Stigma and depression among obese infertile women: a cross-sectional study

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Abstract

Background Obesity causes infertility through various pathways, including disruption of ovarian follicular development, qualitative and quantitative development of the oocyte, fertilization, embryo development, and implantation. In traditional societies such as Türkiye, having children is a determinant of social status. Stigma is defined as a negative sense of social difference from others. Depression is a common health problem in infertile women due to the stressful nature of treatment procedures, fear of treatment failure, and the patient's inability to become pregnant. In this cross-sectional study, the sample consisted of 161 infertile women from an infertility outpatient clinic of a university hospital in Eastern Turkey.

Results It was determined that depression scores had a strong positive correlation with stigma scores. In the multiple regression analysis performed to evaluate the effects of five independent variables determined to have an effect on depression scores, it was seen that the independent variables explained depression levels by 80%.

Conclusion The findings of this study suggest that stigma and depression are significant factors affecting the psychosocial and emotional well-being of obese women experiencing infertility. These results underscore the potential need for more comprehensive psychosocial support and assessment for women experiencing infertility related to obesity. Obese patients should be informed about the importance of pre-pregnancy weight reduction and should be encouraged to lose weight before the treatment to reduce the poor obstetrical outcomes due to obesity. Additionally, evidence-based guidelines should be prepared for assisted reproductive techniques for fertility treatment in obese infertile women.

Keywords Depression, Infertility, Obesity, Stigma

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Background

Infertility has been recognized as a public health problem by the World Health Organization. Approximately 186 million people worldwide are infertile [1, 2]. While the prevalence of infertility was reported around 10–15% in Turkey, it has increased to 30% today [3]. The fertility rate in obese women is lower than in women of normal weight, and its causes include obesity. Obesity has been shown to cause oocyte, hormone, metabolic, and endometrial disorders. At the same time, insulin and leptin changes in obese individuals can also cause anovulation [4].

Moreover, obesity can be accompanied by many psychiatric diseases [5]. The most disturbing consequence of infertility is the stigma caused by social attitudes and prejudices. Stigma can reduce the self-esteem and self-sufficiency of the infertile woman. Additionally, infertile women need to spend more time and money on treatment, which causes additional psychological disorders such as depression and anxiety [6, 7]. Depression is a common health problem in infertile women due to the stressful process of infertility treatments, the anxiety that the treatments will fail, and the inability of the woman to become pregnant.

Infertility treatment is a difficult and long process for couples from the decision stage to treatment. Midwives and gynecology nurses should assess couples' psychosocial well-being and offer comprehensive care that includes psychosocial support throughout the process. Here, caregivers should consider all negative situations that couples may have experienced regarding infertility. Turkey is one of the countries where individuals diagnosed with infertility face problems such as stigma, social isolation, and loss of self-esteem [8, 9]. There are very few studies examining stigma and depression in obese infertile women in the literature. Therefore, this study was conducted to examine the stigma and depression status of obese infertile women in Turkey.

Methods

Design

This study adopted a cross-sectional design. It was executed and reported in accordance with the STROBE Statement: guidelines for reporting observational studies [10].

Participants and setting

This study was carried out with individuals who presented to the infertility outpatient clinic of a university hospital in Eastern Turkey between December 2021 and November 2022. A fixed model in the G*Power software 3.1 [11] was used to calculate the sample size for multiple linear regression analysis. The effect size was accepted as $f^2 = 0.15$, and $\alpha = 0.05$ and $1 - \beta = 0.95$. The study included 9 explanatory variables (7 demographic variables, stigma, and depression). The sample size required to conduct the study with sufficient statistical power was calculated as 134. Considering a potential data loss of 20% to follow-up rate and sampling error, the sample size was expanded to 161. Participant Selection: This study was conducted at the infertility outpatient clinic of a university hospital in Eastern Turkey between December 2021 and November 2022. The total number of eligible women who presented to the clinic during this period was 234 as documented.

The inclusion criteria were as follows: volunteering to participate in the study, being obese (BMI ≥ 30), being over the age of 18, being diagnosed as infertile, being able to read and write in Turkish, and having no visual impairment that could prevent filling in the data collection forms. Participants who met these criteria were considered eligible for inclusion in the study.

Exclusion criteria

Participants diagnosed with psychiatric disorders were excluded from the study. The number of women excluded based on this criterion was 11 as recorded. The number of participants who met the inclusion criteria but did not accept to participate in the study was 62.

Potential sources of bias

To address potential sources of bias, stringent inclusion and exclusion criteria were employed. Efforts were made to minimize selection bias by ensuring that all eligible participants were informed about the study and had the opportunity to volunteer. Additionally, steps were taken to standardize data collection procedures and ensure consistency in data interpretation.

