

Impact of self-perception image on using over-the-counter medications for weight control in Saudi female undergraduates

Azza A.K. El-Sheikh<sup>1,2,\*</sup>, Faten A. AlRadini<sup>3</sup>, Malak T. Bokhamseen<sup>3</sup>, Ameera I. Alhariqi<sup>3</sup>, Malak O. Aldossary<sup>3</sup>, Shahla H. Alhussein<sup>3</sup>, Mona S. Alalyani<sup>3</sup>

1 Department of Basic Health Sciences, College of Medicine, Princess Nourah bint Abdulrahman University, 11671 Riyadh, Saudi Arabia

2 Department of Pharmacology, Faculty of Medicine, Minia University, 61511 El-Minia, Egypt

3 Department of Clinical Sciences, College of Medicine, Princess Nourah bint Abdulrahman University, 11671 Riyadh, Saudi Arabia

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**Abstract:** Body weight image dissatisfaction may motivate females to use over-the-counter (OTC) drugs for targeting ideal body weight. The purpose of this study was to investigate the accuracy of self-image perception and the prevalence of use of OTC agents for weight control. Thus, a questionnaire has been distributed among female student participants at Princess Nourah bint Abdulrahman University, Saudi Arabia. Results showed that large number of the participants had correct self-image perception. From those who misperceived their image, 24.5% were underweight, 39.8% overweight and only 8.6% obese. Only 6% of the participants were using drugs for weight control, which was not significantly correlated with body mass index or health habits. The majority of drug users were from non-health colleges (60%). Participants who tried to control their weight with methods other than drugs were more prevalent among normal weight individuals and underweight. In conclusion, body image misperception may be a factor leading to the abuse of OTC pharmaceuticals for weight control and correlated with the notably low levels of awareness of drugs' adverse effects. Since most of drug users were students in non-health colleges, health education for rational drug use for weight control is recommended.

**Keywords:** Prevalence, over-the-counter drugs, weight control.

## 1. Introduction

Body weight image misperception has a great impact on the unhealthy behaviors of people when choosing methods used for weight control (Jáuregui Lobera et al., 2016). As a result of the dissatisfaction of body weight image, eating disorders are a well-known relatively high prevalent psychopathological condition (Zaitsoff and Grilo, 2010), including anorexia nervosa (9% and 0.3%), bulimia nervosa (1.5% and 0.5%), and binge eating disorder (3.5 and 2.0%) among women and men, respectively (Hudson et al., 2007). The highest association of comorbidity rates with eating behaviors was reported for anorexia nervosa, with mortality rates reaching up to nearly 10% (Achamrah et al., 2017). On the other hand, obesity-induced mortality in Kingdom of Saudi Arabia (KSA) alone may amount to 20,000 people dying yearly (Alnaami, 2016), with female obesity rates reaching up to 34% (Alqarni, 2016).

As a result of the dissatisfaction of body weight, pharmacotherapeutic intervention for body weight control has emerged, mostly available as over-the-counter (OTC) medications. Among the unhealthy weight control behaviors, a study conducted on high school students showed that fasting was the most commonly practiced behavior in nearly 10%, followed by nearly 7% of the students tested taking OTC pills for weight reduction (Ursoniu et al., 2011). Another study conducted on 158 public and private high schools found that the percentage of use of OTC drugs for weight control among females was 10% (Talamayan et al., 2006).

Reviewing the recent articles conducted on eating behaviors and weight control, the data available may not be enough to completely clarify the most used method in weight control, whether pharmacological intervention or other behavioral measures. The scarcity of information available about weight control practices among female college students signifies a need to focus research efforts on this area. Therefore, the purpose of this research was to

investigate the prevalence of use of pharmacological agents for weight control and to estimate the awareness level of their risks and the students' knowledge of the proper use of weight control drugs among students of Princess Nourah bint Abdulrahman University (PNU). Assessing the prevalence of the most widely employed method for weight control will help us in realizing the need for these habits to be corrected, using awareness educational campaigns to promote the knowledge and awareness of pharmacological drug hazards of medications used for weight control.

