Research Article

Pamukkale Medical Journal
doi:https://dx.doi.org/10.31362/patd.1510589

Received: 08.07.2024
Accepted: 01.10.2024
Area of Expertise: Public Health

Title: Evaluation of quality of life, health belief model and insomnia in obese and overweight individuals: a cross-sectional study.

Short title: Quality of life, health belief model and ınsomnia in obese and overweight individuals.

Abstract

Purpose: This study was conducted to evaluate the quality of life, insomnia severity, and approaches according to the health belief model of obese and overweight individuals who applied to the dietician polyclinic of the district health directorate in a district of Istanbul.

Material and methods: This cross-sectional study was conducted between September 2022 and March 2023 among 300 obese and overweight individuals aged above 18 who applied to the dietician polyclinic of the district health directorate in a district of Istanbul. The survey used the insomnia severity index, quality of life short form, and health belief model scale. To compare variables, the Chi-Square test, Mann Whitney U, and Kruskal Wallis tests were used for statistical analysis of the data. $P<0.05$ was considered statistically significant.

Results: 97.3% of the participants in the research were female and 2.7% were male. The mean scores of those who were overweight on the quality of life scale were found to be significantly higher than those of the obese ($p<0.001$). A significant difference was found between the obese and overweight in terms of insomnia severity index scores ($p=0.003$). Also, a significant correlation was found between the perceived benefit subscale and the perceived seriousness, sensitivity, importance of health sub-dimensions, and quality of life scale scores.

Conclusions: This study demonstrated the health beliefs, quality of life, and insomnia levels of obese and overweight individuals. Qualitative studies to be conducted should address the health belief model in more detail by using the data of this study.

Keywords: Obese, overweight, quality of life, insomnia.

Makale başlığı: Obez ve kilolu bireylerde yaşam kalitesi, sağlık inanç modeli ve uykusuzluğun değerlendirilmesi: kesitsel bir çalışma.

Kısa başlık: Obez ve fazla kilolu bireylerde yaşam kalitesi, sağlık inanç modeli ve uykusuzluk.

Öz

Amaç: Bu çalışma, İstanbul'un bir ilçesinde ilçe sağlık müdürlüğüne bağlı diyetisyen polikliniğine başvuran obez ve fazla kilolu bireylerin yaşam kalitesi, uykusuzluk şiddeti ve sağlık inanç modeli yaklaşımlarını değerlendirmek amacıyla yapılmıştır.

Gereç ve yöntem: Bu kesitsel çalışma, Eylül 2022 ile Mart 2023 tarihleri arasında, İstanbul'un bir ilçesinde ilçe sağlık müdürlüğüne bağlı diyetisyen polikliniğine başvuran 18 yaş üstü 300 obez ve fazla kilolu birey arasında gerçekleştirilmiştir. Anket kapsamında uykusuzluk şiddeti indeksi, yaşam kalitesi kısa formu ve sağlık inanç modeli ölçeği kullanılmıştır. Değişkenleri karşılaştırmak için Ki-Kare testi, Mann Whitney U ve Kruskal Wallis testleri kullanılmış olup, $p<0.05$ istatistiksel olarak anlamlı kabul edilmiştir.

Bulgular: Araştırmaya katılanların %97,3'ü kadın ve %2,7'si erkekti. Yaşam kalitesi ölçeğinden alınan puanların ortalamaları fazla kilolu bireylerde obez bireylerden anlamlı derecede yüksek bulunmuştur ($p<0.001$). Obez ve fazla kilolu bireyler arasında uykusuzluk şiddeti indeksi açısından anlamlı bir fark bulunmuştur ($p=0.003$). Ayrıca, algılanan yarar alt ölçeği ile algılanan ciddiyet, duyarlılık, sağlık önemi alt boyutları ve yaşam kalitesi ölçeği puanları arasında anlamlı bir korelasyon bulunmuştur.

