RELIABILITY OF HEALTHY EATING AND HEALTH BEHAVIOR QUESTIONNAIRE FOR THAI ADULTS

Visith Chavasit[1], Uruwan Yamborisut[1, *], Piyanut Sridonpai[1], Juntima Photi[1], Jaroonsree Meenongwah[2], Piyanuch Visetchart[1]

[1] Institute of Nutrition, Mahidol University at Salaya, Nakhon Pathom, 73170, Thailand
[2] Boromarajonani College of Nursing Sampasithiprasong, Ubon Ratchathani, 34000, Thailand

ABSTRACT:

Background: This study aimed to develop and examined reliability of healthy eating and health behavior questionnaire (HEHBQ) used for self-assessment in Thai adults.

Methods: The HEHBQ was developed based on the evidence of the transition of eating pattern among Thai adult population and the conformation with Thai Food Based Dietary Guideline. The HEHBQ included three sections: the context of healthy eating and health behaviors (HE), the unhealthy eating and health risk behaviors (UHE), and self-health monitoring (HM). Four hundreds sixty-five Thai adults, from urban and semi-urban areas, were invited to self-administer the HEHBQ during work day. Anthropometry measurements were also performed in all participants.

Results: HEHBQ had a satisfactory internal consistency that Cronbach's alpha was 0.69 for HE, 0.72 for UHE and 0.79 for HM section. Reliability test outcomes derived from two areas was examined by intra-class correlation coefficient (ICC). The ICC for HE, UHE and HM section were 0.59, 0.54 and 0.77 ($p < .001$) respectively, indicating the fair stability of the questionnaire. The higher proportion of the older adult group who had higher score in all three sections was found when compared to young adult groups. Significantly higher score ($p<0.001$) in HM section was observed in the obese than in the normal weight and wasted participants.

Conclusions: The healthy eating and health behavior questionnaire is reliable and is considered an optional nutrition tool used in public health surveillance. Further modification of questionnaire items may help to predict dietary risk factors associated with specific nutrition-related disorders.

Keywords: Reliability, Eating behaviors, Health behaviors, Questionnaires, Thai, Health behavior questionnaire

DOI: 10.14456/jhr.2015.24 *Received: January 2015; Accepted: March 2015*

INTRODUCTION

Over the past two decades, an economic transition brought about the entire change in food environment and lifestyles of population that hindered more people from eating healthy diets such as the shifting toward the increase in animals-food source intake as well as the increase of higher consumption of vegetable oil and sweetened foods and beverages [1]. The unhealthy diets and physical inactivity are thus the leading causes of obesity and other non-communicable diseases (NCDs) such as type 2 diabetes, dyslipidemia, hypertension and cardiovascular disease [2]. In Thailand, data from the 4thNational Health examination Survey (4th NHES) indicated the increasing trend of adult obesity in both urban and rural areas (40.7% vs 32.4%). For men, the prevalence of obesity increased from 12.5% in 1991 to 23.5% in 2009 and the corresponding rate was 20.2% and 29.4% for women [3]. For type 2 diabetes, data from the same survey indicated the prevalence of population with impaired fasting glucose (IFG) and diabetes was 10.6% and 7.5%, respectively. Furthermore, 35.4% of all diabetes were not previously diagnosed and higher proportion was found in men than in women; 47.3% vs 23.4% [4]. Although the trend of prevalence of hypertension in Thai adults did not change much; i.e. 23.3% in 2004 and 21.5% in 2009 for men and 20.9% in 2004 and 21.3% in 2009 for women [5], a large proportion of hypertensive individuals were sub-optimally controlled. Regarding food consumption pattern, results from the 4th NHES have shown that 97.4% of Thai

* *Correspondence to: Uruwan Yamborisut*
E-mail: uruwan.yam@mahidol.ac.th

Cite this article as: Chavasit V, Yamborisut U, Sridonpai P, Photi J, Meenongwha J, Visetchart P. Reliability of healthy eating and health behavior questionnaire for Thai adults. J Health Res. 2015; 29(5): 341-9. DOI: 10.14456/jhr.2015.24

population consumed higher meat intake and the high use of condiments, particularly added table salts, fish sauce, soy sauce, etc. In contrast, vegetable and fruit intakes were relatively low among 19-59 year-old adults; only 102-142 g/day for vegetables and less than 69 g/day for fruit intake. Likewise, vegetable and fruit intakes were relatively low among the elderly; 77.5-131 g/day for vegetables and less than 67 g/day for fruit intake. People were more likely to dine out and most food they consumed were deep-fried foods rather than boiled or steamed foods. Low milk and dairy consumption was found among Thai adults and elderly [6].