## 2. Methodology

### Study design

A cross-sectional study was conducted in PNU, Riyadh, using a survey to measure the prevalence of self-medication for weight control among PNU university students. Considering that females have higher concern about their self-body image (Deschamps et al., 2015), so the population was chosen from one of the biggest female universities in the world; PNU (Saner, 2011). Along with the basic assessment, the awareness of side effects of certain weight control drugs was evaluated. The initial drafting of the questionnaire was based on similar previously published studies (Talamayan et al., 2006; Al-Rethaiaa et al., 2010; Barichella et al., 2011), followed by linguistic validated. Thereafter, piloting was performed to test face validity and reliability by distributing the questionnaire to 20 students. Experts also reviewed the questionnaire, in addition to members of the Institutional Review Board (IRB; ethical approval number 18-0258).

### Sample calculation of number of participants

No previous literature has been performed to study the prevalence of use of drugs for weight control among university students in KSA. However due to the expected notable use of these drugs, we assumed the prevalence of 75%, with accepted difference as low as 0.05, when level of confidence is 95% ( $\alpha=0.05$ ), power of study of 80% ( $\beta=20\%$ ), the minimal sample size needed for the current study is 456. This calculation was performed using GPower software version 3.1.9.2 (GPower, 2014). Thus, 520 questionnaires were distributed, from which only 500 were completed, covering the minimal sample size needed, with response rate of 96.2%. The questionnaires were distributed among all the 13 health and non-health colleges in PNU. The study used non-probability convenience sampling. The participants were interviewed by the study investigators, where the objectives of the study were explained, and a verbal consent was obtained. They were asked to fill out a self-reported questionnaire made up of 22 questions.

### Details of the questionnaire and interpretation of data

The questionnaire comprised of open and closed ended questions. Demographic information was collected to categorize the participant according to their personal data, including which college, year of study, marital status and number of children, if any. Comorbidities were evaluated by asking about any existing chronic illnesses. To evaluate the participant body weight, we asked the participant to write their weight and height in an open-ended question. From their answer, the body mass index (BMI) was calculated as weight in kilograms divided by the square of height in meters ( $\text{kg}/\text{m}^2$ ) and categorized into four levels: normal weight (18.5-24.9  $\text{kg}/\text{m}^2$ ), overweight (25.0-29.9  $\text{kg}/\text{m}^2$ ), mild obesity (30.0-34.9  $\text{kg}/\text{m}^2$ ) and moderate/severe obesity ( $>35.0 \text{ kg}/\text{m}^2$ ).

Three questions were used for evaluating self-body image, as "How do you see yourself, how friends or family see you?". The answers were scored as 1 for underweight, 2 for normal weight and 3 for over-weight/obese. The most common source of information or advice about weight control measures was assessed by asking "What is your source of advice for weight control?". Options included all the surrounding people, the physician or dietician and internet. In the next section, participants were asked if they are taking any pills for controlling their weight, and examples were given for commercially famous drugs targeting either increasing or decreasing body weight. Participants who responded "yes" for using such drugs were also asked to answer the related questions to evaluate the effectiveness of the drugs, and possible side effects. Moreover, participants documented their responses for source of purchase, whether it was prescribed by doctor, directly purchased from the pharmacy or obtained online.

The participants were also asked about healthy dietary habits, as reading food labels, eating low fat food, low carbohydrates, counting calories, as well as if there is any change in appetite when they are stressed. Several questions were asked to assess what they try to do to control their weight in the past year, the responses to which were scored to indicate whether the participant was actively doing something for weight control or not.

### Statistical Analysis

The data were analyzed using SPSS (statistical package for social science) version 16.0, employing t-test for the quantitative data and Chi-square for the qualitative data. Statistical significance was confirmed if  $P < 0.05$ .

