

## Voice Quality After Gastric Sleeve Surgery: Self-Assessment

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### ABSTRACT

Obesity is a significant global health concern that can affect individuals across all ages and economic backgrounds. Obesity has been shown to have a detrimental impact on various health issues and has been linked to adverse effects on voice quality, as it can lead to fat accumulation around the vocal tract. Therefore, gastric sleeve surgery rose as a highly effective solution for such epidemic, obesity, as it can alleviate some major health issues and also improve voice quality. However, previous studies show contradicting results regarding the impact of weight loss surgeries on voice quality, ranging from a positive impact to little or no effect on voice. Due to this inconsistency, this study primarily aimed to investigate the voice quality in a group of obese individuals who underwent gastric sleeve surgery. The study used a self-assessment online survey to collect quantitative data. The participants were asked to evaluate their voice quality before and after gastric sleeve surgery and their satisfaction with their voice following the surgery. The results showed that the 60 participants were "Unsure" about the types of vocal issues they experienced before and after the surgery. However, they were highly satisfied with their voice quality following the surgery. The results of this study provide significant implications for healthcare professionals into incorporating a comprehensive voice assessment before and after weight loss surgeries. It is recommended for future studies to explore the long-term impact of gastric sleeve surgery on voice quality.

**Keywords:** Voice quality, Gastric sleeve surgery, Obesity, Weight loss

### INTRODUCTION

Obesity is a major global health concern that affect people of all ages and socioeconomic backgrounds (Haidar & Cosman, 2011). It is defined as a pathological excess of body fat induced by an imbalance between energy intake and energy output (Khanna et al., 2021). Thus, it is typically the result of a combination of human behavior, environmental factors, and genetic susceptibility factors (Omer, 2020). Obesity is usually characterized by a body mass index (BMI) over 30 and BMI over 40 for morbid obesity (Colquitt et al., 2009). However, obesity is prevalent worldwide; in the United States, for instance, obesity affects one out of every three adults and one out of every six children (Tiwari & Balasundaram, 2021), and in the United Kingdom, one-quarter of the adult population are obese (Holt & Hughes, 2021). Due to obesity, individuals who are obese face an increased risk of developing various diseases, such as diabetes, dyslipidemia, hypertension, and chronic kidney disease (Khanna et al., 2021). Therefore, various surgical procedures have been developed to treat the global epidemic of obesity, one of which is gastric sleeve surgery.

Gastric sleeve surgery is a common procedure that is performed to help those who suffer from severe obesity in achieving considerable weight loss (Chakhachiro et al., 2022). This surgery was initially introduced in 1999, and it is the most commonly performed surgery in the United States because of its lower risks of health issues (Gandhi et al., 2021). The people who have undergone this surgery would feel full faster since half of the stomach is removed (Choi, 2016), and this leads to faster gastric emptying (Wolfe et al., 2016). Therefore, gastric sleeve surgery is one of the procedures that has not only proven to produce faster weight loss than other conventional lifestyle changes

(Alghmdid et al., 2024), but also helps in mitigating some major health conditions, such as hypertension and hyperglycemia (Németh et al., 2023; Sun et al., 2019). Moreover, the surgery has been shown to enhance mental health, such as depression, stress, and anxiety (Hosseini et al., 2023)

Although gastric sleeve surgery has some health benefits, various studies have also shown that the procedure can lead to multiple complications. For example, after the surgery, a person may have deficiencies in some micronutrients, like vitamins D and B12 (Chiu et al., 2011) and also some deficiencies in minerals, like copper and zinc (Shankar et al., 2010). Moreover, gastric sleeve surgery can cause some short-term complications, such as gastric leak, hemorrhaging and bleeding (Sarkhosh et al., 2013), and also it may cause some long-term complications, such as gastroesophageal reflux disease (Pilone et al., 2019), and in rare cases, gastrointestinal obstruction can occur (Sillén et al., 2021). Additionally, the surgery may cause mental issues, like depression and anxiety (Sait et al., 2019), as well as other complications such as dental caries (Salgado-Peralvo et al., 2018), hair loss (Katsogridaki et al., 2018), and skin problems (Halawi et al., 2013).

