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Thesis Portfolio Abstract

Background

Research suggests high incidence rates of body image dissatisfaction in adult populations. Poor body image has been linked to mental health outcomes including symptoms of depression and low self-esteem. As research into the negative impact of body image dissatisfaction has expanded evidence suggests a link between body image concerns and quality of life. Limited research has focused on the relationship between body image dissatisfaction and quality life, and explored the potential mechanisms that may explain this relationship (self-esteem, depression) in those seeking cosmetic procedures. Research suggests cosmetic procedures lead to improvements in psychosocial functioning. However not all studies report improvements. Criteria for individuals undergoing cosmetic procedures in public healthcare settings and private health providers differ. It is not known if such differences impact on these outcomes.

Aims

The study aimed to conduct a systematic review to explore quality of life, body image, general mental health and self-esteem outcomes for those undergoing surgery in the public healthcare sector and compare these to the private healthcare sector. The purpose of the second part of the study was to investigate self-esteem and depression as mediators in the relationship between body image dissatisfaction and quality of life.

Method

Studies were identified by searching 11 databases for research which explored psychosocial variables before and after cosmetic surgery procedures. Methodological quality of included studies was assessed. A cross-sectional, quantitative design was used in the empirical study. Data was collected with self-report forms from 404 participants seeking cosmetic surgery through two NHS Health Boards.
Results

Systematic review results indicated a greater number of improvements were reported in the public sector in comparison to private sector studies. However the quality of included studies was generally higher in the public sector and significant differences in study design and methodology was found across studies. Empirical results suggested that self-esteem and depression mediate the relationship between psychological, social relations and environment quality of life. Depression was found to mediate the relationship between body image dissatisfaction and physical health quality of life. Self-esteem did not mediate this relationship.

Conclusions

The results suggest there is a relationship between body image dissatisfaction and poor quality of life and self-esteem and depression mediate this relationship. Self-esteem and depression interventions, therefore, may be suitable areas to target for those seeking cosmetic surgery procedures particularly those who may be contraindicated for surgery. Findings also suggest patients undergoing cosmetic procedures in the public sector experience greater improvements in psychosocial functioning compared to private medical settings.
Lay Summary

The research carried out looked at body image and cosmetic surgery. The first study reviewed research into the benefits people may experience from undergoing cosmetic surgery procedures. The aim was to compare these benefits in both public healthcare settings and private medical settings. People who undergo surgery in the public sector often have difficulties with day to day functioning, such as pain or difficulties exercising, related to a body part, and wish to have surgery whereas those who undergo treatments may be doing so for aesthetic reasons. The review revealed that people who underwent cosmetic surgery in the public sector experienced a greater number of improvements in measures of quality of life, mental health, body image and self-esteem, compared to people who had surgery in the private sector. More research is needed to find out more about these differences. Doing so could help identify those who are likely to benefit from surgery and those who may not.

A second study looked at people who had requested cosmetic surgery through the NHS. Information about mental health (self-esteem and depression), body image and life quality was collected from 404 people. The study found that people who are unhappy with their bodies, and are looking for cosmetic procedures, have poorer quality of life. This is associated with lower self-esteem and symptoms of depression. This means that finding ways to improve self-esteem and manage symptoms of depression may help improve the quality of life for those who are looking to improve their body with cosmetic surgery. This is particularly important for those who may be contraindicated for surgery.
Psychosocial Outcomes in Individuals undergoing Cosmetic Surgeries – A comparison of Public and Private Sector Providers: A Systematic Review

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Written in accordance with guidelines for Clinical Psychology Review journal (see Appendix A).
Abstract

The psychosocial benefits of cosmetic procedures continues to be debated. Within the NHS, cosmetic procedures are only provided in exceptional circumstances, where there is likely to be clear benefit to the patient. Private cosmetic providers are not restricted in this way however; it is unclear whether such factors impact on these outcomes. The aim of the current review is to compare improvements in psychosocial outcomes between public healthcare and private providers, for individuals undergoing cosmetic procedures. 11 databases were searched in July 2019 for published and unpublished studies matching inclusion criteria. 39 papers across 33 studies were identified. 20 were identified from the public sector data, 13 from the private sector. Findings revealed a greater number of improvements were reported in public sector studies. The quality of studies was variable. Future research should focus on improving reporting of surgical techniques, complications, selection criteria and clearly defining reasons for surgery requests.

KEY WORDS
Cosmetic surgery, psychosocial outcomes, public healthcare, private providers

Introduction

Increasingly, dissatisfaction with one’s appearance has been associated with a greater demand for aesthetic surgeries worldwide (Heidekrueger et al., 2016). Surgical procedures that change the appearance of the body, in the absence of injury or underlying disease, are described as aesthetic or cosmetic (Atiyeh, Rubeiz & Hayek, 2008). These procedures are often provided by private providers, although cosmetic procedures are also provided by public health boards. However public health providers are subject to strict eligibility criteria. Public healthcare providers carry out cosmetic procedures where there is; clear evidence that the patient will benefit, significant functional impairment and psychological distress related to the body part(s) (AEARP, 2011, 2019; Mello, Domingos & Miyazaki, 2010; Saariniemi, Kuokkanen, Rasanen, Sintonen & Tukiainen, 2011a). Eligibility criteria often also include restrictions on Body Mass Index (BMI). In the UK these are ≥20 and ≤27. Thus those pursuing surgeries through public funds are more likely to be seeking surgery for both functional and appearance concerns. It is not known how such factors may impact on psychosocial outcomes, as no direct comparisons have been made to investigate differences between private medical practices and public health providers.
within the cosmetic literature. Carrying out such a comparison may help to identify where similarities or differences in practice may lie, and the benefits of such practices for patients seeking cosmetic procedures. Such comparisons may also reveal differences in clinical outcomes, models of care, potential training gaps as well as identifying whether surgeries targets clinical need. This is particularly important for NHS health boards who have finite financial resources within an evidenced-based practice framework and may lead to improving the quality of plastic surgery provision across the sectors.

Previous reviews

Results of early reviews evaluating the effectiveness of cosmetic surgeries were inconclusive (Sarwer & Crerand, 2004, Sarwer, Wadden & Pertschuk & Whitaker 1998a). The authors attributed disparate results to the methodological quality of studies, such as lack of control groups and validated assessment measures. More recently, a systematic review carried out by Cook et al. (2006) investigating the benefits of cosmetic surgery over time, found the strongest evidence for improvements related to quality of life (QOL) outcomes following breast reduction surgeries. Overall however, the authors concluded that the evidence did not indicate long-lasting improvements in psychosocial functioning for the majority. In accordance with previous findings, the quality of the research, non-response bias and measurement bias were found to impact upon findings and generalisability. The authors however highlighted that observed differences in surgery for functional concerns compared to aesthetic concerns was likely to mean that individuals seeking cosmetic procedures for appearance concerns only, differ from those who seek publicly funded surgery. They point out however that in the cosmetic literature the basis of funding is rarely stated and therefore this type of research is difficult to investigate. This means there may be differences between surgeries and outcomes between private healthcare sectors and public healthcare sectors.

It has been well documented that psychosocial factors influence motivation to undergo cosmetic surgeries, where those seeking surgery report a desire to enhance their appearance, increase self-confidence and self-esteem and QOL (Honigman, Phillips & Castle, 2004; von Soest, Kvalem, Roald & Skolelborg, 2009). Whilst research suggests significant improvements occur following cosmetic procedures, further studies investigating improvements in other areas of post-operative psychosocial functioning in cosmetic samples remain unclear (Sarwer, 2019). In a double blind randomised control trial of patients undergoing minimally invasive
procedures; QOL and self-esteem were reported to improve at two weeks and sustained three months, post-operatively (Dayan, Arkins, Patel & Gal, 2010). Those who had not previously had treatment demonstrated greater improvements than those who had. However, those who had previously underwent the procedure were found to experience improvements in QOL and self-esteem over time. Such findings suggest improvements may differ for those who have underwent cosmetic procedures before compared to those who have not. On the other hand, Sarwer et al. (2005a) found that although participants reported improvements in self-esteem and symptoms of depression post-operatively, improvements did not reach statistical significance at 3, 6 and 12-month follow-up. Although such differences may reflect variations in methodologies and surgery type, additional findings suggest there may be other variables that negatively impact on psychosocial outcomes. For example, a review carried out by Honigman et al. (2004) found that cosmetic surgery outcomes may be negatively associated with rates of postoperative complications. Findings suggest complication rates may be associated with a higher BMI or physical comorbidities. For example, Hanemann and Grotting (2010) identified that obese patients undergoing breast augmentation and augmentation mastopexy surgery had higher complications rates as did those with diabetes. How complication rates for public and private providers of cosmetic surgery may differ is yet to be systematically investigated. Similarly, the impact of differences in eligibility criteria including BMI, across providers, has yet to be established within the cosmetic research. Studies have demonstrated associations between a higher BMI and increased risks of complication for certain procedures or those undergoing multiple procedures (i.e. abdominoplasty, body contouring) (Au et al., 2008; Wincour et al., 2015). Investigating whether differences exist may contribute to the evidence base, by identifying which factors may impact cosmetic surgery outcomes and offer insight into those that should be considered during the assessment process.

Public and private providers of cosmetic surgery

Cosmetic surgeries performed by the public sector in the United Kingdom (UK) are provided based on functional or symptomatic difficulties. In this way the aim is to improve functioning such as; pain or physical impairment associated with the body part (Breuning, Oikonomou, Singh, Rai & Mendonca, 2010; Fonseca et al., 2018), rhinoplasty surgery for breathing difficulties or breast reduction for physical discomfort and difficulties with exercise. Where physical indications are not present or minimal, surgery may be provided to improve psychological distress and psychosocial functioning associated with the body part(s). Changes to reverse the ‘normal’ ageing
process, for example, post-partum changes (ptotic breasts, lax abdominal wall), are restricted. BMI restrictions are also in place (AEARP, 2011; NHS England, 2019). Similar restrictions are in place in other countries where cosmetic surgery is provided by public health care systems (Mello et al., 2010; Saariniemi et al., 2011a). In the public sector, requests for surgery are generally by General Practitioner (GP) referral. Both surgical and psychological assessments are routinely carried out and aim to identify those who are most likely to benefit from surgery. Psychological assessment forms a vital part of patient care. Research suggests assessment aids understanding of those who are more likely to benefit from psychological treatment as opposed to surgical intervention as well as helping to manage patient expectations (Clarke, Lester, Withey & Butler, 2005; Paraskeva, Clarke & Rumsey, 2014). In a sample of 103 NHS patients referred for a range of cosmetic procedures, Clarke et al. (2005) reported 35% were contraindicated for surgery. Contraindications for cosmetic procedures carried out by public providers include major mental health disorders, disproportionate distress, minimal deformity, and surgery for cosmetic reasons only (Sarwer, Wadden Pertschuk & Whitaker, 1998b; Tignol, Biraben-Gotzamanis, Martin-Guehl, Grabot & Aouizerate, 2007). These factors have been found to correlate with dissatisfaction with surgery and poor post-operative adjustment (Honigman et al., 2004). Thus investigating how such variables may impact on surgical outcomes has important clinical implications.

In contrast to the public sector, private providers characteristically have significantly shorter wait times and patients are free to choose the type(s) of surgery and provider. Potential patients are not routinely required to be referred by GP and screening methods for significant contraindications for surgery may differ from public healthcare systems (Nufield Council on Bioethics, 2017). There are no restrictions on consultations for those paying for surgery. BMI criteria tend to be higher (i.e. > 27) and whilst there are recommendations for considering psychological assessment this is at the surgeons’ discretion (Lemaine & Pusic, 2012; Royal College of Surgeons, 2016). In 2013 a Department of Health Review in the UK (2013) reported only one third of UK private practices routinely carried out psychological assessment and of those only 4% were carried out by a clinical psychologist. Given the associations between poor mental health and poor post-operative satisfaction and adjustment it is likely that there are individuals who undergo procedures with no change to their functioning or experience poor outcomes. This is likely to impact on expectations and satisfaction. Whilst the General Medical Council (2016) recommend providers of cosmetic interventions must consider patients psychological well-being little is known
about how these differences in provision may impact on psychosocial outcomes. Overall, there appears to be differences in provision, eligibility and criteria which raises the question as to whether these differences are associated with psychosocial outcomes in public and private providers.

*Differences across public and private providers for other elective surgeries*

No known studies have been conducted to compare such differences within the cosmetic surgery literature, however the wider healthcare literature has made several comparisons. Whilst these comparisons have not included cosmetic surgery procedures they have included samples of patients undergoing a variety of invasive surgical procedures across public and private hospital settings and reviewed key factors in surgical including patient characteristics, complication rates, differences in surgical procedures, the quality of surgical procedures, patient selection together with the efficiency and performance of health care providers. This literature base appears to indicate differences across these factors. Therefore, the question remains as to whether these findings are comparable to providers of cosmetic surgery interventions. This question is a particularly important one for NHS health boards who have limited resources and may help to contribute towards our understanding of who is likely to be eligible for cosmetic surgeries, those who are likely to benefit from cosmetic procedures and those who are likely to have good surgical outcomes.

Sanjay et al. (2013) compared a sample of 555 patients undergoing hernia repair in public and private sectors. Those undergoing private surgery were found to be younger and of better physical health than those undergoing surgery in the public sector. The authors, however, reported no differences in the occurrence of post-operative complications nor satisfaction rates between the two groups, although no measures were included that would allow comparison of clinical outcomes. In contrast, a scoping review by Tynkkynen and Vrangbaek (2018) investigated hospital provision across Europe. Those receiving treatment within the public sector were found to be older, have lower socioeconomic status, higher levels of co-morbidity and rates of complication compared to those treated in private hospitals. Similarly, Grotle et al. (2014) compared sociodemographic characteristics, QOL, functional symptoms and treatments in those being operated on for lumbar disc herniation. The results showed that patients in the public sector had more comorbidities, including depression, compared with those in private clinics. Whilst those in the public sector scored lower on a QOL measure, after sociodemographic and lifestyle variables were taken into account the groups did not differ significantly. This suggests those in public
sector services may differ in rates of complication, comorbidities, demographic variables and aspects of the surgical procedure. The authors concluded that the frequency of complication rates within public sector settings may reflect higher rates of comorbidities in patients utilising public health services.

Andersen and Jakobsen (2010) found that although private and public sector clinical outcomes were comparable following hip operations, patients' satisfaction rates were higher in private clinics compared to those undergoing surgery in the public sector. Consistent with these findings, Pager and McCluskey (2004) found no differences in post-operative function following cataract surgery when comparing public with private sector services. Again public patients were reported to be significantly less satisfied than private patients. The consistency of a doctor, provision of information and clinic accessibility were reported as sources of dissatisfaction for public patients. Such findings may have an impact on clinical outcomes. In a recent systematic review and meta-analysis Pinto et al. (2016) reported that surgical complications were associated with poorer postoperative psychosocial outcomes, particularly lower physical and psychological QOL. In summary, the differences discussed may suggest that psychosocial outcomes differ when private sector settings and private medical settings are compared.

To our knowledge no comparisons have been made between patients seeking cosmetic surgery within public healthcare systems and private medical settings. Whilst several more recent studies have been conducted following Cook et al.’s (2006) review which have aimed to assess psychosocial outcomes across a variety of cosmetic surgery procedures, there has not yet been an attempt to distinguish between private providers and public healthcare providers of cosmetic surgeries to ascertain potential similarities and differences. Such research may help to address patient safety and inform evidence based practice in the field of cosmetic surgery.

The objective of the present study therefore is to conduct a systematic search of the literature with the aim of comparing patient characteristics, inclusion and exclusion criteria, surgical interventions, rates of complication and the psychosocial outcomes of private and public healthcare providers of cosmetic surgeries.

**Method**

**Search strategy**

To identify whether any previous reviews or reviews in progress relating to the same research question, or similar, had been published, a search of Google Scholar was
first conducted followed by a search of the Database of Abstract Reviews, Cochrane Database of Systematic Reviews and PROSPERO. Whilst a number of reviews were identified comparing psychosocial outcomes across surgery types, no review was identified that matched the aims of the current review.

A search strategy was developed using a combination of the search terms listed: ("cosmetic surger*" OR "plastic surger*" OR "esthetic surger*" OR "aesthetic surger*") OR (blepharoplasty OR “breast surger*” OR “breast augment*” OR mastopexy OR “breast reduction” OR “breast implant” OR gynaecomastia OR “facial surger*” OR pinnaplasty OR otoplasty OR rhinoplasty OR “genital surger*” OR labiaplasty) AND (psycho* OR depress* OR “self-esteem” OR “body image” OR “quality of life” OR wellbeing OR “well-being”).

The search terms were then used to conduct an electronic search to retrieve papers from 1980 to the present date. Online databases were searched in July 2019 (AMED, ASSIA for Health, CAB Abstracts, CINAHL, Embase, Medline, PsycINFO, Scopus, Sociological Abstracts, Social Work Abstracts, Web of Science). An online database of dissertations and theses (ProQuest) together with grey literature (OpenGrey) were additionally searched to identify unpublished literature. Searches were refined to include English citations only. Following screening of titles and abstracts, pertinent papers’ reference lists were reviewed to identify potential papers not identified in the electronic search. If an article contained no information regarding funding source for the surgery, the corresponding author was contacted for information.

The PICO search strategy protocol (Miller & Forrest, 2001) was utilised as a method for developing a search strategy and exclusions.

Inclusion and exclusion criteria

Studies were included if surgery candidates were aged 18 and over and were seeking cosmetic procedures. The definition of this was based upon the American Medical Association’s definition (2018) where cosmetic or aesthetic surgery is “performed to reshape normal structures of the body in order to improve the patient’s appearance and self-esteem in the absence of medical background such as disease or trauma, or procedures that are carried out to correct abnormal body structures or developmental abnormalities”. Papers were excluded where patients were seeking reconstructive surgery as a result of trauma, infection or a disease process. Studies were included that investigated any type of cosmetic surgery and had one or more
measure of psychosocial outcome. Outcomes included QOL, body image and mental well-being including self-esteem. Authors were contacted for studies where no information was provided on funding source. This was to identify whether studies were funded by the public sector (free at the point of access) or privately funded (individuals paying privately for cosmetic procedures). Studies were no information was provided about funding source and no response was received from the authors following contact were excluded. Studies that did not contain both pre and post outcome scores, or measured satisfaction with surgery only were excluded.

**Search results**

Database searches identified 1495 papers and a further thirteen were identified using the manual search method. After the removal of duplicates, 762 titles were screened for eligibility. Titles were included for further investigation if they referenced a type of cosmetic surgery and contained any reference to the psychosocial outcomes. 311 met inclusion criteria. After reviewing articles and contacting authors to determine funding source, 39 studies were included in the review. Exclusion reasons were as follows; not written in English, satisfaction only, no pre or post scores, non-surgical interventions, improvements in functioning only with no psychosocial outcomes, patient characteristics only, non-validated measures. Figure 1 outlines the flowchart detailing the process and exclusion reasons.

**Data extraction and critical appraisal**

Data was extracted for all eligible private and publicly funded studies using a data extraction tool adapted from the data collection form for intervention reviews developed by the Cochrane Collaboration (2014). The authors, country of origin, number of participants, date published, patient characteristics including age, gender, BMI and surgery type, study design, outcome measures used and study results were included. Effect size estimates for within group changes were computed based on the recommendations by Morris & DeShon (2007) for estimating effect sizes based on within group changes. Effect sizes were computed by taking into account the correlation between pre and post test scores. This method is recommended by Morris & DeShon (2007) who recommend using the standard deviation of the pre-test as this score is not influenced by the intervention. Effect sizes were calculated where this information was available using this method.
Authors of eligible studies where information about whether the procedures were carried out under public services or provided by a private provider was not provided, were contacted to provide further information pertaining to the review question. 78 authors were contacted, with a response rate of 30% (n = 23).