Sonuç: Bu çalışma, obez ve fazla kilolu bireylerin sağlık inançlarını, yaşam kalitelerini ve uykusuzluk seviyelerini ortaya koymuştur. Gelecekte yapılacak niteliksel çalışmalar, bu çalışmanın verilerini kullanarak sağlık inanç modelini daha detaylı bir şekilde ele almalıdır.

Anahtar kelimeler: Obez, fazla kilolu, yaşam kalitesi, uykusuzluk.

Introduction

Obesity and overweight are health problems that indicate excessive and abnormal accumulation of body fat, leading to adverse health effects [1]. Globally, the prevalence of obesity and overweight among adults has been increasing over the past few decades. According to the World Health Organization, the prevalence of obesity nearly tripled worldwide between 1975 and 2016. In 2016, 1.9 billion adults were overweight, and 650 million of them were obese [2]. Worldwide, the prevalence of obesity has increased dramatically during the last four decades, and if this trend continues, a majority of the world's adult population will be either overweight or obese by 2030 [3].

Obesity and overweight are serious public health problems that are increasing in prevalence in Türkiye and all over the world. Türkiye has the highest obesity rates among European countries. According to the WHO European Regional Obesity Report 2022, the age-standardized obesity rate in adults in Türkiye is 32.1%, while the overweight rate is 66.8% [4]. According to Türkiye Health Survey 2019 data, while the rate of obese individuals aged 15 years and over was 19.6% in 2016, it was 21.1% in 2019. In terms of gender, in 2019, 24.8% of females were obese and 30.4% were pre-obese, while 17.3% of men were obese and 39.7% were pre-obese [5].

Studies have shown that obesity and overweight are public health problems as they are risk factors for many other health issues. In addition to the increased risk of death associated with excess body fat, obesity and overweight increase the risk of developing various diseases, such as obstructive sleep apnea, type II diabetes mellitus, coronary heart disease, and certain cancers [6-8]. Apart from their physical effects, obesity and overweight can also cause psychological problems such as depression, stress, anxiety, and insomnia, which are as significant as physical problems [9, 10]. Therefore, it has become increasingly clear that obesity-related issues do not simply cause or aggravate medical conditions [11]. Moreover, all factors affecting a person's private, professional, and daily life will directly impact their quality of life. Studies show that being obese or

overweight has a significant impact on a person's functional capacity and quality of life [12, 13].

It is also believed to be linked to the psychological effects of increased obesity and the impact of sleep loss on hormones such as leptin and ghrelin, which play a crucial role in the central regulation of appetite and energy expenditure [14, 16]. The significant decrease in average sleep duration over the last 50 years, which aligns with the rise in obesity rates in the population, suggests that recurrent partial sleep deprivation could have significant implications for public health due to the adverse effects observed in metabolic and hormonal processes [14].

Studies have shown that being obese or overweight reduces quality of life and increases the severity of insomnia. However, few studies have evaluated these effects together with the health belief model. This study examines individuals' levels of insomnia according to the Health Belief Model and their quality of life, as well as the impact of sociodemographic factors such as marital status, gender, and education level on quality of life.

To investigate the relationships between these factors, this study was conducted to evaluate the quality of life, insomnia severity, and approaches according to the health belief model of obese and overweight individuals who applied to the dietician polyclinic of a district health directorate in a district of Istanbul.

Material and methods

Type of research

This is a descriptive and cross-sectional study that has used a *face-to-face* survey design.

Study population

This study was conducted between September 2022 and March 2023. When the daily dietitian application was calculated as 18 individuals, the universe of this study was determined as 1440 adults aged above 18 years. The sample size for the study was calculated using the OpenEpi website [15]. When the sample size was calculated with 50% anticipated frequency and a 5% margin of error, it was aimed to reach 304 individuals. In this study, the convenience sampling method, one of the non-probability sampling techniques, was used for sample selection.

The study was completed with 300 individuals. Inclusion criteria were to be over 18 years old, obese, overweight, and not having any disease that could cause weight gain.

