

Investigating women's awareness, attitude, and practice on weight loss medications in Semnan's sports clubs in 2023

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Abstract

Background and Objective: The increasing rate of obesity all over the world has led to the establishment of different approaches to manage weight. One of the most popular strategies is pharmacotherapy for weight loss. The present study aims to assess knowledge, attitude, and practice about these medications in women attending Semnan's sports clubs.

Materials and Methods: 350 women from 10 different private sport clubs in Semnan, Iran, were selected randomly. A self-administered questionnaire containing 24 questions about obesity and weight loss approaches, especially medications, was used to assess Knowledge, Attitude, and Practice (KAP). Demographic and anthropometric information were gathered from all the participants. SPSS 21 was used for statistical analysis.

Results and Conclusion: Mean age and weight of participants were 30.5 ± 9.5 years and 70.1 ± 13.1 kg, respectively. More than 68% were overweight or obese, and 54% had a poor self-image. Results from KAP revealed that the average knowledge score about weight loss medications was 9.45 ± 1.8 , implying a weak level of knowledge among our participants, and people with higher BMI had higher score ($P = 0.045$). The attitude and practice of the participants showed a higher score than knowledge and had an inverse relationship with anthropometric indices so that the higher body mass index, the lower score of attitude and practice ($P < 0.001$ and $P = 0.007$, respectively). This study highlights a significant knowledge gap regarding weight loss pharmacotherapy among women attending gyms. Given the high prevalence of overweight and obesity in this population, as well as poor body image perceptions, it is important to promote educational initiatives focused on safe and effective weight management strategies, emphasizing addressing both educational and behavioral aspects of weight management programs to support healthier lifestyles.

Keywords: Knowledge, Attitude, Practice, Weight loss medication, Sport

1. Introduction

Obesity, as a multifactorial and mostly preventable disease, affects more than one third of the

world's population, and is caused by complex interactions between genetic, socio-economic, and cultural aspects [1,2]. In the last three

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decades, the global prevalence of obesity (body mass index ≥ 30 kg/m²) has increased by 27.5% for adults and 47.1% for children. In 2014, the World Health Organization reported that there were more than 1.9 billion overweight adults, of which more than 600 million were obese [3], and adopting a Western lifestyle is likely to contribute to further increases in the global adult population facing overweight and obesity, followed by elevating the risk of diabetes, heart disease, high blood pressure, various types of cancer, and overall mortality rates. Among various approaches to obesity management including dietary interventions, increased physical activity, behavioral modifications, prescription weight-loss medications, and surgeries, pharmacotherapy appears particular appealing to practitioners. It is important to note that weight-loss medications are intended to complement diet, exercise, and behavioral changes instead of replace them [4].

Medications for weight management are recommended for people with a BMI ≥ 30 or those with a BMI ≥ 27 and underlying diseases who are unable to lose weight through lifestyle modifications [5]. FDA (Food and Drug Administration) has approved some weight loss drugs for a short duration. After the removal of sibutramine (Meridia) and lorcaserin from the list [6], only five drugs of naltrexone-bupropion (Contrave), orlistat, liraglutide, phentermine-topiramate, and Gelesis (a recently approved drug for long term use) have remained [7-9]. Moreover, FDA has approved MC4 receptor agonist setmelanotide for use in people with severe obesity due to deficiency of POMC, PCSK1 (protein convertase subtilisin/kexin type 1), or LEPR (leptin receptor) in late 2020 [10,11]. In addition, 11 different herbal parts including roots, rhizomes, tubers, stems, root and stem barks, axial parts, leaves, flowers, fruits, seeds, and whole plants have been claimed to have anti-obesity potential. These herbal sources are extensively introduced in Chinese traditional medicine as effective pathways for obesity control by regulating fat metabolism, hormone levels, and intestinal microflora [11,12].

On the other hand, dietary supplements used for weight loss are popular among obese people. Blanck et al. reported that seven percent of American adults used OTC (over the counter) weight-loss supplements, with the greatest use among young obese women. These products are generally popular because people think they are natural, readily accessible, and less effortful than ordinary lifestyle changes, while benefiting from exaggerated advertising claims [6,13,14]. Further, a qualitative study reported that a high percentage of participants reported that the use of these drugs is associated with an increase in muscle and a decrease in fat mass [15].