Quality criteria were developed by first author and the second author to assess the quality of the papers. In comparison to randomised control trials, tools for assessing the quality of cohort studies are limited (Sanderson, Tatt & Higgins, 2007). Thus the assessment tool used for the current review was developed using guidelines for systematic reviews and the critical appraisal of cohort studies (Centre for Reviews and Dissemination, 2008; NHS Centre for Reviews and Dissemination, 2009). Whilst the focus of the quality appraisal tool was related to the sources of bias associated with the methodological quality of included studies it is important to highlight that accurate appraisals of risks of bias requires consistent and reliable reporting. Poor or incomplete reporting of factors such as study design, conduct and analysis can make it hard to make a distinction between studies with good methodologies but insufficient reporting and studies where poor methodologies leads to biased results (Reitsma, Rutjes, Whiting, Vlassov, Leeflang, Deeks, 2009). In this way poor reporting quality may not therefore reflect the methodological quality of a study thus assessing methodological quality based solely on reporting can be misleading (Hill, LaValley & Felson, 2002). Previous reviews carried out to assess the quality of reporting within the plastic surgery literature have identified that both the methodological quality of studies and the quality of reporting required improvement (Agha, Camm, Edison & Orgill, 2013; Agha et al., 2014; Rankin, Sharma, Qureshi, Franco & Myckatyn, 2018). Thus without accurate reporting, sources of bias, can be compounded and difficult to accurately assess.

The two raters compared ratings for an initial random sample to ensure that criteria were applied consistently before being applied to the full sample. Methodological quality was assessed using 19 items across seven criteria (study design, participant selection, outcome measures, surgical intervention, follow-up, statistical analysis, limitations and conflict of interest). Items were rated either “good” (well addressed), “adequate” (adequately addressed), “poor” (poorly addressed) or “not addressed/ not reported/ not applicable” (see Appendix B).

The first author undertook the quality assessment for all studies included in the review and a total of 19 studies (49%) were independently co-rated by the second rater. The
level of agreement was found to be considerable between the two co-raters \((k = .804, p < .001)\). Agreement was reached for the inconsistencies by discussion.

Figure 1. Systematic review search strategy flowchart

The heterogeneity of identified studies, both in terms of design and outcomes, did not allow for a quantitative data synthesis to be undertaken. A narrative review of the evidence is, therefore, provided for psychosocial outcomes grouped by funding source, surgical procedure and type of psychosocial outcome.
Results

Study characteristics

Thirty-nine papers were identified across thirty-three studies. Results are presented by study rather than by individual papers. Twenty studies were identified as being funded by public resources, free at the point of use. Thirteen studies were identified as surgery that was carried out in private practices, paid for by the individuals undergoing cosmetic procedures. Studies recruited from around the globe from countries of varying socioeconomic status. The majority of the studies utilising public funds were from the United Kingdom and Brazil. Of those from private practices the largest number were from America followed by Germany and Iran. A summary of study characteristics is provided in Table I. Breast reduction surgeries formed the largest group of publicly funded procedures whilst individuals undergoing a variety of cosmetic procedures made up the largest group in the private sector. All but two of the studies in the public sector included at least one measure of health (Fonseca et al., 2018; Hollyman et al., 1986). Less than half from the private sector assessed quality of life. The most assessed outcome in this sector related to mental health. Body image and self-esteem were the least assessed outcomes across both groups.

3 randomised control trials (RCT) were identified from public sector studies. The rest of the included studies were prospective observational studies. Nine studies described the use of a control in comparison to two in the private sector. Comparison groups were used in two studies from the private sector and two used control groups. The remaining studies did not use controls or comparisons (public \( n = 11 \), private \( n = 9 \)).

40\% of studies had attrition rates greater than twenty percent in the public sector compared to 61\% of studies in the private sector.

Surgery outcomes

Tables II to III show the main psychosocial outcomes for each included study. Results are presented by outcome and separated by provider.
<table>
<thead>
<tr>
<th>Country</th>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>-</td>
<td>5</td>
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<tr>
<td>Other</td>
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</tr>
<tr>
<td>Europe</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>UK</td>
<td>6</td>
<td>-</td>
</tr>
</tbody>
</table>

**Surgical Procedures**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominoplasty</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Breast augmentation</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Breast reduction</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>Breast surgeries (mixed)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Facial surgery</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Female genital surgery</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Minimally invasive (facial)</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Mixed surgeries</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Rhinoplasty</td>
<td>-</td>
<td>3</td>
</tr>
</tbody>
</table>

**Outcomes assessed**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body image</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Health related quality of life</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>Mental health</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

| Surgical complications                  | 12     | 3       |
Table II. Psychosocial Outcomes: Findings from publicly funded studies

<table>
<thead>
<tr>
<th>Author &amp; Publication Year</th>
<th>Sample Characteristics (Sample size, gender, age (M,SD), BMI)</th>
<th>Study design</th>
<th>Outcome measure/s</th>
<th>Length of follow-up</th>
<th>Loss to follow-up</th>
<th>Rates of complication</th>
<th>Post-operative outcome</th>
<th>Effect size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>de Brito et al., 2010, 2012 (Brazil)</td>
<td>$n = 25$ adults undergoing abdominoplasty surgery $n = 15$ control group (W/L for surgery) 100% female Age: 35 ±7 years Range: 25-60 years BMI: 23.2kg/m Range: 19-30kg/m</td>
<td>Prospective</td>
<td>Short Form-36 Health Survey Questionnaire (SF-36) Rosenberg Self-Esteem Scale (RSE) Body Shape Questionnaire (BSQ)</td>
<td>1, 6 months</td>
<td>1%</td>
<td>41.7%</td>
<td>↑3/8 domains 1 month (MH, PF, ER, VT) 1/8 domains 6 months (MH) ↑RSE scores 1, 6 months ↑ in BSQ scores 1, 6 months</td>
<td>No data</td>
</tr>
<tr>
<td>Berberoglu, Temel &amp; Turkmen, 2015 (Turkey)</td>
<td>$n = 40$ adults undergoing breast reduction surgery 100% female Age range: 26 – 48 years BMI Range: &gt; 18.5 - &lt; 39.9 kg/m</td>
<td>Prospective</td>
<td>Nottingham Health Profile (NHP) Beck Depression Inventory (BDI)</td>
<td>6 months</td>
<td>0%</td>
<td>10%</td>
<td>↑6/6 domains ↑ in BDI scores</td>
<td>Insufficient data to determine ES</td>
</tr>
<tr>
<td>Study</td>
<td>n = 107 adults undergoing breast reduction surgery</td>
<td>Prospective</td>
<td>BREAST-Q</td>
<td>1, 6 months</td>
<td>0%</td>
<td>11.2%</td>
<td>↑ in 3/3 domains at 1 and 6 months (PW, SW, PHW)</td>
<td>0.9 to 2.6 1 month 0.6 to 1.6 6 months</td>
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<tr>
<td>Cabral et al., 2018</td>
<td>100% female</td>
<td></td>
<td></td>
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<tr>
<td>(Brazil)</td>
<td>Age: 34 ±11.6 years Range: 18 – 60 years</td>
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<tr>
<td></td>
<td>BMI: 19-30 kg/m Mean: 25 ±2kg/m</td>
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</tr>
<tr>
<td>Faria et al., 1999</td>
<td>n = 20 adults undergoing breast reduction surgery</td>
<td>Prospective</td>
<td>Short Form-36 Health Survey Questionnaire (SF-36)</td>
<td>4 months</td>
<td>5%</td>
<td>63%</td>
<td>↑ 5/8 domains (PF, ER, MH, GH, VT)</td>
<td>Mean only</td>
</tr>
<tr>
<td>(UK)</td>
<td>100% female</td>
<td></td>
<td>Hospital Anxiety and Depression Scale (HADS)</td>
<td></td>
<td></td>
<td></td>
<td>↑ in HADS scores</td>
<td>Mean only</td>
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<tr>
<td></td>
<td>Age range: 16 – 65 years</td>
<td></td>
<td>Body Satisfaction Scale (BSS)</td>
<td></td>
<td></td>
<td></td>
<td>↑ in BSS scores</td>
<td>No data</td>
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<td></td>
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<td></td>
<td>Body Image Questionnaire (BIQ)</td>
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<td></td>
<td></td>
<td>↑ in BIQ scores</td>
<td>Mean only</td>
</tr>
<tr>
<td>Fonseca et al., 2018</td>
<td>n = 103 adults undergoing breast reduction surgery</td>
<td>Observational</td>
<td>Body Dysmorphic Disorder Examination (BDDE)</td>
<td>6 months</td>
<td>0%</td>
<td>1.94%</td>
<td>↑ in BDDE scores</td>
<td>Mean only</td>
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<tr>
<td>(Brazil)</td>
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<tr>
<td>Study</td>
<td>Sample</td>
<td>Method</td>
<td>Measure</td>
<td>Time</td>
<td>Score</td>
<td>Significance</td>
<td>Data</td>
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<tr>
<td></td>
<td>103 control group (normal sized women not requiring surgery)</td>
<td>Body Investment Scale (BIS)</td>
<td>↑ in BIS scores</td>
<td>Mean only</td>
<td></td>
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<tr>
<td></td>
<td>100% female</td>
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<tr>
<td></td>
<td>Surgery group</td>
<td>Age: 32.50±11.35 years</td>
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<td></td>
<td>Range: 18-55 years</td>
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<tr>
<td></td>
<td>Control group</td>
<td>Age: 33.73±11.27 years</td>
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<tr>
<td></td>
<td>Range: 18-55 years</td>
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<tr>
<td>Guemes et al., 2016</td>
<td>n = 54 obese adults undergoing breast reduction surgery</td>
<td>Prospective Short Form-36 Health Survey Questionnaire (SF-36)</td>
<td>↑ in 4/4 physical domains at 1 month and 1 year (PF, PR, BP, GH)</td>
<td>No data</td>
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<tr>
<td>(Spain)</td>
<td>n = 67 non-obese adults undergoing breast reduction surgery</td>
<td></td>
<td>↑ in 4/4 psychological domains at 1 month (VT, SF, ER, MH)</td>
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<tr>
<td></td>
<td>100% female</td>
<td></td>
<td>ns at 1 year</td>
<td>n/a</td>
<td></td>
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<tr>
<td></td>
<td>Non-obese</td>
<td>Age: 38.8±11.6 years</td>
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<tr>
<td></td>
<td>BMI: 25.9±2.8 kg/m</td>
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<tr>
<td></td>
<td>Obese</td>
<td>Age: 34.3±11.6 years</td>
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<tr>
<td></td>
<td>BMI: 34.3±3.6kg/m</td>
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<tr>
<td><strong>Hernanz et al., 2016</strong> (Spain)</td>
<td><strong>n = 37 obese adults undergoing breast reduction surgery</strong></td>
<td><strong>n = 37 control group (relatives/friends of hospitalised patients)</strong></td>
<td><strong>100% female</strong></td>
<td><strong>Surgery group</strong></td>
<td><strong>Age: 40 ±14 years</strong></td>
<td><strong>Control group</strong></td>
<td><strong>Age: 44 ±12 years</strong></td>
<td><strong>Cohort study</strong></td>
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</tbody>
</table>
| **Non-obese group** | → 4/4 physical domains at 1 month (PF, BR, BP, GH) | ns 1 year | → in 4/4 psychological domains at 1 month and 1 year (VT, SF, ER, MH) | No data | No data | No data | No data | No data | No data | No data | No data | No data | No data | No data | No data | No data | No data
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Intervention</th>
<th>Control Group</th>
<th>Measures</th>
<th>Time Points</th>
<th>Complications</th>
<th>Improvements</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hollyman et al., 1986 (UK)</td>
<td>n = 11</td>
<td>Surgery</td>
<td>n = 19</td>
<td>CCEI</td>
<td>2, 16, 26</td>
<td>NR</td>
<td>↑ in body over perception scores at all time points**</td>
<td>ns CCEI scores</td>
</tr>
<tr>
<td></td>
<td>adults</td>
<td>undergoing breast reduction surgery</td>
<td>controls (not wishing surgery)</td>
<td>Body perceptions test</td>
<td>18.1% 2 weeks, 23% 16 &amp; 26 weeks</td>
<td></td>
<td>↑ 3/6 subscales (SC, FM, SA)</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>100% female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Insufficient data to determine ES</td>
</tr>
<tr>
<td></td>
<td>Surgery group</td>
<td>Age: 22.4 years</td>
<td>Range: 18 – 30 years</td>
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<tr>
<td></td>
<td>Control group</td>
<td>Age: 24.8 years</td>
<td></td>
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</tr>
<tr>
<td>Iwuagwu et al., 2006, 2009 (UK)</td>
<td>n = 36</td>
<td>Early intervention group</td>
<td>n = 37 undergoing breast reduction surgery – delayed intervention group</td>
<td>SF-36, EuroQol 5D, Hospital Anxiety and Depression Scale (HADS)</td>
<td>4 months</td>
<td>0%</td>
<td>8.3% major complications 16.7% minor complications</td>
<td>↑ 8/8 domains</td>
</tr>
<tr>
<td></td>
<td>adults</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>↑ 24 domains (pain, anxiety &amp; depression)</td>
</tr>
<tr>
<td></td>
<td>100% female</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>↑ in HADS scores</td>
</tr>
<tr>
<td></td>
<td>Early intervention group</td>
<td>Age: 41 ±12 years</td>
<td>BMI: 28.6±3.9kg/m</td>
<td></td>
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<td></td>
<td></td>
<td>Anxiety 1.1</td>
</tr>
<tr>
<td></td>
<td>Delayed intervention group</td>
<td>Age: 38 ±12 years</td>
<td>BMI: 28.4±5.2 kg/m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Depression 1.0</td>
</tr>
<tr>
<td></td>
<td>Prospective RCT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5 physical</td>
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<td></td>
<td></td>
<td></td>
<td>0.8 mental</td>
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<td></td>
<td></td>
<td></td>
<td>0.8 (pain)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.6 (anxiety/ depression)</td>
</tr>
<tr>
<td>Study</td>
<td>Country</td>
<td>Sample Size</td>
<td>Demographics</td>
<td>Measures</td>
<td>Time Points</td>
<td>Results</td>
<td>Complications</td>
<td>Other Notes</td>
</tr>
<tr>
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</tr>
<tr>
<td>Mello, Domingos &amp; Miyazaki, 2010</td>
<td>Brazil</td>
<td>n = 30 adults undergoing breast reduction surgery</td>
<td>100% female</td>
<td>Short Form-36 Health Survey Questionnaire (SF-36)</td>
<td>1, 4 months</td>
<td>↑ in 6/8 domains at 1 month (PF, BP, GH, VT, SF, MH)</td>
<td>↑ in 7/8 domains at 4 months (PF, PR, BP, GH, VT, SF, MH)</td>
<td>No data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n = 100% female</td>
<td></td>
<td>Rosenberg Self-Esteem Scale (RSE)</td>
<td></td>
<td>↑ in RSE scores at both time points</td>
<td></td>
<td>No data</td>
</tr>
<tr>
<td>Saariniemi et al., 2008, 2009, 2011</td>
<td>Finland</td>
<td>n = 29 adults undergoing breast reduction surgery</td>
<td>100% female</td>
<td>Prospective RCT</td>
<td>15D Health Related Quality of Life Questionnaire</td>
<td>6 months, 2–5 years</td>
<td>↑ 15/15 dimensions 6 months</td>
<td>↑ 15D Index score 2–5 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n = 35 adults awaiting breast reduction surgery (control group)</td>
<td></td>
<td></td>
<td>Short Form-36 Health Survey Questionnaire (SF-36)</td>
<td></td>
<td>↑ 2/2 summary scores (PC, MC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>n = 100% female</td>
<td></td>
<td>Raitasalo’s modification of the short form of Beck</td>
<td></td>
<td>↑ in RBDI scores 6 months, 2–5 years</td>
<td></td>
<td>Mean only</td>
</tr>
<tr>
<td>Study</td>
<td>Design/Population</td>
<td>Measures</td>
<td>Timepoints</td>
<td>Results</td>
<td>Additional Notes</td>
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<tr>
<td>Shakespeare &amp; Cole, 1997 (UK)</td>
<td>Prospective</td>
<td>RBDI</td>
<td>3, 6 months</td>
<td>↑Self-esteem score, 2 – 5 years Mean only</td>
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</tr>
<tr>
<td>n = 110 adults undergoing breast reduction surgery</td>
<td>100% female</td>
<td>Short Form-36 Health Survey Questionnaire (SF-36)</td>
<td>18% 3 months 24% 6 months</td>
<td>3 months: 37% minor 3% major 6 months: 5% minor 4% major</td>
<td>16/8 domains at 3 months (PF, SF, MH, BP, VT, GH) ↑ 5/8 domains at 6 months (PF, SF, MH, BP, VT) ↑ RSE scores at both time points 0.2 to 0.7</td>
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<tr>
<td>Age: 35 years Range: 15–68 years</td>
<td>BMI range: 20 to &gt; 40 kg/m</td>
<td>Rosenberg Self-Esteem Scale (RSE)</td>
<td></td>
<td></td>
<td>0.5</td>
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<tr>
<td>Tykka et al., 2010 (Finland)</td>
<td>Prospective</td>
<td>15D Health Related Quality of Life Questionnaire</td>
<td>6 months</td>
<td>10% 6 months</td>
<td>14/15 dimensions (BR, S, DS, D) No data</td>
<td></td>
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<tr>
<td>n = 89 adults undergoing breast reduction surgery</td>
<td>Control group (age standardised) 100% female</td>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
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<tr>
<td>Surgery group Age: 44.8±12.3 years Range: 18-73 years</td>
<td>BMI: 26.7±3.3 kg/m Range: 19-37 kg/m</td>
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</tr>
<tr>
<td>Study Authors &amp; Year</td>
<td>Sample Size</td>
<td>Type of Surgery</td>
<td>Characteristics</td>
<td>Measurement Tools</td>
<td>Follow-up</td>
<td>Improvement Rate</td>
<td>Improvement Scale</td>
<td>Depression</td>
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<tr>
<td>Valtonen et al., 2014 (Finland)</td>
<td>n = 88 adults undergoing breast reduction surgery</td>
<td>100% female</td>
<td>Age: 43.8±12.2 years</td>
<td>Prospective</td>
<td>15D Health Related Quality of Life Questionnaire</td>
<td>6 – 12 months</td>
<td>27%</td>
<td>NR</td>
</tr>
<tr>
<td>Meningaud et al., 2003 (France)</td>
<td>n = 103 adults undergoing blepharoplasty, face lift, liposuction, hair loss, rhinoplasty, otoplasty, chin correction</td>
<td>89.3% female</td>
<td>Age 39.7 ±11.5 years</td>
<td>Prospective</td>
<td>EuroQol 5D (EQ-5D)</td>
<td>9 months</td>
<td>23%</td>
<td>7.76%</td>
</tr>
<tr>
<td>Ribeiro &amp; Steiner, 2017 (Brazil)</td>
<td>n = 116 adults undergoing minimally invasive facial treatments (peeling, laser, Botox, thread lifting, tunnelling)</td>
<td>88% female</td>
<td>Age: 46.78±11.9 years</td>
<td>Prospective</td>
<td>WHO Quality of Life-BREF (WHOQOL-BREF)</td>
<td>4 weeks</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Study</td>
<td>Sample Size/Characteristics</td>
<td>Measures</td>
<td>Timeframe</td>
<td>Improvement</td>
<td>NR</td>
<td>Data Quality</td>
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<tr>
<td>Klassen et al., 1996, 1999</td>
<td>286 adults undergoing breast reconstruction, breast augmentation, abdominoplasty, gynaecomastia, asymmetry, mastopexy, rhinoplasty, pinnaplasty. 80.8% female. Age: 32.6±12.3 years.</td>
<td>EuroQol 5D (EQ-5D), Short Form-36 Health Survey Questionnaire (SF-36), General Health Questionnaire 28 (GHQ-28), Rosenberg Self-Esteem Scale (RSE)</td>
<td>6 months</td>
<td>31%</td>
<td>NR</td>
<td>↑ EQ-5D scores (n = 80) 0.4 to 0.8</td>
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<td>↑ 8/8 domains (n = 80) 0.2</td>
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<td></td>
<td>↑ in GHQ-28 scores for breast reduction only 0.2</td>
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<td>↑RSE scores across all surgeries 0.2 to 0.3</td>
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<td></td>
<td>No data</td>
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<tr>
<td>Modaressi et al., 2013</td>
<td>98 adults undergoing body contouring after gastric bypass (abdominoplasty, mastopexy, breast augmentation, mastopexy, brachioplasty). n = 102 undergoing gastric bypass only (control group).</td>
<td>Moorehead-Ardelt Questionnaire, Body contouring group 6 months, Control group 18 months to 8 years</td>
<td>6 months</td>
<td>0%</td>
<td>NR</td>
<td>↑6/6 domains</td>
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<td></td>
<td>Mean only</td>
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</tbody>
</table>
Moss & Harris, 2009
(UK)