## 3. Results

### Sociodemographic parameters

In the current study, 520 questionnaires were distributed among the sampled population, but only 500 participants completed the questionnaires, with a response rate 96.2%. From all participants, 59.4% were students at health colleges (medical, dental, nursing, pharmacy, and rehabilitation), whereas those of non-health colleges were 40.6% (Table 1). Approximately similar numbers of all years in college grades took part in this study. Most of the participants were single, with only 21 (4.2%) married and 2 (0.4%) divorced. Among those who were married, 12 (2.4%) had children. From the self-reported height and weight, the body mass index (BMI) was calculated according to the equation:

$$\text{BMI} = \text{weight in kg} / \text{square of the height in m}^2$$

Participants were divided according to their BMI into four categories: underweight, normal weight, overweight and obese (ranges of below 18.5, from 18.5 to 24.9, from 25.0-29.9 and above 30.0 kg/m<sup>2</sup>, respectively). Based on the participants' responses, most of our sampled population were of normal weight. On the other hand, 10.6% of the participants were underweight, while overweight and obese represented 19.6% and 7.2%, respectively. Concerning the history of comorbidities, the majority reported having no comorbidities (79.6%). Among those who did report comorbidities (20.4%), the highest prevalence was anemia (10.6 %), followed by asthma (6.8%), while depression, hypertension, thyroid, and diabetes were in a range of 1-2% each.

### Prevalence of OTC pharmaceutical drug use for weight control

Out of all participants in the current study, the percentage of participants who used OTC drugs for weight control were 6% (Table 2). Among those who did use drugs, significantly higher percentage (60%) were from non-health, while only 40% were from health colleges.

### Correlations with practicing healthy dietary habits for weight control

Significant correlation between practicing healthy habits for weight control and awareness level was shown (Table 3). The awareness was measured according to the respondent knowledge of weight control drugs side effects. The participants were divided into two subgroups of healthy and unhealthy individuals, according to student's responses to a four-grade scoring question of "What is your healthy dietary habits". Remarkably, the percentage of poor awareness (46.0% and 56.2%) was significantly higher than good awareness (14.1% and 15.8%) in both populations practicing unhealthy and healthy dietary habits, respectively.

There was also a significant correlation between participants practicing healthy dietary habits and those doing previous weight control measures, not including drug intake, but included other behaviors in the past 12 months prior to survey, such as exercise, fasting and herbals (Table 4). Among our study participants, 67.4% were concerned about their weight and trying to maintain healthy weight regardless of their eating habits, compared to 32.6% who were doing nothing. Moreover, 83.6% of the participants who reported having healthy eating habits were taking action in the last 12 months toward maintaining a healthy weight, compared to 60.7% of un-healthy

individuals. From those who were doing nothing to control their weight in the past 12 months, 39.9% were practicing unhealthy dietary habits compared to 16.4% who were practicing healthy dietary habits.

Furthermore, a significant correlation between participants doing previous weight control measures in the past 12 months and their BMI was noticed (Table 5). Interestingly, the highest percent of those who were taking actions in the past 12 months regarding their weight was among normal weight BMI participants (60.2%), followed by the overweight (24.0%), whereas the extremes of underweight and obese showed much lower percentages (8.3% and 7.4%, respectively).

### Correlation of self-perception and BMI

A significant correlation was noticed between BMI and self-perception (Table 6). As self-perception was evaluated according to scoring of three questions about perception of self, family, and friends. To reach the weight perception of the participants, answers were computed by taking the average of the three questions into one variable and categorized them into underweight (3-4), normal weight (5-7) and overweight (8-9) self-perception. Weight misperception varied among BMI groups. According to measured BMI categories, the majority had a correct self-perception, whether they were underweight (75.5%), normal weight (82.8%) or overweight (60.2%). Still misperception of self-image was significantly higher in underweight group where 1.6% misperceived their body weight as obese. To the contrary, none of the over-weight or obese misperceived themselves as under-weight. Interestingly, a relatively large percentage of overweight (39.8%) thought of themselves as normal weight, probably due to cultural and social perception.

### 4. Discussion

To the best of our knowledge, this is the first study to estimate the prevalence of drug use for weight control among college female students in Saudi Arabia. The concern about physical self-image by the vast majority of people worldwide, especially females, and the advertising of thinness as an icon of beauty by the media might have led to self-image dissatisfaction, which might be one of the main reasons behind developing unhealthy methods such as using OTC weight control medications (Zaitsoff and Grilo, 2010). In this study, our main aim was to explore the prevalence of use pharmacological self-medication and comparing them to non-pharmacological behaviors for weight control. The prevalence of drug use among our sample was 6%. Comparing the later percent with other studies having a national representative sample of above 50 thousand, their results was comparable to ours reaching to 7.4% (Talamayan et al., 2006). This demonstrates that a considerable number of individuals are targeting OTC drug use as the most convenient but unhealthy behavior, to control their weight. Interestingly, considerable percent of drug users reported self-medication using more than one drug for weight control, with no consideration of possible drug interactions. Indeed, several weight control drugs may cause severe hazards due to drug interactions if taken concomitantly (Barrea et al., 2019), such as cerebral venous thrombosis (Mainoli et al., 2020) and impaired fetal growth in pregnant females (Owen et al., 2021).

