

## Original Article

# Trying to lose weight among non-overweight university students from 22 low, middle and emerging economy countries

Karl Peltzer PhD<sup>1,2,3</sup>, Supa Pengpid DrPH<sup>1,4</sup>

<sup>1</sup>ASEAN Institute for Health Development, Mahidol University, Salaya, Phutthamonthon, Nakhonpathom, Thailand

<sup>2</sup>Department of Psychology, University of Limpopo, Turfloop Campus, Sovenga, South Africa

<sup>3</sup>HIV/AIDS/STIs and TB (HAST), Human Sciences Research Council, Private Bag X41, Pretoria, South Africa

<sup>4</sup>Department of Research Innovation and Development, University of Limpopo, Turfloop Campus, Sovenga, South Africa

The aim of this study was to assess the prevalence of trying to lose weight among non-overweight in university students and its sociodemographic and behavioural factors from 22 low and middle income and emerging economy countries. In a cross-sectional survey we took anthropometric measurements and used a self-administered questionnaire among 15997 undergraduate university students (mean age 20.8, Standard deviation=2.8, age range of 16-30 years) from 22 universities in 22 countries. Body mass index (BMI) was used for weight status. Results indicate that 27.1% non-overweight students were trying to lose weight, 34.6% among women and 16.5% among men. Among underweight or normal weight students, 19.0% perceived themselves to be overweight, 11.3% were dieting to lose weight, and 53.5% considered to lose weight of high importance. Multivariate logistic regression found that being female, coming from a low income country, the perception of being overweight, high importance of losing weight, dieting to lose weight, trying to eat fibre, and avoiding foods with fat and cholesterol were associated with trying to lose weight in non-overweight university students. The study found a high prevalence of weight control practices and several specific risk factors were identified that can be utilized in interventions to target unhealthy weight control measures.

**Key Words:** trying to lose weight, non-overweight, behavioral factors, university students, 22 countries

## INTRODUCTION

Western influences, urbanization, advanced education, and nutrition transition in rapidly developing and emerging economy countries may have led to greater dissatisfaction with one's weight and body proportions.<sup>1-4</sup> In general, the ideal body image may be perceived as a "thin body" and now tagged with the concept of being physically fit.<sup>5-8</sup> A growing concern about ideal body image in developing countries may have led to follow dietary modifications, dieting more frequently, self-induced vomiting, and the use of laxatives and exercise as weight-loss strategies.<sup>5,7,9</sup> Lam et al<sup>10</sup> note that "a culture of thinness appears to be associated with weight loss efforts among girls in modernising cultures independent of body dissatisfaction." Adolescents and young adults, including university students, may be vulnerable to sociocultural influences promoting thinness (parental, peer and media pressures for thinness, and individual value for modernity) and dieting practices to lose weight.<sup>9,10</sup>

Few studies have investigated weight control practices among non-overweight university students. In a study among university students in Lebanon, the overall prevalence of students trying to lose weight was 30%, with 71% of them being under weight or normal weight,<sup>11</sup> and

among Mexican undergraduate university students, it was found that a quarter tried to lose weight even though they did not perceive or were actually overweight.<sup>12</sup> Latimer et al<sup>13</sup> reported that 28% of college students in the United States (US) who indicated they were under- or about right weight were trying to lose weight, and among US adults, 30% of males and 42% of females who perceived themselves as underweight or normal weight, practiced weight control behaviours.<sup>14</sup>

Factors associated with trying to lose weight among non-overweight adults mainly included 1) sociodemographic factors (females,<sup>11,12</sup> employed,<sup>11</sup> in a fraternity/sorority,<sup>13</sup> registered in a private university;<sup>11</sup> and 2) behavioral factors such as overweight perception,<sup>14</sup> dieting to lose weight,<sup>13</sup> consumption of < or = 2 servings/day

**Corresponding Author:** Prof Karl Peltzer, ASEAN Institute for Health Development, Mahidol University, 25/25 Phutthamonthon Road 4, Salaya, Phutthamonthon district, Nakhon-Pathom 73170, Thailand.