<table>
<thead>
<tr>
<th>Moss &amp; Harris, 2009 (UK)</th>
<th>$n = 51$ adults undergoing breast surgeries, tattoo excision, rhinoplasty</th>
<th>Prospective controlled</th>
<th>Crown-Crisp Experiential Inventory (CCI): anxiety subscale</th>
<th>Beck Depression Inventory (BDI)</th>
<th>Derriford Appearance Scale 24 (DAS24)</th>
<th>3, 12 months</th>
<th>Surgery 23.5%</th>
<th>NR</th>
<th>↑ in CCEI scores</th>
<th>$0.6$</th>
<th>0.2 (surgery)</th>
<th>Mean only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n = 105$ undergoing non-appearance altering surgery (control group)</td>
<td></td>
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<td></td>
<td></td>
<td>Control 0%</td>
<td></td>
<td>↑ in BDI scores (both groups)</td>
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<tr>
<td></td>
<td>67% female (surgery)</td>
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<td></td>
<td>↑DAS scores in those undergoing rhinoplasty and breast surgeries only at 3 months</td>
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<tr>
<td></td>
<td>58% female (control)</td>
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<tr>
<td>Surgery group</td>
<td>Age: 29 ±9 years</td>
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<tr>
<td>Control group</td>
<td>Age: 38.6±10.1 years</td>
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</tbody>
</table>

89.8% female (surgery)
81.4% female (control)

Surgery group
Age: 42.6±11.1 years
Range: 34-55 years
BMI: 46.0±5.1 kg/m
Range: 42-48 kg/m

Control group
Age: 38.6±10.1 years
Range: 31-48 years
BMI: 46±7.7 kg/m
Range: 41-48 kg/m

Moss & Harris, 2009
(UK)
<table>
<thead>
<tr>
<th>Control group</th>
<th>Age: 37 ±10 years</th>
<th></th>
<th></th>
<th>↑DAS scores at 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lavinsky-Wolff et al., 2012</strong> (Brazil)</td>
<td>n = 50 adults undergoing functional and aesthetic rhinoplasty</td>
<td>RCT</td>
<td>WHO Quality of Life-BREF (WHOQOL-BREF)</td>
<td>3 months</td>
</tr>
<tr>
<td>58% female</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Age: 32 ±12.3 years</td>
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</tbody>
</table>

↑ = improvement in score

1SD; BR = breathing, UA = usual activities, MF = mental function, DS = discomfort/symptoms, SA = sexual activity S = sleep, D = distress

SF-36: PF = Physical function, PR = physical role, BP = body pain, GH = general health, VT = energy, SF = social function, ER = role emotional, MH = mental health

SF-36: PC = physical component, MC mental component

BREAST-Q QOL: PW = psychosocial well-being, SW = sexual-well-being, PHW = physical well-being

WHOQOL-BREF domains; PH = physical, PS = psychological, SO = social, EN = environment

Body Perceptions Test; SC = self-confidence, FM = femininity, SA = sexual attractiveness
<table>
<thead>
<tr>
<th>Author &amp; Publication Year (Country)</th>
<th>Sample Characteristics (Sample size, gender, age (M, SD))</th>
<th>Study design</th>
<th>Outcome measure/s</th>
<th>Length of follow-up</th>
<th>Loss to follow-up</th>
<th>Complication rate</th>
<th>Post-operative outcome</th>
<th>Effect size (d)</th>
</tr>
</thead>
</table>
| Figueroa-Haas et al., 2007 (USA)  | \( n = 84 \) adults undergoing breast augmentation  
100% female  
Age: 33±9.5 years  
Range: 21–57 years | Prospective | Rosenberg Self Esteem (RSE) | 1 to 2 months | 0% | NR | ↑ in self-esteem | 0.8 |
| Perez-San-Gregorio et al., 2016 (Spain) | \( n = 135 \) adults undergoing breast augmentation, mastopexy and breast reduction  
100% female  
\( n = 63 \) breast augment group  
Age: 28.38 ±7.40 years  
\( n = 42 \) mastopexy group  
Age: 33.86±6.68 years | Prospective | Short Form Health Survey (SF-12 v.2)  
State-Trait Anxiety Inventory (STAI) | 1, 6, 12 months | 0% | NR | Overall ↑ in 2/8 dimensions (PF, PR) across time points  
↑ in STAI scores across time points | Mean only  
0.6 (state)  
0.7 (trait) |
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Description</th>
<th>Instrumentation</th>
<th>Timepoint</th>
<th>Depressed</th>
<th>Comparison</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saariniemi et al., 2012 (Finland)</td>
<td>n = 30 breast reduction group Age: 37.10±11.79 years</td>
<td>15D Health Related Quality of Life Questionnaire Raitasalo’s modification of the short form of Beck Depression Inventory (RBDI)</td>
<td>6 months</td>
<td>18%</td>
<td>ns</td>
<td>n/a</td>
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<tr>
<td></td>
<td>n = 79 adults undergoing breast augmentation</td>
<td></td>
<td></td>
<td>5.06%</td>
<td>↑ 2/2 domains</td>
<td>Mean only</td>
</tr>
<tr>
<td></td>
<td>100% female</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Age: 35 years Range: 18–52 years</td>
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<tr>
<td></td>
<td>BMI: 21.3 kg/m Range: 17.5-27.3 kg/m</td>
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<tr>
<td>Litner et al., 2008 (Canada)</td>
<td>n = 93 adults rhinoplasty, ageing facial procedures</td>
<td>Derriford Appearance Scale (DAS59)</td>
<td>3 months</td>
<td>0%</td>
<td>None</td>
<td>↑ in 6/6 domains and full scale DAS59 scores</td>
</tr>
<tr>
<td></td>
<td>88% female</td>
<td></td>
<td></td>
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<td></td>
<td>Mean only</td>
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<tr>
<td></td>
<td>Age: 40 years Range: 16–77 years</td>
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<tr>
<td>Goodman et al., 2016 (USA)</td>
<td>n = 120 adults undergoing female genital surgery</td>
<td>Body Dysmorphic Disorder Modification of the Y-BOCS (BDD-YBOC)</td>
<td>Surgery group</td>
<td>27%</td>
<td>↑ in 3/3 domains at all time points</td>
<td>Mean only</td>
</tr>
<tr>
<td></td>
<td>n = 50 control group (attending clinic for other)</td>
<td>Surgery group 6 months, 1, 2 years</td>
<td>Surgery group</td>
<td>33%</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>1 year</td>
<td>NR</td>
<td></td>
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<tr>
<td>Margraf et al., 2013 (Germany)</td>
<td>Prospective controlled</td>
<td>EuroQol 5D (EQ-5D)</td>
<td>3, 6, 12 months</td>
<td>Surgery group 3%, 4%, 7%</td>
<td>NR</td>
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<tr>
<td></td>
<td>n = 544 adults undergoing liposuction, breast augmentation, breast reduction, mastopexy, abdominoplasty, blepharoplasty, rhinoplasty</td>
<td>Beck Anxiety Inventory (BAI)</td>
<td></td>
<td></td>
<td>↑ 4/4/ domains in across time</td>
<td></td>
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<tr>
<td></td>
<td>88% female</td>
<td>Symptoms Checklist 90: depression scale (SCL-90-R)</td>
<td></td>
<td></td>
<td>↑ in BAI scores across time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n = 264 control group (awaiting surgery)</td>
<td>Leibowitz Social Anxiety Rating Scale</td>
<td></td>
<td></td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td></td>
<td>90% female</td>
<td>Rosenberg Self Esteem (RSE)</td>
<td></td>
<td></td>
<td>n/a</td>
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</tr>
<tr>
<td></td>
<td>Age range: 18-65 years</td>
<td>Body Esteem Scale (BES)</td>
<td></td>
<td></td>
<td>ns</td>
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</tr>
<tr>
<td></td>
<td>100% female</td>
<td>Control group 6 months</td>
<td></td>
<td></td>
<td>Mean only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surgery group Age: 32.74 ±10.14 years</td>
<td>Control group 16% 6 months</td>
<td></td>
<td></td>
<td>Mean only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control group Age: 33.20 ±9.58 years</td>
<td>53% 2 years</td>
<td></td>
<td></td>
<td>Mean only</td>
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</tr>
<tr>
<td></td>
<td>n = 264 control group (awaiting surgery)</td>
<td>6 months</td>
<td></td>
<td></td>
<td>Mean only</td>
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<tr>
<td></td>
<td>90% female</td>
<td>2 years</td>
<td></td>
<td></td>
<td>Mean only</td>
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<tr>
<td></td>
<td>Age range: 18-65 years</td>
<td>↑ in 1/35 items in BES 1, 2 years</td>
<td></td>
<td></td>
<td>Mean only</td>
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</tr>
<tr>
<td></td>
<td>100% female</td>
<td>↑ in BAI scores across time</td>
<td></td>
<td></td>
<td>Mean only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surgery group Age: 32.74 ±10.14 years</td>
<td>ns</td>
<td></td>
<td></td>
<td>Mean only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control group Age: 33.20 ±9.58 years</td>
<td>n/a</td>
<td></td>
<td></td>
<td>Mean only</td>
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<tr>
<td></td>
<td>6 months</td>
<td>ns</td>
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<td></td>
<td>Mean only</td>
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<td></td>
<td>2 years</td>
<td>n/a</td>
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<td>Mean only</td>
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<tr>
<td></td>
<td>↑ in 1/35 items in BES 1, 2 years</td>
<td>n/a</td>
<td></td>
<td></td>
<td>Mean only</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Sample Description</td>
<td>Design</td>
<td>Follow-up</td>
<td>Outcomes</td>
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<tr>
<td>Papadopulos et al., 2007 (Germany)</td>
<td><em>n</em> = 228 adults undergoing breast reduction, breast augmentation, liposuction, abdominoplasty, rhytiedectomy, gynaecomastia</td>
<td>Prospective</td>
<td>3, 6 months</td>
<td>↑ in RSE scores, ns body image satisfaction, ↑ body image investment</td>
<td>n/a Mean only</td>
<td></td>
</tr>
</tbody>
</table>

<p>|                                                                 |                                                                                     |                |           | ↑ in overall score and 4/8 domains (AR, E, M, IH at 6 months)            | 0.07 to 0.2 |</p>
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Design</th>
<th>Measures</th>
<th>Follow-Up</th>
<th>Effect Size</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Sarwer et al., 2002 (USA) | Age range: 16–70 years  
  \( n = 57 \) adults undergoing blepharoplasty, rhinoplasty, breast augmentation, facelift, breast reduction, liposuction, abdominoplasty, laser resurfacing  
  100% women  
  Age: 40.64 ±14.78 years | | Body Dysmorphic Disorder Examination Self-Report (BDDE-SR)  
  Multidimensional Body-Self Relations questionnaire (MBSRQ) | 6 months | 21% | NR  
  ↑ overall BDDE scores  
  ↑ 4/9 domains (DS, DO, EP, ES)  
  ns |
| Sarwer et al., 2005, 2008 (USA) | \( n = 100 \) adults undergoing breast surgeries, lipoplasty, rhinoplasty, facelift, blepharoplasty  
  98% female  
  Age: 42.59 ±13.44 years  
  BMI: 22.98 ±4.26 kg/m² | Prospective | Beck Depression Inventory II (BDI-II)  
  Body Dysmorphic Disorder Examination Self-Report (BDDE-SR)  
  Rosenberg Self Esteem (RSE)  
  Multidimensional Body-Self Relations | 3, 6, 12, 24 months | 37% 12 months  
  35% 2 months | NR  
  ns any time points  
  ↑BDDE-SR scores at all time points  
  ns any time points |
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Measures</th>
<th>Follow-up</th>
<th>Effect Size</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>von Soest et al., 2007, 2011 (Norway)</td>
<td>n = 130 adults undergoing breast augmentation, breast reduction, mastopexy, liposuction, abdominoplasty, blepharoplasty, scar revision</td>
<td>questionnaire (MBSRQ), Body Image Quality of Life Inventory (BIQLI), Situational Inventory of Body Image Dysphoria-Short Form (SIBID-S)</td>
<td>6 months, 5 years</td>
<td>↑2/4 subscales at all time points (AE, BS)</td>
<td>Mean only</td>
</tr>
<tr>
<td></td>
<td>n = 838 comparison group (random sample general population) 100% female</td>
<td>Hopkins Symptom Checklist (SCL), Rosenberg Self Esteem (RSE)</td>
<td>6 months, 5 years</td>
<td>↑ RSE 5 years</td>
<td>ns at 6 months, 5 years</td>
</tr>
<tr>
<td></td>
<td>Surgery group</td>
<td>Multidimensional Body-Self Relations questionnaire (MBSRQ)</td>
<td>10% 6 months 49% 5 years</td>
<td>↑ in 1/2 AO subscale 6 months</td>
<td>n/a</td>
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<td>n/a</td>
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<td>0.2</td>
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<td>0.4</td>
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<td>Study</td>
<td>Sample Size</td>
<td>Age and Demographics</td>
<td>Methodology</td>
<td>Questionnaire</td>
<td>Follow-Up</td>
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<tr>
<td>Datema &amp; Lohuis, 2015 (The Netherlands)</td>
<td>n = 110 adults undergoing rhinoplasty</td>
<td>Age: 32.6 years Range: 18-59 years</td>
<td>Retrospective</td>
<td>Utrecht Questionnaire (UQ)</td>
<td>NR</td>
</tr>
<tr>
<td>Hosseinzadeh et al., 2017 (Iran)</td>
<td>n = 150 adults undergoing cosmetic rhinoplasty</td>
<td>Age: 26.8 ±5.4 years</td>
<td>Prospective</td>
<td>Short Form-36 Health Survey Questionnaire (SF-36)</td>
<td>3, 6 months</td>
</tr>
<tr>
<td>Zojaji et al., 2014 (Iran)</td>
<td>n = 50 adults undergoing cosmetic rhinoplasty</td>
<td>Age: 26.4±7.3 years</td>
<td>Prospective Design</td>
<td>WHO Quality of Life-BREF (WHOQOL-BREF) General Health Questionnaire 28 (GHQ-28)</td>
<td>3 months</td>
</tr>
<tr>
<td>↑ = improvement in score;</td>
<td></td>
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<td></td>
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<tr>
<td>SF-36/12: PF = Physical function, PR = physical role, BP = body pain, GH = general health, VT = energy, SF = social function, ER = role emotional, MH = mental health</td>
<td></td>
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<tr>
<td>BDDE; DS = dissatisfaction with feature altered by surgery, DO = dissatisfaction with overall appearance, EP = embarrassment about feature in public, ES = embarrassment about feature in social settings</td>
<td></td>
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<tr>
<td>MBSRQ-AS; AO = appearance orientation, AE = appearance evaluation, BS = body area satisfaction, OP = overweight preoccupation</td>
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<td>FLZ General QOL; friends, hobbies, health, income, work, living conditions, family life, partner relationship</td>
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<tr>
<td>FLZ HRQoL; E = energy, FP = freedom from pain, IH = independence from help; AR = ability to relax; M = mobility</td>
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<tr>
<td>WHOQOL-BREF domains; PH = physical, PS = psychological, SO = social, EN = environment</td>
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</tr>
<tr>
<td>Author &amp; Publication year</td>
<td>Study design</td>
<td>Participant selection</td>
<td>Outcome measures</td>
<td>Surgical Intervention</td>
<td>Follow-up</td>
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<tr>
<td>de Brito et al., 2010 2012 (Brazil)</td>
<td>ADEQ</td>
<td>GOOD</td>
<td>GOOD</td>
<td>GOOD</td>
<td>POOR</td>
</tr>
<tr>
<td>Cabral et al., 2018 (Brazil)</td>
<td>GOOD</td>
<td>ADEQ</td>
<td>ADEQ</td>
<td>GOOD</td>
<td>POOR</td>
</tr>
<tr>
<td>Study</td>
<td>ADEQ</td>
<td>ADEQ</td>
<td>ADEQ</td>
<td>GOOD</td>
<td>GOOD</td>
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<tr>
<td>Berberoglu et al., 2015 (Turkey)</td>
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<tr>
<td>Faria et al., 1999 (UK)</td>
<td>GOOD</td>
<td>GOOD</td>
<td>POOR</td>
<td>ADEQ</td>
<td>POOR</td>
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<tr>
<td>Fonseca et al., 2018 (Brazil)</td>
<td>GOOD</td>
<td>GOOD</td>
<td>GOOD</td>
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<td>Guemes et al., 2016 (Spain)</td>
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<tr>
<td>Hernanz et al., 2016 (Spain)</td>
<td>ADEQ</td>
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Methodological quality

The quality ratings for studies included in the review are presented in Table IV and V.

Study design

In relation to the study design and aims seven studies addressed this well in the public sector. Five studies addressed this well in the private sector. Seven received an adequate rating in both sectors.

Participant selection

Patient characteristics were generally well addressed in both sectors. The quality of reporting of exclusion and inclusion criteria however differed. Seventeen were rated good-adequate in the public sector with seven receiving a good-adequate rating in the private sector. Overall the public sector papers were found to provide more information on exclusions and eligibility criteria.

Outcome measures

Most studies performed well or adequately across both sectors, when rated on the rationale provided for the use and validity of outcome measures. The SF-36 was the most widely used QOL measure whilst the RSE was used in all studies to investigate self-esteem. Measures of mental health and body image varied widely across all studies.

Surgical intervention

More studies in the private sector lacked information on the surgical setting and intervention procedures. Seven studies received a well addressed rating in the public sector compared to one in the private sector. Ratings for reporting of complications followed a similar pattern. Twelve public studies were rated as well addressed for the reporting of complications compared to one in the private sector.

Follow-up

Overall the studies were rated well or adequate for provision for follow-up. Both groups had comparable high rates of attrition.

Confounding variables

Psychological variables and age, BMI, surgery type and co-morbidities have been found to confound results. Seven studies were rated as addressing this well in the
public sector and four in the private sector. Eight were rated as poor in the public sector and seven in the private sector.

Limitations and conflict of interest

13 studies were rated as well addressed in relation to the conflict of interest quality criteria in the public sector. Five were rated as well addressed in the private sector. The study’s limitations were rated as poorly addressed in fifteen of the studies in the public sector in comparison to six in the private sector studies.

Overall there appears to be a higher quality of study in the public sector studies compared to the private sector across the areas assessed.

Patient characteristics

In the public sector, referrals were primarily from GP’s. The number of participants recruited ranged from 20 to 286; the largest of these being a study carried out with NHS patients undergoing five types of surgical procedures (Klassen et al., 1996, 1999). Samples were considerably larger in private practices, ranging from 50 to 808 participants. The largest of these utilised a wait list control design (von Soest et al., 2007, 2011).

