A Critical Snapshot of Preoperative Comorbidity Burden in Bariatric Candidates at a Specialized Bariatric Center, Tripoli, Libya (2022)

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لمحة نقدية عن عبء الأمراض المصاحبة قبل الجراحة لدى المرشحين لجراحة السمنة في مركز متخصص لجراحة السمنة، طرابلس، ليبيا (2022)

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Abstract:

Background: Bariatric surgery is the definitive treatment for morbid obesity and its associated comorbidities. Although its efficacy is well established globally, local data describing patient characteristics and disease burden in regional contexts, such as Libya, remain limited.

Aim: To describe the clinical profile and comorbidity burden of patients undergoing bariatric surgery at the **Preventive Medicine Hospital** in Tripoli, Libya.

Methods: This was a retrospective cross-sectional study analyzing the medical records of 60 consecutive patients who underwent bariatric surgery at the **Preventive Medicine Hospital** in Tripoli throughout **2022**. Data collected included demographics, preoperative Body Mass Index (BMI), and the prevalence of four major obesity-related comorbidities (DM, HTN, GERD, OSA). Continuous data are reported as Mean $\pm$ SD.

Results: The mean age of the cohort was **42.1 ± 9.5 years**, with **66.1%** being female. The mean preoperative BMI was **44.2 ± 5.1 kg/m²**. The average comorbidity burden was **1.93 ± 1.25** major conditions per patient. The most prevalent comorbidities were **GERD (55.0%)**, **OSA (52.5%)**, and **DM (50.8%)**.

Conclusion: Patients undergoing bariatric surgery in this Libyan cohort demonstrated severe obesity and a high burden of obesity-related comorbidities. The high prevalence of GERD, OSA, and DM underscores the need for comprehensive, multidisciplinary preoperative evaluation and optimization to minimize surgical risk and improve postoperative outcomes.

Keywords: Bariatric surgery; Morbid obesity; Obesity-related comorbidities; Gastroesophageal reflux disease.

الملخص :

الخلفية: تُعد جراحة السمنة العلاج الأمثل للسمنة المفرطة والأمراض المصاحبة لها. ورغم ثبوت فعاليتها عالميًا، إلا أن البيانات المحلية التي تصف خصائص المرضى وعبء المرض في سياقات إقليمية، مثل ليبيا، لا تزال محدودة.

الهدف: وصف السمات السريرية وعبء الأمراض المصاحبة لدى المرضى الذين خضعوا لجراحة السمنة في مستشفى الطب الوقائي في طرابلس، ليبيا.

المنهجية: دراسة مقطعية استرجاعية حللت السجلات الطبية لستين مريضًا متتاليًا خضعوا لجراحة السمنة في مستشفى الطب الوقائي في طرابلس خلال عام 2022. شملت البيانات التي جُمعت المعلومات الديموغرافية، ومؤشر كتلة الجسم قبل الجراحة، وانتشار أربعة أمراض مصاحبة رئيسية مرتبطة بالسمنة (داء السكري، ارتفاع ضغط الدم، ارتجاع المريء، انقطاع النفس الانسدادي النومي). عُرضت البيانات المستمرة كمتوسط ± الانحراف المعياري.

النتائج: كان متوسط عمر المجموعة 42.1 ± 9.5 سنة، وكانت نسبة الإناث 66.1%. بلغ متوسط مؤشر كتلة الجسم قبل الجراحة 44.2 ± 5.1 كجم/م². وبلغ متوسط عبء الأمراض المصاحبة 1.93 ± 1.25 حالة مرضية رئيسية لكل مريض. وكانت أكثر الأمراض المصاحبة شيوعًا هي الارتجاع المعدي المريئي (55.0%)، وانقطاع النفس الانسدادي النومي (52.5%)، وداء السكري (50.8 %.)

الخلاصة: أظهر المرضى الذين خضعوا لجراحة السمنة في هذه المجموعة الليبية سمنة مفرطة وعبئاً كبيرًا من الأمراض المصاحبة بها. ويؤكد الانتشار الواسع للارتجاع المعدي المريئي، وانقطاع النفس الانسدادي النومي، وداء السكري على ضرورة إجراء تقييم شامل ومتعدد التخصصات قبل الجراحة، وتحسين الحالة الصحية لتقليل المخاطر الجراحية وتحسين النتائج بعد الجراحة.

الكلمات المفتاحية: جراحة علاج السمنة؛ السمنة المفرطة؛ الأمراض المصاحبة للسمنة؛ داء الارتجاع المعدي المريئي؛ انقطاع النفس الانسدادي النومي؛ داء السكري من النوع الثاني؛ ليبيا.