Measuring tools

Data collection was carried out face-to-face. A survey form consisting of 91 questions in total was directed to the participants. In the first part of the questionnaire, there are questions about sociodemographic characteristics, whether there is a chronic or psychiatric disease, height, weight, fat measurements, and the number of applications to a dietitian. The BMI was calculated using the standard formula: weight in kilograms divided by the square of height in meters (kg/m²). According to World Health Organization (WHO) guidelines, individuals were classified as follows: Overweight: BMI 25-29.9 kg/m², Obesity: BMI ≥30 kg/m². Weight was measured using a 'Tanita BC-418 ma' scale. The scale was calibrated before each session to ensure accuracy.

Height was measured using a standard stadiometer (ADE Assembly Note Column Scale). Participants were asked to stand upright without shoes, with their backs against the stadiometer, and their heads in the Frankfort plane position.

All measurements were conducted by a single dietitian to maintain consistency across the data collection process.

In the second part, there is a 32-item health belief model scale, the Turkish validity, and reliability of which was developed by Dedeli et al. (2011) [17].

The health belief model scale

This scale consists of a total of 32 items, each scored on a 5-point Likert scale. The first 7 items are rated as follows: 1: Never, 2: Sometimes, 3: Often, 4: Very Often, 5: Always. The subsequent 25 items are rated as follows: 1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree. The 16th item is reverse-coded. The Obesity Health Belief Model Scale does not calculate an overall score. Each subscale is calculated by summing the item scores within the subscale and dividing by the number of items in that subscale. It consists of the importance of health, the perception of seriousness, the perception of sensitivity, the perception of obstacles, and the perception of benefit. The averages of the scores obtained by the individuals from each sub-dimension are given and it is interpreted that the one with the higher average has more perception of that sub-dimension. The importance of health consists of 8 items; It shows the level of importance that individuals give to their health. Perceived severity evaluates to what extent individuals see obesity as a serious disease and consists of 4 items (9, 10, 11, 17). Perceived sensitivity evaluates the extent to which individuals find themselves prone to complications and health problems that may develop due to obesity, and to what extent they find the interventions related to obesity useful and consists of 4 items (12, 13, 14, 16). Perceived benefit shows the level of awareness of the benefits that individuals will gain in terms of their health when they can manage obesity and consists of 8 items (21, 22, 24, 25, 26, 27, 28, 32). Detected obstacle shows the level of barriers that

individuals perceive in applying health recommendations for obesity and consist of 8 items (15, 18, 19, 20, 23, 29, 30, 31). The Cronbach alpha coefficient of the scale is 0.80. In this study, it was found to be 0.72.

In the third part, the Quality of Life Scale Short Form was used.

Quality of life scale short form

This scale consists of 34 questions. It was validated and reliable in Turkish by Ünal et al. [18]. A 5-point Likert scale (1-5) is used for each question, it was graded from 1 to 5 (1: always/enormously; 2: often/a lot; 3: sometimes/ moderately; 4: rarely/a little; 5: never/not at all). A score was then calculated for each dimension by adding together its constituent items. Scores obtained by adding up answers graded from 1 to 5 of all items per dimension were transformed to convert the lowest and highest. The lowest 34 points and the highest 170 points can be obtained from the quality of life scale, and as the score increases, it is seen that individuals have a better quality of life. The Cronbach alpha coefficient of the scale is 0.80. In this study, it was found to be 0.70.

In the fourth part, the Insomnia Severity Index was used.

Insomnia severity index

7-item Insomnia Severity Index validity and reliability of which were made by Boysan et al. (2010) [19]. The survey is a 5-point Likert scale, rated as follows: '0: None, 1: Mild, 2: Moderate, 3: Severe, 4: Very Severe'. In the insomnia severity index, high scores indicate deterioration in sleep quality. If the total scores are between 0-7, there is no clinical insomnia, 8-14 is considered as the lower threshold for insomnia, 15-21 is moderate insomnia, and 22-28 is severe insomnia. The Cronbach alpha coefficient of the scale is 0.79. In this study, it was found to be 0.71.