The proportion of women was greater across all studies. Five studies from the public sector included mixed samples undergoing a variety of cosmetic surgeries in their samples and seven from private practices. An RCT carried out in Brazil by public funds had the greatest proportion of males, 42% undergoing rhinoplasty surgery for functional and aesthetic concerns (Lavinsky et al., 2012). Patients’ age range was comparable across the two sectors; ages 16 – 65 years.

Eligibility criteria

The eligibility criteria for surgery reflected criteria routinely used for surgeries carried out with public funds. Primarily functional impairments and degree of body abnormality and BMI constraints. Primarily those undergoing surgery within the private sector were scheduled for surgery. For private studies less information was provided in relation to selection criteria.

Rates of complication

60% of publicly funded studies reported complications rates compared to 23% of the privately funded studies. The highest complication rates were reported for breast
reduction surgery (Faria et al., 1999) in the public sector (63%) and for mixed cosmetic procedures in the private sector (66%; Papadopolus et al., 2007).

Comparison of the quality of papers across the two providers identified that, in general, the public sector papers appeared to be of a higher quality. In particular public sector papers were found to rank highly in the quality of design, eligibility criteria and control of confounds. Patient selection and limitations of the research were particularly poorer for the public sector papers. Of the public sector papers, those of the highest quality with robust designs, good participant selection procedures, low rates of attrition and statistical analysis of potential confounds were Fonseca et al., (2018) and Iwuagwu et al., (2006, 2009). Of the papers assessed from the private sector papers by Figuero-Haas (2007) and Margraf et al. (2013) were found to be of a high quality particularly in relation to the study design, dropout rates and control of confounding variables.

_Psychosocial outcomes_

_Quality of life_

17 studies evaluated QOL. All reported improvements in the public sector. 6 evaluated quality of life in the private sector and of these four reported improvements.

_Public_

The majority of studies investigating QOL related to breast reduction surgeries \( n = 12 \). Of these, all reported improvements in outcomes particularly physical functioning and mental wellbeing. Most studies reported moderate to large effect sizes. The biggest gains were seen in physical functioning. Three studies compared post-operative scores of those undergoing cosmetic surgery with controls (Fonseca et al., 2018; Hernanz et al., 2016; Iwuagwu, 2006, 2009; Modaerssi et al., 2013) and two had greater than 20% attrition (Hollyman et al., 1986; Saariniemi, 2008, 2009, 2011).

Overall nine studies reported improvements in all QOL domains. Eight others reported improvements in some but not all domains across surgery types. Klassen et al., (1996, 1999) reported small to moderate improvements in a sample undergoing mixed procedures. However 106 participants reported no change or a worsening in scores. de Brito et al. (2010) investigated a sample of women undergoing abdominoplasty with reported improvements in three of eight domains at one-month follow-up and one of eight at six-month follow-up. Although a wait list control design was used, those
undergoing surgery were not statistically compared to controls. The study also had a high attrition rate and a small sample size. Meningaud et al. (2003) reported an improvement in psychological quality of life only in those undergoing facial procedures.

Private

Six studies assessed QOL in patients undergoing private aesthetic procedures. Only one reported improvements in all domains in a sample of mixed cosmetic procedures (Margraf et al., 2013). This was the only study that statistically compared a large sample of those who underwent surgery to a wait list control however there was a significant loss to follow-up in the control group at 6 and 12 months. The full sample were reported to differ at baseline in QOL, with the surgery group reporting better baseline scores. No significant differences were reported in a sample who underwent breast augmentation (Saariniemi et al., 2011). When compared to an age standardised general population, mental health domain scores were found to be significantly lower in the surgery group, post-operatively. Pappadopulos et al. (2007) reported improvements in 4/8 domains in patient who underwent various cosmetic procedures. Small improvements were seen in physical functioning ($d = 0.07$ to $0.2$). Hosseinzadeh et al. (2017) reported no improvements at three months in those undergoing rhinoplasty, however small to large improvements were seen at six months in all domains with the biggest improvement in the psychological domain. WZojaji et al. (2014) found a small improvement in the psychological domain in those who underwent rhinoplasty, at three months. Similarly Perez et al. (2016) noted significant improvements in 2/8 domains (physical domains) in a sample of women who underwent breast procedures. Overall one study statistically compared a control group (Margraf et al., 2013) and three reported attrition rates greater than 20% (Hosseinzadeh et al., 2017; Papadopulos et al., 2007; Saariniemi et al., 2012)

Summary

In comparison to private sector studies, no studies from the public sector reported non-significant improvements at follow-up. Such findings suggest patients experienced more QOL gains in public healthcare settings compared to the gains seen in the private sector. However, the small number of private sector studies that measured QOL with which to compare, the diversity of tools used, methodological differences and high rates of attrition warrant caution when interpreting findings. QOL
measures are typically used to assess an individual’s health and physical functioning and may therefore be more likely to detect changes in those undergoing surgery for functional impairments compared to aesthetic reasons.

**Mental Health**

**Public**

Five studies assessed outcomes in relation to breast reduction. Three used a control group (Hollyman et al., 1986; Saariniemi et al., 2008, 2009, 2011). Iwuagwu et al. (2006, 2009) statistically compared a wait list control group to a surgery group. Significant improvements in BDI scores, at 6 months, were reported in two studies (Berberoglu et al., 2015; Moss & Harris, 2009) and 2 and 5 years (Saariniemi et al., 2008, 2009, 2011). Berberoglu et al. (2015) reported no drop-outs however lacked a control whereas Saariniemi et al. (2008, 2009, 2001) reported a significant loss to follow-up (31%). Two studies measured symptoms of anxiety and depression with the HADS (Faria et al., 1999; Iwuagwu et al., 2006 2009). Large effect sizes were reported at 4 months’ follow-up. The fifth study investigated the impact of cosmetic surgery on neurotic symptomatology (CCEI) and found no significant differences post-operatively (Hollyman et al., 1986). However findings were based on a surgical sample of 11 and the study may not have had adequate power to detect a significant effect. The authors noted CCEI scores for the sample were significantly higher compared to the general population, particularly for anxiety and depression. In contrast Moss and Harris (2009) however reported moderate improvements in CCEI scores in a sample who underwent several types of cosmetic procedures. The study reported an attrition rate of 23.5%.

Small improvements in anxiety, depressive and social anxiety symptoms, assessed using the MADRS and the SISST, were reported in a mixed sample who underwent facial surgeries (Meningaud et al., 2003). The study reported significant loss to follow-up and no control group. Although patients were assessed using a structured clinical interview relating to current and past psychological difficulties, this was not controlled in subsequent analysis. Klassen et al., (1996, 1999) reported a small improvement in GHQ-28 in breast reduction patients only. Response rates however were found to differ significantly across surgery type with non-responders more likely to be male and anticipating further follow-up surgery.
Private

11 mental health outcomes were assessed over eight studies. Two studies reported no changes in depressive symptomatology (Sarwer et al., 2005, 2008; von Soest et al., 2007, 2011) whereas Margraf et al. (2013) reported improvements in depression and anxiety scores but not in social anxiety, in a sample of patients who underwent several types of procedures. Whilst the latter study found participants differed significantly from wait list controls in levels of anxiety, depression and body dysmorphia and used a matched pair design to control for this, they noted significant attrition rates in the control group across time. The authors in the former studies reported lack of statistical power and significant losses to follow-up.

Moderate improvements in state-trait anxiety following breast surgeries, were reported by Perez-San-Gregorio et al. (2016). Although patients underwent psychological assessment prior to surgery, previous psychological history or current difficulties were not included in subsequent analysis. Groups differed at baseline in age, across surgery types and all were reported to have higher anxiety at baseline. Four studies reported no changes following cosmetic procedures (BDI, Sarwer et al. 2005; 2008 GHQ-28, Zojaji et al., SCL, von Soest et al., 2007, 2077; SCL, Liebowitz Social Anxiety, Dysmorphic concerns, Margarf et al., 2013).

Summary

Of 11 mental health outcomes assessed within the public sector all but one was found to improve across surgery types. Six out of 12 mental health outcomes assessed in the private sector did not significantly improve. Such findings suggest improvements in mental health outcomes vary across sectors. Nevertheless, differences may reflect outcome measures used, the methodological limitations discussed, substantial losses to follow-up and lack of controls. This makes it difficult to interpret if these differences reflect true differences between groups or reflect the quality of included studies.

Body image

Public

Six body image assessments were used over five studies. All reported improvements. The majority of studies described patients undergoing breast reduction surgery ($n = 3$). All five studies included a control group although only one utilised a body image
measure developed specifically for use with cosmetic surgery candidates (Moss & Harris, 2009).

Faria et al. (1999) reported improvements in body image post-operatively using two assessment tools; the BSS and the BIQ, in a sample of breast reduction patients. The BSS was developed to assess body image concerns in those with eating disorders whilst the BIQ was designed to assess concerns in patients undergoing mastectomy surgery and modified for the study’s purposes. Although the study maintained 95% of their sample the response rate to take part was relatively low 63.5%. The authors were unable to investigate differences between responders and non-responders due to the study design. Fonseca et al. (2018) reported a large post-operative change in the BIS in a similar sample. In comparison to a control group of normal-sized breasts the surgery group differed in baseline scores and significantly improved post-operatively. The studies retained all participants at 6 month follow-up. Large improvements were also reported by Hollyman et al. (1986) using the Body Perceptions Test. Similar to Faria et al. (1999) the measure was designed to be utilised for those with anorexia. Loss to follow-up was reported as greater than 20%. Improvements were also reported in a sample of women undergoing abdominoplasty (de Brito et al., 2010, 2012). Again the tool used was developed to measure eating disorder symptoms. Moss and Harris (2009) reported improvements at 12 month follow-up in DAS24 scores in those undergoing breast surgeries, tattoo excision and rhinoplasty. In comparison to those undergoing non-appearance altering surgery the authors reported a significant improvement in body image.

Private

Six studies used body image assessment tools. Four reported improvements. The majority of these measures were developed or validated for use with cosmetic samples. Two reported no changes at 6 months (Sarwer et al., 2002) and 2 year follow-up (Sarwer et al., 2005, 2008). The majority of studies included samples of mixed cosmetic procedures ($n = 3$). Of the six studies reviewed only one included a wait list control (Goodman et al., 2016) and one a comparison group of the general population (von Soest et al., 2007, 2011).

The three studies investigating changes in mixed cosmetic samples used the Multidimensional Body Self-Relations test (MBSRQ). Although a well-validated measure Sarwer et al. (2002) reported no change in scores at 6 months. Sarwer et al. (2005, 2008) reported improvements in two of four subscales. von Soest et al.
(2007, 2011) noted improvement in appearance orientation at six months but not in appearance evaluation. At five years however this change became non-significant. All three studies however, experienced substantial loss to follow-up and lacked a control group which may represent sources of bias and lead to disparate findings.

Only one study assessed improvements in body image in women undergoing female genital surgery. Goodman et al. (2016) used a control group of age matched controls of new patients or those returning for other surgeries. Using the BES a self-evaluation measure of one’s body and appearance the authors reported only improvement in one of 35 items, sexual self-esteem, at one and two years. However groups differed at baseline, with the surgery group scoring significantly lower at baseline than controls. Furthermore groups also had significantly higher dysmorphic concerns than controls. The study also had High rates of attrition however and no consideration was given to those lost to follow-up. In contrast, Litner et al. (2008) assessed participants undergoing facial procedures with the DAS59 and reported improvement in all six subscales. The authors noted improvements at three month follow-up. Differences found in baseline scores for men and for those undergoing rhinoplasty, a lack of control group and brevity of follow-up (3 months) make it difficult to draw inferences from the reported results.

Summary

Five studies included body image outcomes in the public sector. All reported improvements. Six studies included body image outcomes in the private sector. Of these four reported improvements. Similar to mental health outcomes there were reported differences in the number of studies reporting significant change in the public sector compared to the private sector. However, body image specific measures for surgical procedures appeared to show improvements although methodological issues and study and measure heterogeneity warrant caution with when interpreting findings.

Self-esteem

Public

Three studies included patients undergoing breast reduction surgery. Shakespeare and Cole (1997) reported moderate improvement in self-esteem at three months. However, the study had significant such attrition rates at follow-up. Saariniemi et al.
(2008, 2011) also reported significant improvement in self-esteem. Although a comparison group was included the authors did not report whether levels of self-esteem differed from the general population. Again high rates of attrition were evident. Mello et al. (2010) reported significant improvement in self-esteem at 4 month follow-up in a sample undergoing breast reduction surgery and de Brito et al. (2010, 2012) reported large improvements in those undergoing abdominoplasty.

Private

Four studies assessed self-esteem for patients undergoing private cosmetic procedures.

Two reported improvements. Von soest et al. (2007, 2011) reported no improvements at 6 months and improvement at five years. Although a comparison sample was used at baseline this was not followed up at 5 years. These findings, however may reflect improvement over time rather than the effects of surgery. Two studies of women who underwent breast augmentation reported increases in self-esteem post-operatively (Figueroa-Haas et al., 2007; Ribeiro & Steiner, 2017). Neither included a control group and one had a follow up of less than three months (Figueroa-Haas et al., 2007).

Three studies assessed post-operative outcomes in patients who underwent a variety of cosmetic procedures. Two reported no change in levels of self-esteem (Sarwer, 2005, 2008; von Soest et al., 2007, 2011) whilst Margraf et al., (2013) reported improvements at 3, 6 and 12 months. All had significant attrition rates. Only one study within those undergoing private cosmetic surgery did not have attrition rates greater than twenty percent Figueroa-Haas et al., 2007) and only one included a control group that was statistically compared to the surgery group (Margraf et al., 2013).

Summary

All studies used the same measure to assess self-esteem. All public sector studies reported improvements compared to two out of four studies in the private sector. Such findings are comparable to quality of life, mental health and body image findings where the general trend appears to be more significant change in the public health sector however these must be interpreted in line with the overall quality of the evidence.
Discussion

The review was carried out to compare public and private sector provision of cosmetic surgery and their outcomes.

Main findings

Overall the review identified more significant findings across psychosocial outcomes in the public sector compared to private medical settings. Although the majority of quality of life studies related to breast reduction surgeries, outcomes appeared more favourable in the public sector with all reporting improvements compared to two thirds in the private sector. 88% of studies in the public sector reported improvements in mental health outcomes (depression and anxiety, body dysmorphia) compared to 57% in the private sector (anxiety, depression, social anxiety, body dysmorphia). Body image outcomes were found to significantly improve in all public sector studies compared to 66% of the private sector. Studies assessing self-esteem in the public sector reported improvements in all studies compared to 50% of studies in the private sector.

The public sector reported more complication rates (60%). Complication rates are important when considering the effectiveness of surgical interventions as the literature suggests rates can impact on satisfaction and patient reported outcomes. Despite this psychosocial improvements were reported across all outcomes. Nevertheless given the disparities in reporting found in the current review it is not known if this represents more complications occurring in the public sector or a lack of reporting in the private sector. According to the literature patients who undergo surgeries in public healthcare settings have been found to have more co-morbidities. Comorbid difficulties have been found to impact on complication rates and outcomes (Tynkkynen and Vrangbaek, 2018). Only one study reported excluding patients with comorbidities associated with being overweight in the public sector (Guemes et al., 2016) and one reported the physical comorbidities of those undergoing surgery (Saariniemi et al., 2008, 2011). Only one reported physical comorbidities in the private sector (Saariniemi et al., 2012). Thus reporting of comorbidities was lacking. This is important as comorbidities may represent an important confound given the associations between poorer physical health and surgical outcomes.

Limitations of included studies
The main limitations of the studies included in current review reflect the conclusions of previous reviews pertaining to the quality of the overall literature (Cook et al., 2006; Honigman et al., 2004). The ability therefore to draw firm conclusions is limited by this. In general, studies in both sectors performed most strongly on their objectives and validity of included measures. Poorly designed studies, a lack of information on eligibility and exclusion criteria, poor management of confounds, a lack of control groups, limited reporting of surgical interventions and high rates of attrition, across the two groups, question the validity of results. Methodological biases impact on the ability to draw firm conclusions about differences in public and private sector psychosocial outcomes following cosmetic procedures however there was a general trend for more improvements in the public sector studies than the private sector studies. Overall the quality of studies was higher in the public sector compared to the private sector.

Random sampling methods help to reduce selection bias, ensuring more representative samples whereas convenience samples are more likely to result in selection bias, which poses a threat to external validity. Poor reporting of inclusion and exclusion criteria together with sampling methods impacts on the ability to interpret sample representativeness and thus, the generalisability of findings. Three studies used a randomised control design. Future studies may wish to address this. However the current reviews findings are consistent with a recent systematic review reporting the quality of randomised control trials in plastic surgery (Agha et al., 2013). Whilst the validity of measures included were found to be adequate across studies, control of confounds across may represent a threat to internal validity. The review also found a general lack of adequate accounting of confounds. Adequate control of potential confounding variables can be misinterpreted as the effect of surgery (Deveraux et al., 2005). This means significant findings may be attributable to third variables rather than treatment effect. Similarly for studies investigating surgical interventions, it is recommended that surgical techniques are clear, fully described and authors provide transparent information to allow for accurate assessment of the study. Lack of information can result in bias of interpreting the effectiveness of an intervention based on poor methodology (Juni, Altman & Egger, 2001; Schulz, Chalmers & Hayes, 1995). Inadequate reporting of the provider of care, surgery centre, selection criteria and management of surgical procedures may also represent additional sources of bias impacting on the interpretation of findings thus impacting on generalisability of results. It was also only possible to quantify estimates of effect
size in some studies due to the sparsity of data provided across studies. High attrition rates represented another limitation. This was found for 40% of public sector studies and 61% for private sector studies. Similarly response rates were low in some studies. Only five reported statistically comparing responders to non-responders on patient characteristics. Thus it is possible that responders add non-responders may differ and can lead to spurious findings.

Limitations and strengths

The limitations of the review methods include restriction to English language and a reliance on authors’ response about healthcare setting where this information was not reported. 78 papers were identified that met study criteria, however healthcare provider information was not provided. Although all authors of identified papers were contacted the response rate is a recognised limitation of the current study. Equally, only peer reviewed articles were included. The review found less published data from private medical settings compared to public healthcare settings. Whilst the review investigated a broad range of outcomes across a wide range of surgical procedures in public funded healthcare settings and private medical clinics the majority of papers pertained to breast surgeries.

Results in context

A previous systematic review comparing the effectiveness of multiple cosmetic procedures on psychosocial outcomes reached the conclusion that a lack of evidence meant they were unable to conclude that the majority of cosmetic procedures led to long-lasting improvement in psychosocial outcomes (Cook et al., 2006). The authors highlighted, however, that this was more likely to reflect methodological limitations than lack of effects. Similarly, evidence from the wider literature investigating differences between public healthcare providers and private medical settings highlight a lack of published research and poor quality studies (Basu et al., 2012).

The literature however suggests differences may exist in relation to patient characteristics. These characteristics have been associated with surgical outcomes. For example, those accessing private clinics have been found to be healthier, younger, better educated, and more affluent, have less severe pre-operative symptoms and comorbidities (Chard et al., 2011; Grotle et al., 2014). Unfortunately due to the quality of the reporting this was not able to be assessed in the current review. Such characteristics have been found to be associated with observed differences in pre-operative quality of life outcomes between patients undergoing
surgery in the public and private sector. Thus it is important to acknowledge that such characteristics may represent risk factors for poorer outcomes if comparisons of treatment effectiveness of cosmetic procedures in public and private sectors are further explored (Aalto et al., 2006; Cook et al., 2006).

Distinctions have also been made between patients who seek cosmetic procedures for appearance reasons as opposed to functional reasons (Cook, 2006). Findings from a sample of 228 NHS patients requesting cosmetic procedures suggested that those seeking surgery for appearance reasons were more socially avoidant, had poorer self-esteem, more symptoms of anxiety and depression than those requesting surgery for functional reasons. Given the lack of adequate reporting on selection criteria however, it is difficult to identify patients who may seek private cosmetic procedures for functional reasons rather than appearance reasons or vice versa. This is an area that warrants further investigation. Little is also known about those patients who do not meet criteria for cosmetic surgery through publicly funded sectors or those deemed unsuitable for cosmetic procedures from private sector clinics and the alternative treatments they may receive in relation to body image dissatisfaction.