Thailand Healthy Lifestyle Strategic Plan (THLSP), 2011-2020 was developed under the engagement of the National Economic and Social Development Board, Ministry of Public Health and Institute of Nutrition, Mahidol University [7]. The action plans were designed to strengthen policy of the 11thNational Economic and Social Development plan. The strategic plan adds on in-depth of each health problem and carries on the concept of self-reliant healthy living; i.e. the ability for self-assessment at the individual, family and community levels. Under this scheme, the monitoring of surveillance and health care service system is considered as one important strategic action aimed to detect people who were at risk for obesity and NCDs and to increase the awareness of people to recognize their self-health care. Since a healthy diet and eating behaviors are considered to be closely linked with the importance of maintaining a healthy weight, it is essential to develop the simple nutritional tool used for assessment of eating pattern and nutritional status in general population. In Thailand, although the eating behavior questionnaire has been documented in the Thai Food Based Dietary Guideline (Thai FBDG) which were disseminated to Thai people by the Ministry of Public Health since 1996 [8], however, the reliability of the questionnaire was doubted. The objective of this study was 1) to develop and test the reliability of questionnaire used for assessment of eating behaviors of Thai adults and 2) to determine the relationship of eating and health behavior scores of Thai adults to their nutritional status.

MATERIAL AND METHODS

Study design: Cross-sectional study

Methods

Development of healthy eating and health behaviors questionnaire (HEHBQ)

Eating and health behavior questionnaire was developed by authors based on the relevant literature reviews to identify dietary factors that were associated with physical health outcomes of Thai adults [9, 10] which demonstrated the trend of food consumption pattern and health behaviors among Thai people. Other health information was obtained from the assessment form of health behavior status of Thai youth: the National Health Act [11]. The constructs and items were modified from self-assessment form of eating behavior questionnaire of Thai FBDG [8]. For the developed questionnaire, besides the general information of the respondent, the questionnaire included 3 sections: section I; desirable healthy eating and health behavior (HE1-12), consisted of 12 items to examine the frequency of the desirable healthy eating behaviors, lifestyle and personal hygienic practice. Section II (UHE 1-7) was aimed to examine the unhealthy eating behaviors and other health risk behaviors of person (UHE 1-7). Section III was self-health monitoring (HM1-5) which consisted of questions focusing on self-assessment using simple proxy anthropometric indicators as well as the tracking of biochemical examination. The HEHBQ was completed by one individual adult person.

Scoring the questionnaire

To provide more meaningful results, for each item of section II, score was rated from 0 to 5 according to the frequency of practice; i.e., 0= never done, 1= 1-2 days per month, 2 = $\leq$ 1 day per week, 3 = 2-3 days per week, 4 = 4-6 days per week, 5 = every day. The sum of total scores for HE1through HE12 was 60. For section III, the undesirable health risk, scoring was graded as 0 = everyday, 1 = 4-6 days per week, 2 = 2-3 days per week, 3 = $\leq$ 1 day per week, 4 = 1-2 days per month and 5 = never done. The sum of total scores for UHE1 through UHE7 was 35. For section IV, self-health monitoring, the score was rated as 1 = done or 0 = not done and the sum of total score was 5.The content validity of questionnaire was evaluated by 3 experts and the content was modified according to their comments. The pretest of questionnaire was performed in 222 Thai adults aged between 19- 65 years who were randomly sampled from 3 sub-districts; namely Kud-lad and Pathum of Mueang districts and Pho-Yai of Warin-Chamrap districts. Cronbach's alpha [12] was calculated to test internal consistency. The result outcomes showed the alpha coefficient was 0.681 for both healthy and unhealthy eating behaviors sections and 0.745 for health monitoring section. Two items of sections I were modified for the improved understanding of the respondents; i.e.; for item 2 "How often do you

