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Quality of Life among Adults Undergoing Sleeve Gastrectomy and Lifestyle Modifications: Comparative Analytical Cross-Sectional Study

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ABSTRACT

OBJECTIVE: To assess the health-related Quality of life of adult patients undergoing sleeve gastrectomy with lifestyle modifications.

METHODOLOGY: A Comparative, Analytical, cross-sectional design was employed at Ziauddin and Civil Hospitals, Karachi, from June to November 2022. A total of 102 participants were recruited via consecutive sampling, with 51 in the sleeve gastrectomy group and 51 in the lifestyle modification group. Inclusion criteria included adults aged 18 years or older who had undergone sleeve gastrectomy or followed lifestyle modification for at least 3 months. Exclusion criteria were patients with terminal illnesses (e.g., cancer, HIV/AIDS) and those with diagnosed psychiatric disorders. Data were collected using the RAND SF-36 questionnaire. Statistical analysis was performed via SPSS version 26.

RESULTS: The results showed that among females, the mean score was 53.79, SD ±3.3 with sleeve gastrectomy, and a mean score of 37.46, SD ±7.7 with lifestyle modification (p-value<0.001). Furthermore, in males, the mean score was 53.67 SD±4.2 with sleeve gastrectomy and a mean score of 40.09 SD ±9.5 with lifestyle modification (p-value<0.001).

CONCLUSION: The findings of the study found that 37 (37.3%) of the participants had a very good quality of life, while 8% reported poor Quality of life with both of the procedures. While comparing the quality-of-life score with the procedure of sleeve gastrectomy and lifestyle modification, it was reported as significant with a p-value of less than 0.05.

KEYWORDS: Sleeve Gastrectomy, Life Modifications, Quality of Life, Surgery, Patients, Gastrectomy Procedure.

INTRODUCTION

The globally emerging epidemic of non-communicable diseases (NCDs) is creating major health challenges and is threatening to overwhelm the healthcare delivery system. Non-communicable diseases NCDs are becoming a crisis and are being recognized as a leading cause of mortality and morbidity worldwide[1]. Among the different causes of NCDs, obesity or overweight (increased body mass index) is considered a major cause and a leading health problem that increases the probability of getting NCDs and other health problems[2]. Multiple factors contribute to obesity, including dietary patterns, physical inactivity, genetic predisposition, social roles, and others, leading to a higher fat proportion in the human body than is required[3].

Obesity is accountable for 2.8 million deaths annually, throughout the world, and approximately 35.8 million (2.3%) of the world population is obese[4]. However, the risk of obesity is intensifying in all countries and among all age groups, genders, and income groups[5]. A study conducted in Chile reported that high BMI $\geq$ 25 kg/m² accounted for 31.6% NCDs death, with global estimates of 4.7 million NCDs and a projected annual rise[6]. Another comprehensive review reported that over 70% of have an association with obesity, which highlights the pervasive impact of excess weight on risk of chronic diseases[7]. It is disproportionately affecting middle-income countries (LMICs), posing a double burden on these countries for the diseases since the last decade[8]. Research conducted in Pakistan suggests there is a rising trend of obesity among the community population. The findings report the prevalence of obesity as 22.0% [9]. Moreover, the literature documents that obesity alters biological, physiological, psychological, behavioral, and social processes of an individual. The process may result in restriction or lack of ability to perform an activity with flexibility or within the range considered normal[10,11]. In addition, this negatively affects functional capability and social habits and is considered a main predictor of poor Quality of life[12].

Globally, various treatment methods and techniques have been adopted to reduce obesity or its consequences, such as increased BMI, including exercise, medications, low-fat and low-carbohydrate diets, reduced calorie intake, surgery, and lifestyle modifications[13,14]. Among these techniques, sleeve gastrectomy surgery has emerged as the most desired and effective technique to counter obesity and its associated symptoms. The surgery is mainly recommended for individuals with a BMI of 30-34.9 kg/m2 or for those who fail to adopt the above-mentioned treatment option[15]. On the other hand, scientific findings also suggest that individuals with obesity prefer lifestyle modification methods to reduce their increased BMI and related complications[16].

