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ORIGINAL PAPER

The effect of cosmetic surgery on self-esteem and body image: a systematic review and meta-analysis of clinical trial studies

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Abstract

Background Making changes to one's appearance as a result of psychological trauma can have an impact on one's daily life, social activities, and, ultimately, one's quality of life. Several existing studies have assessed people's psychology for making a surgery request, demonstrating varying levels of satisfaction with cosmetic surgery, but the results of these studies are contradictory. One of the aims of this meta-analysis is to highlight some of the assumptions made in these studies and clarify the inconsistencies. Moreover, this study aims to determine the effect of cosmetic surgery on self-esteem and body image.

Methods This study included articles published in international databases of Cochrane, Embase, Science Direct, Scopus, PubMed, and Web of Science (WoS) from 2001 to 2019. Heterogeneity between studies was assessed using Cochran's $(Q)^c$ and I^2 tests. Due to the found heterogeneity, the random-effects model was used to estimate the standard mean difference of cosmetic surgery tests to measure self-esteem and body image in the intervention group before and after the test.

Results This systematic meta-analysis and review included 23 articles (13 on self-esteem and 10 on body image). The initial studies included in the meta-analysis had samples of 1232 in the self-esteem intervention group and 1083 in the body image intervention group. In the study of the mean difference between self-esteem and body image before and after cosmetic surgery, the difference between self-esteem scores before and after surgery was 1.1 ± 0.24, which showed an increase in the average score after surgery, and the difference between body image scores was 1.3 ± 0.36. The increase in the mean score indicates postoperative compared to preoperative (P<0.01).

Conclusions This study's findings indicate that cosmetic surgery improves self-esteem and body image, which may be of interest to health policymakers and professionals.

Level of evidence: Not ratable.

Keywords Body image · Self-esteem · Surgery · Meta-analysis

Abbreviations

CONSORT	Consolidated Standards of Reporting Trials
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analysis

Introduction

One of the factors that influence human behavior is self-esteem. In fact, the perceptions and judgments that individuals have about themselves determine how they deal with different issues. Self-esteem is a term widely used in both social language and psychological conversations and is related to a person's sense of worth and approval [1]. The most well-known definition of self-esteem was provided by Rosenberg in 1965. According to him, self-esteem is a positive and negative attitude toward oneself [2]. Self-esteem can be considered a set of thoughts, feelings, emotions, and experiences formed in the process of social life. People with high self-esteem have mental maturity, stability, realism, calmness, and increased ability to endure failures. A person with low self-esteem may experience isolation or aggression and antisocial behavior [3].

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Self-esteem is one of the most fundamental factors affecting many aspects of our lives, including social adjustment. Numerous studies have shown the central role of self-esteem in social adjustment. It is believed that there is a mutual relationship between favorable personal adjustment and self-esteem [1].

Body image is a person's evaluation of their personality. This is the result of the mental assessments that we usually make of our behavioral characteristics. As a result, body image may be positive or negative [4]. Like any other psychological aspect, the body image is part of every human's personality, and this perception also evolves through time. The perception that the body image creates in one's mind varies at different times of a person's life, and an example includes the time when a lesion appears the person is considering cosmetic surgery [5].

Changes in appearance, such as mental trauma, can affect one's daily life, social activities, communication, and ultimately the quality of life [6].

Physical beauty has always been praised for centuries because it has been thought that beauty of appearance is the sign of inner beauty [7]. Every year people spend a lot of money on their beauty with temporary methods such as make-up or permanent procedures such as nose surgery and orthodontics. People want to have a proper face and body shape in order to have a more appealing social life [8].

There is a growing demand for cosmetic surgery in the West, such as face lifting, breast enlargement, and liposuction, which are typically elective surgeries. The use of these cosmetic surgeries is steadily increasing; more than 106 million cosmetic surgeries were performed in the USA in 2011. The most common were liposuction, breast enlargement, abdominal surgery, and eyelid surgery [7].

Various articles have investigated the psychological characteristics of individuals according to their request and satisfaction with cosmetic surgeries. However, there are contradictions in the results of these studies. One of the aims of this meta-analysis is to respond to these assumptions and eliminate the inconsistencies. Furthermore, this study aimed to determine the effect of cosmetic surgery on self-esteem and body image using meta-analysis.

