ORIGINAL ARTICLE

USE OF NONPRESCRIPTION SUBSTANCES AMONG UNIVERSITY STUDENTS IN MALAYSIA

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ABSTRACT

The trend of using nonprescription substances for weight-loss management is common. There are several factors associated with the use of nonprescription substances. This study aimed to determine prevalence and factors associated with the use of nonprescription substances for weight-loss management among university students. A cross sectional study was conducted from August until October 2013 among 358 postgraduate students aged 22 – 45 years in Universiti Kebangsaan Malaysia (UKM). A validated self-administered questionnaire was distributed by multistage sampling to the students. The prevalence of using nonprescription substances among university students was 27.9% (n=100). There were significant association between use of nonprescription substances with age (t=2.41, p=0.017), peer influence (t=7.06, p<0.001), media influence (t=4.38, p<0.001), marital status (t=2.41, p=0.017), BMI (x^2=23.72, p<0.001), body weight dissatisfaction (x^2=14.77, p<0.001) and experienced of conventional strategies (x^2=94.81, p<0.001). After controlling the confounders, BMI (Adj OR: 2.49, 95% CI: 1.42-4.36), peer influence (Adj OR: 1.09, 95% CI: 1.03-1.15) and experienced of conventional strategies (Adj OR: 9.25, 95% CI: 4.95-17.28) were positively associated with the use of nonprescription substances. In conclusion, the prevalence of nonprescription substances use among university students is common among overweight and obese, had peer influence and experienced of conventional strategies. Therefore, there is an urgent need to provide university students with education and access to scientific and unbiased information of nonprescription substances.

Keyword: Nonprescription substances, weight-loss, university students.

INTRODUCTION

Use of nonprescription substances for weight loss was defined as the use of any drug, tea, phytotherapy, nutritional supplement or dietary supplement[1], while in United States dietary supplements are deemed to be foods in terms of regulation[2] with the aim to reduce weight. A huge number of nonprescription substances are available at local drugstore, supermarket, health food store and even more options are available online. Most have not been proved effective, and some may be downright dangerous. Unlike drugs, nonprescription substances are mostly self-prescribed with no input from informed medical sources like doctors, nurses, or pharmacists.

The prevalence use of nonprescription substances in global ranged from 17.8% to 71.1%[3,4,5,6]. The use of nonprescription substances among Asian population is also common which ranged from 5.6% to 34.3% in Japan[7], Hong Kong (2.9%)[8], Taiwan (18.3%)[9] and Thailand (45%)[10]. In Malaysia, there is very limited study done regarding nonprescription substances used. From the study conducted in 2011 and 2002, the prevalence was 43%[11] and 58.9%[12].

There are several factors associated with the use of nonprescription substances. Majority of the studies showed that women are higher consumer compared to men[1,4,5,13]. User of nonprescription substances most common among aged 18-34 years old[1,4,13]. In term of marital status, many studies found there is no association with the use of nonprescription substances[4,6,14]. Not much data available to compare usage of nonprescription substances between ethnic groups. In Malaysia, one study found that Malays (44.3%) were more likely to try to lose weight compared to other ethnics' group[12]. Household income also found to be significant association with the use of nonprescription

substances[7,.11,15]. Another factor that contributes use of nonprescription substances is body mass index (BMI). The usage is common among obese compared to normal weight [1,5,11]. Many studies found that peer and media influence strongly associated with use of nonprescription substances[10,11,12]. Failure of conventional strategies such as increasing physical activity and healthy diet intake may contribute to the use of nonprescription substances. One study proved that the nonprescription substances were more likely to be used by those who reported a greater number of lifetime weight-loss attempts, tried a greater number of weight-loss products and methods[4].

The issue of weight-loss is extremely important in our society since the prevalence of obesity in Malaysia is increasing from year to year. Although there is a set of strategies and goals to manage obesity, but the effectiveness of this strategy does not match up to the individual's expectations. Therefore, use of nonprescription substance becomes a choice since a huge number of nonprescription substances are available at local drugstore, supermarket, health food store and even more options are available online. But the patterns and factors associated with use of nonprescription substances are not well known. Strong evidence supporting health advantages from these nonprescription substances also lacking. Therefore, it reinforces the need for studies to be done among Malaysian population.

