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Impact of physical functioning on quality of life post laparoscopic sleeve gastrectomy

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Abstract: **Obesity is associated with reduced Quality of life that improves after bariatric surgery. Laparoscopic sleeve gastroscopy is an effective procedure for weight loss. The aim is to assess the physical functioning, role limitation due to physical health problems, and general health among Saudi patients post laparoscopic sleeve gastrectomy.**

Methodology: Quantitative, descriptive, correlational research design. a convenient sample of sleeve gastrectomy participants from both sex. Participants were selected from the outpatient clinic of Prince Sultan Military Medical City visitors in Riyadh city. Short-form health survey (SF-36) Arabic version used.

Results: The study results revealed that level of the quality of life is high (70.8),

Conclusion: The study results revealed a high quality of life post-sleeve gastrectomy with significant satisfaction in the patient's physical health.

Keywords: **Laparoscopic sleeve gastroscopy, physical health problems.**

1. INTRODUCTION

Since 1975, worldwide obesity has nearly tripled. Over 650 million were obese. 39% of adults were overweight in 2016, and 13% were obese. Most of the population who live in countries were overweight. Obesity kills more people than underweight (WHO, 2018). This is the leading cause of several chronic diseases, and the occurrence is increasing worldwide. The Kingdom of Saudi Arabia is third in the world obesity rankings. The British Medical Journal has put laziness and obesity in the Kingdom at 86%. Diabetes, obstructive sleep apnea, and cardiopulmonary disease are all associated with obesity and significantly increase the risk of overall complications (JR et al., 2018). Obesity is associated with reduced Quality of life (QOL), and in general, QOL improves after Bariatric surgery (BS) & the differential effect of each surgery on QOL is not yet fully understood, but it seems that Roux-en-Y gastric bypass (RYGB) is associated with better patient-centered outcome measures and the greatest improvement in QOL (Herpertz et al., 2003, Mohos et al., 2010, Dumon & Murayama 2011, and Campos 2011). In the study of Major, they confirmed the reliability of Laparoscopic sleeve gastrectomy (LSG) in improving the QOL of obese people, which is worse than that in persons with correct bodyweight, and they added that not only the QOL is related to physical function, as, intolerance of exercise, problems with moving, or joint pain, but also it is related to psychical aspects, including lack of acceptance of themselves, increased stress level, reduced self-esteem, and mood, or depressive states (Major et al., 2016). Previous studies have primarily concentrated on Sleeve gastrectomy (SG) for patients with morbid obesity and showed a tremendous positive impact on the QOL of the majority of patients regarding different spectrums of functioning, including physical and psychological aspects (Alharbi et al., 2018). Studies have found that QOL may be seen as early as three months after surgery. By six months after surgery, patients may improve to the extent of the same QOL scores as the reference population (Whitcomb et al., 2012). Improved results have been reported as early as three months (Julia et al., 2013). SG is an effective procedure for Weight loss and is associated with significant initial improvement in psychosocial aspects regarding depression, anxiety, self-esteem, and mental aspects. The study found that Body image and self-esteem improved significantly after SG (Herpertz et al., 2015). Recent evidence suggests that improved results have been reported as early as three months, and Short-form health survey

36 (SF-36) scores were improved in all domains in the medium to long term. The question remains whether the improvement in QOL is related to weight loss and which factors are associated with improved patients' perceptions. There is wide heterogeneity in the reporting of Patient report outcomes (PRO) measures after BS, but the data are consistent with a significant improvement after both types of surgeries. The improvement starts within the first few months after the surgery and lasts up to10 years. Obese patients present lower values of QOL, but generally, one year after the surgery, are indistinguishable from the general population. The few studies that compared QOL between RYGB and SG could not detect any significant difference (Ramada Faria et al., 2017). Improvements in weight may lead to the assumption that physical activity will increase, as LSG patients had better physical function, higher energy levels, and the perception of better general health. (Ahmed, 2018). QOL is a construct of physical, psychological, and social domains of health that can be measured by a series of questionnaires. (Testa & Simonson, 1996).Current studies have shown the positive effects of BS on general QOL (Andersen JR et al., 2015). Obesity has been correlated with lower scores, especially in the physical component of SF-36. Several trials of BS have concluded that after surgery, there is an improvement in the SF-36 scores, and thus, this is a sensitive instrument to capture this construct (Ballantyne, 2003).