*Implications for future research*

Cosmetic surgeries are provided for both functional and appearance concerns and the review sought to identify if patient reported outcomes differed by healthcare provider given that those requesting surgery through public providers are required to present with functional difficulties. Overall the study found differences across psychosocial outcomes, with more significant findings in the public sector. These results together with the wider healthcare literature suggest further exploration is required within the field of cosmetic surgery. Findings are restrained by the quality of existing data. Further exploration may help to identify which treatments are most likely to be effective. Future studies may wish to address whether comorbidities or symptom severity predict improvement in outcomes as well as compare baseline scores on outcome measures across the two groups. Whilst it may be that publicly funded services provide care for those with greater medical complexities more studies should seek to investigate this and the impact this may have in cosmetic surgeries provided by public healthcare systems.
Whilst there appears to remain a need for better designed studies the current findings suggest those undergoing cosmetic procedures in the public sector experience more benefits from surgery than those in the private sector. Whether these differences are attributable to functional and aesthetic concerns of public healthcare patients is unclear. However, surgery is often complex, carries risks and complications and requires post-operative adjustment. Such factors need to be considered when assessing patients’ suitability for cosmetic procedures. If those providing appearance altering surgeries commit to producing more rigorous data across public and private system outcomes and make this widely available, then further research can carried out to provide clarity on the disparities. Finding out what works and for whom is essential in ensuring patients receive the most effective healthcare with the best outcomes.

Conclusion

Understanding the context in which treatments are delivered and results of surgery for those undergoing cosmetic procedures in any healthcare setting is paramount in providing high standards of care. Ascertaining the physical and psychological needs of these individuals who are seeking complex medical procedures is equally important. The results suggest that body image, mental health, self-esteem and quality of life outcomes differ by provider, where more significant findings were reported by public providers. The reasons for this remain unclear however it seems that public healthcare patients experience more gains, particularly in relation to physical functioning and mental well-being, despite experiencing complications. Nevertheless these findings must be interpreted with caution given the quality of the evidence described. Good quality evidence is essential across both sectors. The current review however a step towards understanding and suggests patients may differ in their motivations and expectations of cosmetic surgery across the two settings.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.
REFERENCES


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The Association between Body Image Dissatisfaction and Quality of Life in individuals seeking cosmetic surgery: Mediating role of Self-esteem and Depression

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Written in accordance with guidelines for Body Image journal (see Appendix C).
Abstract

Body image dissatisfaction is a risk factor for adverse health outcomes. Evidence has demonstrated links between higher levels of body image dissatisfaction and poorer quality of life in general population samples. This has yet to be replicated in those pursuing cosmetic surgery procedures. The aim of this study was to investigate the relationship between body image dissatisfaction and quality of life in a sample of cosmetic surgery patients and explore potential mechanisms that may explain this relationship (through self-esteem and depression). Data was collected from 404 adults seeking cosmetic surgery through two NHS Health boards. The measures used were the Derriford Appearance Scale (DAS24), the Self-Liking Self-Competence Scale-Revised, the Hospital Anxiety and Depression Scale and the WHOQOL-BREF. Body image dissatisfaction was found to predict quality of life. Both self-esteem and depression mediated the relationship between body image dissatisfaction and psychological, social relations and environment quality of life. Whilst depression was found to mediate the relationship between body image dissatisfaction and physical quality of life, self-esteem did not. Additional treatments for body image concerns together with cosmetic surgery procedures are discussed.

KEY WORDS

Body image dissatisfaction, quality of life, self-esteem, depression, cosmetic surgery

Introduction

Body image dissatisfaction and cosmetic surgery

Body image dissatisfaction (BID) describes patterns of negative feelings and beliefs about one’s body shape and size. Epidemiological data suggests high incidence rates across adult populations (Fiske, Fallon, Blissmmer & Redding, 2014) and has been found to be a risk factor for a range of negative health outcomes (Neumark-Sztainer, Paxton, Hannan, Haines & Story, 2006). Substantive evidence also demonstrates a significant association between poor body image and an increased and risk of emotional distress, poor interpersonal functioning, and depression (Cash & Pruzinsky, 1990; Friedman, Reichmann, Costanzo & Musante, 2012). Findings suggest women with greater levels of BID may be at an increased risk for depression and poorer self-esteem compared to men (Furnham & Greaves, 1994). It has also been found to have a significant impact on daily functioning and is often associated with weight related...
issues and problematic eating behaviours (Cash, & Deagle, 1998; Wilson, Latner & Hayashi, 2013).

From a theoretical perspective negative appraisals of one’s own and beliefs of how they are perceived by others are proposed to lead to emotional distress (Cash, 2011). In turn, emotional distress is said to drive appearance altering behaviours, including weight loss and aesthetic surgery (Cash, 2011; Grogan, 2006). Results suggest BID is the biggest predictor of interest in undergoing cosmetic surgery (Markey & Markey, 2009) and prevalence rates appear to be high in cosmetic samples (Sarwer & Polonsky, 2016; Sarwer, Wadden, Pertschuk & Whitaker, 1998). If cosmetic surgery populations are comparable to other samples who report body image disturbance (i.e. eating disorder, overweight) and have significant impairment in functioning then the psychological dimensions that may be associated with BID in cosmetic samples are a relevant area to study.

Body image dissatisfaction and quality of life

Whilst extensive focus has been placed on risk factors associated with BID, the effects of BID on an individual’s quality of life has received less attention. Although quality of life outcomes are of the most assessed outcomes in cosmetic samples the focus tends to be on improvement, post-operatively.

Quality of life (QOL) is defined as an individual’s evaluation of their life across multiple domains. The WHOQOL-BREF (WHO, 1996) assesses four QOL domains; physical, psychological, social relations and environmental. The physical health domain includes items that assess pain and discomfort, activities of daily living and ability to work. The psychological domain asks respondents to consider their feelings towards their body image and appearance, self-esteem and overall well-being. The social relations domain focuses on interpersonal relationships whilst the environmental domain includes items such as, access to health and social care, pursuit of leisure activities and living conditions. Those interested in assessing health-related QOL typically explore the influence of physical and psychological domains. Although it has been well documented that those seeking cosmetic procedures experience physical symptoms associated with the body part(s) and the associated impact on psychological wellbeing, cosmetic surgery research indicates that the other two domains may also be associated with BID. Studies suggest an inverse relationship between these four domains and BID. The strongest associations are found between psychosocial domains and BID (Duarte, Ferreira, Trindade & pinto-Guoveia, 2015;
Mond et al., 2013). Other studies have demonstrated associations across multiple domains in general population samples (Nayir et al., 2016; Wilson et al., 2013). This is consistent with research carried out by Cash and Fleming (2002) who identified body image is positively correlated with different life domains including interpersonal relationships and happiness. Sarwer et al. (1998a) reported women seeking breast reductions reported feelings of embarrassment in social situations and avoidance of physical activities. Further studies have demonstrated associations between body image, self-esteem and social support (Cash, Jakatdar & Williams, 2004; Tylka & Wood-Barcalow, 2015). For those seeking body altering surgeries therefore QOL assessments are likely to reflect an individual's perspective of their life quality influenced by the feelings they hold towards their bodies or body parts, adjustment to their environment and social situations based on these feelings and the degree of functional impairment associated with the body part(s). Thus exploring the impact of BID on all four domains for those seeking body altering surgeries is of relevance.

Cosmetic procedures are often carried out to improve both psychosocial and physical functioning (Bensoussan et al., 2014). Women seeking breast reduction surgeries, for example, report motivations for undergoing surgery include improvement in emotional distress, low self-esteem and physical discomfort (Sarwer et al., 1998). It may therefore be that, similar to general population samples, BID is associated with impairment in physical quality of life in cosmetic surgery patients. A review carried out by Ching, Thoma, McCabe & Antony (2003) found that BID and QOL were the strongest predictors of cosmetic surgery outcomes. Such findings suggest these variables may be of particular importance for those undergoing body altering surgeries. This research may help to better understand the main motivations for those wishing to undergo body altering surgeries and therefore inform service planning and therapeutic decision making.

Furthermore, mechanisms mediating the association between BID and QOL impairment are poorly understood however. Potential variables include psychosocial and health behaviour covariates (Schofield, Hussain, Loxton & Miller, 2002) as well as life satisfaction and self-esteem (Ozgur, Tuncali & Gursu, 1998). For example, Schofield et al. (2002) found moderate associations between cosmetic surgery, elevated stress, poorer mental health, body mass index (BMI) and frequency of dieting. In this way factors such as BMI and poorer mental health may help to explain the relationship between BID and QOL in cosmetic samples. However, the
relationship between BID and psychological factors in those seeking surgery is less clear (Furnham & Levitas, 2012). Whilst findings suggest cosmetic surgery samples may not differ from the general population in terms of mental health, (i.e. self-esteem, depression) patients are found to score higher on measures of BID, self-esteem and psychopathology in relation to the feature they are concerned with (Sarwer et al., 1998b).

According to the wider literature BID is associated with increased levels of self-esteem and depression (Wichstrom & von Soest, 2016; Jackson et al., 2014). In addition, self-esteem and depression have been associated with quality of life impairment (Dunn, O’Neill & Feldman, 2011; Griffiths, Parsons & Hill, 2009). Such findings suggest that psychological factors may be more important to consider. This suggests it may be of benefit to explore their role in the relationship between BID and QOL impairment.

**Body image dissatisfaction and self-esteem**

In the present study one of the potential mediators of the relationship between BID and QOL that is to be explored is self-esteem. Self-concept theories propose that self-esteem derives from multiple domains (Campbell, 1990; Swann, Chang-Schneider & Larsen McLarty, 2007) including appearance. Appearance evaluation is theorised to be a factor in an individual’s overall evaluation of self. In this way heightened levels of BID lead to impairment in global self-esteem (Tiggemann, 2005). Observational data indicate an individuals’ evaluation of their physical appearance strongly correlates with global self-esteem (Furnham, Badmin & Stead, 2002; van den Berg, Mond, Eisenberg, Ackard & Neumark-Sztainer, 2010). In young adults and adolescents body satisfaction has been found to be one of the strongest predictors of self-esteem among (Donellan, Trzesniewski, Conger & Conger, 2007; Wichstrom, 1998). Such findings corroborate the association between BID and self-esteem.

According to etiological theories of BID, the development of poor body image is theorised to be precipitated by low self-esteem (Vohs et al., 2001). Tiggemann (2005) however, assessed BID and self-esteem over time. Results revealed BID significantly predicted self-esteem at two year-follow-up when baseline levels of self-esteem were controlled. When baseline BID was used as a control, self-esteem did not significantly predict subsequent BID. This contradicts etiological theories. Although Wichstrom and Von Soest (2016) found a bidirectional relationship between self-esteem and body satisfaction in adolescence to young adulthood, previous self-esteem in early adulthood did not predict body satisfaction. Whilst there may be a bidirectional effect,
findings suggest body satisfaction is a source of self-esteem, particularly in adulthood. In the cosmetic literature poorer self-esteem has been found to be a significant predictor of cosmetic surgery (Furnham & Levitas, 2012). This means that those with lower levels of self-esteem may be more likely to consider and undergo body altering surgeries. In summary, the findings suggest those seeking cosmetic procedures with higher levels of BID may experience lower levels of self-esteem which may lead to poorer quality of life.

**Body image dissatisfaction and depression**

In the present study depression is also being investigated as a potential mediator of the relationship between BID and QOL impairment. A growing number of studies have highlighted the importance of a positive body image in the context of depression. Consistently increased levels of BID are associated with increased levels of depressive symptoms and depressive disorder (Kostanski & Gullone, 1998; Stice, Hayward, Cameron, Killen & Taylor, 2000). Whilst much of the research comes from adolescent populations the literature suggests this relationship is similar across adulthood. Results published by Richard, Rohmann, Lohse, & Eichholzer (2016) who studied a large sample of adults from the general population indicated positive associations between BID and depression independent of sex, age and BMI. Moulton, Guillays, Hogg & Power (2018) demonstrated associations between BID, self-esteem and depression in those seeking cosmetic surgery from an NHS Health Board. Taken together such results may also suggest that those seeking cosmetic procedures with higher levels of BID may also experience lower levels of depression which leads to poorer quality of life.

**Models of body image, self-esteem, depression and quality of life**

Sarwer et al. (1998b) propose that negative body image is related to overall wellbeing. In this way increased levels of BID are theorised to lead to higher levels of depression and poorer self-esteem. Thus in the current study BID is expected to positively correlate with depression and negatively correlate with self-esteem. Within an eating disorder framework, Bardone, Vohs, Abramson, Heatherton and Joiner (2000) propose a theoretical model which proposes that those who are dissatisfied with their bodies and have lower self-esteem are at the greatest risk for bulimic symptoms. If findings are comparable for cosmetic patients in relation to BID, mental well-being and poorer QOL then this is a relevant area to study as it may highlight vulnerabilities that place those seeking cosmetic surgery, at risk of poor QOL and identify targets for
intervention (i.e. self-esteem and depression) when cosmetic surgery may not felt to be the most appropriate therapeutic intervention. This is particularly important for those seeking cosmetic procedures through the NHS as findings have revealed that up to 42% of patients assessed for cosmetic surgery within NHS settings are contraindicated for cosmetic surgery procedures, and instead it is felt that they would be more appropriate candidates for psychological interventions (Cook, Rosser, Toone, James & Salmon, 2006).

On the basis of the findings discussed, the study proposes a model of the relationship between BID and QOL and the role of self-esteem and depression in cosmetic surgery patients.

Proposed model and hypothesis

1. Higher levels of body image distress, poorer self-esteem and greater depressive symptoms will predict poorer QOL across the four domains (physical, psychological, social relationships and environmental).
2. Self-esteem and depression will mediate the relationship between BID and QOL (see Figure 1).

Despite growing evidence of QOL impairment associated with a negative perception of one’s body, no known research has examined this effect in cosmetic surgery patients. The current study extends past research by testing a mediational model of QOL and exploring psychological mechanisms of BID and QOL.

![Figure 1. Proposed mediation model of body image dissatisfaction, self-esteem, depression and quality of life.](image-url)
Method

Design

The study had a retrospective, cross-sectional design. The method of data collection was the use of an existing dataset. Data was extracted from a database of routine measures used in clinical practice, collected between December 2012 and July 2015. All participants seeking cosmetic surgery procedures through two NHS Health Boards were included. Referrals for surgery are screened according to criteria documented in the Adult Exceptional Aesthetic Referral (AEARP) guidelines (Scottish Government, 2011). Participants found to meet minimum criteria were referred for psychological assessment. Referrers were the Departments of Plastic Surgery, Breast Surgery and Ear, Nose and Throat Surgery.

Participants

The database held data for 510 participants. Participants included in the database were recruited from successive patients receiving first appointments at a Clinical Psychology service. Participants were excluded if they were under the age of 16, seeking reconstructive surgery, or surgery related to an underlying disease process. These exclusion criteria are set out by the AEARP Protocol for aesthetic surgery offered by the NHS. In Scotland cosmetic procedures available on the NHS are only provided in exceptional circumstances. Procedures include gynaecomastia, breast augmentation or reduction, breast asymmetry, abdominoplasty, rhinoplasty, pinnaplasty and body contouring procedures. Contraindications include self-harm within the previous two years, a previous diagnosis of Body Dysmorphic Disorder, major depressive disorder, delusional or schizophrenic illness, an eating disorder, obsessive compulsive disorder or substance misuse disorder. BMI restrictions are also in place for a number of procedures. Full details are available (see AEARP Guidelines, 2011).

Participant characteristics including age, gender, ethnicity, BMI, previous psychological or psychiatric treatment, type of surgery and outcome of psychological assessment were collected.
Measures

Body Image Dissatisfaction

The Derriford Appearance Scale (DAS24) (Moss, Harris & Carr, 2005) was used to measure BID. This is a widely used measure, developed for use with individuals requesting cosmetic surgery. Twenty four items relate to appearance distress, social anxiety and avoidance and functional difficulties related to body image concerns. Participants are asked to identify areas of their body they are self-conscious of and then focus on one particular feature. Items include, “other people misjudge me because of my feature” and “I am self-conscious of my feature”. These are rated on a 4-point Likert scale from “not at all” to “extremely”. 14 items include an N/A option scored as 0. Individual items are summed to provide a total score. Scores range from 11 to 96. Higher scores indicate greater levels of distress. The DAS24 has been tested on large scale samples and is considered to be a psychometrically robust tool for use with a range of aesthetic surgeries. It demonstrates high internal consistency (α = .92), good test-retest reliability of six months (r = 0.82) and high convergent and discriminant construct validity with measures of depression, social anxiety and shame (Carr, Moss & Harris, 2005; Moss et al., 2005).

Quality of life

The World Health Organisations Quality of Life assessment, the WHOQOL-BREF (WHO, 1996) was used to assess QOL across multiple domains. Items include pain and discomfort, body image and appearance, self-esteem and relationships. It is used extensively within health services and more recently, has been used with individuals seeking cosmetic procedures (Rumsey, Clarke & White, 2003; Sarwer & Polonsky, 2016). Participants are asked to rate 24 items on 5-point Likert scales organised into four domains; physical health, psychological, social relations and environment. Examples include, from “very poor to very good” and “none to extremely”. Two additional questions assess global life quality and health. These do not contribute to total subscale scores and are not reported. Items are scored from one to five. Raw domain scores are the sum of each item in each of the domains. The scores are transformed on a scale from 0 to 100, according to guidelines (WHO, 1996) to allow comparisons to be made between domains that include unequal numbers of items.
This is calculated by deducting the lowest score from the actual score, dividing by the range of scores and multiplying by 100. Higher scores indicate better quality of life. In a large reliability study Skevington, Lofty & O'Connell (2004) reported good internal consistency ($\alpha = > .07$) and discriminant validity. The authors of the measure also reported high test-retest reliability, between two to eight weeks across the domains ($r = 0.66$ to 0.87).

**Self-esteem**

The Self-Liking Self-Competence Scale–Revised (SLSC-R) (Tafarodi & Swann, 2001) measured self-esteem. The scale is based upon a two-dimensional construct theory of self-esteem (Tafarodi & Milne, 2002) and comprises two subscales. The self-liking scale assesses an individual’s perception of feedback from the social environment. The self-competence scale assesses perceived abilities in task performance. Both scales strongly correlate with the Rosenberg Self-Esteem Scale, $r = 0.70$ to 0.98 for self-liking and $r = 0.56$ to 0.92 for self-competence (Donnellan, Trzesniewski & Robins, 2015) and has previously been used in other areas of body image research and cosmetic surgery populations (Javo & Sorlie, 2009; Paterson, Power, Yellowlees, Park & Taylor, 2006). Participants’ rate level of agreement with eight items in each subscale (i.e. “I tend to devalue myself” and “I am highly effective at the things I do”). Items are rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Scores are summed into an overall score for each subscale, ranging from 8 to 40. Lower scores reflect lower self-esteem. Studies indicate good internal reliability, self-liking ($a = 0.89$) and self-competence ($a = 0.82$) (Mar, DeYoung, Higgins & Peterson, 2006). Correlations between the subscales were negatively and independently associated with scores for depression, demonstrating good discriminant validity (Tafarodi & Swann, 1995).