The aim of this study is to determine the prevalence use of nonprescription substances and to determine and predict the association between use of nonprescription substances and socio-demographic/economic characteristics, anthropometric measurement, individual factors on perception of body weight, influence of peers, influence of media, product factors and experienced of conventional strategies

MATERIALS AND METHODS

Study design and sampling
This cross sectional study was conducted from August until October 2013 among postgraduate students aged 22 – 45 years in Faculty of Social Sciences and Humanities (FSSK), Faculty of Education (FEDU) and Faculty of Information Sciences and Technology (FSTM) in Universiti Kebangsaan Malaysia (UKM) Bangi Campus. This study was used multistage sampling. First stage, Universiti Kebangsaan Malaysia (UKM) main campus in Bangi was selected by convenience sampling. In the second stage, three faculties were randomly selected from nine faculties available in UKM Bangi campus and in the third stage, by using gender as a factor, 50% male students and 50% female students were chosen by stratified random sampling from each faculty selected in the second stage.

Sample size was calculated manually using Fleiss (1982)[16] method. Factor that is taken into account for the computation of sample size is gender as most studies show that there is association between gender and use of nonprescription substances for weight loss management. Based on the study done by Blanck et al. (2007)[6], proportion of use nonprescription substances in male is 0.029 (P_1), proportion of use nonprescription substances in female is 0.109 (P_2). The sample size required for this study is 349. With the estimated number for non-response rate is 20%, so the total sample size increased to 420 participants.

Study tools

The questionnaires consisted of eight parts:

Part 1: Socio-demographic / economic factors. This part contains basic demographic questions. These include the respondents' age, gender, ethnicity, marital status and household income.

Part 2: Anthropometric measurement. In this part, body weight of the respondents was measured to the nearest 0.1 kg with SECA Digital Flat Weighing Machine. Subjects were weighed barefoot wearing light clothing. Height was measured to the nearest 1 mm with a wall mounted height board with the following requirements: No shoes, heels together, and heels, buttocks, shoulders and head touching the wall with sight straight forward. The participants' body mass index (BMI) was calculated as body weight in kilogram divided by height in meters squared kg/m2) and classified based on the WHO[17] classification as follow: underweight, normal weight, overweight and obese.

Part 3: Individual factor. This part consists of two questions, one for women and one for men. The Figure Rating Scale (FRS) was used to examine body shape dissatisfaction in terms of the perceived current and ideal body image. This tool was originally developed by Stunkard and colleagues in 1983[18]. Participants were asked to select the body shape that they perceived as current body size (CBS) and ideal body size (IBS). Body weight dissatisfaction was calculated as the difference between the perceived current and ideal body shapes. A score of zero showed body satisfaction, while a negative score and positive score indicated body dissatisfaction.

Part 4: Influence of peers. It consists of seven items to examine the influences of friends; friends as a source of influence, friends concerns about body weight and image, friends' talks and pressure from peers to be thin. This part was used and consisted of five-point Likert scales answered with 1 (strongly disagree) to 5 (strongly agree). This variable was measured as continuous data. Validation of new sets of questionnaire was done with Cronbach's Alpha value is 0.80.

Part 5: Influence of media consists of six questions. The respondents were asked about the influencing of media in their decision to use of nonprescription substances; friends as a source of influence and idea to look attractive and thin. This part was used and consisted of five-point Likert scales answered with 1 (strongly disagree) to 5 (strongly agree). This variable was measured as continuous data. Validation of new sets of questionnaire was done with Cronbach's Alpha value is 0.74.

Part 6: Product factors. There are ten questions under general product factors which respondents need to answer about the nonprescription substances used, source of information of the nonprescription substances and any side effects experienced after used the nonprescription substances. Respondents will be asked eight questions about their knowledge regarding nonprescription substances used; about the benefits, the supervision as well as the law regulates the nonprescription substances. It's consisted of five-point Likert scales answered with 1 (strongly disagree) to 5 (strongly agree). This variable was measured as continuous data. Validation of new sets of questionnaire was done with Cronbach's Alpha value is 0.72.