Material and Methods

Method of searching articles

In the study, we searched international databases of Cochrane, Embase, ScienceDirect, Scopus, PubMed, and Web of Science (WoS) to find related resources from 2001 to 2019. The search and evaluation stages of the studies and the quality evaluation were performed according to the PRISMA criterion. The lists of references used in all related articles and reports were manually reviewed to find other possible sources. The keywords used to search for resources were selected from the MESH medical topics database. Keywords were Self-Esteem, Body Image, Cosmetic Surgery, Esthetic Surgery, Blepharoplasty, Facelift, Abdominoplasty, Rhinoplasty, and Plastic Surgery.

Selection criteria for articles

In order to achieve a homogeneous population with a specific intervention, intervention studies with a population performing surgery were selected for this study and observational studies such as control case and cohort studies, case report studies, case series, and review studies were excluded in this study because the type of study and the groups they study are different from intervention studies.

Intervention studies with the following characteristics were selected for meta-analysis: (1) original research articles, (2) clinical trial studies, (3) full text availability, and (4) studies examining the relationship between cosmetic surgery with self-esteem and body image.

Exclusion criteria for articles

Following the collection of studies researched in EndNote software, selected studies were examined in greater depth. The meta-analysis excluded review studies or articles that were not chosen from those undergoing cosmetic surgeries, as well as duplicate studies or articles containing dated data. Finally, 30 studies advanced to the third stage, where the quality of the articles was evaluated.

Quality evaluation of studies

The quality of articles was evaluated using the CONSORT checklist in which the criteria such as study design, foreground and literature review, place and time of study, outcome, inclusion criteria, sample size, and statistical analysis are used for evaluation. Articles that fulfilled 6 to 7 criteria were considered high-quality articles attaining 3 to 5 criteria, and those that fulfilled 2 or fewer criteria were considered medium- and low-quality articles, respectively [9]. In this study, 23 articles were included in the systematic review and meta-analysis as high-quality and medium-quality studies, and seven articles were of poor quality and were excluded. In order to prevent bias among researchers, evaluations in this study were performed independently and blinded. The search and evaluation stages of the studies and the quality evaluation were performed by 3 reviewers based on criteria. Initially, two researchers (NS and MK) reviewed the titles and abstracts of the articles. In case of disagreement among the researchers

regarding each article, the third party (MM) reviewed and provided the final opinion regarding that study. Then, the full text of the studies confirmed in the initial evaluation was reviewed by the same researchers in terms of criteria defined according to the PRISMA criterion.

Extracting the data

All final articles entered into the meta-analysis were prepared using a checklist. The checklist included criteria such as article title, first author's name, year of publication, place of study, the sample size of the intervention group, mean sample before and after the intervention, and standard deviation of the sample before and after the intervention.

Statistical analysis

Because the purpose of this study was to investigate the impact of cosmetic surgery on self-esteem and body image, frequency and rates, as well as the standardized mean difference index, were used to combine the findings of the various studies. I^2 index assessment was conducted to evaluate homogeneity between studies, and due to heterogeneity in studies, a random-effects model was then used to amalgamate results from different studies. A P value less than 0.05 was considered significant. The funnel plot and the Egger test were also used to assess the publication bias.

Results

In this research, all studies regarding the effect of cosmetic surgery on self-esteem and body image without time limitations were systematically reviewed according to PRISMA guidelines. A preliminary search yielded 988 articles, and after going through several phases to narrow the search results, 23 studies published between 2001 and January 2020 were included in the final analysis (Fig. 1).

The total number of participants was 2315 (1232 in the self-esteem intervention group and 1083 in the body image intervention group). The systematic review particulars are shown in Tables 1 and 2, all of which were clinical trials (Table 1).