**Depression**

The Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) measured depressive symptomatology. The measure quantifies symptoms of anxiety and depressive over a one week period and forms part of the recommended assessment for depression (NICE, 2009). The measure has previously been used to explore predictors of poor cosmetic outcomes and has also formed part of pre-
operative evaluations (Cook et al., 2006; Honigman, Philips & Castle, 2004). Participants were asked to complete 14 items across two subscales. Items are rated 0 to 3. Scores are summed to provide a total score for each subscale ranging from 0-21. Higher scores indicate greater severity of emotional distress. The HADS has consistently demonstrated good psychometric properties. A review by Bjelland, Dahl, Haug & Neckelmann (2002) reported good to very good reliability of the depression scale (α = .67 to .90, mean 0.82). It was concluded both subscales measured anxiety and depression as two distinct dimensions. Concurrent validity ranges from 0.67 to 0.73 with the Beck Depression Inventory (Hermann, 1997).

Due to a lack of raw item scores in the dataset Cronbach’s alpha coefficients could not be calculated to assess the internal consistency of each of the scales used for analysis.

Procedure

The DAS24 and WHQOL-BREF were posted to participants prior to assessment with a letter inviting participants to attend for psychological assessment as part of the AEARP pathway. Participants were asked to bring completed measures to their appointment. The SLSC-R and the HADS were administered during participants' assessment. As these measures form part of routine clinical practice and are stored in an anonymised database, consent for participation was not sought. The research was carried out in accordance with the Declaration of Helsinki, namely that participants’ data was handled securely and in confidence. The study received a favourable ethical opinion from Caldicott Guardians (approval reference: IGTCAL 5838; see appendix E) and the University of Edinburgh Department of Clinical and Health Psychology Ethics Research Panel (approval reference: CLIN574; see appendix D).

Data analysis

Power analysis was conducted a priori using G*Power (Faul, Erdfelder, Buchner & lang, 2009). The association between QOL domain scores, BID, self-esteem and depression was analysed using multiple linear regression. Based on conventional statistical significance (α = .05) and power (1 –β = .80) and assuming a medium-sized
relationship between variables, a sample size of at least 77 was needed to analyse a model with 3 independent variables with a within subjects design.

**Missing data**

Data was checked for missing, outliers and parametric assumptions checked prior to statistical analysis. Data screening revealed the percentage of participants who had not completed the self-reported measures at assessment (DAS24, 7.3%; SLSC-R, 14.7%; HADS, 9.4%; WHOQOL-BREF 8.2%). A missing values analysis indicated that Little’s (1998) test of Missing Completely at Random (MCAR) was not statistically significant, $\chi^2(35, n = 404) = 46.82, p = .087$. This suggests data may be assumed to be MCAR. Participants who had not completed one or more of the four self-report measures were excluded ($n = 106$). Only complete cases were utilised for further analysis, with the final sample consisting of 404 cases.

**Assumptions**

Visual examination of the distribution of raw scores revealed that depression scores were positively skewed. BID along with physical and environmental quality of life domains were assessed to be negatively skewed. Kolmogorov-Smirnov tests confirmed that the distributions of all key variable scores were significantly deviated from a normal distribution ($Z$ scores ranged from .054 to .122, all $p < .05$). According to Tabachnick & Fidell (2014) skewness in large samples is unlikely to make a substantive difference in the analyses and highlight that the risk of overestimation or underestimation of variance decreases as the standard error reduces with larger samples ($N > 200$). Therefore parametric analysis were used for all statistical analysis. Data was screened to ensure regression assumptions were met including homoscedasticity, multicollinearity, normal distribution of residuals and linear relationships between predictor and outcome variables. Standardised residual plots suggested that assumptions of normality and linearity were satisfied. Variance inflation factors were below 10 (Bowerman & O’Connell, 1990 and tolerance statistics were above 0.2 (Menard, 1995). No evidence of multicollinearity was found.
Statistical analysis

Five types of analysis examined the relationships between the study variables. Firstly, demographic and clinical data were summarised using descriptive analysis. To address potential effects from demographic variables *t-tests* and one-way ANOVAs and correlation analysis (age) were conducted to explore differences between demographic variables and the study’s outcome variables (self-esteem, depression and QOL domains). Findings were used to determine the need to include these as covariates in subsequent analysis.

For the main hypotheses, Pearson correlation coefficients were examined to investigate associations among the study’s key variables (BID, self-esteem, depression and QOL domains). Multiple regressions were performed using a forced entry method with the three predictor variables and QOL domains to test the predictive relationships between outcome (QOL domains) and predictor variables (BID, self-esteem, depression) to determine whether to include them in the path model. SPSS (version 25) was used for all data analysis.

According to Preacher and Hayes (2008) mediators must be significantly correlated with predictor and outcome variables before determining a mediation effect. In the final analysis therefore parallel mediation analysis were conducted to assess the indirect effect of BID on quality of life domains through self-esteem and depression. PROCESS macro for SPSS, Model 4, was used to test the hypothesised mediation model for all four QOL domains (Hayes, 2013).

Results

Sample characteristics

Descriptive characteristics are shown in Table I. The mean age was 32.3 ±11.5 with the largest number of cases falling within the 16 to 24 age bracket (32.7%). There were a greater number of females than males (n = 328, 81.2%). The mean BMI was 24.6 ± 2.8. The most common surgery request was abdominoplasty (n = 95, 23.5%). 264 patients reported no previous psychological or psychiatric treatment (65.3%). 234 were indicated for surgical assessment following psychological assessment (56.9%).
Descriptive data and mean scores for the outcome measures are presented in Table I and Table II.

**Table I. Demographic and Clinical Characteristics of Cosmetic Surgery Seekers (n = 404).**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency (n)</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Age 18–67 years (M = 32.65±11.5)</td>
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<tr>
<td><strong>Gender</strong></td>
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<tr>
<td>Male</td>
<td>76</td>
<td>18.8</td>
</tr>
<tr>
<td>Female</td>
<td>328</td>
<td>81.2</td>
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<tr>
<td><strong>Ethnicity</strong></td>
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<tr>
<td>White</td>
<td>397</td>
<td>98.3</td>
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<td>Asian</td>
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<td>1.2</td>
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<td>Hispanic</td>
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<td>0.2</td>
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<td><strong>Previous Psychological/Psychiatric treatment</strong></td>
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<td></td>
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<tr>
<td>Yes</td>
<td>139</td>
<td>34.4</td>
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<tr>
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<td>264</td>
<td>65.3</td>
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<td><strong>Surgery Type</strong></td>
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<td>Asymmetry</td>
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<td>Blepharoplasty</td>
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<td>Gynaecomastia</td>
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<td>Mastopexy</td>
<td>9</td>
<td>2.2</td>
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<td>Minimally invasive*</td>
<td>7</td>
<td>1.7</td>
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<td>Pinnaplasty</td>
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<td>7.4</td>
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<tr>
<td>Rhinoplasty</td>
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<td><strong>Body Mass Index (BMI)</strong></td>
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<td>&lt;20</td>
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<td>3</td>
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<tr>
<td>20-27</td>
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<td>75.5</td>
</tr>
<tr>
<td>&gt;27</td>
<td>51</td>
<td>12.6</td>
</tr>
</tbody>
</table>

*Minimally invasive: inverted nipple correction, tattoo removal, thread veins, scar revision

Mean scores and standard deviations for the key study variables (BID, self-esteem, depression, QOL domains) are presented in Table II. The mean score on the DAS24 was 62.8 ±16.6. The mean score for self-esteem was 46.7 ±11.4. The mean depression score on the HADS was 5.7. 29.5% of cases were found to meet clinical criteria for depression. 16.1% were classified as mild, 9.7% as moderate and 3.7% as severe. The lowest mean score on the QOL domains was 44.7 ±19.8 for the psychological domain. The highest mean score was 69.6 ±17.3.
Table II. Summary of Study Variables for BID, self-esteem, depression and QOL domains (n = 404).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Possible Range</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Image Dissatisfaction</td>
<td>11-96</td>
<td>62.8</td>
<td>16.6</td>
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<tr>
<td>Self-Liking-Self-Competence</td>
<td>16-80</td>
<td>46.7</td>
<td>11.4</td>
</tr>
<tr>
<td>Depression</td>
<td>0 – 21</td>
<td>5.7</td>
<td>4.3</td>
</tr>
</tbody>
</table>

| WHOQOL-BREF Physical             | 0- 100         | 65.6  | 20.8 |
| WHOQOL-BREF Psychological        | 0 - 100        | 44.7  | 19.8 |
| WHOQOL-BREF Social Relations     | 0 - 100        | 47.8  | 25.2 |
| WHOQOL-BREF Environment          | 0 - 100        | 69.6  | 17.3 |

Associations between BID, self-esteem, depression and QOL domains

Pearson’s correlations were used to analyse hypothesised relationships between predictor and outcome variables: Table III shows the correlations for BID, self-esteem, depression and QOL domains. There was a significant, moderate correlation between depression and BID (r = 0.51, p < .001). There was a moderate negative correlation found between self-esteem and BID (r = -0.53, p < .001). Significant moderate, negative correlations were found between depression and all four QOL domains. Specifically, higher levels of depressive symptoms were associated with lower levels of QOL in physical health (r = 0.49, p < .001), psychological (r = -0.60, p < .001), social relations (r = -0.46, p < 0.001) and environment (r = -0.53, p < .001). Positive correlations between self-esteem and all QOL domains were statistically significant. Higher levels of self-esteem were moderately associated with greater QOL scores in the psychological domain (r = 0.68, p < 0.001) and environment (r = 0.53, p < 0.001) whereas moderate-low correlations were found between self-esteem and the physical health domain (r = 0.42, p < 0.001) and social relations (r = 0.46, p < 0.001). There
were moderate negative correlations between BID and all four QOL domains. Additionally a negative correlation between depression and self-esteem was found ($r = -0.68, p < 0.001$).

**Covariate analysis**

Analysis of potential covariates and outcome variables (self-esteem, depression and QOL domains) revealed the following: age was positively associated with self-esteem ($r(404) = .15, p = .003$), negatively associated with physical QOL ($r(404) = -.15, p = .003$) and positively associated with psychological QOL ($r(404) = .12, p = .015$). Correlation analysis also revealed BMI was negatively correlated with physical QOL ($r(404) = -.13, p = .016$).

Independent t-tests revealed the following: lower physical QOL scores were found for those who had a history of psychological or psychiatric treatment. This was significant ($t(401) = -2.68, p = .008$). Lower psychological QOL scores were found for those who had a history of previous psychological or psychiatric treatment. This result was also significant ($t(401) = -3.14, p = .002$). Lower environment QOL scores were also found for those who had a history of previous psychological or psychiatric treatment. This was significant ($t(401) = -2.76, p = 0.06$).

To analyse surgery type as a potential confounding variable surgery type was broken down into five categories according to the American Board of Cosmetic Surgery (2019): body contouring procedures, face and neck procedures, breast surgeries, minimally invasive procedures and female genital surgery. A one-way ANOVA found physical QOL scores differed between surgery types ($F(4,399) = 2.88, p = .023$). Post-hoc analysis revealed those having body contouring procedures had significantly higher physical QOL scores than those having breast surgery. This was the only
difference for physical QOL and no differences between surgery type and other QOL domains were found. Surgery types were then dummy coded to allow inclusion in regression and subsequent analysis.

Age, BMI previous psychological or psychiatric treatment, type of surgery (body contouring, breast surgeries) were found to be potential covariates. These were entered into subsequent analyses where they were found to be associated with outcome variables.

*Multiple regression analysis*

To determine whether BID, self-esteem and depression were predictors of QOL, four hierarchical multiple regression analysis were conducted, one for each of the four QOL outcome domains. This also allowed for testing of the strength of the predictor variables (BID, self-esteem, depression) on the four QOL outcome variables. BID, self-esteem and depression were entered as predictor variables simultaneously and each of the four QOL domains were entered as outcome variables. Covariates were entered using a forced entry method prior to predictor variables. The results for regression analyses BID, self-esteem, depression and QOL domains are reported in Table IV.

As self-esteem was associated with age, age was included in each model as a covariate prior to the predictor variables being entered. For the physical health QOL domain, associations were also found between BMI, surgery type and previous treatment. These were included along with age as covariates in the physical QOL model. These were entered first followed by the predictor variables.

*Physical health QOL*

As self-esteem was associated with age, age was included in each model as a covariate prior to the predictor variables being entered. For the physical health QOL domain associations were also found between BMI, surgery type and previous treatment. These were included along with age as covariates in the physical QOL model. These were entered first followed by the predictor variables.
Overall model one (covariates) was significant and was found to explain 7% of the variance for physical health QOL ($F_{(5,361)}=6.49, \ p<.001$). Model two (covariates and predictors) was significant and was found to explain 37.8% of the variance for physical health QOL when controlling for age, BMI, surgery type and previous treatment ($F_{(8,358)}=28.81, \ p<.001$). Of the individual predictors age was found to be a significant negative predictor ($\beta=-.246, \ p<.001$). Previous psychological or psychiatric treatment was found to predict physical health QOL ($\beta=.088, \ p=.035$) as was body contouring procedures ($\beta=.236, \ p<.001$). BMI was found to negatively predict physical health QOL ($\beta=-.089, \ p=.038$). Body image dissatisfaction was found to be a significant negative predictor ($\beta=-.200, \ p<.001$) whilst self-esteem was found to positively predict QOL in this domain ($\beta=.133, \ p=.027$) and depression was negatively predictive ($\beta=-.326, \ p<.001$).

**Psychological QOL**

For the psychological QOL domain age and previous treatment were included in the model as covariates prior to the entering the predictor variables. Overall model one (covariates) was significant and explained 3.6% of the variance for psychological QOL ($F_{(2,400)}=8.46, \ p<.001$). Model two (covariates and predictors) was found to be significant and explained 59.4% of the variance for psychological QOL when controlling for age and previous treatment ($F_{(5,397)}=118.82, \ p<.001$). Of the individual predictors previous treatment was found to be a significant predictor ($\beta=.090, \ p=.005$). BID was found to negatively predict psychological QOL ($\beta=-.382, \ p<.001$). Self-esteem was found to significantly predict psychological QOL ($\beta=.358, \ p<.001$) and depression was found to be a negative predictor ($\beta=-.155, \ p<.001$).

**Social relations QOL**

For the social relations QOL domain age was included as a covariate prior to entering the predictor variables. Model one (covariate) was not significant. ($F_{(1,402)}=2.861, \ p=0.92$). Model two (covariates and predictors) was significant and was found to explain 31.9% of the variance ($F_{(4,399)}=48.174, \ p<.001$). Of the individual predictors BID was found to negatively predict social relations QOL ($\beta=-.316, \ p<.001$). Self-esteem positively predicted social relations QOL ($\beta=.171, \ p=.004$) whereas depression was found to be a negative predictor ($\beta=-.186, \ p<.001$).
Environment QOL

Age and previous treatment were included as covariates prior to entering predictor variables for the environment QOL domain. Model one (covariates) was significant \( F(2,400) = 4.319, \ p = .014 \) and was found to explain 1.6% of the variance. Model two (covariates and predictors) was significant \( F(5,397) = 42.480, \ p < .001 \). Of the individual predictor variables previous treatment was significantly predictive of environment QOL \( \beta = .082, \ p = .045 \). Similarly BID was found to be negatively predictive \( \beta = -.159, \ p = .001 \) as was depression \( \beta = -.266, \ p < .001 \). Self-esteem was found to be a significant positive predictor \( \beta = .252, \ p < .001 \).
**Mediation analysis 1: BID, self-esteem, depression, and physical health QOL**

**Physical health QOL**

Given the observed relationships between the quality of life domains, body image distress, self-esteem and depression together with satisfying the assumptions that significant relationships were identified between predictor variables and outcome variables a mediation analysis was carried out. The hypothesised model proposed that self-esteem and depression would mediate the relationship between body image dissatisfaction and the four QOL domains. The mediation model was tested individually for the four QOL domains PROCESS model 4). The approach uses bootstrapping which involves continually sampling from 10,000 bootstrap samples. Both direct and indirect effects were estimated to generate confidence intervals for these effects. The effect is considered significant at the .05 level of the bias-corrected 95% confidence interval (CI) when the CI does not include zero.
Table III. Correlations of Body Image Dissatisfaction, Self-esteem and Depression and Quality of Life Domains.

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
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<td>1. Depression</td>
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<td></td>
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<td></td>
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<td>2. Self Liking</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self Competence</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3. Body Image Dissatisfaction</td>
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<td></td>
<td></td>
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<td></td>
</tr>
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<td>4. WHOQOL-BREF</td>
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<td></td>
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<td>Physical Health</td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Note. N = 404. ***p < .001, **p < .01, *p < .05, ns
The results of mediation model revealed a 95% CI of -.1885 to .0048 for self-esteem and a 95% CI of -.3272 to -.1383 for depression. As the depression interval did not include zero, it can be concluded that depression mediates the relationship between BID and physical health QOL. As the self-esteem interval did cross zero it can be concluded that self-esteem did not mediate the relationship between BID and physical health QOL. 39.2% of the variance in physical health QOL was explained by the mediation model ($R^2 = .392$) when controlling for age, BMI, surgery type and previous treatment. Table V shows the mediation results of indirect effects for self-esteem and depression. Figures 2 to 6 show models of these effects for each QOL domain. Direct effect and indirect effects are included.

![Diagram showing mediation model](image)

**Note.** ***p < .001, **p < .01, * p < .05, ns p > .05**

**Figure 2.** Mediation model of body image dissatisfaction, self-esteem, depression and physical health quality of life.

**Mediation analysis 2: BID, self-esteem, depression, and psychological QOL**

The results of the mediation model revealed a 95% CI of -.2918 to -.1541 for self-esteem and a 95% CI of -.1487 to -.0403 for depression. As neither of the intervals for the two variables include zero, it can be concluded that both self-esteem and depression mediate the relationship between BID and psychological QOL. 59.9% of the variance in psychological QOL was accounted for by the mediation model ($R^2 = .599$) when controlling for age and previous treatment.
Figure 3. Mediation model of body image dissatisfaction, self-esteem, depression and psychological quality of life.

*Multiple regression and mediation analysis 3: BID, self-esteem, depression, and social relations QOL*

For the social relations QOL domain age was included as a covariate prior to entering the predictor variables. Model one (covariate) was not significant ($F(1, 402) = 2.861$, $p = 0.92$, $R^2 = .007$).

The results of the mediation model revealed a 95% CI of -.2370 to -.0445 for self-esteem and a 95% CI of -.2377 to -.0528 for depression. As neither of the intervals for the two variables include zero, it can be concluded that both self-esteem and depression mediate the relationship between BID and social relations QOL. 32.6% of the variance in social relations QOL was explained by the mediation model ($R^2 = .326$).
Figure 4. Mediation model of body image dissatisfaction, self-esteem, depression and social relations quality of life.

Note. *** p < .001, ** p < .01, * p < .05, ns p > .05
Table IV. Multiple Regressions with Body Image Distress, Self-esteem and Depression as predictor variables.

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>WHOQOL-BREF Physical health</th>
<th>WHOQOL-BREF Physical health</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1 (covariates)</td>
<td>Model 2 (covariates and predictors)</td>
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<tr>
<td>Age</td>
<td>-.281 (.098)</td>
<td>-.444 (.082)</td>
</tr>
<tr>
<td>Previous treatment</td>
<td>6.201 (2.221)</td>
<td>3.879 (1.828)</td>
</tr>
<tr>
<td>Body contouring</td>
<td>7.112 (3.349)</td>
<td>10.546 (2.851)</td>
</tr>
<tr>
<td>Breast surgeries</td>
<td>-1.952 (.296)</td>
<td>1.384 (2.578)</td>
</tr>
<tr>
<td>BMI</td>
<td>-.781 (.387)</td>
<td>-.662 (.317)</td>
</tr>
<tr>
<td>Body image dissatisfaction</td>
<td>-.249 (.067)</td>
<td>-.209 (.046)</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>.250 (.113)</td>
<td>.250 (.113)</td>
</tr>
<tr>
<td>Depression</td>
<td>-.249 (.067)</td>
<td>-.249 (.067)</td>
</tr>
</tbody>
</table>

Adj. $R^2$: Model 1 (0.070), Model 2 (0.378)
F (df): 6.489 (5,361), 28.805 (8,358)

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>WHOQOL-BREF Psychological</th>
<th>WHOQOL-BREF Psychological</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Model 1 (covariates)</td>
<td>Model 2 (covariates and predictors)</td>
</tr>
<tr>
<td>Age</td>
<td>.222 (.084)</td>
<td>.021 (.056)</td>
</tr>
<tr>
<td>Previous treatment</td>
<td>6.831 (2.035)</td>
<td>3.720 (1.328)</td>
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<tr>
<td>Body image dissatisfaction</td>
<td>-.455 (.046)</td>
<td>-.382 (.090)</td>
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<td>Self-esteem</td>
<td>.620 (.079)</td>
<td>.620 (.079)</td>
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<tr>
<td>Depression</td>
<td>-.724 (.209)</td>
<td>-.724 (.209)</td>
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</table>

Adj. $R^2$: Model 1 (0.036), Model 2 (0.594)
F (df): 8.460 (2,400), 118.818 (5,397)
Table IV. continued Multiple Regressions with Body Image Distress, Self-esteem and Depression as predictor variables.