Part 7: Experience of conventional strategies (such as physical activity, diet and combination of physical activity and diet). This part consist of five questions about weight-loss management respondent experienced before, the effectiveness of the weight-loss method

they tried and the reason if they want to change to nonprescription substances.

Outcome measurement
User of nonprescription substances means the participant has used at least one type of nonprescription substance for the last two years. For non-user, the participant never used nonprescription substances.

Data analysis
Data were analyzed using Statistical Package Social Science (SPSS) version 21.0. Normality of distribution was determined for all quantitative variables by histograms, Q-Q plots, skewness and kurtosis. The qualitative data analyzed using Pearson chi-square test, while quantitative data analyzed using independent samples T-test. A p-value of 0.05 was statistically significant. Multiple logistic regression was performed to assess the adjusted association of each variable. All the independent variables were included in the analysis. By comparing forward LR and backward LR, preliminary main effect model is obtained. In this model, variable BMI, peer influence and experienced of conventional strategies retained in the model. Multicollinearity and interaction term were checked and not found any significant interaction effect in the model. Then preliminary final model is obtained. The Nagelkerke R Square showed that about 41% of the variation in the outcome variable (use of nonprescription substances) is explained by this logistic model.

Goodness of fit in logistic regression models was generally measured using Hosmer–Lemeshow test, classification table and area under the ROC curve. From the Hosmer-Lemeshow test, the p-value is 0.151. It is >0.05, so there was no significant difference between the observed probability and the expected probability. From the classification table, sensitivity, specificity of model's prediction was obtained. In this context,

the overall correctly classified percentage is 84.4%. Area under the ROC curve shows the model's ability to discriminate between two outcomes.

In this context, it was significantly different from 0.5 (p<0.001). The model can accurately discriminate 84.8% of the cases. Thus, assumption is met and the model is fit. For checking the outliers, graph Cook's influence statistics versus predicted probability was plotted. The cut-off point for Cook's influence statistics was 1.0. In this data, none is more than 1.0. Therefore, there was no influential outlier.

Ethics
This study has been approved by the UKM Research Ethical Committee (UKMREC) (FF-197-2013). Consent was obtained from deans of the three faculties chosen and all the participants.

RESULTS

Baseline characteristics
A total of 358 questionnaires were returned, thus the response rate was 85.2%. Table 1 shows the characteristics of the respondents participated in this study. More than half of the participants were aged 22 – 33 years old, Malay, single and within normal weight (88.5%; 90.2%; 70.1%; 52.0%; respectively). This study showed that the prevalence of using nonprescription substances among university students was 27.9% (n=100) compared to non-user 72.1% (n=258). Of 100 respondents reported using nonprescription substances, 24.4% (n=43) were male and 31.3% (n=57) were female.

Table 1 Characteristic of respondents

Variable	n= 358	
	Mean (SD)	Number (%)
Age	27.46 (5.16)	-
22 - 33		317 (88.5)
34 - 45		41 (11.5)
Gender		
Female		182 (50.8)
Male		176 (49.2)
Ethnicity		
Malay		323 (90.2)
Others[a]		22 (6.1)
Chinese		11 (3.1)
Indian		2 (0.6)
Marital Status		
Single		251 (70.1)
Married		107 (29.9)
Faculty[b]		
FSSK		122 (34.1)
FSTM		120 (33.5)
FEDU		116 (32.4)
Household Income (RM)[c]	4119.35 (3220.31)	
Body Mass Index	24.46 (4.57)	
Normal (18.5-24.9kg/m^2)		186 (52.0)
Overweight (25-29.9kg/m^2)		113 (31.6)
Obese (>30.0 kg/m^2)		36 (10.1)
Underweight (<18.5kg/m^2)		23 (6.4)

[a] Sabahan and Sarawakian
[b] FSSK = Faculty of Social Sciences and Humanities, FEDU = Faculty of Education,
 FSTM = Faculty of Information Sciences and Technology
[c] n= 214

As for the types of nonprescription substances used, results showed that dietary supplements usage 97.0% (n=97) is more common compared to non dietary supplements 3.0% (n=3). Majority of the participants took dietary supplement in a powder form (59.0%) compared to other types of nonprescription substances (Table 2).