On the other hand, obesity has demonstrated to have a negative impact on voice quality, which might vary depending on weight (Celebi et al., 2013). Obesity can cause fat accumulation and constriction of the vocal tract, which can adversely affect voice quality (Talugula et al., 2023). Thus, the impact of obesity on voice quality can have a detrimental effect on obese individuals, as the poor voice quality adversely impacts the quality of life (Murry & Rosen, 2000). Therefore, weight loss after undergoing a procedure like gastric sleeve surgery has the potential to improve the quality of voice in obese people, as shown in different studies. For example, a longitudinal study by Abd El Wahab et al. (2024) showed that the results for 50 obese individuals who underwent weight loss surgery indicated an improvement in their voice quality six months after the surgery. Similarly, in a study by Bosso et al. (2023) involving 37 obese participants who underwent weight loss surgery found that these individuals showed an improvement in voice quality. Specifically, their voices became less hoarse, had a higher pitch, along with an increase in maximum phonation time.

On the other hand, there are studies showing that there is no significant positive change on voice quality after weight loss surgery. For instance, a study by Solomon et al., (2011) found no substantial improvement in voice performance following weight loss surgery. Thus, airflow, acoustic characteristics, and maximal phonation time have not improved over time following surgery. In a similar vein, (Hamdan et al., 2014) found that weight loss surgery had no significant effect on voice. Their findings revealed no significant differences in acoustic parameters or laryngeal findings before and after surgery. Another study by (Fonseca et al., 2019) showed that there was no substantial improvement in maximal phonation time following weight loss surgery. However, as previous studies have shown that there were conflicting results in regards to the positive impact of weight loss surgery on voice quality. Some studies have shown some positive impact of weight loss surgery on voice quality, while others have shown no to little impact on voice. This inconsistency highlights a gap in our understanding of weight loss surgery and its impact on voice quality, and so this emphasizes the needs for further investigation. Therefore, the purpose of the study is to investigate the voice quality in a group of obese individuals who underwent gastric sleeve surgery. The reason for including only individuals who underwent gastric sleeve surgery was to gain a clear understanding of the post-surgery impacts on voice, as other types of weight loss surgeries may have different effects on voice. Therefore, focusing solely on individuals who underwent gastric sleeve surgery would help provide more accurate results for the study. Thus, the researcher primarily aims to investigate whether gastric sleeve surgery leads to improvements, deteriorations, or no changes in voice quality. Therefore, the researcher attempts to identify the types of vocal issues individuals experience before undergoing gastric sleeve surgery and to determine whether these vocal issues persist after the surgery. In addition, the researcher seeks to assess the participants' satisfaction with their voice quality after gastric sleeve surgery.

Addressing the objectives of the study may first cast more lights on the impact of gastric sleeve surgery on voice quality as voice has a critical role in both the quality of daily communication and quality of life. Furthermore, such research may provide valuable insights to the weight loss medicine field, speech therapists, and health care providers regarding the potential vocal changes that may occur after an individual loses weight following surgery. This could lead to improved recovery strategies and vocal practice techniques that promote long-term vocal health. The following research questions guide this investigation:

### Research Questions

- Q1- What is the most frequently reported vocal issue by participants before gastric sleeve surgery?
- Q2- Do the vocal issues experienced by participants persist after gastric sleeve surgery?
- Q3- How satisfied are participants with their voice quality after gastric sleeve surgery?

## METHOD

### Data Collection

Data for this study was collected using Google Forms survey to investigate the impact of gastric sleeve surgery on voice quality. The survey comprised a series of multiple-choice questions, including demographic questions, and health characteristics questions (e.g., When did you undergo gastric sleeve surgery? What was your weight before and after the surgery? Have you had any vocal surgery in the past?). Then, the survey had a section dedicated to questions about voice quality before and after the surgery, and it concluded with a question related to the participants satisfaction with their current voice quality after the surgery. To ensure accessibility, the survey was distributed through various social media platforms, such as Facebook, X, and WhatsApp. Clear inclusion criteria were outlined in the invitation letter to ensure that only individuals who underwent gastric sleeve surgery and experienced vocal issues either before or after the procedure were eligible to participate.

The informed consent form was obtained from all individuals before their participation in the study. The researcher ensured that confidentiality anonymity was maintained throughout the study, as the survey did not include any identifiable personal information. However, the invitation letter clearly outlined the goal of the study, and the participants completed the survey in Arabic to ensure they understood each question, which took them less than 5 minutes to complete. The survey was available online for about 3 months and 60 participants completed the survey. The researcher exported the data obtained from Google Forms for evaluation, ensuring it was suitable for further quantitative analysis.