Despite the evidence that has highlighted the effect of obesity on NCDs, limited comparative studies exist within the Pakistani context evaluating health-related quality of life among patients undergoing lifestyle modification and sleeve gastrectomy. Furthermore, given the limited evidence from low- and middle-income countries, the current study aims to address this gap by comparing QoL outcomes among adults undergoing sleeve gastrectomy or lifestyle modification at a tertiary care hospital in Karachi.

The current study aims to compare the Quality of life (QOL) of adult patients undergoing sleeve gastrectomy versus lifestyle modification. To determine the possible determinants of the quality of life of adult patients having sleeve gastrectomy in comparison to lifestyle modification.

METHODOLOGY

A Comparative Analytical Cross-Sectional design was employed in the current study. The current study was conducted at Ziauddin University Hospital (ZUH), Karachi, a private and public tertiary care teaching hospital, and at the Civil Hospital Karachi. The duration of the study was from June to November 2022, after the approval of all ethical and research committees. The target population for the study was patients who had undergone sleeve gastrectomy or adopted any lifestyle modification to control their increasing weight. Only those participants were selected who had adopted any nutritional method for at least of month or had undergone sleeve gastrectomy. A consecutive sampling technique was used to recruit the study participants. The sample size was calculated using the Online Software OpenEpi based on a census of 2 months. The sample size was calculated with a confidence interval of 95% confidence interval and a 5% margin of error of 5%. The calculated sample size was 102, equally divided into two groups: 51 in the sleeve gastrectomy group and 51 in the lifestyle modification group. The following inclusion and exclusion criteria were used to include participants in the current study.

Patients aged 18 years and above, imposing no upper age limit, regardless of gender Underwent sleeve gastrectomy. Adopting any lifestyle modification was included.

Participants with any terminal illness, such as cancer, HIV (AIDS), or others. Participants suffering from any mental or psychiatric conditions were excluded.

The current study used a valid and reliable data collection tool. The first component of the questionnaire included demographics and questions about co-morbidities. The second component consists of the RAND-developed Short Form Health Survey (SF-36) tool. The tool is structured, organized, and coherent. It is a Likert scale that measures quality of life across eight domains of health.

This procedure began after obtaining permission to use the instrument and approval from all concerned committees and the study setting. The selected participants were approached, and the date and time for completing the tool were decided. Thereafter, the study's purpose and objectives were shared with potential participants. Eligible participants were identified and invited to participate in the current study voluntarily by signing the informed consent form. Afterwards, the data were collected using a study tool provided to the participants.

The data were analyzed by SPSS 26, and both descriptive and inferential analyses were performed. Initially, the data were checked for normality through the Shapiro–Wilk test. The normally distributed data were analyzed using a parametric test. In descriptive statistics, means ± standard deviations were calculated for continuous variables, and frequencies and proportions were reported for categorical variables. In the inferential analysis, the difference in the mean score for continuous QoL variables was assessed using a t-test for two independent samples, and the difference in proportions for categorical variables was assessed using a Chi-square test of independence. The analysis was performed at a 95% confidence interval (level of significance of 0.05), and a P-value of less than 0.05 was considered statistically significant.

Ethical Consideration

The study obtained approval from the university's Ethical Review Committee with Reference No. 4960222NDNUR and permission to use the tools from the developers. Permission to use the study setting was obtained from the hospitals, and a consultant was approached to recruit the study participants.

