

# The Use of BODY-Q to Assess Factors Impacting Satisfaction and Quality-of-life Postabdominoplasty in Kenya

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**Background:** Massive weight loss can often lead to skin redundancy and affect a patient's quality of life. Abdominoplasty has grown in popularity due to its cosmetic and functional effects. There is currently a paucity in the patient-reported outcome measures literature in low-resource areas. As such, this study aimed to apply the BODY-Q measure to evaluate factors impacting abdominoplasty outcomes in Kenya.

**Methods:** Patients undergoing abdominoplasty were asked to complete BODY-Q scales before and after surgery. Patient demographics, medical history, and postoperative care were retrospectively collected from patient records. Inference statistics were used to assess predictors of improvement in postsurgical BODY-Q scores and seroma formation. Student *t* tests were used to compare means; chi-square tests were used to assess differences between proportions, and  $R^2$  was used to determine the proportion of variance.

**Results:** Thirty-nine patients underwent abdominoplasty, of whom 38 answered both surveys. Mean age and body mass index (BMI) were 38.30 ( $\pm 6.35$ ) years and 30.80 ( $\pm 6.35$ ) kg/m<sup>2</sup>, respectively. The difference in pre- and postoperative BODY-Q scores was  $-73.5$ , with an effect size of  $-6.67$  and a minimal clinically important difference of  $-2.00$ . Positive predictors of BODY-Q score improvement were concurrent liposuction ( $P = 0.004$ ), preoperative BMI ( $P = 0.001$ ), and patient-rated scar quality ( $P = 0.003$ ). Other factors were not significantly predictive.

**Conclusions:** Kenyan patients seem to be highly satisfied with abdominoplasty procedures, which result in significant improvements in quality of life. Factors significantly associated with higher satisfaction include concurrent liposuction, higher preoperative BMI, and postoperative scar quality. (*Plast Reconstr Surg Glob Open* 2025;13:e6539; doi: 10.1097/GOX.0000000000006539; Published online 12 February 2025.)

## INTRODUCTION

A 2023 report from the World Obesity Federation indicated that by 2035 more than 4 billion individuals would

be obese, totaling over half of the predicted world population.<sup>1</sup> Although there is a myriad of successful interventions aimed at treating obesity, including medical and surgical treatment modalities, massive weight loss comes with its own set of challenges—from lifestyle and psychosocial adaptations to physical changes, such as redundant skin.<sup>2</sup> Of particular importance, excess abdominal laxity and adiposity may impact an individual's ability to ambulate, exercise, and use properly fitted clothing.<sup>3</sup> Apart from a physical health perspective, such repercussions have been demonstrated to impact a patient's quality of life (QoL), psychological well-being, and self-image.<sup>3</sup>

Abdominoplasty to excise excessive skin and create a more aesthetically pleasing, firmer abdomen has grown in

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popularity over the years in high-income, high-resource settings, with more than 160,000 procedures performed in the United States in 2019 alone.<sup>4</sup> This has been accompanied by a myriad of studies utilizing patient-reported outcome measures (PROMs) that objectively assessed the positive impact of body-contouring interventions.<sup>5</sup> In contrast, although other areas of the world, namely the Global South, also face a similar rise in obesity and a desire for body-contouring interventions, there has been a paucity of literature assessing the impact of such interventions in those populations.<sup>6</sup> As previously demonstrated in other surgical specialties, patients' surgical goals, individual characteristics, and postoperative expectations can be dissimilar based on population demographics.<sup>7</sup> As such, the interpolation of Global North PROM results onto Global South populations may not be adequate.<sup>8</sup>

The BODY-Q, first developed in 2016, is a rigorously developed PROM designed to objectively measure how a patient functions and feels throughout their weight-loss journey from the presurgical stage to after body-contouring.<sup>9</sup> Using 4 overarching domains—appearance, health-related QoL, eating-related concerns, and experience of care—the BODY-Q consists of a series of scales that evaluate key aspects of patient satisfaction and QoL, including physical, psychological, social, and sexual functioning, and body image.<sup>9</sup> Furthermore, due to its standardized nature, patients' responses can be compared across providers, surgical techniques, and countries, allowing for optimization of care according to a patient-centric approach.<sup>10</sup> In addition, given its psychometric properties, the BODY-Q was deemed a superior PROM when compared with 23 other available measurement scales.<sup>11</sup>

Given the paucity of PROM studies in low-resource settings, this study aims to apply the BODY-Q to patients undergoing abdominoplasty in Kenya. In doing so, we hope to understand QoL outcomes from the patient perspective and determine which patient characteristics are associated with higher patient satisfaction. We hypothesize that postoperative patient satisfaction will be high and that adverse event incidence will negatively associate with postoperative BODY-Q scores.