#### *Demographic Characteristics of the Participants*

The demographic characteristics of the participants (N = 60) are summarized in Table 1. The majority of participants were male, comprising 63.3% (n = 38) of the sample, while females accounted for 36.7% (n = 22). The age distribution shows that the largest proportion of participants fell in the 25–34 age group, representing 36.7% (n = 22). This was followed by the 35–44 age group at 31.7% (n = 19), and the 45–54 age group at 18.3% (n = 11). Participants aged 18–24 accounted for 10.0% (n = 6), while those aged 55–64 were the least represented at 3.3% (n = 2).

The majority of participants reported attaining a Bachelor's degree, representing 58.3% (n = 35) of the sample. High school graduates accounted for 18.3% (n = 11), followed by those with a Master's degree at 13.3% (n = 8). A small proportion of participants had less than a high school education (5.0%, n = 3) or a Doctorate degree (5.0%, n = 3). This demographic profile reflects a diverse sample in terms of gender, age, and educational attainment, with a predominance of males, young to middle-aged adults, and individuals with higher education.

**Table 1** Demographic characteristics of the participants

		N (60)	Percentage
Gender	Female	22	36.7 %
	Male	38	63.3 %
Age Group	18-24	6	10.0 %
	25-34	22	36.7 %
	35-44	19	31.7 %
	45-54	11	18.3 %
	55-64	2	3.3 %
Educational Attainment	Less than high school	3	5.0 %
	High school	11	18.3 %
	Bachelor's degree	35	58.3 %
	Master's Degree	8	13.3 %
	Doctorate	3	5.0 %

#### *Health Characteristics of the Participants*

The health characteristics of the participants (N = 60) are outlined in Table 2. Participants were distributed relatively evenly across different time frames since undergoing gastric sleeve surgery. Equal proportions of participants (16.7%, n = 10) had their surgery either less than one year ago or more than four years ago. Smaller

groups underwent surgery 1–2 years ago (11.7%, n = 7), 2–3 years ago (8.3%, n = 5), or 3–4 years ago (11.7%, n = 7).

The majority of participants reported a pre-surgery weight in the ranges of 101–120 kg (31.7%, n = 19) and 121–140 kg (30.0%, n = 18). A smaller proportion had weights of 80–100 kg (18.3%, n = 11) or more than 140 kg (18.3%, n = 11). Only one participant (1.7%) reported a pre-surgery weight of less than 80 kg.

Post-surgery, a significant shift in weight distribution is observed. Most participants reported weights in the categories of less than 80 kg (43.3%, n = 26) or 80–100 kg (43.3%, n = 26). A smaller proportion remained in the 101–120 kg range (10.0%, n = 6), and very few were in the 121–140 kg category (3.3%, n = 2). None reported a weight of more than 140 kg post-surgery.

The vast majority of participants (91.7%, n = 55) reported no history of vocal surgery or other medical interventions related to their voice either before or after gastric sleeve surgery. Only a small subset (8.3%, n = 5) indicated such interventions.

The data reflects a significant reduction in weight among participants following gastric sleeve surgery, with a majority reaching lower weight categories. Additionally, most participants underwent the surgery within the past four years and reported no history of vocal surgery or related medical interventions.

**Table 2** Health Characteristics of the Participants

	Category	N (60)	Percentage
Time Since Gastric Sleeve Surgery	Less than 1 year ago	10	16.7%
	1-2 years ago	7	11.7%
	2-3 years ago	5	8.3%
	3-4 years ago	7	11.7%
	More than 4 years ago	10	16.7%
Pre-Surgery Weight	Less than 80 kg	1	1.7%
	80-100 kg	11	18.3%
	101-120 kg	19	31.7%
	121-140 kg	18	30.0%
	More than 140 kg	11	18.3%
Post-Surgery Weight	Less than 80 kg	26	43.3%
	80-100 kg	26	43.3%
	101-120 kg	6	10.0%
	121-140 kg	2	3.3%
	More than 140 kg	0	0.0%
Vocal Surgery or Related Medical Interventions	No	55	91.7 %
	Yes	5	8.3 %

## RESULTS

The results presented in this section derived from the survey conducted to investigate the impact of gastric sleeve surgery on voice quality. The researcher investigates three key questions: (1) What is the most frequently reported vocal issue by participants before gastric sleeve surgery? (2) Do the vocal issues experienced by participants persist after gastric sleeve surgery? and (3) How satisfied are participants with their voice quality after gastric sleeve surgery? The findings of these questions would be presented separately, allowing for a thorough analysis of each question.