Measures

Personal information form

The form was prepared by the researchers to determine the demographic and infertility-related characteristics of the participants. It consisted of eight questions.

Infertility Stigma Scale

The Infertility Stigma Scale (ISS) was developed by Fu et al. in 2015 to measure the perceptions of women receiving infertility treatment regarding stigma [7]. The scale consists of 27 items, and it has four subscales, namely "Self-devaluation" (seven items assessing infertile women's irrational beliefs about self-worth), "Social withdrawal" (five items assessing women's fearfulness of social interactions), "Public stigma" (nine

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items assessing a perceived stigma from people around them), and "Family stigma" (six items assessing a perceived stigma from family members). The total score to be obtained from the scale varies between 27 and 135. The Cronbach's α coefficient of the original scale was reported as 0.94. The Turkish validity and reliability study of the scale was conducted by Capik et al. (2018), who reported the Cronbach's α coefficient of the scale as 0.93 [12]. In this study, the Cronbach's α coefficient of the scale was found to be 0.90.

Beck Depression Inventory

The Beck Depression Inventory (BDI) was developed by Beck in 1961 to assess the risk of depression and the severity of depressive symptoms [13]. The respondent is asked to complete a questionnaire consisting of 21 items estimating the severity of various depressive symptoms on a scale of 0 to 3, with 0 being the least severe and 3 being the most severe. The minimum and maximum total scores in the inventory are 0 and 63. BDI was adapted to Turkish by Hisli in a study that included university students, and the scale was identified as a reliable and valid instrument [14]. The Cronbach's α coefficients of the Turkish version of the inventory were reported as 0.80. In this study, the Cronbach's α coefficient of the inventory was calculated as 0.84.

Data analysis

All statistical analyses were performed using IBM SPSS Statistics, Version 23 (IBM, Inc., Armonk, NY, USA). In the analyses of the data, descriptive statistics, independent-samples *t*-test, one-way ANOVA, Pearson's correlation analysis, and multiple linear regression analysis were used for the normally distributed data. The level of statistical significance was accepted as $p < 0.05$.

Ethics approval

Before starting the study, approval was obtained from the Ethics Committee of a university. The women included

Table 1 Sociodemographic characteristics of participants and differences in variables ($n = 161$)

Variables	N (%)	Stigma			Depression		
		X (SD)	Test	p	X (SD)	Test	p
Age (years)							
20–24	11 (6.8)	52.55 (28.00)	3.269*		32.45 (13.14)	3.780*	0.286
25–29	32 (19.9)	53.84 (22.12)		0.352	32.31 (8.42)		
30–34	50 (31.1)	56.06 (21.17)			34.46 (8.92)		
≥ 35	68 (42.2)	51.16 (23.63)			32.37 (9.06)		
Education			0.677*	0.879			
Primary school	40 (24.8)	40 (84.79)			34.18 (10.47)	1.725*	0.631
Middle School	27 (16.8)	27 (79.15)			33.30 (10.41)		
High school	45 (28.0)	45 (82.76)			32.98 (7.47)		
University or above	49 (30.4)	49 (77.32)			31.55 (8.65)		
Duration of marriage			0.839	0.434			
1–4 years	48 (29.8)	49.35 (20.90)			30.96 (8.67)	1.562	0.213
5–9 years	77 (47.8)	53.51 (20.54)			33.64 (8.96)		
10 years or above	36 (22.4)	55.44 (28.39)			33.89 (9.86)		
Has a history of pregnancy			−0.781	0.436			
Yes	61 (37.9)	50.95 (21.60)			30.84 (7.57)	−2.266	**0.025***
No	100 (62.1)	53.77 (23.23)			34.15 (9.77)		
Duration of infertility diagnosis			4.475*	0.107			
0–2 years	101 (62.7)	50.11 (21.42)			31.58 (8.86)	7.329*	**0.026***
3–5 years	28 (17.4)	62.04 (27.21)			35.54 (10.04)		
5 years or longer	32 (19.9)	52.72 (20.22)			34.72 (8.54)		
Currently receiving treatment			−1.076**	0.282			
Yes	136 (84.5)	52.29 (23.12)			33.12 (9.17)	−0.757	0.449
No	25 (15.5)	54.92 (19.76)			31.68 (8.93)		