Tel: +66 2-441-0207; Fax: +66 2-4419044

Email: karl.pel@mahidol.ac.th

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of high-fat foods,<sup>15</sup> skipping meals,<sup>16</sup> engaging in vigorous physical activity,<sup>13,15</sup> and current cigarette use.<sup>17</sup>

The purpose of this study was to assess the prevalence of trying to lose weight among non-overweight and its sociodemographic and behavioural factors in university students from 22 low and middle income and emerging economy countries.

## METHODS

### *Sample and procedure*

This cross-sectional study was carried out with a network of collaborators in participating countries (see Acknowledgments). The anonymous, self-administered questionnaire used for data collection was developed in English, then translated and back-translated into languages (Arabic, Bahasa, French, Lao, Russian, Thai, Turkish) of the participating countries. The study was initiated through personal academic contacts of the principal investigators. These collaborators arranged for data to be collected from 400 male and 400 female undergraduate university students aged 16-30 years by trained research assistants in 2013 in one university in each of their respective countries. The universities involved were located in the capital cities or other major cities in the participating countries. Research assistants working in the participating universities asked classes of undergraduate students to complete the questionnaire at the end of a teaching class. Classes were recruited according to timetable scheduling in a quasi-random fashion. The students who completed the survey varied in the number of years for which they had attended the university. A variety of majors were involved, including education, humanities and arts, social sciences, business and law, science, engineering, manufacturing and construction, agriculture, health and welfare and services. Informed consent was obtained from participating students, and the study was conducted in 2013. Participation rates were in most countries over 90%. Ethics approvals were obtained from institutional review boards from all participating institutions.

### *Measures*

#### **Anthropometric measurements**

Students were weighed and measured by trained researchers using standardised procedures.<sup>18</sup> Standing height of each student was measured to the nearest 0.1 cm without shoes, using a stature meter. Participants were weighed to the nearest 0.01 kg, in their light clothes, on a load-cell-operated digital scale having a weighing capacity of 140 kg. The scale used during the survey was first calibrated with a standard weight and checked on a daily basis.<sup>19</sup> Body mass index (BMI) was calculated as weight in kg divided by height in metre squared. BMI was used as an indicator of overweight ( $\geq 23.0$ - $27.4$  kg/m<sup>2</sup>) and obesity ( $\geq 27.5$  kg/m<sup>2</sup>) in the South and East Asian participants<sup>20</sup> and for the other countries, overweight and obesity was defined as BMI= $25.0$ - $29.9$  kg/m<sup>2</sup> and  $\geq 30$  kg/m<sup>2</sup>, respectively.<sup>21</sup> Underweight was classified as BMI $<18.5$  kg/m<sup>2</sup>.<sup>21</sup>

#### **Socio-demographic questions**

Socio-demographic questions included age, gender, and socioeconomic background were assessed by rating their

family background as wealthy (within the highest 25% in "country", in terms of wealth), quite well off (within the 50% to 75% range for their country), not very well off (within the 25% to 50% range from "country"), or quite poor (within the lowest 25% in their country, in terms of wealth).<sup>22</sup>

#### **Behavioural factors**

Dietary behaviour variables: (a) trying to lose weight; (b) dieting to lose weight; (c) trying to avoid eating foods that contain fat and cholesterol (yes, no); (d) trying to eat foods that are high in fibre (yes, no); (e) frequency of having breakfast; (f) frequency of between-meal snacks and (g) number of meals a day.<sup>22</sup>

Fruit and vegetable (FV) consumption was assessed with two questions "How many servings of fruit do you eat on a typical day?" and "How many servings of vegetables do you eat on a typical day?" using the 24-h dietary recall data as the gold standard.<sup>23</sup> Insufficient fruit and vegetables (FV) consumption was defined as less than 5 servings of fruits and/or vegetables a day.<sup>23</sup>

Body weight perception of body image was assessed by asking students if they considered themselves to be "very overweight", "slightly overweight", "about right", "slightly underweight" or "very underweight".<sup>22</sup> Additional dietary variables included two importance ratings, "how important do you feel it is to keep your body weight within the normal range", and "how important do you feel it is to lose weight". Response options ranged from 1=of very low importance to 10=of very great importance.

Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ) short version, self-administered for the last 7 days (IPAQ-S7S). We used the instructions given in the IPAQ manual for reliability and validity, which is detailed elsewhere.<sup>24</sup> We also used the recommended categorical score, three levels of physical activity (low, moderate and high) as proposed in the IPAQ Scoring Protocol (short form).<sup>24</sup>

Tobacco use was assessed with the question: do you currently use one or more of the following tobacco products (cigarettes, snuff, chewing tobacco, cigars, etc.)? Response options were "yes" or "no".<sup>25</sup>

## RESULTS

### *Sample characteristics*

The total sample included 15746 undergraduate university students (mean age 20.8, SD=2.8, age range of 16-30 years) from 22 countries. Table 1 shows the number of participants in each university or country, the proportion of students classified as BMI underweight (14.9%) and normal weight (63.1%), and among those who are underweight or have a normal weight (n=12484), the proportion of students who are trying to lose weight. Overall, 27.1% non-overweight students were trying to lose weight; this was significantly higher among women (34.6%) than men (16.5%). There was a wide country variation on trying to lose weight ranging from 9.5% in Laos to 34.5% in Mauritius. The rate of trying to lose weight among non-overweight students was below 20% in countries of the Caribbean and South America (Barbados, Jamaica, Colombia and Venezuela) and sub-Saharan (continental) Africa (Ivory Coast, Namibia, Nigeria and

South Africa), while the rate of trying to lose weight was above 20% among students in North Africa, Near East and Central Asia (Egypt, Tunisia, Turkey, Russia, Kyrgyzstan) and most other Asian countries (Bangladesh, Pakistan, Philippines, Singapore and Thailand). Among female university students, the highest proportions of trying to lose weight were in Singapore and Bangladesh (>48%). In some countries, including Jamaica, Ivory Coast, Namibia, and Bangladesh, no significant gender differences were found in terms of trying to lose weight (see Table 1). Further, among underweight or normal weight students, 19.0% perceived themselves to be overweight, 11.3% were dieting to lose weight (36.1% among those who were trying to lose weight), 53.5% considered to lose weight of high importance, 56.3% felt it was of high importance to keep the body weight within the normal range, 37.2% were trying to eat foods rich in fibre, 36.8% tried to avoid eating foods with fat and cholesterol, and 80.2% had not eaten the expected 5 or more times fruits and/or vegetables (see Table 2).

#### **Association with non-overweight university students who are trying to lose weight**

Multivariable logistic regression found that being women, coming from a low income country, the perception of

being overweight, high importance of losing weight, dieting to lose weight, trying to eat fiber, and avoiding foods with fat and cholesterol were associated with trying to lose weight in non-overweight university students (see Table 2).

#### **DISCUSSION**

The study found, among university students from 22 low and middle income and emerging economy countries, a prevalence of weight control practices that compares with previous studies in middle and high income countries.<sup>11-14</sup> The possibility that a large proportion of non-overweight university students across Asia, Africa and the Americas engaged in unhealthy weight control practices is cause of concern, and specific interventions to target unhealthy weight control measures should be promoted. The study found a wide country variation in trying to lose weight. Attempts to lose weight were highest in the group of Asian countries (Bangladesh, Pakistan, Philippines, Singapore and Thailand), where body weights have generally been low, suggesting that local culture and norms could moderate attitudes to weight.<sup>22</sup> The patterning for trying to lose weight was more diverse with men and women from Asian countries (Singapore and Bangladesh), showing more than 48% trying to lose weight.<sup>22</sup> On the other