According to the available data, the standardized mean difference and relative risk indices were used to comparatively assess the studies. In studies where standard deviation ± mean was reported, the standardized mean difference index was used in the meta-analysis. The results of the meta-analysis of self-esteem and body image highlighted that there was heterogeneity between studies (before intervention ($I^2 = 99.9$) and after intervention ($I^2 = 99.9$) for studies on self-esteem, and before intervention ($I^2 = 99.9$) and after intervention ($I^2 = 99.9$) for studies on body image); therefore, the random-effects models were used to combine and compare the results of these sources.

The Egger test was conducted to investigate the presence of publication bias in the studies. According to Egger test results, there was no publication bias in the self-esteem (pre-intervention ($P = 0.121$) and post-intervention ($P = 0.150$)) and body image studies (pre-intervention ($P = 0.195$) and post-intervention ($P = 0.09$)).

According to the meta-analysis results, the mean score of self-esteem was 15.4 ± 4.4 before the intervention and 16.5 ± 4.8 after the intervention, and this difference was statistically significant ($P < 0.01$) (Fig. 2). The mean body image score before the intervention was 37.8 ± 6.3, and after the intervention was 41.3 ± 7.1 with a 95% confidence interval, and this difference was statistically significant ($P < 0.01$) (Fig. 3). The funnel plot shows the standardized mean index and 95% confidence interval in each study and the final estimate of the index resulting from the studies' combination. The graph shows the weight of each study in the final composite value, and the size of each square is according to the weight of that study in the meta-analysis. The horizontal line of each square also shows a 95% confidence interval.

Std difference in mean

In the study of the mean difference between self-esteem and body image before and after cosmetic surgery, it was reported that the difference between self-esteem scores before and after surgery was 1.1 ± 0.24 (Fig. 4), which showed an increase in the average score after surgery, and the difference between body image scores was 1.3 ± 0.36 (Fig. 5). Again, the increase in the mean score indicates postoperative compared to preoperative.

Subgroup analysis

Analysis of the subgroups by type of treatment also shows that the self-esteem score before and after the intervention is 0.77 ± 0.1 and the body image score before and after the intervention is 1.02 ± 0.54, which demonstrates the positive effect of rhinoplasty on increasing the scores of self-esteem and body image (Table 2).

Discussion

Cosmetic surgery is often discussed as a low-priority intervention [10]. Various studies have shown that cosmetic surgery improves the quality of life, self-esteem, etc. [11]. This study aimed to determine the effect of cosmetic surgery on self-esteem and body image using meta-analysis.