## METHODS

Following institutional review board approval, from January to June 2021, patients undergoing abdominoplasty with 2 of the senior authors (A.A.A. and F.W.N.) were asked to complete BODY-Q scales pre- and postoperatively. Patient demographics, medical and surgical history, surgical documentation, and postoperative care were also retrospectively collected from hand-written patient records according to the institutional review board-approved study protocol. All procedures were performed by 2 of the senior authors. Patient inclusion criteria comprised all patients undergoing abdominoplasty with the senior surgeons who had native English fluency, as the questionnaire was administered only in the untranslated, English version. Exclusion criteria included individuals undergoing multiple procedures in the same anesthetic window, such as abdominoplasty and brachioplasty; those who

## Takeaways

**Question:** What are the quality-of-life improvements following abdominoplasty and which techniques lead to greatest patient-reported satisfaction changes in a low-resource center?

**Findings:** The BODY-Q seems to be an accurate measurement to evaluate patient satisfaction rates in low- and middle-income countries. Liposuction at the same time as abdominoplasty is significantly associated with improved BODY-Q scores. Finally, higher body mass index scores do not portend lower satisfaction scores.

**Meaning:** Patient-reported outcomes following cosmetic abdominoplasty in low-resource centers are high, and thus, the intervention should be more freely available.

failed to appropriately follow-up; and those who refused to participate in the study. Patients were asked the preoperative BODY-Q questions in their last presurgical visit and were asked the same questions within 6 months following surgery.

Inference statistics were used to assess predictors of improvement in postsurgical BODY-Q scores and seroma formation. First, a normality test was conducted. This was followed by a Student *t* test that was used to compare means; chi-square tests were used to assess differences between proportions, and *R*<sup>2</sup> was used to determine the proportion of variance. Finally, the Fisher exact test was carried out to assess for predictors of seroma formation. A univariate regression linear model was carried out to do so. Statistical analyses were performed using IBM SPSS Statistics 25 system (IBM, Chicago, IL), and statistical significance was defined as a *P* value less than 0.05.

For surgical technique, in both conventional abdominoplasty and lipoabdominoplasty, the abdomen was infused with 1 L of tumescent solution composed of normal saline, lidocaine, and epinephrine. For some patients, triamcinolone was also added to the infusion. Abdominoplasty started with a standard long curvilinear incision from 1 anterior superior iliac spine to the other, along the bikini line, or as an extension of a previous Pfannenstiel incision. Dissection was done in a suprascapular plane, preserving as much loose areolar tissue as possible, up to the costal margin. In conventional abdominoplasty, where no liposuction was done, wide undermining of the flap was carried out. In contrast, undermining limited to the central abdomen was done in patients who had liposuction concurrently. This was to ensure the preservation of as much blood supply to the flap as possible. In all cases, rectus muscle plication was performed in a single layer with nylon 1 sutures and progressive tension sutures inserted with Vicryl 2-0. Translocation of the umbilicus was carried out, and the abdomen was closed in layers. When liposuction was carried out, the timing in which it was performed differed, with 1 surgeon (A.A.A.) performing it before any incision, whereas the other provider (F.W.N.) performed it after the closure of at least 2 layers of the abdominal wall. Drains were used in most patients.