**Table 1.** Sample, BMI underweight and normal weight status and trying to lose weight in university students

Country	Total sample			Sub-sample: BMI under or normal weight			p value
	N	BMI underweight	BMI normal weight	All trying to lose weight	Men trying to lose weight	Women trying to lose weight	
All	15746	2310 (14.9)	9941 (63.1)	3336 (27.1)	832 (16.5)	2494 (34.6)	<0.001
Caribbean and South America							
Barbados <sup>¶</sup>	577	49 (8.5)	297 (51.5)	60 (11.4)	21 (11.7)	39 (29.5)	<0.001
Jamaica <sup>§</sup>	675	67 (9.9)	420 (62.2)	96 (14.3)	17 (14.9)	79 (21.5)	0.126
Colombia <sup>§</sup>	810	44 (5.4)	560 (69.1)	152 (18.8)	37 (14.7)	115 (32.7)	<0.001
Venezuela <sup>§</sup>	444	44 (9.9)	309 (69.6)	81 (19.2)	18 (13.7)	63 (28.4)	0.002
Sub-Saharan Africa							
Ivory Coast <sup>‡</sup>	777	80 (10.3)	606 (78.0)	136 (18.1)	65 (18.2)	71 (23.3)	0.104
Madagascar <sup>†</sup>	780	141 (18.1)	599 (76.8)	167 (21.6)	51 (13.9)	116 (31.7)	<0.001
Mauritius <sup>§</sup>	461	149 (32.3)	252 (54.7)	158 (34.5)	36 (30.8)	122 (43.3)	0.020
Namibia <sup>§</sup>	466	73 (15.7)	303 (65.0)	76 (16.4)	21 (23.1)	48 (19.3)	0.441
Nigeria <sup>‡</sup>	800	116 (14.5)	578 (72.2)	97 (12.7)	35 (9.5)	62 (21.3)	<0.001
South Africa <sup>§</sup>	749	49 (6.5)	470 (62.8)	108 (15.3)	35 (14.4)	72 (30.0)	<0.001
North Africa, near east and central Asia							
Egypt <sup>‡</sup>	696	27 (3.9)	379 (54.5)	141 (20.5)	33 (21.2)	108 (43.9)	<0.001
Tunisia <sup>§</sup>	961	57 (6.2)	618 (67.5)	210 (23.8)	45 (22.1)	164 (37.5)	<0.001
Turkey <sup>§</sup>	795	76 (9.6)	570 (71.7)	178 (22.5)	35 (11.6)	143 (41.7)	<0.001
Russia <sup>§</sup>	785	108 (13.8)	543 (69.2)	172 (22.0)	27 (9.9)	145 (38.8)	<0.001
Kyrgyzstan <sup>†</sup>	814	135 (16.6)	604 (74.2)	188 (23.1)	20 (6.4)	168 (39.3)	<0.001
South Asia							
Bangladesh <sup>†</sup>	649	76 (11.7)	351 (54.1)	204 (32.1)	92 (48.2)	111 (48.7)	0.916
India <sup>‡</sup>	800	99 (12.4)	406 (50.8)	130 (16.4)	71 (22.0)	59 (33.0)	0.008
Pakistan <sup>‡</sup>	761	259 (34.0)	388 (51.0)	211 (27.7)	76 (24.4)	135 (40.3)	<0.001
Southeast Asia							
Laos <sup>‡</sup>	759	164 (21.6)	439 (57.8)	72 (9.5)	7 (3.5)	65 (16.0)	<0.001
Philippines <sup>‡</sup>	769	194 (25.2)	402 (52.3)	187 (24.5)	20 (15.4)	167 (36.1)	<0.001
Singapore <sup>¶</sup>	678	134 (19.8)	394 (58.1)	181 (26.8)	35 (15.3)	146 (49.7)	<0.001
Thailand <sup>§</sup>	785	169 (21.5)	453 (57.7)	227 (29.0)	31 (19.7)	196 (42.2)	<0.001

<sup>†</sup>Low income country; <sup>‡</sup>Lower middle income country; <sup>§</sup>Upper middle income country; <sup>¶</sup>High income country (Source: World Bank, New Country Classifications, 2013. <http://data.worldbank.org/news/new-country-classifications>).