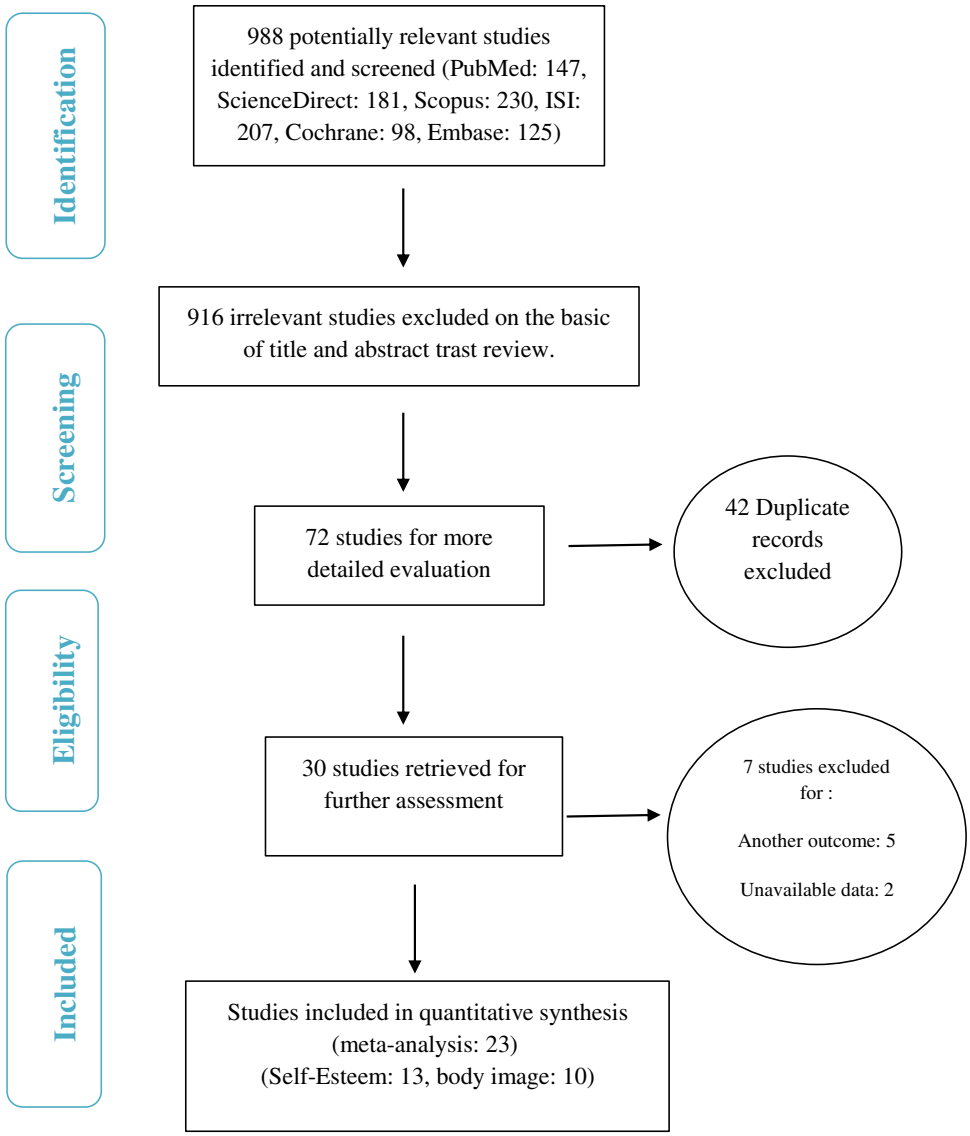


Fig. 1 Flow diagram of study selection

According to this systematic review and meta-analysis study, the mean self-esteem score was 15.4 ± 4.4 before the intervention and 16.5 ± 4.8%, with a 95% confidence interval after the intervention. This difference was statistically significant (P<0.01).

Moreover, in the present study, the mean body image score was 37.8 ± 6.3 before the intervention and 41.3 ± 7.1 with a confidence interval of 95% after the intervention, and this difference was statistically significant (P<0.01).

Cosmetic surgery is one of the latest human achievements to improve living conditions, self-esteem, and body image [12]. Cahill et al. (2011) reported that cosmetic surgery significantly improved the quality of life and self-esteem [13]. However, a study by Cano et al. (2009) argues that plastic surgery can increase the quality of life and self-esteem if the patient is satisfied with the operation in addition to the surgeon's satisfaction [14]. Therefore, patient satisfaction is an important factor influencing cosmetic surgery on self-esteem and body image.

People who are physically and esthetically impaired usually do not interact well with others, reducing their quality of life, self-esteem, and body image [15]. Pecorari et al. (2010) have shown that if self-esteem increases, body image will also increase and self-esteem and, ultimately, the quality of life, which reduces potential psychological disorders [16].

The body image starts in childhood and will be stabilized in adulthood but declines at 35–40. Those with a higher body image (men and women) have greater self-esteem [17].

Factors such as age, sex, level of education, occupation, surgical history, and socioeconomic and cultural status can influence the effect of cosmetic surgery on body image and self-esteem [18].

Table 1 Specifications of studies entered into the meta-analysis of self-esteem and body image