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>WHOQOL-BREF Social relations</th>
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<tr>
<td>Model 1 (covariates)</td>
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<tr>
<td>Age</td>
<td>.185</td>
<td>.109</td>
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<td>Body image dissatisfaction</td>
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<td>.076</td>
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<td>Self-esteem</td>
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<td>Adj. $R^2$</td>
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<tr>
<td>F (df)</td>
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</tr>
<tr>
<td>Model 2 (covariates and predictors)</td>
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<td>Age</td>
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<td>Body image dissatisfaction</td>
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<td>-.6304</td>
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<tr>
<td>Adj. $R^2$</td>
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<td>F (df)</td>
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<tr>
<td></td>
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<tr>
<td>Model 1 (covariates)</td>
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<td>Age</td>
<td>.075</td>
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<td>Previous treatment</td>
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<td>Body image dissatisfaction</td>
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<td>Self-esteem</td>
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<tr>
<td>Depression</td>
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</tr>
<tr>
<td>Adj. $R^2$</td>
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<td></td>
</tr>
<tr>
<td>F (df)</td>
<td></td>
<td></td>
</tr>
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</table>
Table V. Mediation results for indirect effects of self-esteem and depression

<table>
<thead>
<tr>
<th>Mediation/Indirect Effects</th>
<th>Self-esteem</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>95% CI</td>
<td>95% CI</td>
</tr>
<tr>
<td></td>
<td>Effect SE</td>
<td>Lower  Upper</td>
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<tr>
<td>BID and Physical Health QOL</td>
<td>-.0931 .0492</td>
<td>-.1885 .0048</td>
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<tr>
<td>BID and Psychological QOL</td>
<td>-.2912 .0349</td>
<td>-.2918 -.1541</td>
</tr>
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<td>BID and Social relations QOL</td>
<td>-.1358 .0483</td>
<td>-.2370 -.0445</td>
</tr>
<tr>
<td>BID and Environment QOL</td>
<td>-.1350 .0317</td>
<td>-.1999 -.0751</td>
</tr>
</tbody>
</table>

Multiple regression and mediation analysis 4: BID, self-esteem depression and environment QOL

For the environment QOL domain age and previous treatment were included as covariates prior to entering predictor variables. Model one (covariates) was significant (F (2, 400) = 4.319, p = .014, R² = .021) and explained 2.1% of the variance.

The results of mediation model revealed a 95% CI of -.1999 to -.0751 for self-esteem and a 95% bootstrap CI of -.2115 to -.0749 for depression. As neither of the intervals for the two variables include zero, it can be concluded that both self-esteem and depression mediate the relationship between BID and environment QOL. 34.8% of the variance in environment QOL was explained by the mediation model (R² = .348) when controlling for age and previous treatment.
**Figure 5. Mediation model of body image dissatisfaction, self-esteem, depression and environment quality of life.**

**Discussion**

The aim of this study was to explore the relationship between BID and QOL by examining the associations between BID, psychological distress (self-esteem and depression) and QOL. Three main findings emerged: 1) BID was associated with self-esteem and depression 2) BID, self-esteem and depression predicted all four QOL domains 3) the relationship between BID and psychological, social relations and environment QOL, was mediated by both self-esteem and depression. Whilst depression mediated the relationship between BID and physical QOL, self-esteem did not.

Mean depression scores were comparable to Cook et al. (2006). However, the percentage of severe depression cases in the present study was found to be lower (3.7%; Cook et al., 2006: 12.3%). It is likely that this reflects screening procedures at the point of referral as those with severe psychological disorders or significant distress associated with the bodily feature are recommended for psychological interventions.

This may reflect differences in the screening procedures prior to patients undergoing psychological assessment.
In relation to BID, mean scores were found to be comparable to a NHS sample of patients undergoing breast procedures (current sample: 62.8; Moss & Harris (2009) study: 66.4)

Relationship between body image dissatisfaction, self-esteem and depression

The first main finding of the current study that BID was significantly associated with self-esteem and depression is consistent with other findings in both general population, cosmetic samples and those with weight related issues (Ferraro, Rossano, & D’Andrea, 2005; Mond, et al., 2013; Pimenta, Sanches-Villegas, Bess-Rastrollo, Lopes & Martines-Gonsales, 2009; Webster & Tiggemann, 2003). In the present sample of individuals seeking cosmetic surgery, those with higher levels of BID reported lower levels of self-esteem and higher levels of depression. Although there is a limited evidence base providing a theoretical rationale for this relationship, cognitive theories of depression predict that negative evaluation of self is central to depression (Beck, 1987). In this way it can be posited that those seeking cosmetic surgery who hold more negative views about their features for which they seeking body altering surgery, experience more symptoms of depression.

Relationship between body image dissatisfaction and quality of life

The second main findings, which were consistent with other results (Bensoussan et al., 2014; Mond et al., 2013; Nayir et al., 2016) was that BID and depression negatively predicted all four QOL domains. These findings suggest that an individual’s perception of their body and symptoms of depression affect their QOL, such that those seeking cosmetic surgery, who are more distressed about bodies and have higher levels of depression are more likely to have poorer QOL. Additionally, self-esteem was found to positively predict all four QOL domains. This finding suggests that those seeking cosmetic procedures with higher levels of self-esteem are more likely to have better QOL.

Relationship between self-esteem, depression and quality of life domains

The third key finding is that the relationship between body image dissatisfaction and quality of life is mediated by participants’ levels of self-esteem and depression. This means that, in this sample of individuals requesting cosmetic surgery for BID, self-esteem and depression accounted for a proportion of the correlations between BID and, psychological, social relations and environment QOL. For physical health quality of life only depression accounted for a proportion of the correlations between BID and physical health QOL.
These results are consistent with several findings. For example, quality of life has been linked to depression severity (Lasalvia, Ruggeri & Santolini, 2002). This is particularly evident in the dimensions that correspond with diagnostic criteria for depression such as the physical indicators (Kuehner, 2002; Sica da Rocha, Power, Bushnell & Fleck, 2009). Furthermore amongst emotional disorders depression appears to be the strongest predictor of poorer quality of life (Demyttenaere, DeFruyt & Huygens, 2002). Thus, given the presence of depressive symptoms in cosmetic surgery patients, and its relationship with QOL impairment the study proposes that symptoms of depression may be a factor to evaluate with individuals seeking cosmetic procedures, and when evident, should become a target of intervention. Similarly, given the finding that self-esteem also mediated the relationship between BID and QOL in this sample the study also proposes that self-esteem should be evaluated in those wishing to undergo appearance altering surgery, and like depression, become a target of intervention when found to be reduced. This study has extended previous research through the findings that self-esteem and depression mediate the relationship between BID and physical health, psychological, social relations and environment QOL.

**Limitations and strengths**

The study has some limitations to take into account when interpreting findings. Prior to inclusion patients had undergone a selection procedure for surgery where clinical and psychological factors are considered. Such factors include the degree of functional impairment (related to the body part), BMI, level of psychological distress and major mental health disorders or significant life events within a one year period. It is likely that those with minimal abnormalities, those with major mental health disorders, those perceived to have disproportionate distress or a mixture of these factors are screened out. Thus sampling bias may impact on the representativeness of the sample and interpretation of the current results. The generalisability of findings is therefore constrained by the choice of the sample, mainly women requesting cosmetic surgery procedures within two NHS settings who are deemed to meet criteria prior to undergoing psychological assessment. Thus replication of the present findings to include those contraindicated for assessment would contribute to future research. Similarly, restricting the sample to only those with full data may pose another source of bias. However, asking participants to complete assessment measures after being told they are contraindicated for surgery introduces some ethical issues and likely impacts on their motivation to complete them. The research method drew data from an existing dataset. Whilst this method allows access to a
large sample and was identified as appropriate in addressing the research question and a priori hypotheses were developed it must be highlighted that this type of method comes with several limitations. The available data was not collected to address the particular research question, nor to test the particular hypotheses for the current study. Therefore caution should be taken when interpreting the findings. Similarly a third variable that may have been important to consider in the proposed relationships were not available for analysis as secondary datasets limit the ability to select specific questions or measurement tools (Tomlinson-Keasey, 1993). It can also not be ruled out that the associations may be due to third factors not considered in the present study but may have been important covariates to control for in analyses. For example, socioeconomic status and degree of functional impairment. Socioeconomic status has been found to be an important determinant of QOL where some argue that those with more financial resources have more access to social activities, better access to health and social care experience less psychological distress and better QOL (Ackerman, Graves, Wicks, Bennell, & Osborne, 2005; Robert et al., 2009). Future research may address this by exploring the role of socioeconomic factors and degree of reported functional impairment in the observed associations. In addition, whilst the outcome measures used are widely accepted and validated, the study recognises that aside from the DAS24 the other measures used were neither developed for nor validated with cosmetic surgery samples. The lack of reliability and validity data for these measures for use with cosmetic samples must be highlighted as a limitation. Nevertheless it must be recognised that the number of measures developed specifically for cosmetic surgery patients remains substantially limited (Wildogoose, Scott, Pusic, Cano & Klassen, 2013). Additionally, although the SLSC is a validated measure for assessing self-esteem as a multidimensional construct, studies within the cosmetic literature make use of different tools, making direct comparisons more difficult. It also must be noted that participants presented as relatively well adjusted in comparison to the psychological functioning of participants in other samples. Some of these differences likely reflect screening procedures at point of referral. In the current sample those with more complex and enduring psychological disorders and significant body image are recommended for psychological interventions only and are therefore not assessed. No data was available on those excluded at the point of vetting. Whilst the sample represents a large number of individuals seeking cosmetic interventions and is largely representative of those likely to be considered for cosmetic procedures carried out by NHS trusts it is recognised that these eligibility criteria may narrow the applicability of results to other subgroups within cosmetic surgery seeking populations. Future research may wish to explore this further and
explore such associations in those with elevated levels of BID and psychological dysfunction. Finally, the cross-sectional nature of the study design means that causality cannot be inferred. Longitudinal studies are better suited to drawing conclusions about the direction of observed relationships. It may be that one’s body dissatisfaction leads to poorer self-esteem and depression which negatively impacts on quality of life or depression and self-esteem may lead to poorer body image which leads to poorer quality of life. These associations may however also exist in both directions (Neumark-Sztainer et al., 2006). Nevertheless, there are clear relationships identified between the variables in the present study. Furthermore, longitudinal results support the predictive role of BID in a number of adverse health outcomes (Neumark-Sztainer et al., 2006; Pimenta et al., 2009).

At the same time, however, the present study appears to be a first step in testing relationships between these variables within a sample of cosmetic surgery patients. Although BID and QOL impairment have been assessed in general population samples this is the first known study to have investigated this relationship in those seeking body altering surgeries. Furthermore, to date, no research has been found that has assessed two psychological factors as mediators in the relationship between poor body image and quality of life impairment in a cosmetic sample. Thus the study provides a novel exploration of the relationships between these variables in a sample known to have body image concerns which they wish to address with appearance altering surgeries. Another strength of the current study is the large sample of NHS patients undergoing a variety of surgical procedures. Such studies carried out in NHS settings adds to evidence based practice and helps to guide decision making about patient based care.

**Clinical implications and future research**

This study contributes to the current literature base on the relationships between psychological factors and health related QOL those seeking cosmetic procedures under NHS care. The findings that BID, depression and self-esteem are predictive of QOL has clinical implications for the care providers who aim to enhance an individual’s QOL through cosmetic surgeries. If QOL is to be improved in such patients then BID, self-esteem and depression should be assessed alongside functional impairments to better understand requests and decisions for surgery as well as assessing likely surgery outcomes. Furthermore, these factors should also be the focus of interventions aimed at improving QOL for those seeking body altering...
surgeries. A further clinical implication for future research would be to identify whether other non-surgical interventions, such as psychological treatments, reduce body image distress and improve depressive symptoms and low self-esteem in those wanting to undergo cosmetic procedures.

The study’s findings also reveal that self-esteem and depression mediate the relationship between BID and QOL, in the current sample. This is important for two reasons. Firstly, not all patients who request surgery will be eligible (Cook et al., 2006; Sarwer, Spitzer, Sobanko & Beer, 2015) and secondly body image improves with cosmetic procedures (Cook et al., 2019) improvements in self-esteem and depression appear mixed (Bolton, Pruzinsky, Cash & Persing, 2003; Meningaud et al., 2003; Papadopulos et al., 2012; Swanson, 2013). Thus self-esteem and depression appear to be suitable targets for psychological interventions in those seeking cosmetic procedures for BID. Adding these components into alternative treatments or providing these alongside surgical treatments for those pursuing surgery for body image concerns has not been thoroughly studied. A recent meta-analysis investigating body image interventions across populations identified techniques that appeared to be effective in challenging negative perceptions. These were cognitive restructuring of negative body image perceptions and positive self-talk to improve self-worth. However, the study concluded the results for the efficacy of self-esteem interventions were limited by available evidence (Alleva, Sheeran, Webb, Martijn, & Miles, 2015). Future studies therefore may be able to determine the efficacy of such interventions for cosmetic surgery patients. Furthermore, investigation of the observed relationship outwith NHS patient samples and across multiple NHS settings is needed to replicate the current study’s findings. Given the negative impact of BID (Neumark-Sztainer et al., 2006; Stice & Shaw, 2002) this is a worthy area of research. It would be noteworthy to identify if these findings can be replicated with those contraindicated or not eligible for surgeries provided by NHS Healthcare Trusts. Such research may help to determine their individual needs and find alternative treatments to better manage the impact of BID.

Theoretical and empirical research has also highlighted the link between shame and body image difficulties. In particular, shame has been identified as a central feature of body image dissatisfaction and disordered eating patterns (Goss & Allan, 2009; Troop, Allan, Serpell & Treasure, 2008). These associations have been demonstrated in both clinical and non-clinical samples (Ferreira, Pinto-Gouveia & Duarte, 2013; Pinto-Gouveia, Ferreira & Duarte, 2014). As body image dissatisfaction and shame can lead to high levels of distress researchers have sought to explore the role of
self-soothing system on individuals’ distress. Evidence suggests self-soothing mechanisms may lead to reduced levels of shame and body image distress in those with eating disorders (Ferreira et al., 2013). As previously discussed cosmetic samples may be comparable to other sample who report image disturbance. Thus such findings may be replicable in cosmetic surgery patients and may highlight a gap in the cosmetic surgery literature that is worthy of further exploration in relation to the associations between BID and QOL in those seeking cosmetic surgery procedures. Doing so may offer another focus for non-surgical interventions. The direct association between BID and QOL also has broader implications for public health policy. Building positive body image and supporting those with negative body image concerns appears to be a priority as findings suggest improving body image will have a positive impact on people’s quality of life. Future studies may also wish to investigate protective factors in the context of body image concerns and quality of life.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

ETHICAL APPROVAL

All procedures performed in studies involving human participants were in accordance with ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

REFERENCES


Friedman, K. E., Reichmann, S. K., Costanzo, P. R., & Musante, G. J. (2012). Body image partially mediates the relationship between obesity and psychological distress. *Obesity Research, 10*, 33-41.


FULL REFERENCE LIST


Bossuyt & C. Gatsonis (Eds.), *Cochrane Handbook for Systematic Reviews of Diagnostic Test Accuracy Version 1.0.0*. The Cochrane Collaboration.


APPENDIX A: Author guidelines for Clinical Psychology Review

CLINICAL PSYCHOLOGY REVIEW

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• Submit graphics that are disproportionately large for the content.

Colour artwork
Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF), or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable colour figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in color in the printed version. For colour reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article. Please indicate your preference for colour: in print or online only. Further information on the preparation of electronic artwork.

Figure captions
Ensure that each illustration has a caption. Supply captions separately, not attached to the figure. A caption should comprise a brief title (not on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

Tables
Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

References
Citations in the text should follow the referencing style used by the American Psychological Association. You are referred to the Publication Manual of the American Psychological Association, Sixth Edition, ISBN 1-4338-0559-6, copies of which may be ordered from http://books.apa.org/ books.cfm?id=4200067 or APA Order Dept., P.O.B. 2710, Hyattsville, MD 20784, USA or APA, 3 Henrietta Street, London, WC3E 8LU, UK. Details concerning this referencing style can also be found at http://humanities.byu.edu/linguistics/Henrichsen/APA/APA01.html

Citation in text Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

Web references
As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can
be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

Data references
This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

References in a special issue Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

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Most Elsevier journals have their reference template available in many of the most popular reference management software products. These include all products that support Citation Style Language styles, such as Mendeley. Using citation plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal’s style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide. If you use reference management software, please ensure that you remove all field codes before submitting the electronic manuscript. More information on how to remove field codes from different reference management software.

Users of Mendeley Desktop can easily install the reference style for this journal by clicking the following link: http://open.mendeley.com/use-citation-style/clinical-psychology-review When preparing your manuscript, you will then be able to select this style using the Mendeley plugins for Microsoft Word or LibreOffice.

Reference style
References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication. References should be formatted with a hanging indent (i.e., the first line of each reference is flush left while the subsequent lines are indented).


Video

Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labelled so that they directly relate to the video file's content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our video instruction pages. Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

Supplementary material

Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

Research data

This journal encourages and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings. To facilitate reproducibility and data reuse, this journal also encourages you to share your software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. If you are sharing data in one of these ways, you are encouraged to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the research data page.
Data linking
If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the database linking page.

For supported data repositories a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

Mendeley Data
This journal supports Mendeley Data, enabling you to deposit any research data (including raw and processed data, video, code, software, algorithms, protocols, and methods) associated with your manuscript in a free-to-use, open access repository. During the submission process, after uploading your manuscript, you will have the opportunity to upload your relevant datasets directly to Mendeley Data. The datasets will be listed and directly accessible to readers next to your published article online.

Data statement
To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the Data Statement page.
APPENDIX B: Quality criteria – systematic review

Systematic Review Quality Criteria

Review Question:
Do psychosocial outcomes differ for those undergoing cosmetic surgery in public and private healthcare providers?

