	0	1	2	3
2	I did not feel like eating; my appetite was poor.	0	1	2	3

No	Place a check mark (!) in the appropriate column. During the past week.	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)
3	I felt that I could not shake off the blues even with help from my family.	0	1	2	3
4	I felt that I was just as good as other people.	0	1	2	3
5	I had trouble keeping my mind on what I was doing.	0	1	2	3
6	I felt depressed.	0	1	2	3
7	I felt that everything I did was an effort.	0	1	2	3
8	I felt hopeful about the future.	0	1	2	3
9	I thought my life had been a failure.	0	1	2	3
10	I felt fearful.	0	1	2	3
11	My sleep was restless.	0	1	2	3
12	I was happy.	0	1	2	3
13	I talked less than usual.	0	1	2	3
14	I felt lonely.	0	1	2	3
15	People were unfriendly.	0	1	2	3
16	I enjoyed life.	0	1	2	3
17	I had crying spells.	0	1	2	3
18	I felt sad.	0	1	2	3
19	I felt that people disliked me.	0	1	2	3
20	I could not "get going."	0	1	2	3
Total score				d1……	
Depressive symptoms		1.No 2.Yes		d2……	

Part 8: Case record form

Anthropometric measurement	For researcher
1. Height---------- centimeters	A1----------cm
2. Weight---------- kilograms	A2----------kg
3. Waist circumference---------- centimeters	A3----------cm
4. Hip circumference---------- centimeters	A4----------cm

This is the end of the questionnaire, thank you for your participation.