Table 1 Demographic characteristics of participants

Variables	Urban (n=241)	Semi-urban (n=224)	Total (n=465)	*p-value*
	Mean SD	**Mean SD**	**Mean SD**	
Age (yr)	44.5 (11.6)	43.7 (12.42)	44.1 (12.0)	0.473
Body weight (kg)	60.7 (10.6)	60.4 (13.0)	60.6 (11.8)	0.776
Height (cm)	156.2 (6.6)	156.6 (7.9)	156.4 (7.2)	0.586
BMI (kg/m^2)	24.9 (4.1)	24.5 (4.6)	24.7 (4.4)	0.364
Waist circumference (cm)	84.2 (10.0)	83.5 (10.6)	83.7 (10.3)	0.352
Total body fat (%)	31.1 (9.6)	28.6 (10.4)	29.9 (10.0)	0.008*
Participants' education	**n =240**	**n =223**	**n =463**	
≤ Primary school	111 (46.3)	84 (37.7)	195 (42.1)	
Secondary school	105 (43.8)	97 (43.5)	202 (43.6)	0.007**
Diploma	14 (5.8)	14 (6.3)	28 (6.0)	
≥ Bachelor degree	10 (2.2)	28 (12.6)	38 (8.2)	
Participants' occupation	**n =240**	**n = 223**	**n =463**	
Student	3 (1.3)	5 (2.2)	8 (1.7)	
Housewife	76 (31.7)	50 (22.4)	126 (27.2)	
Officer	26 (10.8)	40 (17.9)	66 (14.3)	0.005**
Farmer/labor worker	97 (40.4)	110 (49.3)	207 (44.7)	
Business owner/Chief executive officer	9 (3.8)	6 (2.7)	15 (3.2)	
Small trade	29 (12.1%)	12 (5.4%)	41 (8.9%)	
Recent illness	**n =241**	**n=222**	**n =463**	
Normal	152 (63.1)	147 (66.2)	299 (64.6)	
Diabetes	15 (6.2)	8 (3.6)	23 (5.0)	
Hypertension	8 (3.3)	9 (4.0)	17 (3.7)	0.814
Cardiovascular disease	1 (0.4)	2 (0.9)	3 (0.6)	
Dyslipidemia	6 (2.5)	9 (4.0)	15 (3.2)	
>1 NCDs†	21 (8.7)	19 (8.6)	40 (8.6)	
Allergy	9 (3.7)	5 (2.3)	14 (3.0)	
Other diseases	9 (3.7)	8 (3.6)	17 (3.7)	
Not known	20 (8.3)	15 (6.8)	35 (7.6)	

Significantly different between two districts by * Independent sample t-test and by
**Chi-square test
† Non-communicable diseases

consume the variety of foods?" that the term "variety of foods" was clarified. For item 6, "How often do you consume foods that have been prepared using cooking processed with boiling/roasting /steaming or spicy?" and it was indicated that only one method of cooking process will be defined by the respondent.

Participants

The eligible participants were both male and female adults, aged ≥ 19 years, who have resided in Ubon Ratchathani province for 1 year or more. Data collections were performed in 2 districts; i.e., Mueang (urban area) and Lao Suea Kok (semi-urban area) districts. For each district, participants were randomly sampled from four sub-districts. The research protocol was approved by Institutional Review Board, Mahidol University (COA. No. 2014/071.0606). Written consent forms were obtained from all participants at the time of data collection.

Anthropometric measurement and questionnaire administration

The research team contacted and asked permission from the district public health officer. Then, the adult participants were enrolled from two areas on the consecutive day. Anthropometric measurements were performed in all participants in the morning. For each participant, body weight and total body fat was measured using digital weighing scale (Tanita^{R}Innerscan, Model BC-545, Tokyo, Japan). For measurement of body fat, each participant was instructed to step on the platform of the equipment and to hold the electrodes with both hand grips and arms straight down for 1-2 minutes until the body fat was determined. Standing height was measured with stadiometer (Stanley-Mabo^R, Poissy, France). Body mass index (BMI) was calculated as weight divided by height in meter squared (kg/m^2). Overweight was defined by BMI between 23.0-24.9 kg/m2 and obesity by BMI of

