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Evaluation of satisfaction with over-the-counter weight loss supplements

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Abstract

The majority of studies on satisfaction with medication examine satisfaction with a prescribed pharmaceutical agent, while exploration of satisfaction with over-the-counter drugs is limited. This study aims to examine satisfaction with non-prescribed weight loss supplements and the factors that may affect satisfaction levels, such as overall body satisfaction. The participants in this study consisted of a convenience sample of 119 subjects who have either used weight loss supplement or are still using it at the time of enrollment. Results indicate that perceived effectiveness of weight loss supplement is the ultimate predictor of global satisfaction. Overall assessment of weight loss supplement revealed low satisfaction levels with regard to effectiveness and global satisfaction, while satisfaction with side-effects and convenience were relatively high. Body dissatisfaction was found to be significantly negatively correlated to satisfaction with effectiveness, side-effects and global satisfaction with weight loss supplement. Moreover, subjects with higher body dissatisfaction have a higher expectancy from weight loss supplement.

Keywords

Pharmaceuticals, over-the-counter, dietary supplements, body image, satisfaction

Introduction

Patient satisfaction, a multidimensional concept with vaguely defined inputs, such as health status, socio-economic and demographic characteristics, patient expectations and health service delivery stimuli has been shown to have a significant impact on health outcomes.^{1,2} Patient satisfaction has been conceptualized as a pyramidal structure which involves satisfaction with different aspects of medical care. Satisfaction with medication occupies the highest, the most precise and the narrowest position in this hierarchy, covering aspects related to a specific medication's effectiveness, side-effects, convenience of use and impact on health-related quality of life.³

Weight loss supplements (WLS) are appealing to consumers since they have a “natural” image, and are easily accessible without prescription. The public has witnessed a tremendous increase in marketing practices of health food,⁴ as well as over-the-counter (OTC)-WLS in recent years, particularly through the Internet, despite the controversies regarding their efficacy and safety.⁵ Studies have also found that the accuracy of information about dietary supplements in both teen and adult magazines are highly questionable.⁶

The high prevalence of dieting, exercising and weight loss supplement consumption can be attributed to bodily changes due to aging and other circumstances such as pregnancy, as well as a desire to adhere to social norms. The aesthetic impulse encouraged by the consumer culture and the media to construct identities by way of modifying the surface body⁷ has created a “beauty myth”⁸ as individuals constantly monitor themselves and “repair” the flawed parts of their bodies. In this context, obesity has become one of the important issues associated with physical appearance, and one of the major reasons for dissatisfaction with

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one's body. It has been found that being overweight is highly correlated with bodily dissatisfaction, as participants are either dissatisfied with certain parts of their body or they just "feel fat".⁹ Therefore, body satisfaction and body size are highly related, creating a massive market for OTC supplements, consisting of individuals, mostly women, desiring to lose the unhealthy and unattractive appearance associated with excess weight.

An overwhelming majority of studies examine patient satisfaction with a prescribed pharmaceutical agent in a clinical setting. On the other hand, exploration of satisfaction with medication in OTC settings, and specifically for OTC weight loss supplements (OTC-WLS), is limited to a very small number of studies.^{7,10-12} Given the dramatic increase in obesity worldwide and accompanying growth in OTC-WLS market,¹³ assessment of satisfaction with non-prescribed weight loss supplements and possible determinants of satisfaction such as demographics, body mass index (BMI) and self health perception is critical in understanding how and why these patient-consumers perceive treatment in different ways.

The aim of this study is to assess satisfaction with non-prescribed weight loss supplements and the factors that may affect satisfaction levels. While previous studies on satisfaction with a particular medication have identified the impact of current health status and demographic characteristics on satisfaction level¹ or the impact of the supplement on weight loss over a long time period,¹⁴ tests for OTC-WLS and a more holistic approach to consider a patient's feelings about his/her bodily appearance have been very limited to date. Moreover, it is important to capture patients who discontinued using supplements for specific reasons. In this context, self body perception is proposed to be a particular form of perception of an individual's own health status, and the relationship between satisfaction with one's body and satisfaction with OTC supplement treatment is also examined in this study.

Materials and methods

Study sample

A convenience sample was recruited from the members of a private weight loss center in Izmir, Turkey. Subjects who met the following criteria were included in the study: (1) subjects of either gender older than 18 years and (2) subjects who had used an OTC-WLS without the guidance of a physician in the previous 12 months or who were continuing to use these supplements at the time of enrollment. The study was approved by the Ethics Committee of Izmir University of Economics and data were collected after verbal consent was obtained from the subjects.