Permission was obtained from Istanbul Medipol University Clinical Research Ethics Committee for the study (permission date: 26.08.2022, and permission number 746). Before commencing the research, permission to use each scale was obtained from the authors responsible for the scales.

Statistical analysis

Descriptive data are presented as standard deviation values, means, and frequency tables. The chi-square test was used for statistical analysis of the data, to compare variables. The normal distribution of variables was examined using histogram and Kolmogorov-Smirnov/Shapiro-Wilk tests. Independent samples were compared with the t-test for continuous variables with parametric distribution, and those without normal distribution were compared with the Mann-Whitney U and Kruskal Wallis tests. Relationships between non-normally distributed continuous variables were evaluated with

the Spearman correlation test. The SPSS Statistics 20.0 (Armonk, New York: IBM Corp.) statistical program trial version was used. *P*<0.05 was considered statistically significant.

Results

This study was completed with a total of 300 individuals. 97.3% of the participants in the research were female and 2.7% were male. All of the participants are over the age of 18 and their average age is 38.00±8.96. 28% of the participants were overweight (BMI 25.0 kg/m^2-29.9 kg/m^2), and 72% were obese (BMI>30.0 kg/m^2). 53.3% of the participants stated that a dietitian from a different institution had applied before. The first application of 41% of the participants applied to our institution, the second application of 26.7%, the third application was 9.6%, and four or more applications were 22.7% 44% of the participants stated that they had any chronic disease, and the most frequently mentioned chronic disease was diabetes mellitus.

The sociodemographic characteristics of the participants in the study were examined according to the insomnia severity index and are shown in detail in Table 1. Accordingly, it was determined that obese people had significantly more severe insomnia symptoms than overweight people (p=0.003), and those with chronic diseases had significantly more severe insomnia symptoms than those without chronic diseases (p=0.034).

In Table 2, the sociodemographic characteristics of the participants and the scores they got from the quality of life scale were compared. The participants' quality of life scale average scores were 128.61±24.71, with a minimum of 36 points and a maximum of 170 points. When quality of life scores were evaluated according to gender, males' quality of life scores were higher than females, and the difference was not significant (p=0.560). The mean scores of those who were overweight on the quality of life scale were found to be significantly higher than those of the obese (p<0.001). There was a significant difference between the patients with chronic (p=0.022) or psychiatric disease and those without lower quality of life scale scores (p=0.012).

When the quality of life of the participants was evaluated according to the severity of insomnia in Table 3, the scores of the participants with moderate and severe insomnia were found to be significantly lower (p<0.001).

The comparison of the scores they got from the health belief model subscales according to their sociodemographic characteristics is shown in Table 4 in detail. The difference between the scores of the participants' perceived barriers (p=0.002) and benefits sub-scales according to their educational status was found to be significant (p=0.011). The presence of obesity in first-degree relatives and the score they got from

the perceived disability subscale were also found to be significant (p=0.008). A significant difference was found between the obese and overweight in terms of perceived benefit scores (p=0.029). A comparison of the insomnia severity of the participants according to the sub-dimensions of the belief model in health is shown in Table 5 in detail. There was a significant difference between insomnia severity scores and both the importance of the health subscale (p=0.007) and the perceived barriers subscale (p=0.014).

The sub-dimensions of the health belief model, the scores obtained from the short form of the quality of life scale, and the correlation dimensions between the age variable were evaluated (Table 6). Accordingly, a significant correlation was found between the perceived benefit subscale and the perceived seriousness, sensitivity, importance of health sub-dimensions, and quality of life scale scores. While there was a positive correlation between the perceived usefulness subscale and the other subscales of the scale, a negative correlation was observed with the quality of life. Perceived disability and perceived susceptibility subscales also showed a significant negative correlation with the quality of life scale. A significant positive correlation was observed between the age variable and the importance of the health subscale.