**Table 1. Patient Demographics**

<b>Total No. Patients</b>	<b>39</b>
Age, y, mean (SD)	38.30 (6.35)
Preoperative weight, kg, mean (SD)	84.60 (14.60)
BMI, kg/m <sup>2</sup> , mean (SD)	30.80 (6.50)
Medical comorbidities, n (%)	
Diabetes	2 (5.1)
Hypertension	5 (12.8)
Smoking history, n (%)	
Never	38 (97.4)
Current or former	1 (2.6)
Surgical history, n (%)	
Previous liposuction	2 (5.1)
Previous abdominoplasty	3 (7.7)

**Table 2. Surgical Techniques, Postoperative Care, and Adverse Events**

Abdominoplasty techniques	
Rectus muscle plication, n (%)	39 (100.0)
Concomitant liposuction, n (%)	25 (64.1)
Advancing sutures use, n (%)	27 (69.2)
Triamcinolone use, mean (SD)	18 (46.2)
Postoperative care	
Length of stay, d, mean (SD)	4.9 (3.6)
Compression garments, d, mean (SD)	80.6 (52.5)
Time to drain removal, d, mean (SD)	5.6 (2.6)
Pain duration, d, mean (SD)	10.1 (4.6)
Scar quality, n (%)	
Well-hidden	8 (20.5)
Visible, but indifferent	22 (56.4)
Displeasing	9 (23.1)
Complications, n (%)	
Seroma	8 (20.5)
Hematoma	2 (5.1)
Hypertrophic scar	1 (2.6)
Liposuction burn	1 (2.6)
Pulmonary embolism	1 (2.6)
Death	0 (0.0)

## RESULTS

A total of 39 patients underwent abdominoplasty with the senior authors. Most patients were obese or overweight (mean body mass index [BMI] 30.80 kg/m<sup>2</sup>; range 21.0–40.6 kg/m<sup>2</sup>), had no major comorbidities, and did not have a history of plastic surgery (Table 1). In all procedures, the rectus muscles were plicated, and in the majority of these, concomitant liposuction (64.1%) and advancing sutures (69.1%) were performed; approximately half of patients had triamcinolone applied during the procedure (Table 2). Postoperative care was standard among patients, including nonopioid medication regimen, and drain and compression garment use. The most common complications recorded were seroma formation (8/39, 20.5%) followed by hematoma (2/39, 5.1%)—which were managed conservatively in the outpatient setting. The mean length of hospital stay in days was 4.9 ± 3.6. Further postoperative care data and adverse events are summarized in Table 2.

Of the 39 patients operated on, 38 completed both the pre- and postsurgical BODY-Q questionnaires (97.4%).

**Table 3. BODY-Q Results**

Preoperative scores, mean (SD)	2.3 (11.5)
Postoperative scores, mean (SD)	79.0 (17.9)
Difference pre- and postoperative, mean (SD)	76.7 (23.5)
Effect size	5.15

The difference in pre- and postoperative scores was 76.7, with the effect size being 5.15 (Table 3). Major positive predictors of improvement in BODY-Q scores were concurrent liposuction ( $P = 0.004$ ), higher preoperative BMI ( $P = 0.001$ ), and subjectively patient-rated scar quality ( $P = 0.003$ ). Other factors, including age, length of stay, and pain duration, for instance, were not significantly predictive. (See table, Supplemental Digital Content 1, which displays predictors of seroma formation, <http://links.lww.com/PRSGO/D857>.) Finally, no factor significantly predicted seroma formation. (See table, Supplemental Digital Content 2, which displays predictors of improvement in postsurgical BODY-Q score, <http://links.lww.com/PRSGO/D858>.)

Regarding length of stay, on average, patients were hospitalized for 4.89 days after surgery (SD 3.57). Factors associated with a decreased hospitalization included a higher BMI ( $P < 0.001$ ); no other predictors were correlated with hospitalization, including age, smoking history, or concurrent procedure. (See table, Supplemental Digital Content 3, which displays predictors of decreased length of stay, <http://links.lww.com/PRSGO/D859>.)

## DISCUSSION

This study's findings confirmed the authors' hypothesis that this patient population experiences very significant improvements in body image and satisfaction following abdominoplasty. Importantly, the large effect size found indicates the high surgical benefit on the procedure on QoL. In all, the data indicate that BMI is not associated with decreased satisfaction even if correlated with somewhat increased surgical complications. This suggests the importance of holistic patient workup in body-contouring procedures. In addition, concomitant lipoaspiration and abdominoplasty led to higher postoperative BODY-Q scores, highlighting the positive role of targeted fat removal in this procedure.