	Author, year, reference	Place of study	Type of surgery	Sample size	Mean ± SD of before	Mean ± SD of after	Quality
Self-esteem	Papadopulos, 2019, [23]	Germany	Blepharoplasty	46	30.85 ± 4.82	35.40 ± 4.12	High
	Bashizadeh, 2018, [24]	Iran	Blepharoplasty	60	32.91 ± 4.44	32.61 ± 4.49	Medium
	Hashemi, 2011, [25]	Iran	Rhinoplasty	41	20.67 ± 5.53	22.73 ± 3.44	High
	Borujeni, 2019, [26]	Iran	Rhinoplasty	100	1.58 ± 0.25	1.7 ± 0.17	High
	de Arruda, 2005, [27]	Brazil	Rhytidoplasty	32	6.62 ± 3.14	3 ± 2.23	High
	Heidarzadeh, 2019, [28]	Iran	Cosmetic surgery	200	28.91 ± 6.46	30.04 ± 5	High
	Rastmanesh, 2009, [29]	Iran	Rhinoplasty	194	18.8 ± 4.5	22.6 ± 4	Medium
	Viana, 2000, [30]	Brazil	Blepharoplasty	50	5.1 ± 4.1	8.4 ± 4.7	Medium
	von Soest-1, 2009, [31]	Norway	Breast reduction	51	3.02 ± 0.51	3.12 ± 0.46	High
	von Soest-2, 2009, [31]	Norway	Liposuction and abdominoplasty	28	3.04 ± 0.62	3.09 ± 0.59	High
	von Soest-3, 2009, [31]	Norway	Breast augmentation	59	3.16 ± 0.41	3.24 ± 0.37	High
	Sobanko, 2018, [32]	USA	Invasive cosmetic procedures	75	26.5 ± 0.05	28.3 ± 0.05	High
	Moghadam, 2018, [33]	Iran	Rhinoplasty	296	20.26 ± 1.38	21.33 ± 1.4	High
Body image	Bashizadeh, 2018, [24]	Iran	Blepharoplasty	60	100.05 ± 12.39	106 ± 10.88	Medium
	Borujeni, 2019, [26]	Iran	Rhinoplasty	100	2.35 ± 0.68	3.29 ± 0.65	High
	Heidarzadeh, 2019, [28]	Iran	Cosmetic surgery	200	126.67 ± 17.18	130.76 ± 9.73	High
	Rastmanesh, 2009, [29]	Iran	Rhinoplasty	194	60.3 ± 2.4	78.2 ± 15.8	Medium
	von Soest-1, 2009, [31]	Norway	Breast reduction	51	2.72 ± 0.86	3.07 ± 0.85	High
	von Soest-2, 2009, [31]	Norway	Liposuction and abdominoplasty	28	3.08 ± 0.93	3.5 ± 1.03	High
	von Soest-3, 2009, [31]	Norway	Breast augmentation	59	3.87 ± 0.58	3.86 ± 0.56	High
	Moghadam, 2018, [33]	Iran	Rhinoplasty	296	45.95 ± 11.69	46.88 ± 9.07	High
	Sobanko, 2018, [32]	USA	Invasive cosmetic procedures	75	31.3 ± 0.05	35.2 ± 0.05	High
	Vargel, 2001, [34]	Turkey	Cosmetic surgery	20	3.23 ± 0.68	3.37 ± 0.51	High

Table 2 Subgroup analysis based on the type of treatment

Type of cosmetic surgery		Number of articles	Sample size	I^2	Egger test	Std difference in mean
Rhinoplasty	Self-esteem	5	664	58.3	0.956	0.77 ± 0.1
	Body image	3	590	98.4	0.364	1.02 ± 0.54

High body image and self-esteem give the individual a sense of confidence that enables them to adapt to challenging situations [19].

Our systematic review and meta-analysis show that cosmetic surgery is a good choice for increasing self-esteem and body image and is usually well tolerated by the patient, and has very few complications.