People are encouraged to use weight-loss drugs even at the gym. Unfortunately, they take these drugs without valid information about their benefits and side effects. Women are the main consumers of weight-control programs (especially pharmacotherapy). However, little information about their knowledge, perception, and practice regarding weight loss drugs is available [16].

The Knowledge, Attitude, and Practice (KAP) survey is a cost-effective method for gathering both quantitative and qualitative insights that may be barrier to certain activities. In recent years, different weight loss approaches including lifestyle changes, use of pharmacological aids, and invasive procedures have been growing in Iran, especially among women who are striving for fitness. By increasing the use of both validated and non-validated weight loss aids, no study has been done about women's knowledge and information on weight loss medications, and their consumption pattern in Semnan province. Therefore, this cross-sectional study seeks to examine the knowledge, attitudes, and practices about weight loss medications among women attending sports clubs in Semnan.

2. Materials and Methods

2.1. Study population and setting

This cross-sectional study was conducted across 10 fitness clubs in Semnan, Iran, in 2023. Using convenience sampling, a total of 350 women aged

20-60 years with no history of bariatric surgery were enrolled in the study.

2.2. Questionnaire

Data were collected using a pretested, self-administered questionnaire. The instrument assessed: (i) the participants' demographic and baseline characteristics, including age, educational level, marital status, occupation, self-reported body image (categorized as thin, normal, overweight, or obese), and family history of chronic diseases; and (ii) knowledge, attitudes, and practices regarding weight-loss medications and supplements.

Prior to the main data collection, the questionnaire was pre-tested in two fitness clubs to ensure that all items were clear and comprehensible to the participants. The knowledge section comprised "true," "false," and "no opinion" response options. The attitude section evaluated personal opinions and beliefs-encompassing cognition, emotion, and desire-regarding weight-loss medications. Finally, the practice section consisted of questions evaluating behavioral practices in this regard.

Each section consisted of eight items. Responses were scored as follows: 2 points for a correct answer, 0 points for an incorrect answer, and 1 point for a "no opinion" response. One item concerning the unrestricted, long-term use of weight-loss medications was reverse-scored. Consequently, total scores for each section ranged from 0 to 16, with higher scores reflecting superior knowledge, more favorable attitudes, and better practices.

2.3. Measures

On the scheduled day, prior to commencing physical activity, anthropometric measurements were obtained. Participants' body weight was measured in minimal clothing using a calibrated digital scale with accuracy of 100 g. Using a non-stretchable measuring tape, height was measured in a standing position without shoes with accuracy of 0.5 cm, and waist and hip circumferences were evaluated with accuracy of 1 mm. Finally, body mass index (BMI) was

calculated as weight in kilograms divided by the square of height in meters (kg/m^2).

2.4. Ethical issues

This study was conducted following approval from the Research Council and the Ethics Committee of Semnan University of Medical Sciences, Semnan, Iran (Protocol ID: IR.SEMUMS.REC.1402.010). Furthermore, after the study objectives were thoroughly explained to all eligible individuals, participants provided written informed consent prior to enrollment.

2.5. Statistical analysis

Statistical analyses were performed using SPSS software, version 21.0 (IBM Corp., Armonk, NY, USA). The normality of quantitative variables was assessed using the Kolmogorov–Smirnov test. The Chi-square test was utilized to evaluate the associations between knowledge, attitude, and practice scores and other categorical variables. Quantitative data is expressed as mean $\pm$ standard deviation (SD). Statistical significance was set at p-value less than 0.05.

3. Results and Discussion

A total of 350 women from fitness clubs participated in this study, yielding a 100% response rate, with a mean age of 30.5 ± 9.5 years. Data indicates more than half held no college degree and were housekeeper (Table 1), while 68.6% of participants were classified as overweight or obese ($\text{BMI} \geq 25 \text{ kg}/\text{m}^2$) (Table 2).