In the past years, there has been an increase in the popularity of body-contouring aesthetic procedures, considering the worldwide increase in obesity rates and resulting instances of massive weight loss.<sup>12</sup> Although anecdotally this has also been true in lower resource settings, there is no formalized body of literature assessing the goals of care as well as the satisfaction rates of these populations. To the authors' knowledge, this analysis presented the most comprehensive application of the BODY-Q PROM in a low-income nation and the first of its kind in Kenya. The analysis demonstrated a large improvement in postoperative BODY-Q scores with effect size and minimal important difference of greater significance when compared with well-studied high-resource cohorts.<sup>13</sup>

Aligned with previous existing literature, the current study demonstrated an overall improvement in QoL

following abdominal plastic surgery. Compared with patients undergoing bariatric surgery alone, abdominoplasty in the setting of surgically induced weight loss has been found to positively correlate with patient's self-confidence, psyche, functional ability, and physical health.<sup>14</sup> Importantly, factors impacting the extent of postoperative QoL change have been previously identified, including patient demographics, such as age, comorbidities, and surgical history.<sup>15</sup> These may be particularly important in the patient selection process and in assessing the best candidates for surgery while managing both providers' and patients' expectations.

Of factors impacting postoperative QoL changes, BMI has been the most heavily debated. Preliminary studies have evaluated the negative impact of higher BMI on surgical adverse events and complications. For instance, Ghnnam et al<sup>16</sup> found that higher BMI was significantly associated with increases in operative time, length of hospital stays, drainage duration, drainage amount, and postoperative complications occurring in as many as 80% of obese (BMI  $\geq 30$  kg/m<sup>2</sup>) patients. More importantly, it could worsen abdominoplasty outcomes, including increased rates of postsurgical aesthetic dissatisfaction and revisions.<sup>16,17</sup> Further, Rios-Diaz et al<sup>13</sup> saw worse postoperative BODY-Q scores in obese patients when compared with individuals with BMI less than or equal to 30 kg/m<sup>2</sup>.

Although the validity of these studies must be considered and appreciated, emerging literature has questioned the role of BMI as the sole index for patient selection criteria, inviting providers to assess patient candidacy from a holistic rather than binary fashion.<sup>18</sup> Contrasting results found by Fisher, in Hammond et al,<sup>19</sup> patients with BMI levels more than 32 kg/m<sup>2</sup> were found to have statistically significantly higher satisfaction rates despite increased complication profiles compared with their lower BMI counterparts. This aligns with the results of the present study in which higher BMIs were predictive of improved postsurgical BODY-Q scores. This potentially emulates a trend seen in postbariatric patients in whom presurgical QoL scores are lower in higher BMI patients, leading to higher absolute pre- and postsurgical score changes.<sup>20</sup> Given the association of higher BMI with higher postsurgical satisfaction scores, providers may consider operating patients with higher BMIs, easing their patient selection criteria. Similarly, higher BMI was not only associated with higher postsurgical BODY-Q scores, but also with a shorter length of hospitalization in this specific cohort. Although this contradicts most plastic surgery literature, when controlling for other comorbidities, studies emerging from other surgical fields suggest that other health predictors may contribute greater to length of stay.<sup>16,21,22</sup> Thus, given the aggregate results of this study regarding BMI, as it seems to be most beneficial to those with higher values, BMI should not necessarily be used as a strict, sole exclusionary criterion for surgery. In contrast, BMI may be utilized as one of many factors involved in preoperative planning, and most importantly, patient-provider decision-making should take precedence over relying on a single determining agent.