Measures

Satisfaction with OTC-WLS has been assessed by the Treatment Satisfaction Questionnaire for Medication (TSQM) Version 1.4 developed by Atkinson et al.¹⁵ TSQM is a 14-item self-reporting generic instrument to measure satisfaction with treatment medication. The first 11 items pertain to three specific scales (effectiveness, side-effects and convenience), whereas the remaining three make up a single global satisfaction scale. Items are scored on either 5-point or 7-point scales, which are then transformed into scale scores with a possible range from 0 to 100, where higher scores indicate a higher level of satisfaction. A validated Turkish version of TSQM was obtained from the developer, Quintiles (San Francisco, CA, USA), and self-administered by the subjects upon their visit to the center.

The instrument also included measures to assess variables related to demographics, weight and height of the subject for the purpose of BMI calculation, previous weight loss attempts and methods used, information sources about the weight loss supplement in use, usage of the supplement in terms of exposure duration and frequency and self body perception. Individual's perception of own body was measured with a single item (*I feel satisfied with the shape of my body*), which commonly appears in two well-established scales to measure body shape concerns, i.e. Eating Disorder Inventory¹⁶ and The Dieting and Bingeing Severity Scale.¹⁷ The item aimed to measure the overall concern of the individuals about the shape of their bodies utilizing a gestaltic approach, rather than focusing on specific parts or regions of the body, with responses from 1 (Always) to 5 (Never).

Satisfaction with OTC-WLS is analyzed with respect to four TSQM items (effectiveness, side-effects, convenience and global satisfaction). In addition to descriptive statistics analyzing several variables, each subscale of TSQM was tested for possible relationships with body dissatisfaction and BMI by using Pearson correlation analysis (2-tailed), in addition to ANOVA analyses with post hoc contrasts to examine group differences in satisfaction level with regard to demographics and other variables. Statistical analyses were performed with SPSS 17.0 software (SPSS Inc., Chicago, USA).

Results

The total study population consisted of 119 subjects. Descriptive statistics related to demographics and OTC-WLS usage is presented in Tables 1 and 2.

In all, 58% of the subjects had a BMI ≥ 25 , with 21% with a BMI ≥ 30 ; 39.5% of the subjects had a body weight within the normal range (BMI 18.5–24.9).

However, a majority of the subjects were dissatisfied with their body, with a dissatisfaction mean score of 3.26 ± 1.17 , where 5 indicated total dissatisfaction ($p < .05$). A total of 89.9% of the subjects reported a previous attempt to lose weight, either in the form of a self-imposed diet (31.9%), exercising (7.6%), a combination of diet and exercise (35.3%) or other self-imposed methods.

At the time of enrollment, 19.3% of the subjects were continuing to use an OTC-WLS, while the remainder had discontinued use within the previous 12 months. A total of 31.9% discontinued use after deriving expected benefits, as opposed to 27.8% who discontinued use after seeing no benefits. The largest group of users (40.0%) had continued the supplement for 1–2 months and 99.2% had taken the supplement at least once a day. The most frequent source of recommendation for supplements was friends and relatives (55.4%). Most commonly used OTC-WLS was apple chromium (28.6%), followed by cayenne pepper (24.4%).

Users' satisfaction with the supplement was calculated using the TSQM scoring algorithm which generated a score ranging between 0 and 100 for effectiveness, side-effects, convenience and global satisfaction scales (Table 3). Subjects evaluated the effectiveness of and global satisfaction with the supplements as being low (38.09 ± 26.81 ; 35.53 ± 27.49). However, the supplements were found to be satisfying with regard to side-effects (83.50 ± 26.19) and convenience of use (68.76 ± 15.41).

Table 1. Sample characteristics

Characteristic	All subjects ($n = 119$)
Female (%)	80.7
Age (mean \pm SD)	35.1 ± 10.75
Education	
<High school graduate (%)	7.6
High school graduate (%)	26.1
Graduate or post graduate (%)	66.3
Income level	
Lower middle	10.1
Middle	62.2
Upper middle	21.0
Upper	6.7
BMI (mean $\text{kg}/\text{m}^2 \pm$ SD)	26.60 ± 5.03
Body dissatisfaction (mean \pm SD)	3.26 ± 1.17

BMI: body mass index.

Relationship between body dissatisfaction, BMI and satisfaction with OTC-WLS

Pearson correlation analysis (2-tailed) was performed to test for any significant relationship between body dissatisfaction, BMI and satisfaction with OTC-WLS. Table 4 presents the Spearman intercorrelations among these constructs. Results indicate that body dissatisfaction is significantly negatively correlated with effectiveness ($p < .01$), side-effects and global satisfaction sub-scales ($p < .05$). On the other hand, BMI only negatively correlates to satisfaction with side-effects ($p < .01$). Another interesting finding is that BMI is not significantly correlated to body dissatisfaction, whereas interscale correlations reveal that global satisfaction with an OTC-WLS is only influenced by the satisfaction with effectiveness of the supplement ($p < .001$).