Association between uses of nonprescription substances and all factors.
Table 3 shows the association between uses of nonprescription substances and all factors. There were significant association between use of nonprescription substances with age (t=7.80, p=0.005), peer influence (t=7.06, p<0.001), media influence (t=4.38, p<0.001), marital status (t=2.41, p=0.017), BMI (x^2=23.72, p<0.001), body weight dissatisfaction (x^2=14.77, p<0.001) and experienced of conventional strategies (x^2=94.81, p<0.001). Gender, ethnicity, household income and product factors did not significantly influence the practice of taking nonprescription substances among university students.

Table 2 Types of nonprescription substances used among university students

Nonprescription Substances	n= 100		
	Male, n (%)	Female, n (%)	Total, n (%)
Dietary Supplements[a]			97 (97.0)
Pill	12 (12.0)	11 (11.0)	23 (23.0)
Powder	23 (23.0)	36 (36.0)	59 (59.0)
Liquid	0 (0.0)	1 (1.0)	1 (1.0)
Teas	7 (7.0)	7 (7.0)	14 (14.0)
Non Dietary Supplements[b]			3 (3.0)
Drugs	0 (0.0)	1 (1.0)	1 (1.0)
Cream	1 (1.0)	1 (1.0)	2 (2.0)

[a]. Defined and regulated as foods which intended to be used for weight control, as well as all herbal supplements not required pre-market approval.
[b]. Defined as supplements intended to be used for weight control required pre-market approval

Predictors toward use of nonprescription substances for weight-loss management

Multiple logistic regression was performed to determine the predictors toward nonprescription substances use. After controlling the confounders, only overweight and obese (Adj OR: 2.49, 95% CI: 1.42-4.36), had peer influence (Adj OR: 1.09, 95% CI: 1.03-1.15) and had experienced of conventional strategies (Adj OR: 9.25, 95% CI: 4.95-17.28) were positively associated with the use of nonprescription substances (Table 4). So, the logistic model to predict nonprescription substances use is given by:

Logit of Use Nonprescription Substances = - 4.284 + (2.49 * overweight and obese) + (1.09 * peer influence) + (9.25 * experienced of conventional strategies).

DISCUSSION

The prevalence of using nonprescription substances within two years among university students in this study was 27.9% comparable with study done among university students in Jordan which was 27.4%[5]. This result also parallel with the prevalence reported in United States and Korean students which is ranged from 31.3% – 33.9%[4,13,19]. In contrast, the finding is lower than the prevalence reported by other studies done in Malaysia with the rate varying from 43% – 58.9%[11,12]. The lesser use of nonprescription substances by university students might be explained by the fact that they are aware of health and healthy lifestyle and the sample size used. Regarding types of nonprescription used among university students, the majority of them consumed dietary supplement in powder form 59.0%, followed by pill form 23.0% and slimming teas 14.0%.

This finding in contrast with the result from one study done in Malaysia that found the most popular weight-loss substances used were slimming teas (24.9%), vitamin or health supplements (21.9%) and chitosan (19.0%)[12].

In this study, students with aged 34 – 45 years old prone to use nonprescription substance with odd 2.5 times more compared to students aged 22 – 33 years old. A survey conducted among general public in Malaysia shared the similar finding, those between aged 40 - 49 years old are more likely to try to lose weight[12]. Another study in Malaysia found that age did not significantly influence the practice of taking nonprescription substances[11].