2. METHODOLOGY

The study design was a quantitative, descriptive, correlational research design that was utilized for this study to answer the research questions. The study was conducted in the Outpatient clinic of Prince Sultan Military Medical City (PSMMC). Using the convenience sampling method with a total of 164 LSG participants of patients who underwent LSG from 3 months from the operation and more, who have a regular visit to the Outpatient department for management and follow-up. Inclusion criteria Only adult patients above 18 years old, of Saudi nationality, who have undergone LSG surgery three months and above for the data collection, and who were interested in participating. LSG led to an improvement in almost all of the items tested by using the three questionnaires (Al Khalifa & Al Ansari 2018). A standardized research instrument, SF-36 was used to evaluate the QOL.

3. RESULTS

Table (1) Demographic profile of the respondents:

Item		Frequency / N = 164	Percent %
Age	18-27	27	16.5%
	28-37	58	35.4%
	38-47	50	30.5%
	48-57	25	15.24%
	58-67	4	2.44%
	Mean	37.45	
	SD	9.88	
Gender	Female	110	67.1%
	Male	54	32.9%
BMI	Normal (18.5 – 24.9)	19	11.6%
	Overweight (25 – 29.9)	45	27.4%
	Obese (30 – 34.9)	44	26.8%
	Extremely Obese (35 <)	56	34.1%
	Mean	32.9	
	SD	6.8	
Marriage status	marriage	114	69.5%
	single	38	23.2%
	widow\divorced	12	7.3%
Living with	Alone	4	2.4%
	Family	160	97.6%
Education level	Illiterate	2	1.22 %
	Intermediate	15	9.15%
	high school	47	28.66%
	University	85	51.8%
	Postgraduate	15	9.15%

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Working status	no	75	45.7%
	yes	89	54.3%
Do you smoke	no	134	81.71%
	yes	30	18.29%
Operational date	3 - < 6 months	58	35.4%
	6 - < 9 months	30	18.3%
	9 to < 12 months	12	7.3%
	12 months and more	64	39%
Did you meet your goal	yes	98	59.8%
	no	3	1.8%
	not yet	63	38.4%

Table (1) shows the demographics analysis and descriptive data. For the age distribution, we see that (35.4%) of the respondents were in the age group (28-37 years). Referring to gender characteristics, it yields that (67.1%) of the sampled respondents are "Female" and (32.9%) are "males". In addition, we see that the body mass index (BMI) of the participant on the day of data collection was (34.1%) of the participants is "Extremely Obese". Moreover, marriage status for the sample shows that (69.5%) of the sample are "married". Another demographic variable is living with whom, and it shows that (97.6%) of the sample are living with "their families". Coming to education level Table shows that (51.8%) of the sample has a "university level". Regarding working status, we see that (54.3%) of the sample have "work". Whereas, for the operational date, (39%) shows that the period "12 months and more". In addition, illustrates that (59.8%) of the sample have "met their goals".

Table (2) The quality of life among Saudi patients

Quality of life domain	Mean	Standard Deviation
Physical functioning	77.165	23.02
Role limitations due to physical health problems	62.65	41.30
Role limitations due to emotional problems	69.91	40.48
Energy or fatigue	60.06	20.76
Emotional well-being	68.87	18.82
Social functioning	74.84	23.82
Pain	78.01	22.37
General Health	70.39	16.66

Table (2) shows the QOL among Saudi participants based on the different domains. The mean score of the QOL among Saudi participants was (70.24) representing a high-quality life defining a more favorable health state post SG. With a mean of (78.01), the “pain” scale domain is the highest in the standardized scale applied in the questionnaire. Whereas "energy or fatigue” related aspects of the scale ranked as lowest with a (60.06) mean score.

3.1 Physical Functioning

Table (3.1) descriptive statistics of the physical functioning scale items

Physical functioning	Yes, limited a lot		Yes, Limited a little		No, Not limited at all		Mean	Std. Deviation	Rank
Item	N	%	N	%	N	%			
1. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	52	31.70%	56	34.14%	56	34.14%	51.2	40.68	10
2. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	12	7.3%	57	34.8%	95	58%	75.3	31.57	7
3. Lifting or carrying groceries	15	9.15%	39	23.80%	110	67.07%	78.96	32.8	6
4. Climbing several flights of stairs	27	16.5%	47	28.70%	90	54.88%	69.2	37.7	9
5. Climbing one flight of stairs	18	11%	27	16.5%	119	72.6%	80.18	33.87	5

6. Bending, kneeling, or stooping	30	18.30%	31	18.9%	103	62.8%	72.26	39.26	8
7. Walking more than a mile	0	0%	38	23.2%	126	76.8%	88.4	21.2	1
8. Walking several blocks	12	7.3%	38	23.2%	114	69.5%	81.1	31	4
9. Walking one l blocks	11	6.7%	22	13.4%	131	79.9%	86.59	28.8	3
10. Bathing or dressing yourself	16	9.8%	8	4.9%	140	85.4%	87.8	30.9	2

Table (3.1) show the analysis of the physical functioning aspects of patient QOL scale “physical functioning” items. The overall mean is (77.165), which indicates that the physical functioning aspects of patient QOL in this domain is high on the standardized scale applied in this questionnaire.