### Research Question 1: What is the most frequently reported vocal issue by participants before gastric sleeve surgery?

Table 3 summarizes the frequency and percentage of vocal issues reported by participants before undergoing gastric sleeve surgery. The most common response was "Unsure," reported by 46 participants, accounting for 76.7% of the sample. This suggests that the majority of participants were either unable to identify or did not perceive specific vocal issues before surgery.

Among those who identified specific vocal concerns, "Breathiness" was the most frequently reported, with 7 participants (11.7%). Other vocal issues, such as "Hoarseness," "Breathiness combined with other issues (e.g., Unsure, Vocal fatigue, or Pitch instability)," and singular complaints like "Weak" and "Pitch instability," were rare, each reported by only 1 or 2 participants, representing 1.7%–3.3% of the total sample.

The high proportion of "Unsure" responses indicates limited awareness or recognition of vocal issues among participants before surgery. This highlights the need for further education or assessment tools to help individuals identify subtle vocal changes. The relatively low frequency of specific vocal complaints suggests that, for most participants, vocal issues were not a prominent concern preoperatively.

**Table 3: Frequency of Vocal Issues Reported Before Surgery**

Response	Frequency	Percentage
Unsure	46	76.7%
Breathiness	7	11.7%
Hoarseness	2	3.3%
Breathiness, Unsure	1	1.7%
Breathiness, Vocal fatigue	1	1.7%
Breathiness, Pitch instability	1	1.7%
Weak	1	1.7%
Pitch instability	1	1.7%

**Research Question 2: Do the vocal issues experienced by participants persist after gastric sleeve surgery?**

The persistence of vocal issues reported by participants before and after gastric sleeve surgery reveals important trends (Table 4). The issue with the highest persistence was "Unsure," with 40 out of 46 participants continuing to report uncertainty about their vocal issues after surgery, yielding a persistence rate of 86.96%. This finding highlights a consistent lack of clarity or confidence among participants in identifying vocal changes, both pre- and post-operatively. It may also suggest that subtle or subjective vocal changes are challenging for individuals to self-assess, underscoring the need for standardized evaluation tools.

In contrast, most specific vocal issues, such as "Breathiness," "Hoarseness," "Pitch instability," and combinations like "Breathiness, Unsure," did not persist after surgery. These issues had persistence counts of zero, meaning that participants who reported these problems before surgery did not continue to report them afterward. The persistence rates for these issues were 0.00%, suggesting that they may have resolved or diminished following the surgery. This pattern is encouraging and may indicate a positive impact of the procedure or related postoperative changes on specific vocal concerns.

The issue "Breathiness, Vocal fatigue" was the only vocal problem other than "Unsure" to exhibit persistence, with 1 out of 1 participant continuing to report it post-surgery, resulting in a persistence rate of 100.00%. However, the small sample size for this issue limits the generalizability of the finding and warrants cautious interpretation. It does suggest, however, that some vocal problems might persist in isolated cases, highlighting the need for individualized follow-up.

**Table 4** The persistence of vocal issues reported by participants before and after gastric sleeve surgery

Issue	Issue	Persisted	Total Before	Percentage Persisted
Unsure	Unsure	40	46	86.96
Breathiness, Pitch instability	Breathiness, Pitch instability	0	1	0
Breathiness	Breathiness	0	7	0
Breathiness, Vocal fatigue	Breathiness, Vocal fatigue	1	1	100
Hoarseness	Hoarseness	0	2	0
Breathiness, Unsure	Breathiness, Unsure	0	1	0
Weak	Weak	0	1	0
Pitch instability	Pitch instability	0	1	0

Overall, the data indicate that most specific vocal issues do not persist after gastric sleeve surgery, but the high persistence of uncertainty regarding vocal issues ("Unsure") suggests a need for greater support in vocal health assessment. Addressing this uncertainty through improved evaluation tools or professional guidance could enhance the understanding and management of vocal changes in this population.

**Research Question 3: How satisfied are participants with their voice quality after gastric sleeve surgery?**

Table 5 provides a detailed overview of participants' satisfaction with their voice quality after undergoing gastric sleeve surgery. The table shows both the frequency and the percentage of participants in each of the satisfaction categories. A very small proportion of participants, 1.7%, reported being dissatisfied with their voice quality after the surgery. This suggests that only a few individuals were unhappy with their post-surgery voice, which indicates a low level of dissatisfaction within the sample.