Table 1- Demographic characteristics of the participants

Demographic characteristics (n = 350)	Percentage
Marital status	
Married	54.1
Single	45.9
Education level	
Less than a college degree	70.9
College degree or greater	29.1
Job	
Housewife	73.7
Working	26.3

Table 2- Anthropometric characteristics of the participants

Participant characteristics (n = 350)	Results
Weight (kg)	70.07 ±13.07
Height (cm)	158.48 ±5.22
Hip circumference (cm)	105.49 ±9.38
Waist circumferences (cm)	88.55 ±11.87
Waist circumferences categories (cm)	
< 82	25.8%
82-102	50.4%
> 102	23.8%
Body Mass Index (kg/m ²)	27.91 ±5.13
Body Mass Index categories (kg/m ²)	
< 18.5	2.9%
18.5-24.9	28.6%
25-29.9	36.9%
> 30	31.7%

A significant difference was observed between participants' actual body status, according to BMI, and their self-reported body image perception. Women with obesity demonstrated the greatest degree of body image misperception, while those classified as thin exhibited the highest concordance between their actual anthropometric status and perceived body image (Table 3). The majority of participants (82%) were unable to identify common anti-obesity medications and supplements, including L-carnitine, fluoxetine, metformin, and orlistat. Notably, only 10% of the respondents identified physicians and dietitians as their primary source of information regarding these substances.

The level of knowledge regarding weight-loss medications was significantly and directly associated with anthropometric indices, with higher knowledge scores observed among individuals with a higher BMI ($p = 0.045$).

Regarding attitudes, more than two-thirds of the participants affirmed that the most effective approach for weight reduction is a combination of dietary restriction and physical exercise. Figure 1 illustrates the participants' prior weight-loss attempts. Among the 350 enrolled women, 270 (77.1%) reported at least one lifetime weight-loss attempt, with 34% of these individuals utilizing a combination of dietary modifications and physical exercise.

Regarding behavioral practices, 16% of the participants reported a lifetime history of using weight-loss medications (Figure 1). When questioned about the specific agents utilized, orlistat and herbal formulations were the most frequently cited; however, 46% of users could not identify the name of the substance they had consumed. Among the females with a history of pharmacotherapy, 48% used them based on professional advice from a dietitian or physician. Conversely, of the 226 women who had never utilized anti-obesity agents, 73% ($n = 165$) refrained from their use primarily due to concerns regarding potential adverse side effects.

Table 3- Body self-image of the participants according to their BMI

BMI categories	< 18	18-25	> 25	> 30
Self image				
Very thin	-	19	11	14
Thin	7	6	19	15
Normal	3	52	18	11
Overweight	-	21	52	72
Obese	-	2	9	19
Total	10	100	109	131

*Colored cells show wrong self-image

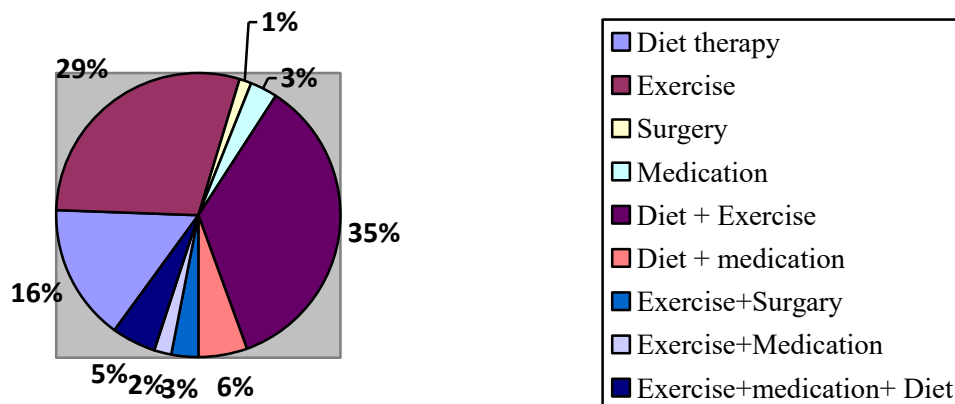


Figure 1- Weight loss strategies utilized by the participants

The participants' attitudes and practices regarding these medications demonstrated a significant inverse relationship with anthropometric indices; specifically, a higher body mass index was associated with lower attitude and practice scores ($p < 0.001$ and $p = 0.007$, respectively).