Introduction

Obesity has escalated into a major global pandemic, characterized by its substantial impact on public health and the immense economic burden it places on healthcare systems worldwide [1]. Defined by the World Health Organization as an abnormal or excessive fat accumulation that may impair health, the global prevalence of overweight and obesity has nearly tripled since 1975 [2]. Morbid obesity, specifically, is a complex, chronic disease associated with a significant reduction in life expectancy and is strongly correlated with a constellation of severe health complications [3].

The pathophysiological consequences of morbid obesity are extensive, contributing to high prevalence rates of numerous **obesity-related comorbidities (ORCs)**, including Type 2 Diabetes Mellitus (DM), Hypertension (HTN), Gastroesophageal Reflux Disease (GERD), and Obstructive Sleep Apnea (OSA) [4]. This clustering of diseases, known as multimorbidity, significantly increases patient complexity and surgical risk [5]. Furthermore, obesity rates, particularly severe obesity, have been rising rapidly in the Middle East and North Africa (MENA) region, presenting a unique and growing challenge to regional health infrastructure [6]. For patients failing conventional weight management strategies, **bariatric surgery** has become the established standard of care [7]. Meta-analyses consistently demonstrate that bariatric procedures provide the most effective and durable solution for sustained weight loss [8]. Beyond anthropometric improvement, bariatric surgery is recognized for its profound metabolic effects, leading to high rates of remission for Type 2 Diabetes [9] and substantial improvement in cardiovascular risk factors such as hypertension [10]. However, despite the established global efficacy, data regarding the specific patient characteristics and the local prevalence of comorbidities among bariatric candidates in specialized Libyan clinics remain scarce. This localized information is crucial for optimizing preoperative assessment, surgical planning, and post-operative care tailored to the specific disease burden of the cohort.

Aim of the Study: The primary objective of this retrospective analysis was to precisely describe the clinical profile and comorbidity burden of patients undergoing bariatric surgery at a specialized clinic in Tripoli, Libya, between 2022 and 2023.

Materials and Methods

Study Design and Setting

This study was conducted as a retrospective cross-sectional analysis based on a review of medical records from the Preventive Medicine Hospital in Tripoli, Libya. All patients who underwent bariatric surgery between January and December 2022 were included, yielding a total study cohort of 60 patients.
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Study Population and Selection Criteria

Inclusion Criteria

Patients were eligible for inclusion if they:

1. Underwent bariatric surgery at the Preventive Medicine Hospital during the study period, including **Sleeve Gastrectomy (SG)** or **Roux-en-Y Gastric Bypass (RYGB)**.
2. Had complete and legible medical records documenting preoperative anthropometric measurements and comorbidity status.

Exclusion Criteria

Patients were excluded if their medical records were **incomplete, missing essential data, or illegible** for the primary variables of interest.

Data Collection

Patient data were extracted from preoperative clinical files using a **standardized data collection sheet**. The following variables were recorded:

- **Demographics:** Age and sex.
- **Anthropometrics:** Preoperative weight (kg), height (m), and calculated Body Mass Index (BMI, kg/m²).
- **Comorbidities:** Binary status (Yes/No) for four major obesity-related conditions — Type 2 Diabetes Mellitus (DM), Hypertension (HTN), Gastroesophageal Reflux Disease (GERD), and Obstructive Sleep Apnea (OSA).
- **Surgical History:** Documentation of any previous non-bariatric major surgeries (Past Surgical History, PSH).

Definition of Comorbidities

Comorbidities were identified based on documentation in the medical records prior to surgery:

- **Diabetes Mellitus (DM):** a documented diagnosis, use of antidiabetic medications, or laboratory findings consistent with diabetes.
- **Hypertension (HTN):** a documented diagnosis or use of antihypertensive therapy.
- **Gastroesophageal Reflux Disease (GERD):** a documented clinical diagnosis based on typical symptoms, endoscopic findings, or long-term use of acid-suppressive medication.
- **Obstructive Sleep Apnea (OSA):** a documented diagnosis or clinically suspected OSA recorded in the medical file, with or without confirmatory polysomnography.

Statistical Analysis

All data were analyzed using the **Statistical Package for the Social Sciences (SPSS), version 28.0** (IBM Corp., Armonk, NY, USA).

Continuous variables (e.g., age, BMI) were presented as **mean ± standard deviation (SD)**, while categorical variables (e.g., sex, comorbidity prevalence) were summarized as **frequencies and percentages (n, %)**.