Table 2 Reliability of healthy eating and health behavior questionnaire (HEHBQ) evaluated by intra-class correlation coefficient (ICC) and Cronbach's alpha

Questionnaire section	Reliability data		*p-value*	Cronbach's alpha
	ICC	95% CI		
Healthy eating & health behaviors (HE1-12)	0.595	0.538-0.647	0.001	0.699
Unhealthy eating & health behaviors (UHE1-7)	0.540	0.472-0.601	0.001	0.716
Health monitoring (HM1-5)	0.768	0.733-0.800	0.001	0.792

Table 3 Reliability of healthy eating and health behavior questionnaire (HEHBQ) evaluated by intra-class correlation coefficient (ICC) and Cronbach's alpha, by age group

Questionnaire subsection	ICC	95% CI	*p-value*	Cronbach's alpha
19-30 yrs				
Healthy eating health behaviors (HE1-12)	0.594	0.440-0.720	0.001	0.717
Unhealthy eating & health behaviors (UHE1-7)	0.481	0.273-0.646	0.001	0.709
Health monitoring (HM1-5)	0.711	0.590-0.804	0.001	0.756
31-50 yrs				
Healthy eating health behaviors (HE1-12)	0.619	0.542-0.688	0.001	0.731
Unhealthy eating & health behaviors (UHE1-7)	0.440	0.322-0.543	0.001	0.669
Health monitoring (HM1-5)	0.782	0.735-0.824	0.001	0.806
51-65 yrs				
Healthy eating health behaviors (HE1-12)	0.529	0.413-0.630	0.001	0.612
Unhealthy eating & health behaviors (UHE1-7)	0.581	0.473-0.674	0.001	0.710
Health monitoring (HM1-5)	0.678	0.593-0.751	0.001	0.736

$\geq$ 25 kg/m^2 [13]. Waist circumference was measured at the horizontal level that passed through the umbilicus. Measurement was performed twice and the mean average was used as the data. The HEHBQ were sent to all participants for self-administration and returned back to the researchers once they finished them.

Statistical analyses

All anthropometric data and information from questionnaires were recoded and analyzed using Statistical Package for Social Science (SPSS, version 19, Chicago, IL, USA). The continuous variables were presented as mean (SD). Significant mean difference between groups was defined at $p<0.05$. Regarding the reliability test, result outcomes from two areas were evaluated using the intra-class correlation coefficient (ICC). The questionnaire was also assessed for internal consistency using Cronbach's alpha.

RESULTS

Demographic characteristics of respondents

Table1 shows the characteristics of the respondents. The mean age of respondents ranged between 43.7- 44.5 year old. There was no difference in the BMI values of respondents between urban and semi-urban area, except for the slightly higher body fat of adults in urban when compared to those in semi-urban area. Most of the respondents in urban completed the primary educational level whereas those of semi-urban area completed the secondary educational level. Most respondents from two areas were farmers and/or labor workers. The overall 64.6% of respondents indicated that they were healthy and 8.7% of urban and 8.6% of semi-urban of respondents presented with multiple non-communicable diseases.

Reliability of healthy eating and health behavior questionnaire (HEHBQ)

Table 2 shows the results of reliability test to explain the question content of how consistent the answers of the respondents from one area to another area. All ICC values were statistically significant and ranged from 0.54 to 0.76 (p=0.001).By age–specific classification, the ICC values ranged from 0.48 to 0.71 (p= 0.001 for all sections) for the group of 19-30 year-old. Also, the corresponding ICC values ranged from 0.44 to 0.78 (p = 0.001) for the group aged 31-50 years and 0.53 to 0.68 for the group aged 51-65 years (p = 0.001) (Table 3).

To examine the internal consistency of HEHBQ that how well each item was correlated with the remaining items of questionnaire, the Cronbach's alpha was computed for each section. Results show that alpha coefficient ranged from 0.69 to 0.79 (Table 2). By age classification, the alpha ranged from 0.71 to 0.76 for the group of 19-30 year-old, 0.67 to 0.81 for adults aged 31-50 years and 0.61 to 0.74 for adults aged 51-65 years for each section.