Among the participants who perceived themselves as "thin" or "very thin," the prevalence of supplement consumption was 10.5%. In contrast, among those who perceived themselves as "normal," "overweight," or "obese," the consumption rate was 24.8% (Table 4).

Table 4- status of weight-loss medications with the participants' body self-image

	Supplement use		Total
	Yes	No	
Self-image			
Very Thin	7	36	43
Thin	2	41	43
Normal	22	61	83
Over Weight	34	111	145
Obese	8	22	30
Total	73	271	344*

* Data regarding supplement use were unrecorded for six participants.

The growing global prevalence of overweight and obesity has driven a parallel increase in public interest regarding weight-loss medications. Extant literature indicates that women are the primary consumers of these pharmacotherapies, accounting for approximately 85% of all related

prescriptions in the United States [17]. Corroborating this trend, our findings demonstrate that awareness regarding weight-reducing medications was significantly higher among participants who met the clinical criteria for these interventions, which may actively contribute to the rising utilization rates of these agents.

Participants displayed a weak level of knowledge with a mean score of 9.45 ± 1.8 . The data indicates that 47.4% had ≤ 2 correct answers, 43.1% fell into the moderate category (3–5 correct answers), and only 9.5% reached the high level (≥ 5 correct answers). Despite weak knowledge, awareness concerning their specific side effects was relatively high. In total, 21.3% ($n = 73$ out of 344) of the participants reported a daily intake of at least one type of supplement; remarkably, none of these individuals were able to identify the specific names of the products consumed. The most frequently cited reasons for supplement utilization were physician prescription (44.4%) and the improvement of quality of life (35.4%). Supplement consumption was significantly lower among individuals who demonstrated higher knowledge and more favorable attitudes toward anti-obesity agents. Conversely, supplement use was not significantly associated with age, educational level, employment status, marital status, BMI, or the concurrent use of anti-obesity medications. In contrast to our results, Almughais et al. reported that more than half of their

participants in Saudi Arabia demonstrated a high level of knowledge about anti-obesity drugs, and over 65% exhibited high awareness of serious side effects [18]. This discrepancy is likely attributable to demographic variations between the study populations; Almughais et al. evaluated female capital residents who held university degrees and worked within the healthcare system, whereas our sample was exclusively limited to women attending fitness clubs. Meanwhile, our findings regarding baseline awareness align with the study by Algarni et al., which demonstrated that approximately one-third of participants were familiar with the names of these pharmaceutical agents [19].

In contrast to the findings reported by Almughais et al. [18], educational attainment was not a significant determinant of awareness levels in the present study. Conversely, employment status demonstrated a significant inverse relationship with awareness, with housewives exhibiting the highest levels of awareness. This finding may be attributable to the pervasive influence of health-focused educational programming across mass media channels, for which housewives constitute a primary audience.

In term of knowledge, our findings concur with those of Sharaf et al. [20], who reported that the majority of participants in Saudi Arabia possessed limited knowledge regarding anti-obesity medications. Furthermore, consistent with their results, we observed a significant positive association between awareness levels and anthropometric indicators. This relationship is likely driven by the fact that as women experience weight gain, they actively seek alternative weight-management strategies, including pharmacotherapy, to induce weight loss. Conversely, we identified a significant negative association between both attitudes and practices and anthropometric indicators. Notably, certain fundamental methodological differences exist between the two studies; Sharaf et al. conducted their investigation exclusively among individuals with obesity, whereas the present study encompassed participants across all body mass index (BMI) categories.

One of the most notable findings of the present study was that over 60% of participants identified dietary adherence and regular physical exercise as the most effective strategies for weight management. This consensus indicates a highly positive attitude toward conventional weight-reduction methodologies. Furthermore, participants demonstrated relatively good attitudes and practices regarding the utilization of weight-loss medications.