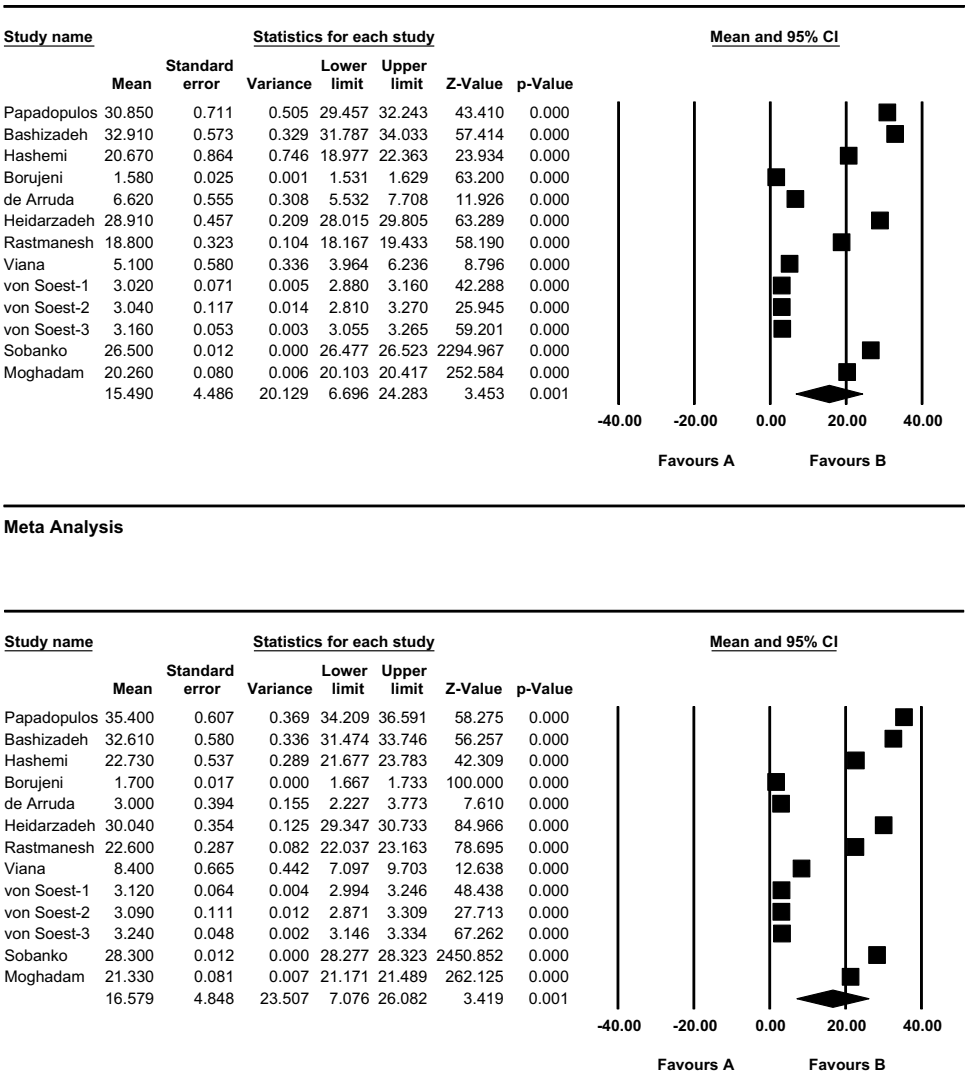


Fig. 2 Accumulation diagram of studies included in meta-analysis using self-esteem standardized mean difference index before and after intervention

It is also suggested that an external stimulus such as the suggestion of others (the engaged partners or future spouses) that mistakenly believe that the surgery will improve their relationship or lead to marriage makes the hesitant patient the inappropriate candidate for cosmetic surgery.

A patient with a history of psychiatric or unrealistic expectations and multiple surgical histories, and a history of visiting multiple physicians, can be concerning for the surgeon. Therefore, it is advisable to decide more carefully and after psychiatric counseling.

The patient's inappropriate and unstable occupational and social status can be an alarm signal for further investigation and follow-up of his mental condition to prevent future problems.

Cosmetic surgery enhances self-esteem and body image, which can be of interest to health policymakers and professionals. In the study of Papadopulos et al., this issue is well mentioned and they reported that abdominoplasty increases the quality of life, particularly family life. Also, patients' level of self-confidence and emotional stability after this operation will be very high and will have a very positive impact on their lives [20].