In addition, from looking at the table (3.1) and going into detail about the physical functioning sub-scale and statements of the scale are ranked to show which states have more impact than the other. The statement "Walking more than a mile" had the highest mean (88.4) which indicate that this item is the most impact on the sub-scale and it shows that (76.8%) of the patient says that "No, Not limited at all" and (23.2%) responded with "Yes Limited a little". Then comes in second the statement "Bathing or dressing yourself" with a mean of (87.8). Then comes the third statement "Walking one block" with a mean of (86.6). The least impact statements in this sub-scale are "Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports" with a mean of (51.2), and looking at the frequency of the answers on this item, it shows that (34.1%) answered with "No, Not limited at all" and "Yes limited a little"; and (31.7%) answered with "Yes limited a lot".

3.2 Role limitations due to physical health problems

Table (3.2) descriptive statistics of the role limitations due to physical health problems scale items

Role limitations due to physical health problems	**Yes**		**No**		**Mean**	**Std. Deviation**	**Rank**
Item	**N**	**%**	**N**	**%**			
1. cut down the amount of time you spent on work or other activities	52	13.7%	112	68.3%	68.3	46.7	1
2. accomplished less than you would like	69	42.1%	95	57.9%	57.9	50	4
3. were limited in the kind of work or other activities	68	41.5%	96	58.5	58.5	49.4	3
4. had difficulty performing the work or other activities (for example, it took extra effort)	56	34.2%	108	65.8%	65.9	47.6	2

Table (3.2) show the analysis of "the role limitations due to physical health problems" aspects of patient QOL scale items; the overall mean (62.65), which indicates that role limitations due to physical health problems aspects of patient QOL is high on the standardized scale applied in this questionnaire.

In addition, from looking at the table (3.2) and going into detail about "the role limitations due to physical health problems" sub-scale and statements of the scale are ranked to show which statement has more impact than the other. The statement "cut down the amount of time you spent on work or other activities" had the highest mean (68.3), which indicates that this item is the most impact on the sub-scale, and we see that (68.3%) answered "NO" and (31.7%) answered "Yes", then comes in second the statement "had difficulty performing the work or other activities (for example, it took extra effort)" with a mean (65.9). The least impact statements in this sub-scale are "accomplished less than you would like" with a mean (57.9) where (57.9%) said "No" and (42.1%) said "Yes".

3.3 General Health

Table (3.3) descriptive statistics of the General Health scale items

General Health	Excellent		Very good		Good		Fair		Poor		Mean	SD	Rank
Item	N	%	N	%	N	%	N	%	N	%			
1. How to see your health condition?	58	35.4%	68	41.5%	28	17.1%	8	4.9%	2	1.2%	76.2	22.8	2

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Item	Definitely true		Mostly true		Don't know		Mostly false		Definitely false		Mean	SD	Rank
2. I seem to get healthy as anybody I know	11	6.7%	15	9.2%	48	29.3%	30	18.3%	60	36.6%	67.2	31	4
3. I am as healthy as anybody I know	35	21.3%	34	20.7%	48	29.3%	27	16.5%	20	12.2%	55.6	32.3	5
4. I expect my health to get worse	5	3.1%	10	6.1%	54	32.9%	23	14%	72	43.9%	72.4	28.3	3
5. My health is excellent	75	45.7%	64	39%	15	9.2%	6	3.7%	4	2.4%	80.5	23.3	1

Table (3.3) show the analysis of "General Health" aspects of patient QOL scale items; the overall mean (70.4), indicates that the General Health of patient QOL in this domain is high on the standardized scale applied in this questionnaire.

Looking at the table (3.3) and going into detail about the General Health sub-scale and statements of the scale are ranked to show which statement has more impact than the other. The statement "My health is excellent" had the highest mean (80.5), which indicates that this item is the most impact on the sub-scale, and (45.7%) of the participants answered "definitely true" and (39%) answered "mostly true". Then comes in second the statement "How to see your health condition" with a mean (76.2) where (41.5%) answered "very good" and (35.4%) answered "excellent". The least impact statements in this sub-scale are "I am as healthy as anybody I know" with a mean of (55.6) where (29.3%) of the participants answered "don't know" and (12.2%) answered "Definitely false".

Correlation between the level of QOL and demographic characteristics

Table (4) show the correlation value and the significant correlation at level 0.01 (**) and 0.05 (*) positively or (-) negatively correlations. There is a significant positive correlation between "physical functioning" with "Operational date" coded value (0.638**) and also with "did you meet your goal from the operation" with value (0.394**).