RESULTS

Table I: Socio-demographic characteristics of study participants

Demographic Variable n=102 (100%)	Frequency	Percent
Gender		
Male	38	37.25%
Female	64	62.75%
Study Setting		
Ziauddin Hospital	20	19.61%
Civil Hospital	82	80.39%
	Mean	
Age (years)	35.84±5.7	
Weight (per KG)	143.03±13.3	
Height (feet)	5.81±0.25	
Employment Setting		
Self-Employed	30	29.41%
Part Timer	14	13.73%
A homemaker	11	10.78%
Student	13	12.75%
Military	8	7.84%
Retired	1	0.98%
Other	25	24.51%
Informal Education		
Madrassa	12	11.76%
Urdu Reading only	9	8.82%
Certificate received for the diploma	2	1.96%
diploma without a certificate	38	37.26%
Degree	41	40.20%
Language		
Urdu	46	45.10%
Sindhi	16	15.69%
Balochi	7	6.86%
Pashto	11	10.78%
Punjabi	18	17.65%
Siraiki	4	3.92%
Family Status		
Nuclear	56	54.90%
Extended	41	40.20%
Single	5	4.90%
Marital Status		
Single	7	6.86%
Married	86	84.32%
Divorced/Separated	8	7.84%

Widowed	1	0.98%
Socioeconomic Status		
Lower	11	10.78%
Lower middle Class	13	12.75%
Middle Class	69	67.65%
Upper Class	9	8.82%

"Percentages were rounded to two decimal places, and minor adjustments were made to ensure totals equal 100%"

Comparisons of Quality-of-Life Score with respect to Sleeve gastrectomy & lifestyle modification

The quality-of-life scores of participants who underwent the procedure of sleeve gastrectomy and lifestyle modification were analyzed. A p-value of less than 0.05 was considered to be a significant value. According to the study results, the quality-of-life average score with sleeve gastrectomy was higher, with a mean score of 53.7 ± 4, than with lifestyle modification, 38.9 ± 8.8. A higher score shows a better quality of life. The result is shown in **Table II** (P-value <0.001).

Table II: Comparisons of Quality-of-Life Score with respect to Sleeve gastrectomy & Lifestyle modification

Method n=102	Quality Of Life	P-value
	Mean ± SD	
Sleeve gastrectomy (n=51)	53.7±4	<0.001
Lifestyle Modification (n=51)	38.9±8.8	

An Independent T-test has been applied. A P-value ≤ 0.05 is considered significant.

Table III: Comparisons of Quality of Life's Domains with respect to sleeve gastrectomy & lifestyle modification

Quality of Life	Sleeve Gastrectomy n=51		Lifestyle Modification n=51		P-Value
General Health					
Poor	0	0.00%	8	15.69%	<0.001
Fair	0	0.00%	14	27.45%	
Good	11	21.57%	24	47.06%	
Very Good	35	68.63%	3	5.88%	
Excellent	5	9.80%	2	3.92%	
Limitations of activities					
Yes, limited a lot	0	0.0%	4	7.84%	
Limited a little	51	100%	45	88.24%	0.041
No	0	0.0%	2	3.92%	
Physical health problem					
Yes	21	41.18%	8	15.69%	0.004
No	30	58.82%	43	84.31%	
Emotional Health Problem					

Yes	0	0.00%	12	23.53%	<0.001
No	51	100%	39	76.47%	
Social activities interference					
Most of the Time	2	3.92%	17	33.33%	<0.001
Some of the Time	31	60.79%	34	66.67%	
A little of the Time	17	33.33%	0	0.00%	
None of the Time	1	1.96%	0	0.00%	
Pain					
Severe	0	0.00%	21	41.18%	<0.001
Moderate	7	13.73%	17	33.33%	
Mild	43	84.31%	13	25.49%	
Very Mild	1	1.96%	0	0.00%	
Energy and emotional fall					
Most of the time	0	0.00%	3	5.88%	<0.001
A good bit of the time	1	1.96%	35	68.63%	
some of the time	39	76.47%	9	17.65%	
A little of the time	11	21.57%	3	5.88%	
None of the time	0	0.00%	1	1.96%	
Low Mental Health					
Mostly True	0	0.00%	1	1.96%	<0.001
Don't Know	15	29.41%	39	76.47%	
Mostly False	36	70.59%	10	19.61%	
False	0	0.00%	1	1.96%	