Table 4 Number of participants and their eating and health practice scores, by age group

Questionnaire items	Age group			*p-value*
	19-30 yrs (n=72)	31-50 yrs (n=232)	51-65 yrs (n=161)	
	Number (%)	Number (%)	Number (%)	
Healthy eating (HE1-12)				
Scores ≤ average mean	43 (59.7)	115 (49.6)	66 (41.0)	0.025
Score > average mean	29 (40.3)	117 (50.4)	95 (59.0)	
Unhealthy eating (UHE1-7)				
Scores ≤ average mean	50 (69.4)	116 (50.0)	67 (41.6)	0.001
Score > average mean	22 (30.6)	116 (50.0)	94 (58.4)	
Health monitoring (HM1-5)				
Scores ≤ average mean	54 (75.0)	117 (50.4)	65 (40.4)	0.001
Score > average mean	18 (25.0)	115 (49.6)	96 (59.6)	

Significantly different among different age groups by Chi-square test, at $p<0.05$

Table 5 Mean scores on HEHBQ subsection of Thai adults, by nutritional status.

Questionnaire items	Nutritional status				F	*p-value*
	Wasted (n=19)	Normal weight (n=152)	Overweight (n=97)	Obese (n=197)		
	Mean SD	Mean SD	Mean SD	Mean SD		
Healthy eating (HE1-12)	44.2 (6.7)	46.6 (6.4)	47.8 (6.2)	47.6 (6.8)	2.209	0.086
Unhealthy eating (UHE1-7)	21.6 (6.4)	20.9 (6.6)	21.5 (6.3)	21.1 (5.7)	0.142	0.902
Health monitoring (HM1-5)	2.7 (1.9) [a]	3.5 (1.7) [a]	3.8 (1.5) [a,b,c]	4.0 (1.4) [c]	6.607	0.001

Wasted; BMI <18.5 kg/m^2, normal weight; BMI 18.5-22.9 kg/m^2, overweight; BMI 23.0-24.9 kg/m^2, obese; BMI ≥ 25 kg/m^2

[a,b,c] Mean score of obese group was significantly different from that of the normal weight and wasted groups and mean score of the overweight group was significantly different from that of the wasted group, at $p< 0.05$ by ANOVA and post hoc analysis by Scheffe's test

Eating and health practice scores of the respondents

Table 4 shows significantly higher proportion of the older adult respondents who had higher score in all three sections when compared to the proportion of younger adults. Table 5 shows the mean score of each section of the HEHBQ, categorized by nutritional status. No significant mean difference in score in HE and UHE sections were found among wasted, normal weight, overweight and obese group. For HM section, the mean score of the obese group was found to be significantly higher than that of the normal weight and wasted respondents. Likewise, mean score of the overweight group in HM section was significantly higher than that of wasted group.

DISCUSSION

This study aimed to develop and test the reliability of eating and health behavior questionnaire (HEHBQ).The questionnaire was self-administered and three main sections were monitored: healthy eating and health behaviors, unhealthy eating and health risk behaviors and self-health monitoring. The content HEHBQ were constructed based on existing evidence of literature reviews [9-11] and Thai FBDG reference [8]. Our results showed the Cronbach's alpha ranged from 0.69 to 0.79 for each section indicating the good internal consistency of the questionnaire [14]. However, reliability test, as indicated by ICC value from two areas, was lower for healthy eating and unhealthy eating sections, which was about 0.54-0.59. When considering on the developed questionnaire, there were a few items that might result to be the confusing for the respondents; such as, item HE 5; milk drinking was focused only on either cow's milk or goat milk but not soybean milk which was commonly consumed by some adult respondents. For item HE7, it was suggested that the terminology of emotional stress as well as the level of stress should be clearly defined so that the respondents could score. Considering on item HE12, the hygienic practice on hand washing of which the procedure should also be defined. Likewise, for the UHE 5, some respondents might recognize the raw foods in different way; for example, the mixed diet that he/she consumed might be the food mixture of cooked sticky rice and raw fermented fish, etc., thereby, it was difficult to make the scoring.

