Self-Efficacy, Decisional Balance and Stages of Change on Dietary Practices among Metabolic Syndrome Persons, Uthai Thani Province

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Objective: *To determine factors related to stages of change regarding dietary intake of persons with metabolic syndrome in Uthai Thani.*
Material and Method: *Five hundred metabolic syndrome persons were randomly selected using a three-stage sampling method and voluntarily responded to a validated, self-administered questionnaire.*
Results: *Majority of the respondents (36.4%) had dietary practices in the pre-contemplation stage while only 17.4 percent of them were in the action and maintenance stage. Perceived self-efficacy, pros, and cons of decisional balance for dietary intake had statistically positive association with the stages of change (Somers'd value = 0.21, 0.29, and 0.09 with p<0.01, <0.01, and 0.015 respectively).*
Conclusion: *Perceived self-efficacy, pros, and cons of decisional balance are related to stages of change regarding dietary intake of persons with metabolic syndrome. Therefore, perceived self-efficacy, pros for positive and cons for negative dietary intake should be emphasized to elevate food consumption practices of the metabolic syndrome persons from pre-contemplation to action and maintenance stage.*

Keywords: *Stages of change, Dietary practices, Decisional balance*

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Metabolic syndrome is a group of disorders consisting of abnormality of blood cholesterol levels, the high blood pressure levels, and high blood/sugar levels[1,2]. A person with metabolic syndrome will be at a high risk of coronary heart disease and type 2 diabetes mellitus[3-5]. The prevalence of metabolic syndrome has been increasing worldwide[3,4]. According to the waist circumference measurement program, one of the screening indicators for metabolic syndrome, regarding the Thai population aged 15 years and over in 2010, it was determined that 21.98 and 14.48 percent of females and males in Uthai Thani had over-waist circumference[6].

The main causes of metabolic syndrome were obesity, high-fat diet intake, and lack of exercise that could be changed by behavioral modifications[4,7-9]. One of the well known models in explaining health behavior is the theory of Stages of Change developed by Prochaska and Di Clemente[10]. Stages of change is a series of stages that represent a given person's readiness to change health behavior through 5 stages, pre-contemplation, contemplation, preparation or ready for action, action, and maintenance[10-12]. It is necessary to identify at what stage of change is the health behavior of a person located in order to organize appropriate methods for change. The Prochaska model was applied to various types of health behavior studies such as smoking cessation, fruit and vegetable intake, and dietary fat reduction[13-16]. The common factors included in the studies were self-efficacy, pros and cons of decisional balance, and selected demographic variables. However, no part of the present study was done in persons with metabolic syndrome in Thailand. Results of the present study will be useful in planning better effective strategies to change dietary intake practices of the metallic syndrome persons.

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Material and Method

The sample size of 241 was calculated by using Daniel's formula[17]. In order to reduce the bias from multi-stage sampling method, 500 samples were selected. First, three out of 20 districts of Uthai Thani that met the criteria of having over 20 percent of the population with over-waist circumferences were randomly selected. One sub-district, from the three selected districts, that had the highest rate of over-waist circumference was drawn. The sample size of each sub-district was calculated using proportional to size and systematic random sampling was applied to select the samples from the list of persons with metabolic syndrome. The following inclusion criteria were used to screen the eligible persons: males with over 90 centimeters and females with over 80 centimeters of waist circumference; or had Body Mass Index of $\geq$25 kg/m^2; or had 2 out of 4 items of blood tests that were triglyceride level $\geq$150 mg/dL, HDL cholesterol $\leq$40 mg/dL for males or $\leq$50 mg/dL for females, blood pressure level $\geq$130/85 mmHg, and fasting blood/sugar level $\geq$100 mg/dL[18].

Instruments

All respondents were voluntarily completed self-administered questionnaires, that their validity and reliability were assessed and approved. There were four parts of questionnaire to fill out and each respondent spent approximately 30 minutes to complete them.