In contrast, 8.3% of participants expressed a neutral stance regarding their voice quality. These individuals neither felt that their voice quality had improved nor worsened significantly, reflecting a moderate response to the surgery's impact on their voice.

A larger group, 25.0%, of participants reported being satisfied with their voice quality following the surgery. This indicates that a quarter of the participants had positive feelings about their post-surgery voice, suggesting that the surgery led to a favorable outcome for many individuals. The most notable finding from the table is the 65.0% of participants who reported being very satisfied with their voice quality after the gastric sleeve surgery. This indicates that the majority of participants were extremely pleased with the outcome, suggesting that the surgery had a largely positive effect on their voice quality.

**Table 5** Satisfaction with Voice Quality After Gastric Sleeve Surgery

Satisfaction	Frequency	Percentage
Dissatisfied	1	1.7 %
Neutral	5	8.3 %
Satisfied	15	25.0 %
Very Satisfied	39	65.0 %

Overall, the results show a predominantly positive response to the impact of gastric sleeve surgery on voice quality. Most participants (65%) were very satisfied, while only a small percentage (1.7%) were dissatisfied. These findings suggest that the gastric sleeve surgery was generally associated with significant improvements in or satisfaction with participants' voice quality.

A Chi-square goodness-of-fit test was conducted to determine whether the distribution of satisfaction levels with voice quality after gastric sleeve surgery differed significantly from an expected equal distribution (Table 6). The results of the Chi-square test were statistically significant,  $\chi^2(3) = 58.13, p < .001$ , indicating that the distribution of satisfaction levels was significantly different from an equal distribution.

**Table 6** Chi-square goodness-of-fit test to determine whether the distribution of satisfaction levels with voice quality after gastric sleeve surgery differed significantly from an expected equal distribution

$\chi^2$	Degrees of Freedom	p
58.13	3	<.001

Given the statistical significance of the Chi-square test, it can be concluded that the distribution of satisfaction with voice quality after surgery is not uniform, with a clear skew toward higher satisfaction levels.

**DISCUSSION**

The main purpose of this study was to investigate the impact of gastric sleeve surgery on voice quality. Thus, the researcher sought to identify the types of vocal issues participants experience before undergoing gastric sleeve surgery and whether they persist after the procedure. Moreover, the researcher assessed participants' satisfaction with their voice quality following the surgery. Key findings for the first research question which aimed to identify the types of vocal issues before surgery revealed that the option "Unsure" was the most frequently selected choice in the survey regarding vocal issues, accounting for 76.7% of the sample, followed by "Breathiness," which accounted for 11.7%, while the other vocal issues received less than 3.3%. The findings of the second question, which aimed to identify the types of vocal issues that persist after gastric sleeve surgery, showed that the option "Unsure" was the most frequently selected response in the survey. Our study's final outcome, derived from question 3, showed highly positive response, with 65% of participants were very satisfied with their voice quality after gastric sleeve surgery.

One of the notable findings of this study revealed that most of the participants were unaware of the specific vocal issues they experienced before or after gastric sleeve surgery, although 22.5% rated their voice quality before

the surgery between mediocre to very bad. This result is broadly consistent with the findings of Bosso et al. (2023), who reported that the participants did not notice the improvement of their voice quality after the surgery. Thus, one possible explanation for the high "Unsure" responses in this study could be due to the complexity of voice quality, which is influenced by various factors, such as emotional states or illnesses (Fitri et al., 2024), and the participants might have been unsure about the specific factors that impacted their voice quality, which could affect their awareness of the specific vocal issues they experienced before or after the surgery.

Another possible explanation for the high response rate for the option "Unsure" before and after the surgery is that the participants may be unaware of the types of vocal issues they experienced since the changes in their weight and other related health factors might attract more attention. Thus, unawareness of some of the health issues like certain vitamins deficiencies (Palep et al., 2017) among individuals who underwent weight loss surgery is common. However, this phenomenon, unawareness of the symptoms, is not unique, as patients suffering from different ailments can be oblivious of their own symptoms. For example, patients with obstructive sleep apnea, which is characterized by breathing difficulty while sleeping, are usually unaware of their symptoms (Kerna et al., 2021), also some of the patients with schizophrenia are unaware of some of their symptoms (Flashman et al., 2000). Therefore, it is probable that the participants in this study were unaware of the types of vocal issues they had, as obesity and other major health concerns dominate their attention, whereas vocal issues are unimportant to them.