It was found that significantly higher proportion of older adults performed better health practice than

the younger adults, as indicated by higher scores in all health sections. This might be explained by that the majority of older persons were more susceptible to obesity and/or chronic disease, thus, they tended to increase their awareness on health risk by improving their eating habits and lifestyles. When classified by nutritional status (Table 5), no significant difference in mean scores of both healthy, unhealthy eating and health behavior sections was found among wasted, normal weight, overweight and obese groups. This might be due to the lack of key specific nutrition information on the questionnaire that might hinder the discrimination of individuals who were at risk. Results from one previous study showed that questionnaire relevant to specific domain could be able to distinguish among varied eating behaviors in a general population, particularly in adults and cognitive restraint was the most identifiable in young adults [15]. Our results also revealed that mean score of health monitoring of the obese group was significantly higher than that of the normal weight and wasted groups. This could be explained by that some of obese persons who suffered from the adverse health complication would more often monitor their physical health. Generally, effective weight management in obese persons requires the appropriate physical environment and support for modifying their dietary and physical activity patterns [16].

The advantage of this developed questionnaire was that it was the simple nutrition tool that can be used for self-assessment. However, the drawback of the questionnaire was that the indexes did not cover a broad range of domain relevance to other aspect; such as, individual nutrition knowledge, food security, home or other social environment that could influence dietary practice of persons. The examination of driven psychological factor is considered another important issue as this provides the comprehensive understandings of how eating behaviors are associated with weight change. Previous study demonstrated that emotional eating was associated with BMI and long term weight gain in young adults and the compensatory restraint was negatively associated with weight gain in adults [17]. Another study showed that age and gender factors influenced on eating behavior. The overweight older persons had higher scores for emotional eating than the normal weight persons, which support the idea that overweight persons are more likely to use food to cope with negative event and causes overconsumption. In addition, women had higher mean score for restrained eating than men; implying that women are more likely to diet than men [18]. For our developed questionnaire, it was suggested that items regarding the desirable and undesirable eating and health practices should be integrated as a whole part rather than were listed in separated section of questionnaire. This should be done to minimize the bias of the respondents. The increase in questionnaire items using context targeted to other specific nutrients and food behavior patterns may help to improve the quality of questionnaire to be used for nutrition surveillance.

CONCLUSION

The healthy eating and health behavior questionnaire was developed for Thai adults. This nutrition tool is simple and used for self-administration. Further elaboration of questionnaire items may help to improve the quality of questionnaire used for tracking specific nutrition-related diseases.

ACKNOWLEDGEMENTS

The study was funded by Thai Food and Drug Administration. The authors are very grateful to all participants from Ubon Ratchathani province for their co-operation in providing nutrition and health information. We also thank all health care personnel from Boromarajonani College of Nursing Sampasithiprasong and district health centers for their kind help in data collection.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

REFERENCES

1. Popkin BM, Adair LS, Ng SW. Global nutrition transition and the pandemic of obesity in developing countries. Nutr Rev. 2012; 70(1): 3-21.
2. Waxman A. WHO's global strategy on diet, physical activity and health. Response to a worldwide epidemic of non-communicable diseases. Scandinavian Journal of Nutrition. 2004; 48(2): 58-60.
3. Aekplakorn W, Inthawong R, Kessomboon P, Sangthong R, Chariyalertsak S, Putwatana P, et al. Prevalence and trends of obesity and association with socioeconomic status in Thai adults: National Health Examination Surveys, 1991-2009. J Obes. 2014; 2014: 410259. doi: 10.1155/2014/410259 [Cited 2014 December 29]. Available from: http://dx.doi.org/10.1155/2014/410259
4. Aekplakorn W, Chariyalertsak S, Kessomboon P, Sangthong R, Inthawong R, Putwatana P, et al. Prevalence and management of diabetes and metabolic risk factors in Thai adults: the Thai National Health Examination Survey IV, 2009. Diabetes Care. 2011; 34(9): 1980-5.
5. Aekplakorn W, Sangthong R, Kessomboon P, Putwatana P, Inthawong R, Taneepanichskul S, et al. Changes in prevalence, awareness, treatment and control of hypertension in Thai population, 2004-2009:

Thai National Health Examination Survey III-IV. J Hypertens. 2012; 30(9): 1734-42.