The stage of change part was developed by modifying the questionnaire for measuring stages of change developed by Prochaska James O, Velicer WF Di Clemente Carlo et al[19]. Three questions with yes or no answers were used to ask the respondents about their dietary practices in controlling of high carbohydrate, sweet, salty, and fatty food in the past month and the next 6 months. The combination of answers were used to categorized the respondents into 5 stages of change, according to their dietary practices, pre-contemplation (PC), contemplation (C), preparation or Ready for action (P), action (A), and maintenance (M).

Decisional balance on dietary intake scale, a 5-point rating scale, was developed by the researcher. There were 18 items concerning the pros and cons or obstacles of dietary practices. Internal consistency of the items was calculated by using Cronbach's alpha coefficient. The reliability values of the decisional balance on dietary intake part (pros and cons) were 0.8729 and 0.8425, respectively. The higher scores indicated having more pros or fewer obstacles for favorable dietary practices.

Perceived self-efficacy on dietary intake scale, a 5-point rating scale, was also developed by the researcher. There were 20 items to assess perceived self-efficacy of the respondents to perform dietary practices. The reliability value of the perceived self-efficacy part was 0.8492. The higher scores indicated having more efficacies to perform dietary practices.

The present study was conducted after the research proposal was approved by the Ethical Committee on Research in Human Subjects, Faculty of Public Health, Mahidol University, under approval number MUPH 2011-251. The data were collected by the researcher and assistant researchers. The objectives of the study and research procedure were explained to the respondents. Each respondent was informed to sign the consent form and provide demographic data voluntary.

Data analysis

Descriptive statistics namely frequency and percentage were used to describe the present study variables. A Chi-square test was computed to assess the relationship between variables that nominally measured. Kendal tau b was used to examine the symmetric association between ordinal measured variables and Somer's d statistic was used to assess asymmetric association between ordinal factors. A p-value of less than 0.05 was considered statistically significant.

Results

Stages of change regarding dietary practices of the metabolic syndrome of the respondents were described in Table 1. More than one-third of the samples were in the pre-contemplation stage and the least of 17.4% were in the action and maintenance stage. There were more males in the pre-contemplation stage than females while there were more females in the action and maintenance stage than males. Regarding perceived self-efficacy to perform dietary practices females had higher confidence than males as shown in Table 2. Table 3, 4 indicated that about 42 percent of the samples responded that pros in controlling of dietary intake were very important or the most important for them while about 41 percent perceived that obstacles to perform favorable dietary practices were not important or not important at all. More males than females answered that neither pros nor cons about positive dietary practices were important.

Self-efficacy to perform positive dietary

Table 1. Frequency and percentage of the respondents' stages of change of dietary intake by gender (n = 500)

Stages of change	Gender		Total
	Male	Female	
Pre-contemplation	53 (42.4)	129 (34.4)	182 (36.4)
Contemplation	22 (17.6)	71 (18.9)	93 (18.6)
Preparation	35 (28.0)	103 (27.5)	138 (27.6)
Action and maintenance	15 (12.0)	72 (19.2)	87 (17.4)
Total	125 (100.00)	375 (100.0)	500 (100.0)

Table 2. Frequency and percentage of the respondents' perceived self-efficacy to perform dietary intake by gender (n = 500)

Self-efficacy	Gender		Total
	Male	Female	
Lowest confidence	37 (29.6)	67 (17.9)	104 (20.8)
Low confidence	24 (19.2)	66 (17.6)	90 (18.0)
Moderate confidence	22 (17.6)	93 (24.8)	115 (23.0)
High confidence	23 (18.4)	62 (16.5)	85 (17.0)
Highest confidence	19 (15.2)	87 (23.2)	106 (21.2)
Total	125 (100.00)	375 (100.0)	500 (100.0)

Table 3. Frequency and percentage of the respondents' decisional balance on the pros of dietary intake by gender (n = 500)