The pattern of anti-obesity medication consumption varies significantly across different populations. In a study conducted in Taiwan, approximately half of the individuals implementing weight-loss strategies reported utilizing weight-loss medications, with similar proportions observed for herbal preparations and nutritional supplements [21]. Consistently, supplement consumption was reported by 21.2% of the participants in the present study. Interestingly, this utilization rate was higher among women who perceived their weight status as normal (30.14%) compared to those who perceived themselves as obese (11%), yet lower than among women who perceived themselves as overweight (46.6%). This trend may be attributed to a heightened anxiety regarding weight gain among normal-weight women, who potentially resort to weight-loss interventions as a prophylactic measure to prevent obesity. This effect is notably more pronounced among women who perceive themselves as overweight. Potentially, when women perceive their weight status as overweight, they proactively attempt to shed excess weight through various modalities, including pharmacotherapy. Conversely, this pattern may not extend to individuals with obesity, a discrepancy that could stem from a history of refractory weight-loss attempts using diverse methods. Additionally, these individuals may seek more immediate results, whereas pharmaceutical interventions often do not yield rapid, drastic reductions toward their target weight. Furthermore, women with obesity frequently experience obesity-induced depression, which can significantly diminish motivation for weight-loss maintenance. Consequently, the utilization rate of weight-loss medications among individuals with obesity may be lower than that of their normal-weight or overweight counterparts. This context aligns with findings by

Pillitteri et al., who demonstrated that supplement consumption among Americans actively attempting to lose weight was 33.9%, with a significantly higher prevalence observed among women than men (44.9% vs. 19.8%, respectively) [22]. The high prevalence of nutritional supplement utilization may be driven by the common public perception that these products are completely harmless. This misconception often leads to indiscriminate use without a comprehensive understanding of actual physiological requirements or specific supplement functions. Crucially, these agents are not entirely without adverse effects. Although commercially available supplements are safe, unguided self-medication may remain clinically hazardous. These agents should be administered exclusively under the supervision of a specialist and for a restricted duration. Concurrently, the elevated consumption rates of these medications suggest a growing public disinclination toward lifestyle modifications, such as dietary adherence and regular physical exercise, in favor of more convenient interventions. Critically, pharmacotherapy for weight management is clinically indicated only after conventional lifestyle modifications have failed to achieve sufficient weight loss. Furthermore, when these medications are prescribed, they are intended to serve as an adjunct to -rather than a replacement for- a calorie-restricted diet and physical activity [23]. Consequently, there is an urgent need for mass media, online platforms, and digital networks to disseminate accurate, evidence-based information regarding the appropriate role of weight-loss interventions.

The selection of appropriate weight-loss medications depends heavily on utilizing verified sources of clinical information. In the present study, only 10.6% of participants reported obtaining their information from a physician or a registered nutritionist. Conversely, the vast majority of participants relied on non-validated, commercially driven channels, such as television advertisements and general mass media. Furthermore, fitness club coaches were identified as another prevalent, non-clinical source of information. Similarly, a study conducted in Mississippi evaluating the baseline knowledge of sports coaches regarding anti-obesity medica-

tions revealed that nearly half of the respondents possessed no foundational knowledge; only 58% could successfully identify at least one weight-loss agent, and none were able to name more than two [24]. This critical deficit in foundational knowledge can lead to the utilization of unsafe weight-loss medications and exacerbate the risks associated with unguided self-administration. Corroborating this reliance on non-professional networks, an independent study evaluating Iranian women with overweight or obesity (BMI = 28.36 ± 3.73 kg/m²) aged 20-50 years demonstrated that approximately 60% of participants obtained their information regarding anti-obesity medications directly from friends and family members [6]. In contrast to those findings, the present study revealed that approximately half of the participants with a history of weight-loss medication utilization had received professional guidance from a physician or a registered nutritionist. This observation aligns with the report by Torres et al., which indicated that registered dietitians serve as the primary source of nutritional information for athletic coaches and trainers [25]. Given the pervasive marketing across digital networks and the growing inclination among women to expedite body-composition goals through pharmacological agents, the consensus of recent findings strongly supports the execution of rigorous, large-scale studies evaluating the long-term adverse profiles and clinical risks of these medications. Concurrently, implementing target-specific educational interventions regarding safe weight-management strategies and anti-obesity pharmacotherapy is imperative for athletic coaches, who represent a pivotal, high-influence group guiding the utilization of these agents [26]. In term of practice, 16% of our study population utilized pharmaceutical methods for weight reduction, which were predominantly obtained via medical prescription. This prevalence is notably higher than the 2-3% utilization rates reported in previous literature [27,28]. This discrepancy is likely attributable to differences in the target populations; the present study evaluated women actively attending sports and