In the present study, the majority of drug users for weight control were from non-health colleges. This shows a significant difference based on health education. Findings from the current study was consistent with a previous one which investigated an additional educational parameter; parents' educational level role in weight control behaviors (Al Sabbah et al., 2010). The latter study showed significant correlation between educational level of the parents and health control behaviors of their adolescent offspring, which emphasized the effect of education on participants' use of OTC drugs for weight control.

Remarkably, in the present study, the percentage of poor awareness (46.0% and 56.2%) was significantly higher than good awareness (14.1% and 15.8%) in both populations practicing unhealthy and healthy dietary habits, respectively. A previous study reported that the majority of university undergraduates had unhealthy habits, despite their good nutritional knowledge (Yun et al., 2018). Another study reported that their participants engaged in high-risk dietary health behaviors despite of their awareness of the consequent hazards (Tateyama et al., 2019). These studies together with the current findings suggests that public awareness might not be enough to control habits, as the latter is controlled by multifactorial influences that might direct the population behaviors. Thus, it is recommended that

health promotion would be nationwide and would include nutritional and athletic activities, to ensure motivating the population into adopting healthier habits. In the current study, there was a significant number of participants practicing unhealthy habits who were not taking any action toward their weight and had poor level of awareness. This subgroup is of strong need to be educated about the healthy methods and require professional support regardless of their weight, as they are at higher risk of future hazardous weight control behaviors, including intake of OTC drugs for weight control.

The majority of the participants of the current study had poor awareness about hazards of OTC drugs for weight control. Despite their poor awareness, several participants were taking action regarding their weight, but not including OTC drug intake. Their trials for weight control, however, were conducted in the wrong manner, as those who practiced unhealthy habits regarding their weight control were more than 60%. Similar results of using inappropriate weight-control efforts have been previously reported and were online of our current results (Forestell, 2018; Kang et al., 2021). Our results also showed a notable number of over- or under-weight participants that weren't concerned about controlling their weights (about 40%). Such percentage is alarming, as this group is susceptible to having an abnormal BMI and may acquire many other health risks due to practicing daily bad habits, predisposing such individuals to a large scale of diseases, including cardiovascular diseases, fatty liver, diabetes and alzheimer's disease (Cuzmaret et al., 2020; Ebrahimpour et al., 2020; Wang et al., 2021).

In the current study, obese and underweight participants represented nearly 17 and 10%, respectively. This is in line with previous study conducted in the year 2020, via a nationwide cross-sectional survey in Saudi Arabia, reporting that nearly quarter of the population suffered from obesity and about 10% were underweight (Althumiri et al., 2021). In our sampled population, a remarkable percent of obese and under-weight participants misperceived their body image. This was in line with a previous study that showed similar results of under- and over-estimation of BMI (Jayawardena et al., 2014). Such False body image perception may lead to practicing unhealthy weight control habits and may predispose to higher incidence of eating disorders (Linardon, 2021). Interestingly, in the present work, a significant fraction of the overweight participants reported that they perceive their self-image as normal weight, probably due to social or cultural body weight perception that was reflected on their self-image. This emphasizes the necessity of increasing the knowledge regarding the proper body weight and healthy manners, by initiating training programs and health centers that improve the competence of nutritional and lifestyle habits.

In conclusion, despite that this study estimated relatively low prevalence of drug use for weight control, yet it showed that health college students were less drug users compared to non-health colleges, suggesting the importance of health education in combating the abuse of drugs for weight control. This study also revealed that a significant an alarming fraction with abnormal BMI misperceived their body weight. Despite the general caution towards drug intake, the majority showed poor knowledge about weight control drugs' side effects, indicating the need for health education programs to correct weigh control behaviors.