Decisional balance on the pros	Gender		Total
	Male	Female	
Not important at all	38 (30.4)	74 (19.7)	112 (22.4)
Not important	24 (19.2)	87 (23.2)	111 (22.2)
Moderate	13 (10.4)	55 (14.7)	68 (13.6)
Very important	32 (25.6)	94 (25.1)	126 (25.2)
Most important	18 (14.4)	65 (17.3)	83 (16.6)
Total	125 (100.00)	375 (100.0)	500 (100.0)

Table 4. Frequency and percentage of the respondents' decisional balance on the cons of dietary intake by gender (n = 500)

Decisional balance on the cons	Gender		Total
	Male	Female	
Not important at all	35 (28.0)	82 (21.9)	117 (23.4)
Not important	17 (13.6)	72 (19.2)	89 (17.8)
Moderate	25 (20.0)	89 (23.7)	114 (22.8)
Very important	25 (20.0)	62 (16.5)	87 (17.4)
Most important	23 (18.4)	70 (18.7)	93 (18.6)
Total	125 (100.00)	375 (100.0)	500 (100.0)

practices, pros in controlling of dietary intake, and obstacles to perform favorable dietary practices were shown to have highly significant positive association with stages of change regarding dietary practices (Somers' d value = 0.21, 0.29, and 0.09 with $p<0.01$, <0.01, and 0.015, respectively). Regarding demographic variables namely gender, age group, educational level and occupation, only the educational level was significantly related to the stages of change (Somers' d value = 0.12, $p = 0.027$), Table 5, 6.

Discussion

In the present study, about one-third of the samples had dietary practices in the pre-contemplation stage of behavioral change. Only 17.4 percent of them were in the action or maintenance stage. This might be due to the fact that the respondents were screened by health officers as metabolic syndrome persons but never had participated in a behavioral modification program regarding over nutrition and decreasing risks of chronic diseases conducted by provincial public health office.

For factors related to stages of behavioral change regarding dietary practices, most of the study focused on internal factors such as essential knowledge, perceived self-efficacy, decisional balance that comprised of pros and cons to perform target health behaviors. In the present study, self-efficacy to perform positive dietary practices was significantly associated with stages of behavioral change. The respondents who posed more confidence to practice dietary intake tended to move to the higher stage of behavioral change regarding dietary practices. These findings were supported by the concept of Albert Bandura[20] that a person could be able to perceive or hold the belief about his or her self-efficacy by understanding what should be done and after performing, the expected outcome will be accomplished. Therefore, that person will take action.

Decisional balance for positive dietary intake was differentiated into 2 aspects, pros and cons. With respect to the pros of dietary intake, significant relationship of the levels of the thoughts about the benefit of dietary intake was found with the stages of change ($p<0.01$). Detailed analysis showed that the highest percent of samples who found the benefits of dietary intake at the high and highest levels were in the action and maintenance stages. If a person realized or thought about the benefits of changing behavior he or she was more likely to be at the decision-making stage, in other words, was ready to change behavior. Regarding the cons of dietary intake, a significant relationship with the stages of change was also found.

For the demographic variables, the present study showed no significant relationship between gender, age group, and occupation and stages of behavioral change on dietary intake. This should be due to the fact that the respondents, mostly overweight metabolic syndrome persons, were in the working-age group, ages between 35-60 years, and farmers and labors. Moreover, the most important was that they were homogeneous groups that were not affected by the different dietary practices of each stage of behavioral change. This finding agreed with the study of J Ma et al[13] who found that there was no significant relationship between age, sex and stages of change in fruit and vegetable intake, but marital status was found to relate to the stages of change in fruit and vegetable intake.

Educational level was found to relate significantly with stages of behavioral change on dietary intake. Detailed findings showed that more who finished primary school and lower were at the pre-contemplation stage of behavioral change on dietary intake compared to other stages. Among the samples who finished secondary school and higher, most of them were at the preparation or ready for action stage. This finding could be attributed to the fact that those who had a higher level of education could read and write, and therefore had more opportunity to read or seek more information than those with a lower education level.