Author:

Year:

Country:

Language:

Surgical procedure:

Funding Source:

1. Study Design

1.1. The research question/ rationale/ hypotheses of the study are clear and well clearly described.

<table>
<thead>
<tr>
<th>Good</th>
<th>The study’s rationale is explicit and clearly described. Objectives are appropriate and theoretically driven. Hypotheses and/or research questions are clearly described.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>The study’s rationale is clearly described. It is generally appropriate and theoretically driven. However hypotheses and/or research questions are not clearly stated but inference can be made from the information provided.</td>
</tr>
<tr>
<td>Poor</td>
<td>The study’s rationale is poorly or inadequately described. Little to no theoretical background is provided that sets the research and aims in context.</td>
</tr>
<tr>
<td>Not addressed Not applicable</td>
<td></td>
</tr>
</tbody>
</table>
1.2. The fundamentals of the study design are clearly described and are appropriate for the research purposes.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>The design of the study is well documented and appropriate for study’s objectives.</td>
</tr>
<tr>
<td>Adequate</td>
<td>The study’s design is relatively unclear and does not clearly address the study’s research objectives.</td>
</tr>
<tr>
<td>Poor</td>
<td>The study’s design is not appropriate for the study’s research objectives.</td>
</tr>
<tr>
<td>Not addressed</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

2. Participant Selection

2.1 Eligibility criteria, target population and selection are clearly specified and defined.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>The eligibility criteria and study population are clearly defined. Selection criteria for surgery and/or study inclusion and exclusion criteria is well described and includes where participants are recruited from, time point of recruitment. Participant characteristics are described in full (e.g. gender, age).</td>
</tr>
<tr>
<td>Adequate</td>
<td>The eligibility criteria and study population are adequately described. Details are provided on a minimum of two participant characteristics and include one of the following: recruitment location or time point of recruitment.</td>
</tr>
<tr>
<td>Poor</td>
<td>One or no characteristics are described and no details are provided on recruitment location or time point of recruitment.</td>
</tr>
<tr>
<td>Not addressed</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
2.2. The participants in the study are representative of those who would be eligible for the intervention in the clinical population of interest and selected from the same population.

| Good | The population sample are recruited from an appropriate population base and closely represent the cosmetic surgery seeking population. The clinical and demographic characteristics are fully described. |
| Poor | Participants are not representative of the global cosmetic surgery seeking population. Little or no clinical and demographic characteristics are provided in the study. |
| Not addressed Not applicable | |

2.3. Inclusion and exclusion criteria are pre-specified, applied uniformly to all participants and all eligible participants are included in the study.

| Good | Inclusion and exclusion criteria are well described and are applied consistently to all participants. All participants who meet criteria for inclusion are included and those excluded are clearly described. |
| Adequate | Inclusion criteria is adequately described and applied consistently to all participants but details on those excluded are not clearly described. |
| Poor | Inclusion criteria is unclear and details on exclusions are not provided. |
| Not addressed Not applicable | |
2.4. The clinical and demographic characteristics are fully described for those included in the study.

<table>
<thead>
<tr>
<th>Good</th>
<th>The clinical and demographic characteristics of the sample are described in full for all participants included in the study.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>Little or no clinical and demographic characteristics are provided for participants included in the study.</td>
</tr>
<tr>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

2.5. Sample size justification is provided together with power description or variance and effect estimates are provided.

<table>
<thead>
<tr>
<th>Good</th>
<th>Details are provided on the reasons for the number of participants included in the study. Power analysis is reported. The sample size is sufficient for the study design and analyses. (Sample size to detect an effect of 0.8, with an alpha of .05).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>Sample size is justified. Power analysis is not reported but the information provided allows for calculation. The sample size is appropriate and the power adequate for the analyses carried out. (Sample size to detect an effect of 0.8, with an alpha of .05).</td>
</tr>
<tr>
<td>Poor</td>
<td>No details are provided on the reasons for the number of participants included in the study or the study is underpowered.</td>
</tr>
<tr>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>
3. **Outcome Measures**

3.1. Outcome measures are clearly defined and a clear rationale is provided for the use of these outcomes in the study.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Good</strong></td>
<td>The outcome measures used are clearly described and clear justification is provided for their use in the context of the study.</td>
</tr>
<tr>
<td><strong>Adequate</strong></td>
<td>The outcome measures are clearly defined, but little justification is provided for their use in the context of the study.</td>
</tr>
<tr>
<td><strong>Poor</strong></td>
<td>The outcome measures are poorly described and no justification is provided for the measures used in line with the context of the study.</td>
</tr>
<tr>
<td><strong>Not addressed</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Not applicable</strong></td>
<td></td>
</tr>
</tbody>
</table>

3.2. Outcome measures are valid, reliable and are used consistently.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Good</strong></td>
<td>Standardised measures are used and the measure/s have good validity and reliability for use with cosmetic surgery seeking populations. Measures are used consistently across all participants.</td>
</tr>
<tr>
<td><strong>Adequate</strong></td>
<td>The outcome measures have reasonable validity and reliability but may not be validated for cosmetic surgery seeking populations. The measures are used consistently across all participants.</td>
</tr>
<tr>
<td><strong>Poor</strong></td>
<td>The outcome measures have not been and are not reliable. The measures are used inconsistently across all participants.</td>
</tr>
<tr>
<td><strong>Not addressed</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Not applicable</strong></td>
<td></td>
</tr>
</tbody>
</table>
4. Surgical Intervention

4.1. The surgical intervention is clearly defined and delivered consistently across the study population together with information about treatment setting and the clinicians delivering treatment.

<table>
<thead>
<tr>
<th>Good</th>
<th>The surgical intervention is clearly detailed and delivered consistently across all participants. Clear information is provided about the clinical setting and clinician/s carrying out the procedure/s.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>The surgical intervention is reasonably described. The surgical intervention is delivered consistently across all participants. Information about the clinical setting and clinician/s carrying out the procedure/s is somewhat provided.</td>
</tr>
<tr>
<td>Poor</td>
<td>The surgical intervention is poorly described or is not delivered consistently across all participants. Information about the clinical setting and clinician/s carrying out the procedure/s is poorly described.</td>
</tr>
<tr>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

4.2. Details are provided on how many participants undergo surgery as planned and any adverse outcomes/complications are reported.

<table>
<thead>
<tr>
<th>Good</th>
<th>The number of participants undergoing surgery as planned is clearly reported and information is provided on any adverse outcomes or complications occurring as a result of the surgical intervention.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>The number of participants undergoing surgery as planned is clearly reported, information on any adverse outcomes or complications occurring as a result of the surgical intervention are reasonably described.</td>
</tr>
<tr>
<td>Poor</td>
<td>The total number of participants undergoing surgery as planned and any</td>
</tr>
</tbody>
</table>
adverse outcomes or complications arising as a result of the surgical intervention are poorly described.

<table>
<thead>
<tr>
<th>Not addressed</th>
<th>Not applicable</th>
</tr>
</thead>
</table>

5. Follow-up

5.1. Timing and length of follow-up and outcome measures used are fully described and adequate for the study’s aims.

<table>
<thead>
<tr>
<th>Good</th>
<th>Length of follow-up, and number of times of follow-up occurs and outcome measures used are fully described. The length of follow-up is appropriate for the study’s aims.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>No details are provided about length of follow-up, and number of times follow-up occurs. The length of follow-up and measurements used are poorly described. The length of follow-up is inappropriate for the study’s aims.</td>
</tr>
<tr>
<td>Not addressed</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

5.2. Loss to follow-up rate is well described and details on those lost to follow-up are provided.

<table>
<thead>
<tr>
<th>Good</th>
<th>Completeness of follow-up is fully described. Details on those lost to follow-up are provided and attrition rates are carefully considered. The loss to follow-up rate is 20% or less and a comparison is made between participants and those lost to follow-up/non-responders.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>Completeness of follow-up is adequately described and the loss to follow-up rate is 20% or less or no comparison is made between participants and those lost to follow-up.</td>
</tr>
<tr>
<td>Poor</td>
<td>Completeness of follow-up is not described and the study’s attrition rate is poorly described.</td>
</tr>
</tbody>
</table>

136
6. Statistical Analysis

6.1. Key confounding variables are considered in the study’s design and analysis and measured appropriately.

<table>
<thead>
<tr>
<th>Good</th>
<th>Key confounding variables (i.e. demographic variables) are clearly identified and described and are controlled for in the study design and/or analysis.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>Key confounds are identified and measured and attempts are made to control for the study design or analysis.</td>
</tr>
<tr>
<td>Poor</td>
<td>Key confounding variables are not identified or are identified but not controlled for in the study design or analysis.</td>
</tr>
<tr>
<td>Not addressed</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

6.2. The choice of data analysis is appropriate to the study design and the outcome measures used.

<table>
<thead>
<tr>
<th>Good</th>
<th>The analysis used suitable for the study's design and outcome measures used.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>Chosen analysis is not suitable for the study's design nor outcome measures used.</td>
</tr>
<tr>
<td>Not addressed</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

6.3. Assumptions for the chosen analysis are met or appropriately addressed.

<table>
<thead>
<tr>
<th>Good</th>
<th>Assumptions for the intended analysis are reported to be met or reported to be not met and adjusted where</th>
</tr>
</thead>
</table>
appropriate (e.g. by using non-parametric equivalents).

<table>
<thead>
<tr>
<th>Poor</th>
<th>Assumptions are not reported to be met and are not adjusted for appropriately.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

7. **Limitations and conflict of interest**

7.1. The study’s limitations are clearly outlined and addressed.

<table>
<thead>
<tr>
<th>Good</th>
<th>The limitations of the study are clearly detailed and addressed within the design and analysis. Inference of results are clearly stated within the context of the limitations described.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>The limitations of the study are described but the inference for results are not reported although areas for future research may be suggested.</td>
</tr>
<tr>
<td>Poor</td>
<td>The study’s limitations and inference of results are poorly described or not addressed.</td>
</tr>
<tr>
<td>Not addressed/ Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

7.2. Conflicts of interest and source of funding are addressed.

<table>
<thead>
<tr>
<th>Good</th>
<th>The source of funding and role of funders and any conflicts of interest are clearly stated.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorly addressed/ Not addressed/ Not applicable</td>
<td>The source of funding and role of funders and any conflicts of interest are not clearly stated or acknowledged.</td>
</tr>
</tbody>
</table>
APPENDIX C: Author guidelines for Body Image Journal

DESCRIPTION

Body Image is an international, peer-reviewed journal that publishes high-quality, scientific articles on body image and human physical appearance. Body image is a multi-faceted concept that refers to persons' perceptions and attitudes about their own body, particularly but not exclusively its appearance. The journal invites contributions from a broad range of disciplines - psychological science, other social and behavioural sciences, and medical and health sciences. The journal publishes original research articles, brief research reports, theoretical and review papers, and science-based practitioner reports of interest. The journal gives an annual award for the best doctoral dissertation in this field.

Suitable topics for submission of manuscripts include:
• The effects of body image and physical characteristics (e.g., body size, attractiveness, physical disfigurements or disorders) on psychological functioning, interpersonal processes, and quality of life;
• Body image and physical appearance in the full range of medical and allied health contexts;
• Body image and physical appearance in diverse cultural contexts;
• Validation of assessments of the multidimensional body image construct;
• Factors that influence positive and negative body image development;
• Adaptive and maladaptive body image processes and their clinically relevant consequences on psychosocial functioning and quality of life;
• Relationship of body image to behavioural variables (e.g., exercise and other physical activity, eating and weight-control behaviours, grooming and appearance-modifying behaviours, and social behaviours);
• Scientific evaluation of interventions to promote positive body image or to prevent or treat body image difficulties and disorders.

GUIDE FOR AUTHORS

Types of Papers
The journal publishes original research articles, brief research reports, systematic reviews and meta-analyses (see PRISMA checklist: http://www.prisma-statement.org/), methodological/protocol articles, invited or topic-approved review articles*, and science-based practitioner reports of interest. The journal also gives an annual award for the best doctoral dissertation in this field.

Brief Research Reports. These should not exceed 2,500 words (excluding abstract, references, tables, figures and appendices). Up to a total of two one-page tables, figures, and/or appendices are permitted. The number of references cannot exceed 30.

While regular-length papers have no explicit limits in terms of numbers of words, tables/figures, and references, authors are encouraged to keep their length below 35 total pages. A paper's length must be justified by its empirical strength and the significance of its contribution to the literature.

*For authors who wish to submit a review, please contact the Editor-in-Chief (tylka.2@osu.edu) for approval of topic prior to submission.
The Seymour Fisher Outstanding Body Image Dissertation Annual Award The journal gives an annual award for the best doctoral dissertation in this field.

Ensure that the following items are present:
One author has been designated as the corresponding author with contact details:
• E-mail address
• Full postal address

All necessary files have been uploaded:
Manuscript:
• Include keywords
• All figures (include relevant captions)
• All tables (including titles, description, footnotes)
• Ensure all figure and table citations in the text match the files provided
• Indicate clearly if colour should be used for any figures in print Graphical Abstracts / Highlights files (where applicable) Supplemental files (where applicable)

Further considerations
• Manuscript has been 'spell checked' and 'grammar checked'
• All references mentioned in the Reference List are cited in the text, and vice versa
• Permission has been obtained for use of copyrighted material from other sources (including the Internet)
• A competing interests statement is provided, even if the authors have no competing interests to declare
• Journal policies detailed in this guide have been reviewed
• Referee suggestions and contact details provided, based on journal requirements

BEFORE YOU BEGIN

Ethics in publishing
Please see our information pages on Ethics in publishing and Ethical guidelines for journal publication.

Studies in humans and animals
If the work involves the use of human subjects, the author should ensure that the work described has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans. The manuscript should be in line with the Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals and aim for the inclusion of representative human populations (sex, age and ethnicity) as per those recommendations. The terms sex and gender should be used correctly.

Authors should include a statement in the manuscript that informed consent was obtained for experimentation with human subjects. The privacy rights of human subjects must always be observed.

All animal experiments should comply with the ARRIVE guidelines and should be carried out in accordance with the U.K. Animals (Scientific Procedures) Act, 1986 and associated guidelines, EU Directive 2010/63/EU for animal experiments, or the
National Institutes of Health guide for the care and use of Laboratory animals (NIH Publications No. 8023, revised 1978) and the authors should clearly indicate in the manuscript that such guidelines have been followed. The sex of animals must be indicated, and where appropriate, the influence (or association) of sex on the results of the study.

**Declaration of interest**
All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double-blind) or the manuscript file (if single-blind). If there are no interests to declare then please state this: 'Declarations of interest: none'. This summary statement will be ultimately published if the article is accepted. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches.

** Submission declaration and verification**
Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see 'Multiple, redundant or concurrent publication' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyrightholder. To verify originality, your article may be checked by the originality detection service Crossref Similarity Check.

**Preprints**
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<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Abdominoplasty</strong></td>
<td>Surgery to remove excess skin, scars, stretch marks and fat from the stomach.</td>
</tr>
<tr>
<td><strong>Ageing facial procedures</strong></td>
<td>A range of nonsurgical procedures to treat the appearance of ageing skin.</td>
</tr>
<tr>
<td><strong>Blepharoplasty</strong></td>
<td>Surgery to reshape the eyelids, also known as an eyelid reduction.</td>
</tr>
<tr>
<td><strong>Body contouring surgery</strong></td>
<td>A range of surgical procedures to remove excess skin and fat following massive weight loss.</td>
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<tr>
<td><strong>Botox</strong></td>
<td>Botulinum toxin injections: used to treat the appearance of fine lines and wrinkles.</td>
</tr>
<tr>
<td><strong>Brachioplasty</strong></td>
<td>Surgery to reshape and improve the appearance of the upper arms.</td>
</tr>
<tr>
<td><strong>Breast asymmetry</strong></td>
<td>Surgery to correct asymmetry of the breasts by altering the form, volume or position of the breast(s).</td>
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<tr>
<td><strong>Breast augmentation</strong></td>
<td>A surgical procedure carried out to enlarge the breast, usually by inserting an implant underneath the breast tissue.</td>
</tr>
<tr>
<td><strong>Breast reconstruction</strong></td>
<td>A procedure carried out to make a new breast after removal of the breast or part of the breast.</td>
</tr>
<tr>
<td><strong>Breast reduction</strong></td>
<td>Surgery to reduce the size of the breasts by removing fat, breast tissue and skin.</td>
</tr>
<tr>
<td><strong>Chin correction</strong></td>
<td>Surgery carried out to reshape the chin either by enhancement or reduction.</td>
</tr>
<tr>
<td><strong>Cosmetic/ aesthetic rhinoplasty</strong></td>
<td>Surgery to improve the appearance of the nose.</td>
</tr>
<tr>
<td><strong>Face lift</strong></td>
<td>A procedure to tighten and lift loose skin of the face. Also known as a Rhytiedectomy.</td>
</tr>
<tr>
<td><strong>Female genital surgery</strong></td>
<td>Procedures to enhance the appearance of female genitalia.</td>
</tr>
<tr>
<td><strong>Functional rhinoplasty</strong></td>
<td>Surgical treatment of the internal structure of the nose to improve breathing difficulties without alteration of the outer nose.</td>
</tr>
<tr>
<td><strong>Gynaecomastia</strong></td>
<td>A surgical procedure for males which involves removal of tissue or excess skin from the breast(s).</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
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<tr>
<td>Laser resurfacing</td>
<td>A non-surgical treatment to improve skin texture and appearance with the use of lasers.</td>
</tr>
<tr>
<td>Lax abdominal wall</td>
<td>A condition where the muscles of the abdomen become weak and flabby resulting in the loss of elasticity of the muscles.</td>
</tr>
<tr>
<td>Lipoplasty/Liposuction</td>
<td>Removal of deposits of excess fat from areas of the body.</td>
</tr>
<tr>
<td>Mastopexy</td>
<td>Surgery to remove loose skin from around the breasts and then lift and reshape them. Commonly known as a breast uplift.</td>
</tr>
<tr>
<td>Minimally invasive</td>
<td>Surgical techniques that limit the size of incisions needed which lessen recovery time and risks associated with pain and infection.</td>
</tr>
<tr>
<td>Otoplasty</td>
<td>Surgery to alter the position of the ears, pinning back the ears. Also known as pinnaplasty.</td>
</tr>
<tr>
<td>Peeling</td>
<td>A skin-resurfacing procedure where a chemical solution is applied to the skin to remove the top layers.</td>
</tr>
<tr>
<td>Post-partum change</td>
<td>The physiological changes that occur to the body after childbirth.</td>
</tr>
<tr>
<td>Ptotic breasts</td>
<td>Sagging of the female breasts as a result of the ageing process.</td>
</tr>
<tr>
<td>Rhinoplasty</td>
<td>Surgery to alter the appearance of the shape of the nose.</td>
</tr>
<tr>
<td>Scar revision</td>
<td>Surgery that aims to minimise the appearance of a scar.</td>
</tr>
<tr>
<td>Tattoo excision</td>
<td>The cutting out of a tattoo from the skin.</td>
</tr>
<tr>
<td>Thread lifting</td>
<td>A minimally invasive procedure where temporary stitches are used to lift the skin.</td>
</tr>
</tbody>
</table>
Janna Brogan  
Trainee Clinical Psychologist  
Department of Clinical and Health Psychology  
School of Health in Social Science  
University of Edinburgh  

19 March 2019  

Dear Janna,  

Application for Level 1 Ethical Approval  

Reference: CLINS74  
Project Title: Body Image Dissatisfaction and Quality of Life: a mediation of role self-esteem and depression in individuals seeking cosmetic surgery  
Academic Supervisor: Emily Newman  

Thank you for submitting the above research project for review by the Department of Clinical and Health Psychology Ethics Research Panel. I can confirm that the submission has been independently reviewed and was approved on the 18th March 2019.  

Should there be any change to the research protocol it is important that you alert us to this as this may necessitate further review.  

Yours sincerely,  

Kirsty Gardner  
Administrative Secretary, Clinical Psychology
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Janna Brogan
Dundee Adult Psychological
15 Dudhope Terrace
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DD3 6HH

Date 21 February 2019
Your Ref
Our Ref IGTCA/5838
Enquiries to Mr J. Donnelly
Extension 70249
Direct Line N/A

Dear Janna,

CALDICOTT APPROVAL – Body Image Dissatisfaction and Quality of Life: a moderated mediated analysis of the role of Self-Esteem and Depression in individuals seeking Cosmetic Surgery

Proposal Sponsor: Professor Kevin Power, Consultant Clinical Psychologist, NHS Tayside

Data User(s): Janna Brogan, Trainee Clinical Psychologist, NHS Tayside

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Yours sincerely

Joseph Donnelly
Data Protection Officer

Everyone has the best care experience possible
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Chairman, John Brown CBE
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