Another likely interpretation for the high response rate for the option "Unsure" before and after the surgery is that the participants had a difficulty in self-assessing their vocal issues. It is reported by Yang et al. (2017) that individuals who were candidates for weight loss surgery usually have difficulties self-assessing their condition. Therefore, the participants in this study may find it difficult to assess the types of vocal issues they have been experienced before and after gastric sleeve surgery, thus they opted for "Unsure" as a neutral option. On the other hand, the results of the study showed that 65% of the participants were highly satisfied with their voice quality after gastric sleeve surgery. This high rate could be due to their satisfaction of the general outcomes of the surgery and how they probably started to notice the positive outcomes of losing weight. As reported in multiple studies that patients are usually satisfied with the outcomes of the weight loss surgery (Andersson, 2015; Faccio et al., 2016; Kabu Hergül & Özbayır, 2021); therefore, the satisfaction with their voice quality may be because of the fact that their overall health has begun to improve, implying a positive correlation between voice quality and broader health outcomes.

Although this study offers valuable insights into the impact of gastric sleeve surgery on voice quality, certain limitations need to be addressed. First, the number of participants in this study is relatively small ( $N = 60$ ). This limited sample size may impact the generalizability of the findings and may also restrict the statistical power to yield significant outcomes. Another limitation of this study is that the health characteristics of the participants (e.g., weight before and after surgery, time of the surgery, etc.) were self-reported, which may lead to potential biases or inaccurate recall of the information. Therefore, this self-report approach may have impacted the accuracy of the study findings. An additional limitation worth mentioning is that the data collection method involved was a survey questionnaire; thus, participants' responses are subject to bias and they may underreport or overreport, for example, their actual weight, the vocal issues they had, or their satisfaction with the surgery outcomes.

To expand the findings of this study, future studies should consider several areas for further development. First, it is recommended that future studies include a larger sample of participants to achieve more reliable findings. Also, future studies should include recorded samples of the participants speech and compare them with those of healthy subjects, so that they can objectively measure the changes in voice quality after gastric sleeve surgery. Furthermore, it is advisable for future studies to have actual medical characteristics of the participants, which can be sourced from the participants' medical records at the hospital or clinics where they underwent gastric sleeve surgery. Additionally, imaging scans of the speech organs, such as larynx and vocal cords, can help investigate the anatomical changes in these areas before and after the surgery and their impact on voice quality.

## CONCLUSION

The study primarily aimed to investigate the impact of gastric sleeve surgery on voice quality. Therefore, the researcher attempted to identify the types of vocal issues participants experienced before and after they underwent gastric sleeve surgery. Also, the researcher sought to assess the participants' satisfaction with their voice quality following the surgery. The main findings showed that the participants selected "Unsure" when asked about the types of vocal issues they experienced before and after the surgery. Also, the findings showed that the participants were highly satisfied with their voice quality following gastric sleeve surgery. These findings have significant implications for health professionals in incorporating voice quality assessment before and after gastric sleeve surgery, as voice has a crucial role in enhancing both the quality of daily communication and quality of life. Another implication of this study stems from the uncertainty that the participants showed in their responses which might

indicate an important need for collaboration between healthcare providers to educate such individuals to monitor their voice quality before and after surgery.

Another noteworthy implication of this study is that the high level of satisfaction that participants have on their voice quality after the surgery, which may indicate the successfulness and positive outcomes of gastric sleeve surgery on both quality of life and voice quality. This is consistent with previous studies where individuals tend to report a high level of satisfaction following weight loss surgery (Alharbi et al., 2023). Thus, the high level of satisfaction with their voice quality can be used as an indicator for the trust and high quality associated with gastric sleeve surgery, as satisfaction can be used as a valid assessment for the quality of service provided for patients (Donabedian, 1981).

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### **Institutional Review Board Statement**

Not applicable.

### **Informed Consent Statement**

Informed consent was obtained from all participants involved in the study.

### **Data Availability Statement**

The data analyzed for this study can be made available upon formal request.

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### **Conflicts of Interest**

The author declares that there are no conflicts of interest related to this study.

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