It should be noted that the respondents of the present study did not reflect the large population of the country, since the present study setting was located only in Uthai Thani. Therefore, further research should be conducted in different parts of Thailand to compare the results and asses other internal and external factors that related to the stages of behavioral change of dietary intake e.g. social support, health education practices of the sub-district, health promotion hospital, the effectiveness of behavioral modification program implemented at the local health office.

Conclusion

Public health office should assess the persons with metabolic syndrome regarding the stages of dietary intake behavioral change and then organize learning activities to promote appropriate dietary intake in accordance with the care receivers' stage of change. For the pre-contemplation stage group, the appropriate

Table 5. Relationship between gender, age, educational level, occupation and stages of change on dietary intake of the respondents (n = 500)

Variables	Stages of change on dietary intake				χ^2	p-value
	PC	C	P	A&M		
Gender						
Male	53 (42.4)	22 (17.6)	35 (28.0)	15 (12.0)	4.541	0.209
Female	129 (34.4)	71 (18.9)	103 (27.5)	72 (19.2)		
Age (years)						
35-40	40 (30.8)	25 (19.2)	41 (31.5)	24 (18.5)	7.314	0.604
41-45	40 (35.4)	18 (15.9)	34 (30.1)	21 (18.6)		
46-50	49 (39.8)	26 (21.2)	25 (20.3)	23 (18.7)		
>50	53 (39.5)	24 (17.9)	38 (28.4)	19 (14.2)		
Educational level						
Primary school	153 (39.7)	66 (17.2)	99 (25.7)	67 (17.4)	0.077*	0.027
Secondary school and higher	29 (25.2)	27 (23.5)	39 (33.9)	20 (17.4)	0.118**	
Occupation						
Farmer	94 (34.3)	45 (16.4)	86 (31.4)	49 (17.9)	11.511	0.242
Labor	53 (43.1)	22 (17.9)	28 (22.8)	20 (16.2)		
Housewife	15 (45.5)	8 (24.2)	6 (18.2)	4 (12.1)		
Government officer	20 (28.6)	18 (25.7)	18 (25.7)	14 (20.0)		

* Kendal tau b; ** Somers' d
PC = pre-contemplation; C = contemplation; P = preparation; A&M = action and maintenance

Table 6. Relationship between perceived self-efficacy, decisional balance on pros and cons of dietary intake and stages of change on dietary intake of the respondents (n = 500)

Variables	Stages of Change of dietary intake					p-value
	PC	C	P	A&M		
Self-efficacy						
Lowest confidence	54 (29.7)	12 (12.9)	32 (23.2)	6 (6.9)	0.201*	<0.01
Low confidence	44 (24.2)	13 (14.0)	20 (14.5)	13 (14.9)	0.211**	
Moderate confidence	38 (20.9)	25 (26.9)	31 (22.5)	21 (24.1)		
High confidence	26 (14.3)	15 (16.1)	31 (22.5)	13 (14.9)		
Highest confidence	20 (11.0)	28 (30.1)	24 (17.4)	34 (39.1)		
Pros of dietary intake						
Not important at all	73 (40.1)	10 (10.8)	24 (17.4)	5 (5.7)	0.274*	<0.01
Not important	47 (25.8)	14 (15.1)	36 (26.1)	14 (16.1)	0.287**	
Moderate	17 (9.3)	17 (18.3)	28 (20.3)	6 (6.9)		
Very important	30 (16.5)	31 (33.3)	30 (21.7)	35 (40.2)		
Most important	15 (8.2)	21 (22.6)	20 (14.5)	27 (31.0)		
Cons of dietary intake						
Not important at all	55 (30.2)	20 (21.5)	22 (15.9)	20 (23.0)	0.084*	0.015
Not important	42 (23.1)	12 (12.9)	22 (15.9)	13 (14.9)	0.088**	
Moderate	28 (15.4)	22 (23.7)	37 (26.8)	27 (31.0)		
Very important	27 (14.8)	21 (22.6)	28 (20.3)	11 (12.6)		
Most important	30 (16.5)	18 (19.4)	29 (21.0)	16 (18.4)		