Discussion

The participants' views on obesity, their quality of life, and their insomnia indices were assessed in this study of overweight and obese people. Ninety percent of the individuals in this study who made dietetic applications were females. WHO statistics from 2016 showed that 39.2% of obese people in Türkiye who were 18 years of age or older were female and 24.4% were male; Turkish Statistical Institute (TUIK) data from 2019 showed that 24.8% of obese people who were 15 years of age or older were female and 17.3% were male [2, 5]. The higher incidence of obesity in females can be attributed to several factors, such as living a more stressful lifestyle than men, engaging in less physical activity, and experiencing hormonal or obstetric issues unique to females.

After assessing the participants' degree of insomnia, it was shown that those who were obese had more severe insomnia than those who were overweight. Furthermore, it has been observed that moderate to severe symptoms of sleeplessness are more common among obese or overweight people with chronic illnesses. Greater primary sleep disruptions and daytime tiredness were similarly linked to higher body mass, according to a study by Duraccio et al. [20] involving 1,133 participants. Muhammad et al. [1] did a cross-sectional study on 31,358 older persons and discovered that widows and singles experienced more severe insomnia than married people. This study demonstrated a strong correlation between the severity of insomnia and marital status,

with divorced people reporting more mild insomnia. In the study they conducted, Vorona et al. [21] discovered a strong correlation between obesity and sleeplessness. Logue et al. [22] found in another study that obese patients had lower sleep duration and lower quality sleep. Additionally, Buscemi et al. [23] observed that among a sample of 200 obese patients with chronic illnesses, there was a strong correlation between obesity and shorter sleep durations.

The short form of the quality of life scale was used to evaluate participants' obese and overweight participants' quality of life. It was shown that those who were obese had poorer quality of life scores than those who were overweight. A substantial inverse association between obesity and quality of life was discovered in Jia et al.'s study [24], which is consistent with the findings of this study. They also stated that the quality of life is low in those who are overweight, but the quality of life decreases as the BMI level increases, and the quality of life increases with weight loss. In a study conducted by Sach et al. [25] with a sample of 1865 individuals, it was stated that the quality of life of obese individuals was lower than those of normal weight and that their obesity-related chronic diseases may also be effective. In this study, the quality of life of obese and overweight individuals with comorbidities such as chronic illnesses and psychiatric disorders was found to be significantly lower than those who do have not any psychiatric or chronic diseases. In a cohort study involving 64,631 individuals that evaluated the relationship between obesity and quality of life, it was found that obese and overweight individuals had lower quality of life compared to those with normal weight. Additionally, those with three or more mental or physical illnesses were also associated with lower quality of life. The findings of this study, which have a higher reliability than ours, support our findings [26]. In Thommasen et al.'s study [27], it was concluded that the presence of chronic disease is the strongest determinant among the health-related parameters affecting quality of life. In this study, quality of life was found to be significantly lower in individuals with more severe levels of insomnia. Similarly, a study conducted in São Paulo that evaluated the relationship between insomnia and quality of life also found that the severity of insomnia had a significant impact on quality of life [28].

It was found in this study that individuals who had applied to dietitians at various institutions had a lower quality of life. This might be the result of situations brought on by their despondency, the fact that these people apply to more institutions and do not receive the answers they want, or a combination of psychological or genetic diseases. The scores of the participants from the health belief model scale in obesity are not calculated as the total score, and the scores of the sub-dimensions were evaluated separately. Accordingly, the participants got the highest score from the perceived

seriousness sub-dimension and the lowest score from the perceived obstacle sub-dimension. According to the obesity health belief model scale; the increase in the individual's perception of seriousness is related to their awareness of the seriousness of the situation and its consequences. Individuals with a high perception of seriousness towards a health problem are more likely to engage in health-promoting behavior because they feel prone to contracting the disease. In the studies, it was determined that the most effective determinants of behavior change were Perception of Benefit and Perception of Obstacles, while the least effective determinants were Perception of Severity, and it was stated that the effect of the perceived obstacle should be reduced and the effect of other sub-dimensions should be increased for the realization of the health behavior related to the disease [29, 30]. Barakat et al. [31] in a study carried out, it was stated that the increase in perceived benefit also improves preventive health behaviors.