The chi-Square test has been applied. A P-value≤0.05 is considered significant.
"Percentages were rounded to two decimal places, and minor adjustments were made to ensure totals equal 100%"

Table IV: Comparison of Quality-of-Life score among Demographic Variables with respect to Sleeve gastrectomy and Lifestyle modification

Demographic Variables n=102	Status	SG=51 LSM=51	Mean ± std	P-value
Gender				
Female	Sleeve Gastrectomy	14	53.79 ±3.3	<0.001
	Lifestyle Modification	24	37.46 ±7.7	
Male	Sleeve Gastrectomy	37	53.67 ±4.2	<0.001
	Lifestyle Modification	27	40.09 ±9.5	
Hospital Setting				
Civil Hospital	Lifestyle Modification	20	37.92 ±6.8	<0.001
Ziauddin Hospital	Sleeve Gastrectomy	51	53.70 ±4.0	<0.001
	Lifestyle Modification	31	39.45 ±9.9	
Employment Setting				
Self-Employed	Sleeve Gastrectomy	12	53.69 ±2.3	<0.001
	Lifestyle Modification	19	37.68 ±8.7	
Part Timer	Sleeve Gastrectomy	9	54.08 ±3.9	<0.001
	Lifestyle Modification	4	39.82 ±6.7	
A homemaker	Sleeve gastrectomy	6	51.47 ±4.8	0.077
	Lifestyle Modification	5	39.12 ±14.4	
Student	Sleeve gastrectomy	8	54.20 ±3.7	0.081
	Lifestyle Modification	5	42.83 ±16.5	

Military	Sleeve gastrectomy	2	54.42 ±8.1	0.004
	Lifestyle Modification	6	36.28 ±3.9	
Retired	Lifestyle Modification	1	43.36 ±3.9	
Other	Sleeve gastrectomy	14	54.05 ±4.7	<0.001
	Lifestyle Modification	11	39.58 ±4.2	
Informal Education				
Madrassa	Sleeve gastrectomy	5	53.10 ±5.7	0.001
	Lifestyle Modification	7	38.81 ±4.6	
Urdu Reading only	Sleeve gastrectomy	9	53.59 ±4.5	
Certificate received for the diploma	Lifestyle Modification	2	31.86 ±0.0	
Diploma without a certificate	Sleeve gastrectomy	13	52.48 ±4.1	<0.001
	Lifestyle Modification	25	39.82 ±9.5	
Degree	Sleeve gastrectomy	24	54.54 ±3.3	<0.001
	Lifestyle Modification	17	38.26 ±9.4	
Language				
Urdu	Sleeve gastrectomy	29	54.01 ±3.6	<0.001
	Lifestyle Modification	17	40.24 ±10.8	
Sindhi	Sleeve gastrectomy	5	53.45 ±5.5	<0.001
	Lifestyle Modification	11	34.59 ±5.2	
Balochi	Sleeve gastrectomy	3	49.56 ±4.9	0.055
	Lifestyle Modification	4	38.50 ±6.3	
Pashto	Sleeve gastrectomy	5	54.51 ±5.6	0.001
	Lifestyle Modification	6	37.17 ±6.0	
Punjabi	Sleeve gastrectomy	7	54.24 ±2.7	0.006
	Lifestyle Modification	11	41.67 ±10.1	
Siraiki	Sleeve gastrectomy	2	52.21 ±2.5	<0.001
	Lifestyle Modification	2	40.71 ±3.8	
Family Status				
Nuclear	Sleeve gastrectomy	32	54.04 ±3.6	<0.001
	Lifestyle Modification	24	39.71 ±10.7	
Extended	Sleeve gastrectomy	17	53.31 ±4.8	<0.001
	Lifestyle Modification	24	37.79 ±7.1	
Single	Sleeve gastrectomy	2	51.77 ±1.9	0.007
	Lifestyle Modification	3	40.41 ±1.8	
Marital Status				
Single	Sleeve gastrectomy	3	56.64 ±1.5	0.364
	Lifestyle Modification	4	47.12 ±16.0	
Married	Sleeve gastrectomy	41	53.49 ±4.0	<0.001
	Lifestyle Modification	45	38.03 ±7.9	
Divorced/Separated	Sleeve gastrectomy	7	53.73 ±4.1	0.015
	Lifestyle Modification	1	38.94 ±3.3	
Widowed	Lifestyle Modification	1	42.48 ±3.5	
Socioeconomic Status				
Lower	Lifestyle Modification	11	37.81 ±5.3	
Lower middle Class	Sleeve gastrectomy	7	53.22 ±4.2	<0.001
	Lifestyle Modification	6	36.43 ±6.0	
Middle Class	Sleeve gastrectomy	39	53.85 ±4.0	<0.001
	Lifestyle Modification	30	40.59 ±10.0	
Upper Class	Sleeve gastrectomy	5	53.27 ±3.9	0.001
	Lifestyle Modification	4	32.30 ±6.6	