* Kendal tau b; ** Somers' d
PC = pre-contemplation; C = contemplation; P = preparation; A&M = action and maintenance

method to stimulate people's awareness or providing feedback about the benefits of appropriate dietary intake as well as the disadvantages of unhealthy dietary intake should be emphasized. Pros and cons of the peer persons should also be presented and disseminated. Among the contemplation stage groups, impact or consequences of their dietary intake practices should be evaluated or reviewed by themselves. Activities for the preparation stage groups should emphasize self-confidence and the activities for the action and maintenance stage groups should emphasize providing positive reinforcement. Finally, since the present study was carried out in different districts of the same province, the different contexts of the selected areas affect different behaviors, and the developing of a data-collecting instrument, the detailed study of the community's contexts should be done prior the development of the instrument, especially behaviors regarding dietary intake.

Potential conflicts of interest

None.

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การรับรู้ความสามารถตนเอง สมดุลการตัดสินใจและขั้นตอนการเปลี่ยนแปลงเกี่ยวกับการปฏิบัติในการบริโภคอาหารของผู้ที่มีภาวะอ้วนลงพุง จังหวัดอุทัยธานี

มณีรัตน์ ธีระวิวัฒน์, นิรัตน์ อิมามี, ทวีศักดิ์ คำกลึง

วัตถุประสงค์: *เพื่อศึกษาปัจจัยที่สัมพันธ์กับขั้นตอนการเปลี่ยนแปลงพฤติกรรมด้านการบริโภคอาหารของผู้ที่มีอาการเมตาบอลิกซินโดรม จังหวัดอุทัยธานี*

วัสดุและวิธีการ: *กลุ่มตัวอย่างของผู้ที่มีอาการเมตาบอลิกซินโดรม จำนวน 500 ราย ได้รับการคัดเลือกโดยวิธีการสุ่มตัวอย่างแบบสามขั้นตอนและเป็นผู้ที่สมัครใจในการตอบแบบสอบถามตามตัวแปรที่ศึกษา*

ผลการศึกษา: *พบว่ากลุ่มตัวอย่างส่วนใหญ่ ร้อยละ 36.4 มีการปฏิบัติด้านการบริโภคอาหารอยู่ในขั้นก่อนชั่งใจมีเพียงร้อยละ 17.4 อยู่ในขั้นลงมือปฏิบัติและขั้นกระทำอย่างต่อเนื่อง การรับรู้ความสามารถตนเอง สมดุลการตัดสินใจ ด้านดีและด้านที่เป็นอุปสรรคในการปฏิบัติด้านการบริโภคอาหารมีความสัมพันธ์ทางบวกกับขั้นตอน การเปลี่ยนแปลงอย่างมีนัยสำคัญทางสถิติ (Somers'd value = 0.21, 0.29 และ 0.09 โดยมีค่า p<0.01, <0.01 และ 0.015 ตามลำดับ)*

สรุป: *การรับรู้ความสามารถตนเอง สมดุลการตัดสินใจด้านดีและด้านที่เป็นอุปสรรค มีความสัมพันธ์ทางบวกกับขั้นตอนการเปลี่ยนแปลงด้านการบริโภคอาหารของผู้ที่มีอาการเมตาบอลิกซินโดรม ดังนั้นควรเน้นเรื่องของการรับรู้ความสามารถตนเอง สมดุลการตัดสินใจด้านดีและด้านที่เป็นอุปสรรคในการปฏิบัติด้านการบริโภคอาหาร ของผู้ที่มีอาการเมตาบอลิกซินโดรม ทั้งในขั้นก่อนชั่งใจ ขั้นลงมือปฏิบัติและขั้นกระทำอย่างต่อเนื่อง*