Table 3 Association between use of nonprescription substances for weight loss management and all factors

Variables	Nonprescription substances, n (%)		Crude OR (95% CI OR)	t-value / x^2-value	p-value
	Users (N=100)	Non-users (N=258)			
Age				7.80^c	0.005^{c*}
• 22 - 33	81 (25.6)	236 (74.4)	1		
• 34 - 45	19 (46.3)	22 (53.7)	2.52 (1.30, 4.89)		
Gender				2.11^c	0.147^c
• Female	57 (31.3)	125 (68.7)	1.41 (0.89, 2.25)		
• Male	43 (24.4)	133 (75.6)	1		
Ethnicity				0.50^c	0.481^c
• Malay	92 (28.5)	231 (71.5)	1.34 (0.59, 3.07)		
• Non-Malay	8 (22.9)	27 (77.1)	1		
Marital Status				5.50^c	0.019^{c*}
• Single	61 (24.3)	190 (75.7)	1		
• Married	39 (36.4)	68 (63.6)	1.79 (1.10, 2.91)		
Household Income (RM)[d]	4269.25 (2960.94)[a]	4055.39 (3332.39)[a]	1.00 (1.00, 1.00)	0.44^b	0.658^b
Body Mass Index				23.72^c	$<0.001^{c*}$
• Non-Obese	38 (18.2)	171 (81.8)	1		
• Overweight & Obese	62 (41.6)	87 (58.4)	3.21 (1.99, 5.18)		
Peers Influence	22.24 (5.14)[a]	17.74 (5.51)[a]	1.16 (1.11, 1.22)	7.06^b	$<0.001^{b*}$
Media Influence	19.78 (5.23)[a]	17.04 (5.33)[a]	1.10 (1.05, 1.15)	4.38^b	$<0.001^{b*}$
Knowledge on Product	26.15 (4.40)[a]	25.33 (5.00)[a]	1.04 (0.99, 1.09)	1.62^b	0.110^b
Body Weight Dissatisfaction[e]				14.77^c	$<0.001^{c*}$
• Satisfied	14 (13.6)	89 (86.4)	1		
• Dissatisfied	86 (33.7)	169 (66.3)	3.24 (1.74, 6.02)		
Experienced of Conventional Strategies				94.81^c	$<0.001^{c*}$
• Yes	83 (55.0)	68 (45.0)	13.64 (7.56, 24.63)		
• No	17 (8.2)	190 (91.8)	1		

[a]. Mean (SD),[b.] Independent t-test,[c]. Pearson Chi-square test,[d]. n = 214
[e]. Body Weight Dissatisfaction= Current Body Size (CBS) - Ideal Body Size (IBS)
(0 = Satisfied, >0 or <0 = Dissatisfied)
[*].Significant at $p <0.05$

Table 4 Predictors with use of nonprescription substances for weight loss management

Variables	Regression Coefficient (b)	Adj OR[a] (95% CI OR)	x^2 stats. (df)[b]	p value[b]
BMI				
Overweight & Obese vs Non obese	0.91	2.49 (1.42, 4.36)	10.17 (1)	0.001
Peers Influence	0.08	1.09 (1.03, 1.15)	8.96 (1)	0.003
Experienced of Conventional Strategies				
Have experienced vs do not have experienced	2.22	9.25 (4.95, 17.28)	57.78 (1)	<0.001

[a].Adj. OR = Adjusted Odds Ratio (Forward LR Multiple Logistic Regression was applied.
[b]. Likelihood Ratio (LR) test
Multicollinearity and interaction term were checked and not found.
Hosmer-Lemeshow test, (p=0.151)
Classification table (overall correctly classified percentage=84.4%)
Area under the ROC curve (84.8%) were applied to check the model fitness

Two studies indicated that younger adult aged 18 – 34 years were significantly more likely to be users [4,13]. The effects of age on use of nonprescription substances may be due to desire to look attractive, thin and also the exposure to the nonprescription substances available in the market from the peers, media and family members. Besides that, students aged 34 – 45 years old generally have more stable income to buy nonprescription substances.

Regarding marital status, this study found that married students prone to use nonprescription substance with odd 1.8 times more compared to single students. This finding is contrast with finding reported by several studies indicated that there were no significant association between marital status and use of nonprescription substances for weight-loss [1,6,14]. The difference is because some

study due to enhance physical appearance in order to look attractive in front of the spouse , only focusing on certain group of people, sample size used and limitation of time which commitment to the family and as a student.