In this study, when the relationships between the sub-dimensions of the health belief model scale and the variables were examined, a significant relationship was found between the education level of the individuals and the perceived barrier and benefit sub-dimensions. As the level of education increases, the perceived disability score decreases, while the perceived benefit score increases. Kahraman et al. [32] by this study, it was stated that there was a significant difference between education level and perceived disability dimensions. Darvishpour et al. [33] on the other hand, it is necessary to develop educational interventions to improve health behaviors, and in this way, perceived benefits should be understood and barriers to health behaviors should be removed. When obese and overweight individuals were compared according to the health belief model, it was determined that the perceived benefit scores of obese individuals were significantly higher. This may be related to the awareness that obese individuals will gain more benefits from losing weight than overweight individuals. However, no significant difference was observed in terms of perceived severity between obese and overweight individuals. A study conducted in Iran with students reported that overweight students scored lower on perceived severity compared to those with normal weight. The lack of a significant difference in our study may be because we did not compare these findings with normal-weight individuals [34].

There are also some limitations of the research. First, the use of a non-probability sampling method and the fact that patients were recruited from a single center limit the generalizability of the study results. Additionally, as a cross-sectional study, it has the disadvantage of not being able to establish causality. Secondly, the length of the questionnaire was reflected in the answers of the participants and caused reluctance to

answer some of the questions, resulting in missing data. Thirdly, the fact that the research was conducted in a low socioeconomic region caused the participants to have difficulty understanding and answering the questions, and it may tend to show differently.

Despite these, the research is a powerful one as it has not been done before in the region. In addition, in the literature, these scales have been evaluated separately in obese individuals, and studies in which all of them are evaluated together are limited.

Accordingly, it was found that the level of insomnia was more severe, and the quality of life was lower in obese individuals than in overweight individuals. According to the health belief model, it was determined that the scores of obese individuals on the perceived benefit subscale were higher than those who were overweight. In addition, the relationship between education level and perceived disability and benefit has been revealed. Qualitative studies to be conducted should address the health belief model in more detail by using the data of this study. In addition, these individuals continue their dietitian controls, and changes after weight loss should be recorded or prospective studies should be planned.

Funding: No funding was received for this study.

Authors contributions: M.A.S. and S.D. constructed the main idea and hypothesis of the study. M.A.S. and S.D. developed the theory and arranged/edited the material and method section. S.D. has evaluated the data in the Results section. Discussion section of the article written by S.D. M.A.S. reviewed, corrected, and approved. In addition, all authors discussed the entire study and approved the final version.

Conflict of interest: No conflict of interest was declared by the authors.

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Table 1. Characteristics of participants according to the Insomnia Severity Index

		Insomnia Severity Index								
		Clinically insignificant		Insomnia threshold		Moderate insomnia		Severe insomnia		*p* value*
		n	%	n	%	n	%	n	%	
Gender	Female	100	38.2	111	42.4	40	15.3	11	4.2	0.873
	Male	4	50.0	3	37.5	1	12.5	0	0.0	
Education	Illiterate	1	25.0	1	25.0	1	25.0	1	25.0	0.109
	Literate	1	9.1	6	54.5	4	36.4	0	0.0	
	Primary Education	55	39.0	57	40.4	22	15.6	7	5.0	
	Secondary Education	36	46.2	29	37.2	11	14.1	2	2.6	
	University	11	30.6	21	58.3	3	8.3	1	2.8	
Marital Status	Married	95	38.9	100	41.0	38	15.6	11	4.5	**0.039**
	Single	8	44.4	10	55.6	0	0.0	0	0.0	
	Divorced	0	0.0	2	40.0	3	60.0	0	0.0	
Psychiatric disease	Yes	3	17.6	9	52.9	4	23.5	1	5.9	0.355
	No	96	39.0	103	41.9	37	15.0	10	4.1	
Chronic Disease	Yes	35	31.0	47	41.6	23	20.4	8	7.1	**0.034**
	No	60	42.0	63	44.1	17	11.9	3	2.1	
BMI	Overweight	42	51.2	34	41.5	4	4.9	2	2.4	**0.003**
	Obese	62	33.0	80	42.6	37	19.7	9	4.8	