Similarly, the role of concomitant procedures in the same anesthetic window as abdominoplasty ought to be evaluated. In a study assessing trends of abdominoplasty in the

United States, concurrent liposuction has increased in the past 16 years with 63% of cases undergoing simultaneous procedures.<sup>12</sup> Although the addition of liposuction to plastic surgery procedures could pose potentially increased rates of seroma or hematoma formation, the same study found similar adverse event rates across years studied, suggesting that this addition could potentially come without jeopardy to patient outcomes.<sup>12</sup> In the present study, the data demonstrate similar rates in the cohort studied—the first study from a sub-Saharan African nation to analyze these surgical characteristics. Moreover, similar to the primary literature emerging in high-income nations, the use of abdominal liposuction in our patient cohort was not found to significantly affect the rate of seroma formation.<sup>23</sup> Although previous literature has traditionally demonstrated an increase in seroma development in the setting of large-volume liposuctions, data emerging from lipoabdominoplasty and other body-contouring procedures have been dichotomous. Although some large prospective studies did suggest a significant association between liposuction addition and seroma formation in the setting of abdominoplasty, other studies failed to find a significant correlation.<sup>24,25</sup> In actuality, Rodby et al,<sup>26</sup> for example, concluded that the addition of liposuction decreased seroma incidence. The use of this technique is further favored by the results in the present study that demonstrate a significant improvement in BODY-Q score in those who underwent simultaneous liposuction.

Furthermore, the association between complication profile and postoperative QoL indexes has also been heavily debated in the literature. Although traditionally associated with worsened QoL scores following aesthetic plastic surgery interventions, this study's data align with previously published large patient cohorts in which such correlations were not emulated.<sup>19,27,28</sup> Although different postulations could be made to explain such a phenomenon, one could argue that body-contouring interventions are largely aesthetic, and they do serve a restorative purpose. Abdominoplasty also reduces excessive pannus and corrects diastasis, which promotes improved physical functionality, including improved ambulation.<sup>29–31</sup> As such, differently from purely aesthetic interventions, the reconstructive component of abdominoplasty may warrant high postsurgical content despite an adverse event profile as high as 52%.<sup>32</sup> Finally, although efforts to reduce such high complication rates have been reported in the literature, including the usage of progressive tension sutures and triamcinolone, none of these were associated with a reduced seroma rate formation in this cohort.<sup>24,33,34</sup> Thus, although future studies in this specific population are warranted, the authors cannot comment in favor of their use in already low-resource, material-deprived settings.

### Strengths, Limitations, and Future Directions

The present study is subject to certain limitations inherent to its retrospective nature, which limits potential collected data to what was available and reported in the primary patient charts and operative notes, relying on the accuracy of these. Furthermore, although, to the authors' knowledge, this is the first instance in which the BODY-Q was applied to a sub-Saharan African population



undergoing abdominoplasty, the results may not be generalizable to cohorts in other regions of the country or the subcontinent because this study was conducted in a large urban academic center by 2 senior surgeons. Future studies with a larger patient cohort are warranted, including prospective multicenter, transnational studies. Also, further factors that may benefit this unique patient population as well as further comorbidities that may preclude optimal surgical outcomes should be assessed. This is especially true given the limitations of BMI; thus, other metrics of body composition, such as bioimpedance, could be assessed for correlations with adverse event rates.

Finally, patient-reported outcomes allow for an objective measurement of individuals' goals of care while acknowledging their values, desires, and subjective perception of symptoms.<sup>10</sup> The application of the BODY-Q to each encounter may be unfeasible considering the questionnaire length. As such, in their innate form or when translated, PROMs may be utilized to study populations and align goals of care according to distinct aesthetic preferences and foremost aspects of care. In doing so, patients may engage in an active conversation with providers, using the BODY-Q or similar objective criteria to highlight features of care that matter the most to them. Thus, despite the limitations addressed herein, the study presents the first instance of the application of the BODY-Q in an understudied cohort, demonstrating important factors that may be leveraged to improve patient QoL.

## CONCLUSIONS

To the authors' knowledge, this is the first time the BODY-Q PROM was applied to a low-resource setting. The patients evaluated here seem to be highly satisfied with abdominoplasty procedures with significant QoL improvements. Among the factors evaluated, concurrent liposuction with abdominoplasty, higher preoperative BMI, and postoperative scar quality positively impacted BODY-Q scores. Although patient selection criteria and intraoperative techniques remain subjected to patient-provider decision-making, the results here can be utilized to inspire surgical practices in low- and middle-income nations.

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## DISCLOSURE

*The authors have no financial interest to declare in relation to the content of this article.*

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