fitness clubs, whereas prior investigations focused on the general population. Furthermore, our findings indicated that 77.1% of participants had experienced weight loss at least once, with 34% of these individuals utilizing a combined approach of dietary modification and physical activity. The data also revealed that the vast majority of participants had no history of anti-obesity medication use. This trend differs from large-scale epidemiological data, such as a substantial study involving 3,500 American adults, which reported that among the 1,444 individuals who made serious weight-loss attempts, 33.9% resorted to weight-loss supplements [22]. Machado et al. revealed that 12.8% of Brazilian adults utilized weight-loss medications, whereas the overall prevalence of individuals attempting to achieve weight reduction was 26.6% [29]. Collectively, these findings indicate a moderate-to-high level of behavioral practices regarding weight management within both study populations.

Consistent with our findings, Algarni et al. demonstrated that the majority of participants prioritized dietary modification and regular physical exercise as their primary strategies for weight reduction [19]. In their study, only one-third of participants reported utilizing pharmaceutical agents for weight management, and 74.6% acknowledged that the administration of these medications necessitates professional clinical oversight. Furthermore, no significant correlation was observed between baseline knowledge scores and attitude scores [19]. Collectively, both investigations indicate that public awareness regarding weight-loss medications remains fundamentally low.

The non-utilization of anti-obesity medications among individuals meeting the clinical criteria for treatment can be influenced by several multifaceted factors. These barriers include a lack of comprehensive health insurance coverage for these agents [30], inconsistent clinical evidence regarding their long-term safety profiles [31], and, as demonstrated in the present study, heightened patients' apprehension regarding potential adverse effects. Moreover, both patients

and clinicians may perceive that these pharmacotherapies do not yield sufficient weight reduction to justify their clinical utilization [32]. Concurrently, a pervasive societal and clinical perception remains that obesity is primarily a behavioral failure rather than a metabolic disease; consequently, the use of anti-obesity medications is often dismissed as an inappropriate or superficial intervention [33].

4. Conclusion

This study provides valuable insights into the knowledge, attitudes, and practices regarding conventional weight-management methodologies and anti-obesity medications among a specific population of women. Although participants demonstrated moderate attitudes and behavioral practices toward weight-reducing drugs, their overall awareness of these pharmaceutical agents remained critically limited. Despite a high frequency of historic weight-loss attempts among Iranian women in the present study, the prevalence of anti-obesity medication utilization was not remarkably elevated, a trend primarily driven by widespread patients' apprehension regarding potential adverse effects. However, given that women's health serves as a critical barometer for overall societal well-being, and recognizing sports clubs as influential environments that frequently promote or recommend these interventions, there is an urgent need to establish targeted public health awareness programs. These educational initiatives regarding weight reduction strategies and anti-obesity treatments should be specifically tailored for fitness club coaches-who act as pivotal community influencers-as well as the club members themselves. Such initiatives are essential to mitigate the risk of adverse health outcomes. Given the high prevalence of overweight and obesity within this population, compounded by distorted body image perceptions, it is imperative to promote educational campaigns focused on safe, evidence-based weight management strategies. These programs must address both the cognitive-

educational and behavioral dimensions of weight management to foster sustainable, healthier lifestyles.

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6. Conflict of interests

The authors declare no competing interest.

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