Physical beauty is socially and psychologically valued and influences our social life and behavior [20]. This study found that patients were more satisfied with their sexual relations and their body and recommended more than 90% abdominoplasty [20]. Hansel et al. reported in their study that 86% of the patients surveyed were satisfied with the results of their cosmetic surgery and 86% recommended

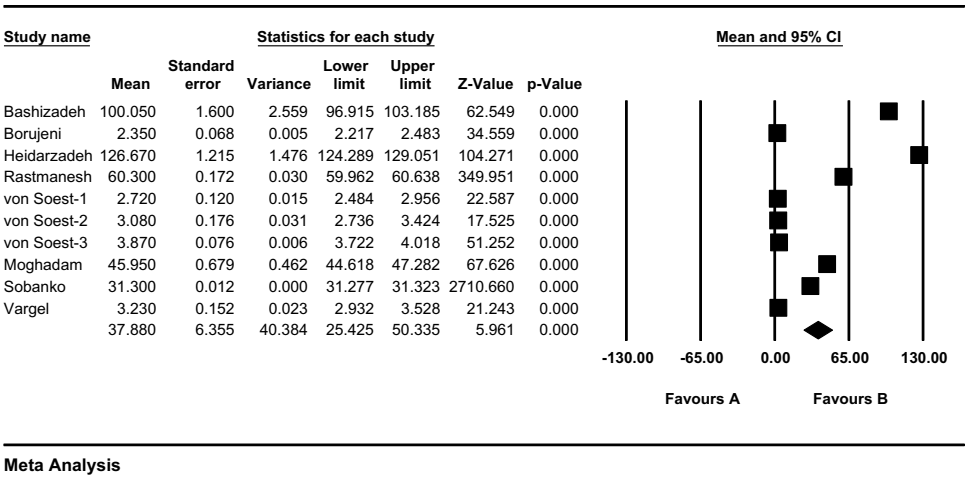
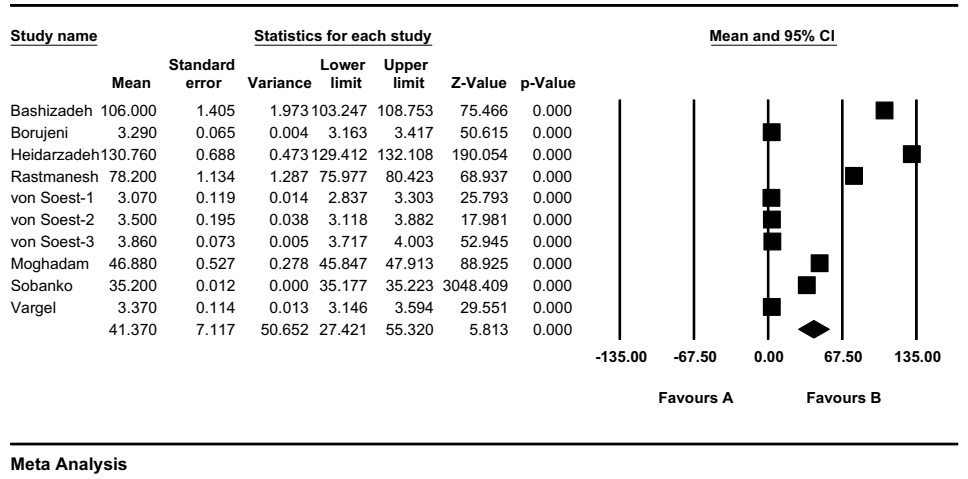


Fig. 3 Accumulation diagram of studies included in meta-analysis using body image standardized mean difference index before and after intervention