* Kruskal–Wallis test

** Mann–Whitney *U* test

*** $p < 0.05$

Table 2 Mean and standard deviation values of variables

Variables	Mean	SD	Minimum	Maximum	Percentiles		
					25	50	75
Stigma	52.70	22.60	27.00	130.00	34.00	45.00	65.50
Self-devaluation **7**–**1.72**	12.08	6.64	7.00	35.00	7.00	10.00	14.50
Social withdrawal **5**–**1.62**	8.11	2.68	5.00	17.00	6.00	8.00	10.00
Public stigma **9**–**1.95**	17.60	8.59	9.00	45.00	11.00	15.00	21.50
Family stigma 6–**1.66**	10.00	6.02	6.00	30.00	6.00	6.00	13.00
Depression	32.89	9.18	21.00	67.00	26.50	31.00	37.50

Table 3 Pearson's correlations (*p*-values) between variables (*n* = 161)

Variables	Depression	
	r	*p*
Stigma	0.686[a]	0.000
Self-devaluation	0.845[a]	0.000
Social withdrawal	0.845[a]	0.000
Public stigma	0.616[a]	0.000
Family stigma	0.542[a]	0.000

[a] Correlation is significant at the 0.01 level (2-tailed)

in the study were informed about the aim of the study, and their questions were answered. The women were informed about the fact that their information would be kept confidential and not be used in any other place, and they had the right to withdraw from the study at any time. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Volunteer participants were included in the study.

Results

Sample characteristics

The research was completed with 161 individuals who met the inclusion criteria. It was determined that 42.2% of the participants were between the ages of above 35, 30.4% had a university or higher education level, 47.8% had been married for 5–9 years, and 67.2% had no

history of pregnancy. The duration of the diagnosis of infertility was determined to be 3–5 years among 27.21% of the participants, and 23.12% of the participants were currently receiving treatment (Table 1).

Stigma, depression, and their relationships

The mean stigma score of the participants (52.70 (SD 22.60)), their mean self-devaluation score (12.08 (SD 6.64)), their mean social withdrawal score (8.11 (SD 2.68)), their mean public stigma score (17.60 (SD 8.59)), their mean family stigma score (10.00 (SD 6.02)), and their mean depression score (32.89 (SD 9.12)) were all on moderate levels. The detailed descriptive results are shown in Table 2.

Correlations between variables

It was determined that the depression scores of the participants had a strong positive correlation with their stigma scores. It was found that depression had a very strong positive relationship with the self-devaluation variable, a very strong positive relationship with social withdrawal, a strong positive relationship with public stigma, and a moderate positive relationship with family stigma (Table 3).

Regression analyses examining covariates of depression

As seen in the results above, the depression scores of the participants differed significantly depending on their demographic variables. Before regression analyses, we

Table 4 Multiple linear regression analysis examining covariates of depression (*n* = 161)

Explanatory variables	*B*	Beta	*t*	*p*	*F*	Adjusted R^2
Self-devaluation	0.210	0.139	2.692	0.008	84.561	0.785
Public stigma	0.123	0.116	1.981	0.049		
Age	2.600	0.090	2.397	0.018		
Pregnancy history	1.121	0.060	1.571	0.118		
Time since diagnosis	0.567	0.030	0.798	0.426		

Durbin Watson: 2.28; *R-squared*: 0.795

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tested the normality of the data on depression using the Shapiro–Wilk test. The results indicated that the data on depression ($p = 0.945 > 0.05$) fit a normal distribution. Regression analyses were conducted, and depression was selected as the outcome variable, while self-devaluation, social withdrawal, public stigma, family stigma, general stigma, and sociodemographic variables that showed significance were regarded as the explanatory variables. The variables were then screened using the multiple regression analysis method (backward method), and a regression analysis was performed. In the multiple regression analysis performed to evaluate the effects of five independent variables determined to have an effect on depression scores, it was seen that the independent variables explained 80% of the total variance in depression scores. It was determined that the level of depression increased by 0.210 points as the self-devaluation of the participants increased, 0.123 points as their public stigma status increased, 2.600 points as their age increased, and 0.567 points as their duration of diagnosis increased by 1 unit. Additionally, it was found that the level of depression increased by 1.12 points in those without a history of pregnancy (Table 4).

Discussion

Fertility can be negatively affected by obesity. In women, early onset of obesity triggers the development of menses irregularities, chronic oligo-anovulation, and infertility in adulthood. Obesity in women can also increase the risk of miscarriages and impair the outcomes of assisted reproductive technologies and pregnancy when the body mass index exceeds 30 kg/m^2 [13, 15]. Thus, the combination of infertility and obesity poses some very real challenges in terms of both the short- and long-term management of these patients [16]. The results of this study, which was conducted to determine the relationship between the stigma and depression levels of obese infertile women, are discussed in this section with reference to the relevant literature.