Bold values are significant with $p<0.05$. CI− and CI+ are the lower and upper bounds of the 95% confidence interval. *Chi-Square Test

Table 2. Comparison of the sociodemographic characteristics of the participants according to the short form of the quality of life scale

		Quality of Life Scale Short Form				*p* value
		Mean	**Standard deviation**	**Minimum**	**Maximum**	
Gender	Female	128.36	25.05	36.00	170.00	0.560*
	Male	135.67	11.78	124.00	151.00	
Education	Illiterate	129.00	.	129.00	129.00	0.348**
	Literate	115.71	30.01	68.00	148.00	
	Primary Education	130.36	23.85	64.00	170.00	
	Secondary Education	125.34	26.57	36.00	170.00	
	University	134.92	20.17	73.00	163.00	
Marital Status	Married	128.86	24.77	36.00	170.00	0.419**
	Single	135.00	7.87	126.00	146.00	
	Divorced	106.00	39.34	64.00	142.00	
Have a child	Yes	128.57	24.85	36.00	170.00	0.836*
	No	126.17	24.39	64.00	150.00	
Obesity in first degree relatives	Yes	122.47	26.16	63.00	169.00	**0.028***
	No	131.64	23.77	36.00	170.00	
Applying to a dietitian at another institution before	Yes	122.36	25.69	36.00	170.00	**<0.001***
	No	134.93	22.69	63.00	170.00	
Psychiatric Disease	Yes	113.54	26.01	63.00	169.00	**0.012***
	No	130.31	24.07	36.00	170.00	
Chronic Disease	Yes	124.45	22.47	64.00	169.00	**0.022***
	No	131.39	26.28	36.00	170.00	
Use of any psychiatric drugs	Yes	108.50	30.85	63.00	169.00	**0.021***
	No	129.67	24.24	36.00	170.00	

BMI	Overweight	138.24	24.90	36.00	170.00	**<0.001***
	Obese	124.02	23.37	63.00	165.00	

Bold values are significant with $p<0.05$. CI− and CI+ are the lower and upper bounds of the 95% confidence interval. *Mann Whitney U ** Kruskal Wallis

Table 3. Comparison of the insomnia severity of the participants according to the short form of the quality of life scale

		Quality of Life Scale Short Form				***p* value**
		Mean	**Standard deviation**	**Minimum**	**Maximum**	
Insomnia Severity Index	Clinically insignificant	137.48	21.76	36.00	170.00	**<0.001***
	Insomnia threshold	126.49	23.74	63.00	170.00	
	Moderate insomnia	114.20	23.78	64.00	155.00	
	Severe insomnia	115.71	34.48	70.00	155.00	

Bold values are significant with $p<0.05$. CI− and CI+ are the lower and upper bounds of the 95% confidence interval. * Kruskal Wallis

Table 4. Comparison of the sociodemographic characteristics of the participants according to the sub-dimensions of the belief model in health