An Independent T-test has been applied.
A P-value≤0.05 is considered significant.

DISCUSSION

According to the study results, the participants were n=102, with a mean age of 35.84 years and an SD of ±5.7. These findings were similar to those of a study conducted by **Timkova V 2024** [17] in 2017, in which the mean age of the participants was 44.9 years, with an SD of ±12.7. The mean weight of the participants was 143.03 kg (SD of ±13.3), and the mean height of the participants was 5.81 feet (SD of ±0.25). These findings were also similar to the results of a study in which the mean weight of the participants was 133.3kg with a standard deviation of ±15.3 [18]. By gender, the subjects were categorized into two groups: 37.3% of the participants were female, and 62.7% were male. Similarly, these findings were similar to those of a study by **Castro AI et al.** [19] in 2018, in which 60% of participants were female and 40% were male. According to the employment status of the participants, 29.4% of the participants were self-employed, 13% were part-timers, 10.8% were homemakers, 12.7% were students, 7.8% were military, 1% retired, and 24.5% were from another profession. These findings were contradictory to the results of a study conducted by **Rafique I et al.** [4] in 2018, in which the majority (62.8%) were unpaid, followed by 21.3% non-government employees, 12.3% self-employed, and 3.7% government employees. In the current study, regarding educational status, the majority of participants (40.2%) held degrees, followed by 37.3% with a diploma or certificate, 11.8% who had attended madrasa, and 8.85% who could read Urdu only. These findings were similar to the findings of a study conducted by **Akkayaoğlu H 2020**[20] in 2018, in which the majority (44%) of the participants had university-level education, followed by 42% of participants with a high school level of education, and 14% had elementary level of education. According to participants' ethnicity, the majority (45.1%) were Urdu speakers, 15.7% were Sindhi, 17.6% were Pashto, and the remaining participants were from other ethnic backgrounds. These findings were similar to those of a study conducted in Malaysia, which included participants from different ethnic backgrounds[5]. Furthermore, the marital status of the participants showed that the majority (84.3%) of the participants were married, 7% were single, 8% were divorced, and only 1% were widowed. These findings were similar to those of a study in which the majority (80%) of participants were married and only 20% were unmarried[19]. Likewise, another study showed the same findings: 86.2% of married participants and 13.8% of unmarried participants[5]. According to the study findings, socioeconomic statuses of participants were divided into four categories: 10.8% (n=11) belonged to the lower Class, 12.7% (n=13) belonged to the lower middle Class, 67.6% (n=69) belonged to the middle Class, and the other 8.8% (n=9) belonged to the upper Class.