6. National Health Examination Survey Office. The report of food consumption survey in Thai people: the Thai National Health Examination Survey IV. Nonthaburi: Health System Research Institute; 2011.
7. National Steering Committee on Thailand Healthy Lifestyle Strategy. Thailand healthy lifestyle strategy plan B.E. 2554-2563 (2011-2020). Bangkok: National Economic and Social Development Board, Ministry of Public Health and Institute of Nutrition, Mahidol University; 2012.
8. Bureau of Nutrition. Working group on Food-Based Dietary Guidelines for Thai People. Nonthaburi: Ministry of Public Health, Department of Health; 1996.
9. National Statistical Office [NSO]. Health care behavior of Thai population. Executive summary, 2005 and 2013.Bangkok: NSO; [2014].
10. Wibulpolprasert S. Thailand health profile 2008-2010. Nonthaburi: Ministry of Public Health; 2011.
11. Health Education Division. Health behavior status of Thai youth: the national health act. Self-assessment form. Nonthaburi: Ministry of Public Health, Department of Health service Support; 2008.
12. Gliner JA, Morgan GA. Research methods in applied settings: an integrated approach to design and analysis. Mahwah: Lawrence Erlbaum Associates Inc.; 2000.
13. WHO/IASO/IOTF. The Asia-Pacific perspective: redefining obesity and its treatment. Melbourne: Health Communications; 2000.
14. de Villis RF. Scale development: theory and applications. 2nd ed. Thousand Oaks: SAGE Publications; 2003.
15. de Lauzon B, Romon M, Deschamps V, Lafay L, Borys JM, Karlsson J, et al. The Three-Factor Eating Questionnaire-R18 is able to distinguish among different eating patterns in a general population. J Nutr. 2004; 134(9): 2372-80.
16. Hill JO, Wyatt H. Outpatient management of obesity: a primary care perspective. Obes Res. 2002; 10(Suppl 2): 124S-30S.
17. Schembre SM, Geller KS. Psychometric properties and construct validity of the Weight-Related Eating Questionnaire in a diverse population. Obesity (Silver Spring). 2011; 19(12): 2336-44.
18. Bailly N, Maitre I, Amanda M, Herve C, Alaphilippe D. The Dutch Eating Behaviour Questionnaire (DEBQ). Assessment of eating behaviour in an aging French population. Appetite. 2012; 59(3): 853-8.

APPENDIX I: HEALTHY EATING AND HEALTH BEHAVIOR QUESTIONNAIRE (HEHBQ) FOR THAI ADULTS

Explanation: The eating and health behavior questionnaire (HEHBQ) is developed for individual person to perform their self-evaluation. Please fill-in the information regarding your habitual eating habits and health behaviors in the blank space.

General information

Date.....

(1) ID No.....
Respondent's address

(2) Sub-district..... (3) District..... (4) Province.....

(5) Gender ☐ Male ☐ Female

(6) Birth date..... Age.....years

(9) Your recent body weight.....kg. (8) Height.....cm. (9) BMI.....kg/m^2

(10) Waist circumference.....cm.
(Location of waist circumference: measure at horizontal level that passes through the umbilicus)

(11) At present, how is about your physical health?
☐ Healthy ☐ Diabetes ☐ Hypertension ☐ Heart disease
☐ Dyslipidemia ☐ Allergy; identify.....
☐ Other; identify..... ☐ Not known

(12) What is your educational level?
☐ Uneducated ☐ Primary school ☐ Secondary school (grade 7-9)
☐ Secondary school (grade 10-12) ☐ Diploma/vocational certificate
☐ Bachelor degree ☐ Master degree or higher

(13) What is your occupation/career?
☐ Housewife ☐ Officer in the office/organization ☐ Labor worker; farmer, factory worker, etc.
☐ Business owner/chief executive officer ☐ Small trades
☐ Other; identify.....