According to their Infertility Stigma Scale total and dimension scores, the participants of this study had the highest level of perceived stigma in the public stigma domain, and they had a mean total score of 52.70, which was moderate. In the study conducted by Yilmaz and Kavak (2019) examining the relationship between stigma and depression in 121 infertile women, it was found that infertile women experienced moderate stigma, and the public stigma dimension was the most affected among the dimensions of the same scale [9]. Sophia and Punitha (2017) found that 62% of infertile individuals experienced social stigma in their study with 60 participants who were selected using the purposive sampling technique [17].

The mean BDI score in this study was 32.89 (SD 9.12), indicating that the participants had severe depression. Obesity has been associated with abnormalities in reproductive function and fertility in women. Associations between infertility, depression, and anxiety have been found in non-obese populations. However, studies examining the relationship between depression and infertility in obese women are rare. In a study that was performed with the participation of 88 obese women to examine the potential psychosocial correlates of infertility in a population of women undergoing bariatric surgery, women identified as infertile were more likely to be diagnosed with a depressive disorder or major depressive disorder not otherwise specified than women who were not infertile [18].

In this study, depression scores were found to be strongly and positively associated with general stigma scores, very strongly associated with self-devaluation and social withdrawal scores, positively associated with public stigma scores, and moderately associated with family stigma scores. This shows that as the perceived stigma levels of the participants increased, their depressive symptoms also increased. As a result of the stigma that obese individuals are exposed to, their self-esteem is also negatively affected [19]. In the literature, it was stated that the effect of stigma is more pronounced on women than on men. Obese individuals are "labeled" in social spaces. Discrimination causes them to lose their self-esteem and become susceptible to depression [20]. In the case of infertility, the tendency to see the inability to have children as the fault of the woman is closely related to stigma [7]. It can lead to health problems such as long-term depression, low life satisfaction, or social isolation [21]. In countries like Turkey, where motherhood is in an important position in terms of gender roles, women who cannot fulfill this role are stigmatized and exposed to negative language [22]. Depression is more common in women, and infertility is thought to be a common outcome [23]. Compared to fertile controls, infertile patients were significantly more likely to experience negative emotional states such as depression, self-judgment, and external and internal shame [24].

In the multiple regression analysis performed in this study to evaluate the effects of five independent variables determined to have an effect on depression scores, it was seen that the independent variables explained 80% of the total variance in the depression scores of the participants. It was determined that the level of depression increased by 0.210 points as the self-devaluation scores of the participants increased, 0.123 points as their public stigma scores increased, 2.600 points as their age increased, 0.567 points as the duration of their diagnosis increased, and 1.12 points

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in those without a history of pregnancy. Considering the woman's "motherhood" role, the inability to achieve this role may be perceived by the individual as her loss of "feminine" values. In this process, infertile individuals can internalize the negative attitudes of those around them, have similar thoughts, and thus, stigmatize themselves [25]. As the duration of infertility diagnosis increases, the number of people who know about this situation increases in the social circles of individuals. For this reason, it is expected that the social pressure on individuals and related psychiatric symptoms will increase [26]. In a descriptive cross-sectional study on 248 infertile women and 96 infertile men without psychiatric disorders and 51 women and 40 men who had children to evaluate depression and anxiety levels between infertile couples and fertile couples in Turkey, the duration of infertility was associated with depression. It was found that as the infertility duration of the participants increased, their symptoms of anxiety and depression also increased. This result can be explained as that as a woman gets older, her chance of conceiving is lower, and therefore, she will be more worried, her anxiety symptoms will increase, and she may become more sensitive due to mental burden and emotional imbalances [27]. In a study conducted with 172 women who were experiencing primary or secondary infertility, it was reported that women with primary infertility (no previous pregnancy) had higher stigmatization levels and higher rates of depressive symptoms and anxiety symptoms [28].

Conclusion
As a result of the research, it was found that the dimension of social stigma was higher than in other areas. In addition, it was determined that obese infertile women had severe depression. In infertile female patients, clinical follow-up in terms of depression and anxiety is important. Most stigma and discrimination take place in the healthcare system. To reduce stigmatization or protect infertile individuals from stigmatization, healthcare workers should take an active role in initiatives such as helping healthy/ill individuals maintain their self-confidence, co-development of treatment, being aware of dangers such as discrimination that may harm the individual, showing that they respect the priorities of healthy/ill obese individuals rather than the priorities of the healthcare system, and working with families.

Authors' contributions
All authors contributed to the study's conception and design. Material preparation, data collection, and analysis were performed by HK, ÖK, and FE. The first draft of the manuscript was written by ÖK and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Availability of data and materials
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
Before starting the study, approval (No: 2021/11–21) was obtained from the Ethics Committee of a university.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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