Analysis of Quality of Life, comparison of Quality-of-life score, and Quality of Life with respect to the procedure

The Quality of Life of the participants were analyzed through an SF-36 Scale. The results of the study showed that the majority (37.3%) of the participants had a very good quality of life, followed by 34.3% with a good quality of life, 6.9% with an excellent quality of life, and 13.7% with a fair quality of life. In comparison, 78% reported poor quality of life, indicating a large gap in the overall level of life satisfaction and well-being of the group investigated. Conversely, these findings were contradictory to those of a study in which 55% fell into the category of fair Quality of life and 20% into the category of poor quality of life, while none of the participants had scored in the category of very good or excellent quality of life [21]. Furthermore, another study's findings reported that 35% of participants had a good, while 46% were classified as having very good to excellent quality of life[22]. These studies show that quality of life measures is complicated, as individual experiences and treatment outcomes vary, reflecting the complexity of health and well-being. In the current study, regarding emotional health problems, 88.2% reported none, while 11.8% reported some.

These findings were also similar to those of a study in which the majority of participants reported emotional restriction after the procedure, with a mean score of 85.37 ± 31.27, compared to the pre-mean score of 36.75 ± 0.78 [17]. This similarity indicates that the emotional well-being of individuals across studies follows a consistent pattern.

Comparison of Quality of Life with respect to the Sleeve gastrectomy & Lifestyle modification:

According to the comparison of Quality-of-Life scores across the procedure and Demographic Variables, a statistically significant difference was observed in QOL score between both genders. In females, the mean QOL score was 53.79, SD ±3.3 in the sleeve gastrectomy group compared to a mean score of 37.46, SD ±7.7 with Lifestyle modification (p-value<0.001). Similarly, in males, the mean score was 53.67 ± 4.2 with sleeve gastrectomy and 40.09 ± 9.5 with lifestyle modification (p-value < 0.001). These findings were consistent to the results of a previous study in which participants reported a low mean score of 4.5±1.4 (2.6-7.7) on a scale of 10.5±6.2 (1.3-20.5) [22]. At the same time, the mean quality of life score without co-morbidities was non-significant, with a p-value of less than 0.05 [22]. The mean differences in the physical and mental components among the points of both procedures were 40.6 points in the surgical procedure and 31 points in the pre-operative groups[23]. Likewise, another study concluded that the score of distal gastrectomy was +6.5 (95% CI: 0.8-12), p = 0.026, and neoadjuvant treatment was +8.2 (95% CI: 1.8-15), p = 0.012. The minimally invasive technique scored significantly higher compared to surgical procedures [24]. These studies show how sleeve gastrectomy, lifestyle changes, and other surgeries impact patients' quality of life. These therapies can alter physical and mental health. Consistent differences across studies emphasize the importance of considering each medical treatment's specific effects on patients, as each intervention has its benefits and drawbacks that can greatly impact a patient's quality of life.

RECOMMENDATIONS

Future research could compare hospitals in other provinces to provide a more comprehensive understanding of quality-of-life outcomes across diverse healthcare settings. Conducting true experimental studies, such as randomized controlled trials, is recommended to generate robust evidence and identify areas for improvement in patient care. It is also recommended to organize seminars and workshops for healthcare professionals and patients to raise awareness, foster behavioral change, and enhance the quality of life of individuals undergoing similar treatments.

CONCLUSION

The mean quality of life score for sleeve gastrectomy was higher at 53.7 (SD ± 4) compared to lifestyle modification, which had a mean score of 39.45 (SD ± 9.9). A higher score reflects a better quality of life. When comparing the quality-of-life scores between the two interventions, sleeve gastrectomy and lifestyle modification, the results were statistically significant, with a p-value of less than 0.05. Additionally, there was a significant association between quality-of-life outcomes and the demographic characteristics of the participants, underscoring the influence of individual factors on the results.

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Data Sharing Statement: The corresponding author can provide the data proving the findings of this study on request. Privacy or ethical restrictions bound us from sharing the data publicly.

AUTHOR CONTRIBUTION

Dilshad N: Conceptualization, methodology, ethics approval, investigation (data collection), data curation, formal analysis, visualization, writing original draft, project administration.
Marshall P: supervision, conceptual guidance, methodological oversight, validation, resources, writing review, final approval of the manuscript
Shakirullah: Co-supervision, methodology refinement, statistical guidance, interpretation of findings, writing review and editing.

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