Regarding BMI and use of nonprescription substances, this study found that overweight and obese student prone to use nonprescription substance with odd 3.2 times more compared to non-obese students. By controlling the confounders, the odds (chance) to use nonprescription substances reduced from 3.2 times to 2.5 times. Similar findings were reported by several studies that have done before [1,11,14,19]. There are many reasons why overweight and obese people seek nonprescription substances for weight loss; easily available, less demanding than exercise and diet and increasing awareness of health problems associated with being overweight or obesity and the widely publicized concept that being thin

is attractive. But it differ from the study done in Tehran and Jordan [5,14]. In addition to the association between BMI and nonprescription substances usage, this observation also related to the body weight dissatisfaction. Findings from this study demonstrated that students who dissatisfied with their body weight prone to use nonprescription substance with odd 3.2 times more compared to those who satisfied. It was also found in other study that body image dissatisfaction has positive relationship with use of nonprescription substance [1,4,20]. Body weight dissatisfaction among university makes them more likely to use of nonprescription substances to lose weight because they want to improve their appearance and concerned with their bodies.

Peer influences and media influences also play a role in the decision to take nonprescription substances by the students in this study. This study showed that with one unit increase in peer and media influence there was 1 times the odds (chance) to use nonprescription substances. This finding is similar to that observed by Paweena Yuktanonda and Kullaya Pisitsungkagarn[20], indicated that peer and media influences has positive relationship with diet pill usage (p<0.01). About the source of information on nonprescription substances, this study found that 41.0% got the information about nonprescription substances from media and 33.0% from peer influence. This finding higher than from the study conducted by Al-Naggar and Chen[11] among Management & Science University (MSU) students in Malaysia. Pressure from peers to be thin, advertisements featuring in the magazines and on the internet as well as misleading claim about the nonprescription substances were the commonest factors that contribute to greater trend of using it.

In term of experienced of conventional strategies, this study found that students had experienced of conventional strategies 13.6 times the odds (chance) to use nonprescription substances compared to who do not had experienced. By controlling the confounders, the odds (chance) to use nonprescription substances reduced from 13.6 times to 9.3 times. Pillitteri et al.[4] proved that the nonprescription substances were more likely to be used by those who reported a greater number of attempts compared to those who had not. Usually conventional strategies may take a longer time to be effective and it needs a lot of commitment. Therefore, many people switch to other method in order to achieve the targeted weight that set up by them. This study found that gender, ethnicity, household income and product factors did not play a role in use of nonprescription substances among university students.

This study had several limitations including the sample was recruited among students in UKM only, thus it could not represent the whole population and cross-sectional design limits the conclusions regarding causal relationships. However a cross-sectional one could be enough to achieve association between use of nonprescription substance with specific factor which was our main objective. Despite of the limitations, the intended sample size in this study was fulfilled according to earlier calculation. Future studies need to examine large sample size, representative samples of different age groups in order to represent the diversity of both students and other young adults in the Malaysia. This might imply that further study should also investigate the incidence of nonprescription substances used among non-student populations in the Malaysia. There are very few proven choices in nonprescription medications for effective weight loss and many of these products have not been adequately studied for effectiveness or safety. Priority should be

given to promote research on the safety and effectiveness of commonly used nonprescription substances.

CONCLUSION

In conclusion, the prevalence use of nonprescription substances among university students is low. This study revealed that students who are overweight and obese, had peer influence and experienced of conventional strategies were more likely to use nonprescription substances. Many of them do not have accurate information about nonprescription substances. Therefore, there is an urgent need to provide university students with education and access to scientific and unbiased information. Health education strategy is one of the important aspects in the public health context. There are many ways that public health people can do to control the usage of nonprescription substances. For example, promotion of healthy behaviors for weight-loss management, develop a proper guide for nonprescription substances use and provide scientific based evidence by doing research regarding this matter.

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