Table 2. OTC-WLS usage

Usage characteristics	All subjects ($n = 119$)
OTC-WLS used (%)	
Apple chromium	28.6
Cayenne pepper	24.4
Amino acids	9.2
Lida daidaihua	6.7
Others (herbal teas, herbal pills, etc.)	31.1
Duration of OTC-WLS usage (%)	
Less than a week	9.3
1–2 weeks	15.1
2–3 weeks	15.1
1–2 months	42.0
More than 2 months	18.5
Frequency of OTC-WLS usage (%)	
Several times a day	48.7
Once a day	50.5
Once a week	0.8
Reason to quit (%)	
Derived expected benefits	31.9
Derived no benefits	27.8
Side-effects	20.2
Inconvenient to use	0.8
Use continuing	19.3
Source of recommendation for OTC-WLS (%)	
Advertisements	16.0
Advice of friends and/or -relatives	55.4
Advices of the Internet users	7.6
Advice of the pharmacist	17.6
Other	3.4

OTC-WLS: over-the-counter-weight loss supplements.

Group differences for satisfaction with OTC-WLS

In order to examine group differences with regard to demographics and OTC-WLS usage characteristics, a series of ANOVA analyses with post hoc contrasts were performed. Findings indicate that the type of OTC-WLS used leads to significant differences in satisfaction with regard to side-effects ($p < .01$) but has no impact on other aspects of satisfaction. The most dissatisfied subjects with regard to side-effects are the users of lida daidaihua (64.06 ± 40.47) whereas users of apple chromium (94.66 ± 11.21) and amino acids (95.45 ± 13.13) are satisfied with the relative lack of side-effects. Satisfaction with effectiveness and global satisfaction varied significantly in accordance with duration of use, with those who continued the OTC-WLS for prolonged periods (i.e. 1–2 months or more) being more satisfied ($p < .01$), consistent with Nachtigal et al.¹⁴ Frequency of use led to no significant differences in satisfaction levels either for effectiveness, side-effects, convenience or global satisfaction.

Satisfaction with side-effects significantly differed for education level ($p < .01$), with those educated to at least high school level reporting higher satisfaction levels (85.85 ± 24.04 vs. 54.86 ± 35.22). A confirmatory check whether less educated subjects differed in terms of other variables showed that they had

significantly higher BMIs ($p < .001$), which is the main contributor to dissatisfaction with side-effects, as noted above. Age, income level and gender led to no significant differences in any aspect of satisfaction. These findings are summarized in Table 5.

Discussion and conclusions

In this study, global satisfaction with an OTC-WLS is found to be significantly influenced only by the satisfaction with effectiveness of the supplement ($p < .001$), in contrast to the original work of Atkinson et al.,¹⁵ who demonstrated that all three aspects of satisfaction are related to global satisfaction with the medication. This finding is particularly important, as with such dietary supplements, the key motive for consumers is likely to be losing weight whatever it takes (i.e. effectiveness), regardless of other aspects of satisfaction such as side-effects and convenience. This may also explain the increasing trend in consumption of OTC-WLS despite the media publicity of the negative consequences or warnings given by health officials.

Another important finding involves subjects who evaluated the global satisfaction with the supplements, therefore the effectiveness, as being low. Satisfaction with effectiveness and global satisfaction differed significantly only for duration of use. This is interesting since studies suggest that great majority of weight loss supplements lack adequate efficacy data.¹⁸ Chromium picolinate, for instance, which is currently used as an active substance in popular weight loss drugs, led to a reduction of 0.08–0.2 kg/week compared with a placebo during an administration period of 6–14 weeks. Although this finding was statistically significant, it has been suggested to lack clinical meaning.¹⁹ A meta-analysis by Pittler et al. also showed that there is no compelling evidence for the effectiveness of popular herbal weight loss ingredients.²⁰

Although satisfaction with effectiveness of OTC-WLS was low, satisfaction was found with regard to

Table 3. Satisfaction with OTC-WLS

TSQM scale items	Mean	Standard Deviation
Effectiveness	38.09	26.81
Side-effects	83.50	26.19
Convenience	68.76	15.41
Global satisfaction	35.53	27.49

OTC-WLS: over-the-counter-weight loss supplements.

Table 4. Spearman intercorrelation

	Body dissatisfaction	BMI	Effectiveness	Side-effects	Convenience
BMI	.148				
Effectiveness	-.285**	-.175			
Side-effects	-.190*	-.256**	.152		
Convenience	-.033	-.080	.192*	.227*	
Global satisfaction	-.223*	.037	.713***	.138	.166

BMI: body mass index.

* $p < .05$ level (2-tailed).