		Importance of health		**Perceived severity**		**Perceived sensitivity**		**Perceived barriers**		**Perceived benefits**	
		Mean	**Sd**	**Mean**	**Sd**	**Mean**	**Sd**	**Mean**	**Sd**	**Mean**	**Sd**
Gender	Female	2.98	0.76	4.75	0.69	4.18	0.94	2.22	0.91	4.67	0.64
	Male	3.11	0.92	4.78	0.41	4.31	0.58	1.56	0.41	4.70	0.33
***p* value**		0.685*		0.746*		0.865*		0.077*		0.448*	
Education	Illiterate	3.13	1.02	4.67	0.58	4.44	0.55	3.04	0.69	4.50	0.38
	Literate	3.21	0.94	4.92	0.21	4.48	0.73	3.19	0.95	4.74	0.39
	Primary Education	3.05	0.79	4.65	0.86	4.23	0.98	2.23	0.96	4.68	0.67
	Secondary Education	2.79	0.64	4.86	0.44	4.19	0.85	2.12	0.76	4.74	0.54
	University	3.03	0.76	4.91	0.24	3.89	0.96	1.84	0.74	4.49	0.73
***p* value**		0.162**		0.332**		0.097**		**0.002****		**0.011****	
Marital Status	Married	3.00	0.75	4.74	0.71	4.20	0.93	2.24	0.92	4.67	0.65
	Single	2.73	0.92	4.86	0.23	3.94	1.03	1.73	0.44	4.66	0.35
	Divorced	2.56	0.22	5.00	0.00	4.45	0.67	1.94	0.77	4.95	0.11
***p* value**		0.322**		0.364**		0.488**		0.129**		0.098**	
Obesity in first degree relatives	Yes	2.97	0.75	4.77	0.69	4.24	0.89	2.39	0.88	4.67	0.54
	No	2.98	0.77	4.74	0.69	4.16	0.94	2.09	0.91	4.67	0.69
***p* value**		0.847*		0.301*		0.580*		**0.008***		0.376*	

BMI	Overweight	2.99	0.83	4.66	0.86	4.10	1.04	2.11	0.91	4.52	0.82
	Obese	2.98	0.73	4.79	0.60	4.22	0.89	2.23	0.90	4.73	0.53
***p* value**		0.782*		0.465*		0.661*		0.295*		**0.029***	

Bold values are significant with $p<0.05$. CI− and CI+ are the lower and upper bounds of the 95% confidence interval. *Mann Whitney U ** Kruskal Wallis

Table 5. Comparison of the insomnia severity of the participants according to the sub-dimensions of the belief model in health

		Importance of health		**Perceived severity**		**Perceived sensitivity**		**Perceived barriers**		**Perceived benefits**	
		Mean	**Sd**	**Mean**	**Sd**	**Mean**	**Mean**	**Sd**	**Mean**	**Sd**	**Mean**
Insomnia Severity Index	Clinically insignificant	3.18	0.72	4.84	0.46	4.11	0.93	2.05	0.84	4.69	0.49
	Insomnia threshold	2.83	0.71	4.74	0.66	4.15	0.97	2.12	0.83	4.64	0.72
	Moderate insomnia	2.94	0.76	4.80	0.58	4.36	0.78	2.63	0.93	4.73	0.56
	Severe insomnia	2.90	0.96	4.70	0.50	4.39	0.50	2.35	1.04	4.83	0.31
***P* value**		**0.007****		0.375**		0.609**		**0.014****		0.448**	

Bold values are significant with $p<0.05$. CI− and CI+ are the lower and upper bounds of the 95% confidence interval. ** Kruskal Wallis

Table 6. Correlations between sub-dimensions of belief model in health, quality of life scores, and age

		Quality of Life Scale Short Form	**Age**
Perceived benefits	Spearman Correlation	-0.211**	0.028
	Sig. (2-tailed)	**0.006**	0.656
Perceived barriers	Spearman Correlation	-0.289**	0.063
	Sig. (2-tailed)	**<0.001**	0.347
Perceived severity	Spearman Correlation	-0.148	-0.024
	Sig. (2-tailed)	0.061	0.702
Perceived sensitivity	Spearman Correlation	-0.172*	0.078
	Sig. (2-tailed)	**0.032**	0.217
Importance of health	Spearman Correlation	-0.095	0.171**
	Sig. (2-tailed)	0.232	**0.006**

**. Correlation is significant at the 0.01 level (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed)

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