There is a significant negative correlation between "role limitations due to physical health problems" with "BMI" (-.224**).

Table (4) relationship between demographic variables and physical functioning, role limitations due to physical health problems, and general health.

Pearson Correlations	physical functioning	role limitations due to physical health problems	general health
age	-0.135	0.092	0.126
gender	-0.151	0.013	.159*
Marriage status	0.107	-0.046	-.190*
Living with	-0.015	-0.025	-0.004
Education level	-0.126	-0.065	0.153
BMI	-0.117	-.224**	-0.046
Pearson Correlations	physical functioning	role limitations due to physical health problems	general health
do you work	-0.075	-0.018	0.019
salary	0.04	0.069	0.018
smoke	0.021	-0.017	-0.112
date of sleeve coded	.638**	0.057	-0.08
Did you meet your goal from the operation	.394**	-0.032	-0.09

4. DISCUSSION

Quality of life and Demographic Characteristics

The findings of the current study showed a significant positive correlation between "physical functioning" and "operational date", also with "did you meet your goal from the operation". This is consistent with the result of Poelemeijer et al. (2020), who found that those who underwent BS witnessed considerable weight loss, and thus, better physical functioning in their life. The major outcome of undergoing BS is losing much weight, where patients usually lose more than 50% of their excess

weight. The results of the study also showed that (59.8%) of the research sample have lost weight and achieved their goal of surgery. A majority of the participants confirmed that their health had improved remarkably enhancing life expectancy (Fontaine et al., 2003).

Moreover, we can see that there is a significant negative correlation, as reflected in a high BMI, which increases role limitation due to physical health problems. Klingemann reports that it is not the amount of weight loss that is related to the QOL, but rather the achieved BMI (Klingemann et al., 2009). These findings confer with a study where the effects of weight loss were emphasized to have a significant influence on several comorbidities (Ruiz-Tovar et al., 2018) and a significant decrease in sleep apnea, menstrual irregularities, and joint pain (Alkassis et al., 2019).

Accordingly, the majority of those who went BS are young individuals. The current study confirmed this claim where most of the respondents aged between 28 and 47 years old. Similar results were also achieved by (JR et al., 2018) and (Olt et al., 2017).

LSG for patients with morbid obesity showed a tremendous positive impact on the QOL of the majority of patients regarding different spectrums of functioning, including physical aspects (Alharbi et al., 2018).

Lastly, the present study indicated that there is a significant positive correlation between "general health" with "gender". General health in males is better than in females. While on the other hand, there is a significant negative correlation between "general health" with "marriage status". As the general health increase, the marital status of the widow and divorced is better than the married status.

Studies said there is no difference between gender and QOL (Macano et al., 2017). There is no correlation between sex and QOL (Alkassis et al., 2019).

Recent studies have indicated that weight loss surgery may even lower the rates of death for patients who have been diagnosed with severe obesity. The best results are manifested when patients follow surgery with regular exercise and healthy eating patterns (US Department of Health and Human Services, 2012).

The study noted all patients showed an improvement in their QOL. It is interesting to note, however, that one patient complained of excess skin mass after weight loss, and another patient complained of an excessive degree of weight loss (Alkassis et al., 2019).

Improvements in weight may lead to a statement that physical activity will increase, as LSG patients had better physical function, higher energy levels, and the insight of better general health. (Ahmed, 2018).

The other benefit of BS is the resolution of comorbidities. There is no other medical intervention that simultaneously treats numerous diseases as weight loss surgery does. As people lose weight more rapidly, in the long run, the weight loss goals are attained. However, it is the maintenance mode that is considered to be a risky stage for most people. Most of them find it hard to diet and exercise regularly. As a result, one starts gaining weight back. This is because there is a lack of a good support system, which will drive someone to stick to good habits (Lalor et al., 2008).

5. CONCLUSION

The study results revealed a high Quality of life (QOL) among participants post Laparoscopic sleeve gastrectomy (LSG) with the highest domain of "Physical functioning and energy or fatigue". Moreover, some demographic variables have a highly significant positive correlation between Physical functioning with operational date and goal met energy or fatigue with age.

On the other hand, the study has shown, the QOL, which got a negative correlation, is the domain of "role limitations due to physical health problems and pain". The results revealed the mean score highly significant negative correlation between role limitations due to physical health problems with BMI; Pain with work status.

Ethical Considerations

Ethical codes of conduct were strictly followed in all stages of the research; all information obtained from the participants in the study remained strictly anonymous and confidential.

The patient's participation in the study was voluntary. Confidentiality was applied to the questionnaire by coding, and the gathered data was sealed and placed in locked drawers to keep it confidential. Written informed consent was signed by the patient before starting to fill out the self-administered questionnaire.

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