** $p < .01$ level (2-tailed).

*** $p < .001$ level (2-tailed).

side-effects (83.50 ± 26.19) and convenience to use (68.76 ± 15.41). Further analysis revealed that the type of OTC-WLS used leads to significant differences in satisfaction with regard to side-effects ($p < .01$) but has no impact on other aspects of satisfaction. The subjects most dissatisfied with side-effects were the users of lida daidaihua (64.06 ± 40.47). On the other hand, users of apple chromium (94.66 ± 11.21) and amino acids (95.45 ± 13.13) were satisfied with the relative lack of side-effects, in accord with the literature.²¹ Similar to the previously mentioned lack of data in efficacy, data regarding the safety of OTC-WLS is generally not regarded as adequate.¹⁸ A range of adverse events are identified in the literature regarding herbal food supplements, however compared to the popularity of these products, only a small number of such reports have been made. It is suggested that the possibility of under-reporting of these adverse events may also exist,²⁰ particularly due to the importance consumers attach to the efficacy of these supplements, which may underestimate the negative aspects of the product, as previously mentioned.

A majority of previous research identifies a strong and positive correlation between BMI and body-dissatisfaction.²² However, the lack of significance of this relationship in the present study can be attributed to the fact that self body perception may be distorted regardless of the actual body size, a tendency that also is evident in literature. For instance, Paxton et al. discovered that one third of adolescent girls within a normal BMI range are dissatisfied with their body.²³ Other studies reported similar findings where individuals with normal BMI are dissatisfied with their weights and wanted to be thinner in accord with the Western thin ideal.²⁴ In this context, feelings associated with thinness become much more important than reality in leading weight-loss behavior.

In parallel, our study revealed that body dissatisfaction is significantly negatively correlated to satisfaction with effectiveness, side-effects and global satisfaction with the OTC-WLS. This is similar to a few previous studies where the significance of the problem was found to be unrelated to the level of satisfaction.²⁵ This may be particularly related to the fact that subjects with higher body dissatisfaction also have a higher expectancy from the weight loss supplements, which are usually unrealistic.^{26,27} As outcome expectancy lies at the heart of satisfaction, it is reasonable for these subjects to be highly dissatisfied with these supplements, which are usually marketed as producing "miraculous" results. On the other hand, this study found out that BMI only negatively correlates to satisfaction with side-effects ($p < .01$), whereas this relationship is stronger than that with body dissatisfaction. In other words, subjects become relatively much more dissatisfied with the side-effects as their BMI increases, as compared to an increase in their body dissatisfaction. This finding may be attributable to the fact that subjects with higher BMI are predisposed to health-related problems such as hypertension, coronary events or metabolic syndrome, possibly rendering the subjects more susceptible to side-effects.

We believe that a more holistic approach to the issue of satisfaction provides meaningful insights in terms of *why* consumers use OTC weight loss supplements, in addition to *whether*²⁸ or *how*²⁹ they might consume dietary supplements. In contexts where pharmacists sometimes rely on the Internet or word of mouth as information sources,³⁰ consumers' lack of knowledge on several issues regarding supplementary drugs may lead to ineffective consumption. But this study also demonstrated that consumers may not be satisfied with the supplement because they do not reach their ideal body shape, a

Table 5. Group differences for satisfaction with OTC-WLS

Between groups	Effectiveness		Side-effects		Convenience		Global satisfaction	
	F	p	F	p	F	p	F	p
Type of OTC-WLS	2.137	.081	4.564	.002**	.604	.661	.799	.528
Duration of use	6.909	.000***	1.505	.205	.036	.998	4.392	.002**
Frequency of use	.140	.870	.253	.777	1.298	.277	.914	.404
Education level	.487	.692	4.300	.006**	.202	.895	1.230	.302
Income level	1.653	.181	2.126	.101	.958	.415	1.773	.156
Gender	.004	.951	2.379	.126	2.645	.107	.106	.745
Age	1.509	.216	1.579	.198	2.779	.054	.464	.708

OTC-WLS: over-the-counter-weight loss supplements.

* $p < .05$ level (2-tailed).

** $p < .01$ level (2-tailed).

*** $p < .001$ level (2-tailed).

construct that is subjective, erratic and dependent on consumers' feelings.

The limitations of this study include the use of a convenience sample and self-report questionnaires. However, the findings contribute to the literature by providing evidence on a scarcely researched area, on satisfaction with weight loss supplements in an OTC setting. Moreover, this study also offers some important insights into the mechanism of satisfaction with particular medications, including the impact of usage characteristics and self-related assessments of the patients. Future research can investigate how different segments of consumers³¹ can generate different attitudes towards the drug or their bodies. Further research can also focus on exploring the satisfaction with other prescribed and non-prescribed weight loss supplements and possible determinants of the satisfaction with these products.

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Conflict of interest

The authors declare no conflict of interest.

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