**Table 2.** Logistic regression with trying to lose weight among non-overweight university students

Variables	Unadjusted odds ratio	Adjusted odds ratio
Socio-demographics (N or M, % or SD)		
Age in years		
16-19 (3921, 32.7)	1.00	1.00
20-21 (4585, 38.3)	0.93 (0.85-1.02)	1.05 (0.91-1.20)
22 or more (3478, 29.0)	0.72 (0.62-0.80)***	0.90 (0.77-1.04)
Gender		
Men (5129, 41.3)	1.00	1.00
Women (7302, 58.7)	2.68 (2.45-2.93)***	1.95 (1.71-2.21)***
Wealth		
Wealthy (526, 4.3)	1.00	1.00
Quite well off (5990, 48.8)	0.93 (0.77-1.13)	1.08 (0.79-1.47)
Not well off (4738, 38.6)	0.77 (0.63-0.93)**	0.91 (0.66-1.25)
Poor (1033, 8.4)	0.63 (0.50-0.80)***	0.97 (0.66-1.41)
Country income		
Low income (1906, 16.9)	1.00	1.00
Lower middle income (4137, 36.7)	0.75 (0.67-0.85)***	0.74 (0.61-0.89)**
Upper middle income (4892, 43.4)	0.93 (0.82-1.04)	0.81 (0.67-0.98)*
High income (346, 3.1)	0.57 (0.42-0.77)***	1.03 (0.76-1.33)
Behavioural factors		
Body image-overweight (2285, 19.0)	13.2 (11.9-14.8)***	8.40 (7.34-9.60)***
Importance to keep body weight within the normal range		
Low (1-8) (5327, 43.7)	1.00	1.00
High (9-10) (6876, 56.3)	1.72 (1.58-1.87)***	1.09 (0.96-1.24)
Importance to lose weight		
Low (1-5) (5618, 46.5)	1.00	1.00
High (6-10) (6451, 53.5)	5.10 (4.03-5.61)***	3.00 (2.63-3.43)***
Dieting to lose weight (1357, 11.3)	31.5 (26.4-37.5)***	18.8 (15.2-23.2)***
Trying to eat fibre (4502, 37.2)	2.03 (1.87-2.21)***	1.49 (1.31-1.68)***
Avoids fat and cholesterol (4511, 36.8)	2.92 (2.69-3.17)**	2.01 (1.78-2.27)**
Fruit and vegetable (<5 or more/day) (9117, 80.2)	0.85 (0.77-0.94)***	0.96 (0.82-1.11)
Number of meals a day (2.7, 0.7)	0.94 (0.89-0.99)*	0.97 (0.90-1.06)
Skipping breakfast (5722, 46.1)	1.02 (0.94-1.11)	---
Number of in-between snacks (1.5, 0.9)	1.03 (0.98-1.08)	---
Physically active (6607, 52.9)	0.95 (0.88-1.03)	---
Current tobacco user (1405, 12.3)	0.89 (0.78-1.01)	---

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ ; CI=Confidence interval.

hand, also high rates of trying to lose weight were found in students from Egypt, Tunisia, Turkey, Russia, and Kyrgyzstan, in countries where body weights may have generally been higher. The overall lowest rates of trying to lose weight among non-overweight students were in countries of the Caribbean and South America (Barbados, Jamaica, Colombia and Venezuela), and sub-Saharan (continental) Africa (Ivory Coast, Namibia, Nigeria and South Africa). This may be explained by a higher body weight ideal in these cultures.<sup>2</sup>

Overall, non-overweight students who are trying to lose weight were more likely to be women and from a low income country. The higher prevalence in females may be expected and concurs with previous studies.<sup>11,12</sup> This finding may be attributed to a greater pressure and influence of society and media on women to have a low body weight.<sup>13</sup> However, in a few study countries of this survey including Jamaica, Ivory Coast, Namibia, and Bangladesh, no gender differences were found in terms of trying to losing weight. Future studies that focus on the prevalence of weight control among non-overweight men can be beneficial, especially to understand weight perceptions and dieting behaviour, and to tailor interventions accordingly.<sup>13</sup>

A surprising was the finding that trying to lose weight

among non-overweight university students was more prevalent in students from lower than higher income countries. It is possible that university students in low income countries are more privileged to enter a university than in higher income countries, and more sociocultural pressure on the thinness ideal is placed on students in these countries. In a previous study,<sup>11</sup> being registered in a private university was associated with trying to lose weight. This finding is confirmed in this study in the example of Bangladesh, where the study sample included students from a private university; Bangladesh is a low income country and it had a high prevalence of trying to lose weight among both women and men.