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Table 1: Sociodemographic parameters of participating female university students.

Variable	Frequency	Percentage (%)
College		
Foundation	60	12.0
Medicine	94	18.8
Dentistry	32	6.4
Nursing	62	12.4
Pharmacy	25	5.0
Rehabilitation	24	4.8
Non-health	203	40.6
Collage grade		
Preparatory year	73	14.6
First year	111	22.2
Second year	86	17.2
Third year	118	23.6
Fourth year	60	12.0
Fifth year	52	10.4
Marital status		
Single	477	95.4
Married	21	4.2
Divorced	2	0.4
Number of kids		
Not married	477	95.4
No children	10	2.0
Pregnant	1	0.2
1 kid	9	1.8
2 kids	3	0.6
BMI categories		
Underweight	53	10.6
Normal weight	313	62.6
Overweight	98	19.6
Obese	36	7.2
Comorbidities		
No	398	79.6
Yes	102	20.4
Diabetes		
No	495	99.0
Yes	5	1.0
Hypertension		
No	497	99.4
Yes	3	0.6
Asthma		
No	466	93.2
Yes	34	6.8
Thyroid disease		
No	494	98.8



Yes	6	1.2
Anemia		
No	447	89.4
Yes	53	10.6
Depression		
No	492	98.4
Yes	8	1.6
Others		
No	488	97.6
Yes	11	2.2

**Table 2: Prevalence of using drugs for weight control among female university student participants from health and non-health colleges.**

	Frequency	Percentage
Drug users	30	6.0%
Health colleges	12	40.0%
Non-health colleges	18	60.0%
Non-drug users	470	94.0%
Health colleges	285	60.6%
Non-health colleges	185	39.4%
Total	500	100.0%

**Table 3: Healthy habits and awareness level among participating female university students.**

	Awareness categories			Total
	Poor awareness	Moderate awareness	Good awareness	
Unhealthy	163 (46.0%)	141 (39.8%)	50 (14.1%)	354 (100%)
Healthy	82 (56.2%)	41 (28.1%)	23 (15.8%)	146 (100.0%)
Total	245 (49.0%)	182 (36.4%)	73 (14.6%)	500 (100.0%)

**Table 4: Healthy habits and previous weight control measures among participating female university students.**

		Unhealthy	Healthy	
Previous weight control measures*	Doing nothing	139 (39.3%)	24 (16.4%)	163 (32.6%)
	Do something	215 (60.7%)	122 (83.6%)	337 (67.4%)
Total		354 (100%)	146 (100%)	500 (100%)

\*Previous weight control measures did not include intake of any medications.

**Tables 5: Body mass index (BMI) and health habits among female university student participants.**

		Doing nothing*		Doing something	
BMI Categories	Underweight	25 (15.3%)	28 (8.3%)	53 (10.6%)	
	Normal weight	110 (67.5%)	203 (60.2%)	313 (62.6%)	
	Overweight	17 (10.4%)	81 (24.0%)	98 (19.6%)	
	Obese	11 (6.7%)	25 (7.4%)	36 (7.2%)	
<b>Total</b>		<b>163 (100.0%)</b>	<b>337 (100.0%)</b>	<b>500 (100.0%)</b>	

\*Previous weight control measures during the past year is categorized into either doing nothing to control body weight or doing something to control it.

**Table 6: Body mass index (BMI) and self-image body perception among female university student participants.**

		Self-image perception of body weight			
		Under weight	Normal weight	Over weight	
BMI	underweight	40 (75.5%)	12 (22.6%)	1 (1.9%)	53 (100.0%)
	Normal weight	42 (13.4%)	256 (81.8%)	15 (4.8%)	313 (100.0%)
	overweight	0 (0.0%)	39 (39.8%)	59 (60.2%)	98 (100.0%)
	obese	0 (0.0%)	3 (8.3%)	33 (91.7%)	36 (100.0%)
<b>Total</b>		<b>82 (16.4%)</b>	<b>310 (62.0%)</b>	<b>108 (21.6%)</b>	<b>500 (100.0%)</b>