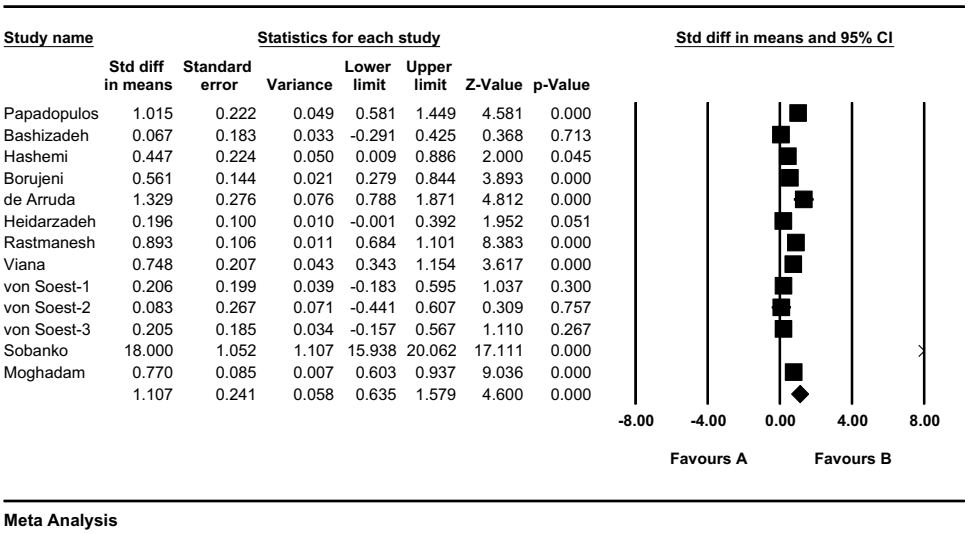


Fig. 4 Std difference in mean of studies included in meta-analysis using self-esteem before and after intervention

it to their friends [21]. Lazar et al. reported in their study that the quality of life after cosmetic surgery (abdominoplasty) has a positive effect on their mental state [22].

The results show the positive effect of cosmetic surgery on improving self-esteem and body image, so in patients who have lost part of their beauty due to injuries, accidents,

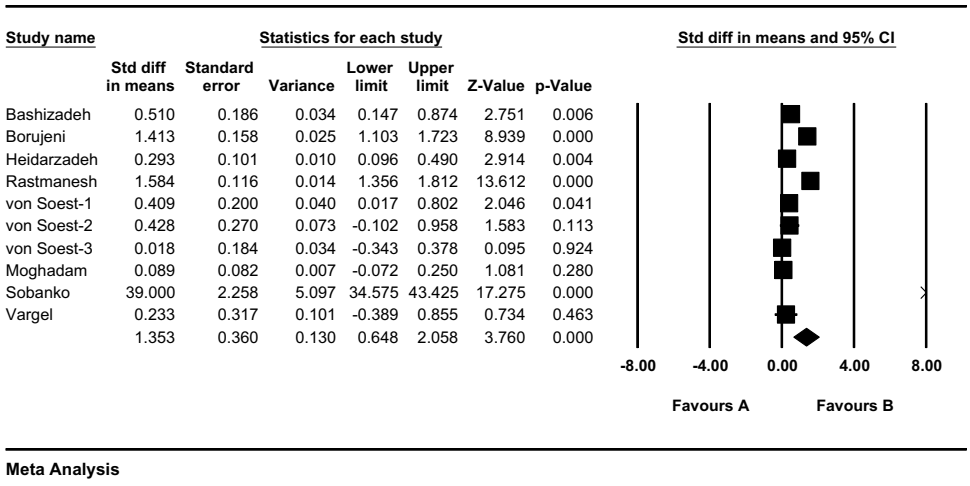


Fig. 5 Std difference in mean of studies included in meta-analysis using body image before and after intervention

or incidents, it can improve their mental health and return. This can be very important in health policy and especially the provision of insurance services by health insurance companies. Health insurance, which covers the physical problems caused by death and injury and physical disability, can address the mental health status of those who also need plastic surgery. Finally, it is suggested that in order to select the right person for cosmetic surgery, the surgeon needs to be more aware of the psychological symptoms and be more precise in the patient's behavior, emotions, and speaking with a psychoanalytic perspective.

Conclusion

This study shows that cosmetic surgery enhances self-esteem and body image, which can be of interest to health policymakers and professionals.

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Author contribution MM and MK contributed to the design; MM contributed to statistical analysis and participated in most of the study steps. MM and NS prepared the manuscript. MK, MM, MBH, and HA assisted in designing the study, and helped in the interpretation of the study. All authors have read and approved the content of the manuscript.

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Data availability Not applicable.

Declarations

Ethical approval and consent to participate Ethics approval was received from the ethics committee of deputy of research and technology, Kermanshah University of Medical Sciences (IR.KUMS.REC.1399.193). In this study, no separation was performed to evaluate gender affirming surgery in nonbinary patients.

Consent for publication Not applicable.

Conflict interests Mohsen Kazeminia, Nader Salari, Mohammadbagher Heydari, Hakimeh Akbari, and Masoud Mohammadi declare no competing interests.

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