In agreement with previous studies,<sup>13,14</sup> this study found that behavioral factors such as overweight perception and dieting to lose weight were highly associated with trying to lose weight in the non-overweight students. Of concern is that students who are non-overweight, very many are dieting to lose weight, which is unnecessary and even be unhealthy. It is interesting that the high importance of losing weight was highly associated with trying to lose weight, while the importance to keep the body weight within the normal range was not associated. It appears the emphasis here is on losing weight irrespective of having normal or underweight and keeping the body

weight within the normal range. The study further found other dietary behaviours including trying to eat fiber and avoiding foods with fat and cholesterol was associated with trying to lose weight in non-overweight university students. This dietary behavior seems to reflect the health promotion evidence, which was also found in other studies.<sup>15,16</sup> In bivariate analyses, sufficient fruit and vegetable consumption and having less number of meals in a day were associated with trying to lose weight. Future studies may explore further if barriers to eating fruits and vegetables differ between students who are trying to lose weight or not.<sup>13</sup>

Having fewer meals a day, but not skipping breakfast could be suggestive of an 'unhealthy response to weight loss pressures.<sup>26</sup> Contrary to some previous studies,<sup>13,15,17</sup> this study did not find any relationship between current tobacco use, engaging in physical activity and trying to lose weight. This study population seems not to engage in increased physical activity, which can be an effective way to lose weight.<sup>27</sup>

### Study limitations

This study had several limitations. The study was cross-sectional, so causal conclusions cannot be drawn. The investigation was carried out with students from one university in each country, and inclusion of other centres could have resulted in different results. University students are not representative of young adults in general, and the weight control prevalence and its risk factors may be different in other sectors of the population. Apart from anthropometric measurements, a limitation of the study was that all the other information collected in the study was based on self-reporting. It is possible that certain behaviours were under or over reported. The study item "dieting to lose weight" in this study did not further define the specific dieting methods used to lose weight,<sup>9</sup> which should be included in future studies.

### Conclusion

The study found a high prevalence of trying to lose weight in a large sample of non-overweight university students from Africa, Asia and the Americas. Several risk factors for weight control in non-overweight university students were identified, which can be utilized, together with a greater tolerance of normal body weight, in health promotion programmes, especially among female university students.<sup>26</sup>

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## Original Article

## Trying to lose weight among non-overweight university students from 22 low, middle and emerging economy countries

Karl Peltzer PhD<sup>1,2,3</sup>, Supa Pengpid DrPH<sup>1,4</sup>

<sup>1</sup>ASEAN Institute for Health Development, Mahidol University, Salaya, Phutthamonthon, Nakhonpathom, Thailand

<sup>2</sup>Department of Psychology, University of Limpopo, Turfloop Campus, Sovenga, South Africa

<sup>3</sup>HIV/AIDS/STIs and TB (HAST), Human Sciences Research Council, Private Bag X41, Pretoria, South Africa

<sup>4</sup>Department of Research Innovation and Development, University of Limpopo, Turfloop Campus, Sovenga, South Africa

### 来自中低新兴经济体国家的非超重大学生试图减肥

本研究的目的是评估来自 22 个中低新兴经济体国家的非超重大学生试图减肥的发生率和引起他的社会人口和行为因素。在这个横断面调查中，我们测量了来自 22 个国家 22 所大学的 15,997 名本科生（平均年龄 20.8 岁，标准差为 2.8，年龄范围为 16-30 岁）的人体指标，每个志愿者填写了问卷。用体质指数（BMI）评估体重状况。结果显示 27.1% 的非超重学生在试图减肥，其中女生有 34.6%，男生有 16.5%。在低体重或正常体重的学生中，19.0% 的人认为自己超重，11.3% 的人在节食减肥，53.5% 的人认为减肥很重要。多重 logistic 回归分析发现：来自低收入国家的女性、认为自己超重、减肥很重要、节食减肥、想要吃膳食纤维而避免吃含脂肪和胆固醇的食物与非超重大学生试图减肥有关。本研究发现确定了体重控制的做法和几个具体风险因素的高发生率，这个结果可用于对目标不健康体重控制措施的干预。

**关键词：**试图减肥、非超重、行为因素、大学生、22 个国家