(14) What do you think about your body shape?
☐ Thin ☐ Normal weight ☐ Overweight ☐ Obese

Section I: Healthy eating and health behaviors

For each item, please choose only one answer (by marking symbol X on the block) that is closely to your behaviors during past 6-months

Item	Healthy eating & health behaviors	Frequency of practice					Rarely or not done
		Every day	4-6 days per week	2-3 days per week	≤1 day per week	1-2 days per month	
HE1	How often do you consume 5 food groups daily?	☐	☐	☐	☐	☐	☐
HE2	How often do you consume the variety of foods?	☐	☐	☐	☐	☐	☐
HE3	How often can you eat vegetables and fruits as much as one-half of plate?	☐	☐	☐	☐	☐	☐
HE4	How often can you can eat various kind of vegetables up to 4-6 ladles per day?	☐	☐	☐	☐	☐	☐
HE5	How often can you drink 1-2 glasses of cow's milk or goat milk daily?	☐	☐	☐	☐	☐	☐
HE6	How often do you consume foods that have been prepared using cooking processed with boiling/roasting /steaming or spicy?	☐	☐	☐	☐	☐	☐
HE7	How often are you in a good mood/not stress?	☐	☐	☐	☐	☐	☐
HE8	How often can you sleep well for at least 7-8 hours per day?	☐	☐	☐	☐	☐	☐
HE9	How often can you perform exercise or household tasks until exhausted, at least 20 minutes per day?	☐	☐	☐	☐	☐	☐
HE10	How often do you eat cooked food?	☐	☐	☐	☐	☐	☐
HE11	How often do you use the spoon to scoop food?	☐	☐	☐	☐	☐	☐
HE12	How often do you wash your hands before having meal?	☐	☐	☐	☐	☐	☐

Section II: Unhealthy eating and health risk behaviors

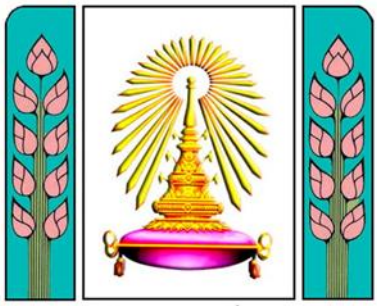
For each item, please choose only one answer (by marking symbol X on the block) that is closely to your behaviors during past 6 months

Item	Unhealthy eating & health behaviors	Frequency of practice					Rarely or not done
		Every day	4-6 days per week	2-3 days per week	≤1 day per week	1-2 days per month	
UHE1	How often do you consume high fat/deep fried foods or foods prepared using coconut milk?	☐	☐	☐	☐	☐	☐
UHE2	How often do you consume sweetened foods (bakery products, chocolate, dessert, etc.)?	☐	☐	☐	☐	☐	☐
UHE3	How often do you consume salty foods or using salty condiments?	☐	☐	☐	☐	☐	☐
UHE4	How often do you drink the sweetened beverages (carbonated drinks, fruit juices, green tea, etc.)?	☐	☐	☐	☐	☐	☐
UHE5	How often do you consume the raw foods?	☐	☐	☐	☐	☐	☐
UHE 6	How often do you smoke?	☐	☐	☐	☐	☐	☐
UHE 7	How often do you drink the alcoholic beverages?	☐	☐	☐	☐	☐	☐

Section III: Self-health monitoring during past 6 month

Please choose only one answer by marking symbol X on the block

Item	Self- assessment	Done	Not done
1	You measure your body weight every 3 months	☐	☐
2	You measure your waist circumference every 3 months to assess whether you are obese or not	☐	☐
3	You measure your blood pressure every 3 months	☐	☐
4	Your blood sample has been examined for glucose level at least once a year	☐	☐
5	Your blood sample has been examined for lipid profile at least once a year	☐	☐



วิทยาลัยวิทยาศาสตร์สาธารณสุข
จุฬาลงกรณ์มหาวิทยาลัย
COLLEGE OF PUBLIC HEALTH SCIENCES
CHULALONGKORN UNIVERSITY

International Curriculum
College of Public Health Sciences, Chulalongkorn University

Master of Public Health and Doctor of Philosophy in Public Health

By offering specialties in Public Health and Management, Community and Reproductive Health, Urban and Global Health, Environmental and Occupational Health and Health Behavior the trimester-based Program provides a variety of types and durations of study to respond to students' needs as follow.

Master of Science and Doctor of Philosophy in Public Health Sciences

Through the fields of study in Thai Traditional and Alternative Medicines, Bimolecular Technology, this in-house, semester-based Program aims at developing and producing high quality academic research in order to contribute the body of knowledge in the field of public health sciences.

More information contact: academic_cphs@chula.ac.th

Call + 66 2218 8191