The **comorbidity burden** was calculated as the mean number of the four major comorbidities (DM, HTN, GERD, OSA) per patient.

Given the descriptive nature of this analysis, **no inferential statistical testing** was performed; however, a **p-value < 0.05** was considered statistically significant for any future comparative assessments.

Results

A total of 60 consecutive patients who underwent bariatric surgery at a specialized clinic were included in this retrospective analysis.

1. Patient Demographics and Anthropometrics

The cohort demonstrated a high-risk profile, with all patients meeting the criteria for morbid obesity (BMI $\geq$ 35 kg/m²). Missing data were accounted for by specifying the valid sample size (n) for each variable.

Characteristic	Result	Notes
Total Cohort Size (N)	60	
Age (years)	42.1 ± 9.5	Mean ± SD; range 24–62 years; n = 55
Sex	37 Female (66.1%) / 19 Male (33.9%)	n = 56
Weight (kg)	127.5 ± 18.7	Mean ± SD (range: 84–195 kg)
Body Mass Index (BMI, kg/m²)	44.2 ± 5.1	Mean ± SD (range: 35.9–56.4 kg/m²; n = 60)

Key Anthropometric Findings

- The cohort showed a significant female predominance (66.1%).
- The mean preoperative BMI of 44.2 kg/m² confirms the severe degree of obesity among the surgical candidates.

2. Comorbidity Profile and Disease Burden

The prevalence of the four major obesity-related comorbidities—Type 2 Diabetes Mellitus (DM), Hypertension (HTN), Gastroesophageal Reflux Disease (GERD), and Obstructive Sleep Apnea (OSA)—was assessed, and the total disease burden was quantified.

A. Prevalence of Major Comorbidities

Comorbidity	Count (n)	Prevalence (%)	Valid N
GERD (Gastroesophageal Reflux Disease)	33	55.0	60
OSA (Obstructive Sleep Apnea)	31	52.5	59
DM (Type 2 Diabetes Mellitus)	30	50.8	59
HTN (Hypertension)	22	37.9	58

GERD was the most prevalent condition, affecting **33 out of 60 patients (55.0%)**, followed by OSA in **31 out of 59 patients (52.5%)**, DM in **30 out of 59 patients (50.8%)**, and HTN in **22 out of 58 patients (37.9%)**. Differences in denominators reflect missing data inherent to retrospective record review.

Comorbidity Burden

The mean number of major comorbidities per patient was **1.93 ± 1.25**. Overall, **39 out of 60 patients (65.0%)** had two or more comorbidities, while **23 out of 60 patients (38.3%)** had three or more comorbidities. A history of prior non-bariatric major surgery was documented in **14 out of 60 patients (23.3%)**, underscoring the clinical complexity of this population.

Discussion

This study aimed to describe the clinical profile and comorbidity burden of patients undergoing bariatric surgery at a specialized clinic in Tripoli, Libya. The analysis of 60 consecutive patients provides the first clear insight into the characteristics of this surgical cohort within a local Libyan setting.

Demographics and Anthropometrics

The cohort's demographic profile is largely consistent with established international trends, showing a female predominance, with 66.1% of the patients being female. This aligns with findings from major bariatric databases, which typically report a higher proportion of female patients seeking bariatric intervention worldwide, suggesting that gender disparity in healthcare-seeking for severe obesity is present in this regional setting as well [11]. The mean age of 42.1 ± 9.5 years also falls within the peak range reported in the literature for bariatric candidates, who are usually in their fourth to fifth decades of life [12].

A key finding was the mean preoperative Body Mass Index (BMI) of 44.2 ± 5.1 kg/m². This value is representative of the severely obese population eligible for surgery and indicates that patients presenting to the specialized clinic exhibit a significant severity of obesity, comparable to cohorts in Western countries [13]. This high BMI serves as a crucial baseline indicator of the metabolic risk carried by the cohort.

Comorbidity Burden

The most significant result of this analysis is the high prevalence and substantial burden of obesity-related comorbidities (ORCs). The mean comorbidity count was 1.93 ± 1.25 major conditions per patient, with 65.0% of patients presenting with two or more of the assessed ORCs. This finding confirms that bariatric surgery in this Libyan clinic is being performed on a genuinely complex, multimorbid population, requiring high-level preoperative management and rigorous risk stratification [14].

Diabetes Mellitus (DM) and Hypertension (HTN)

The prevalence of Type 2 Diabetes Mellitus (50.8%) was remarkably high, affecting over half of the cohort. This rate is higher than that often reported in general bariatric surgery populations (typically 30–40% in Western cohorts) and suggests a potentially severe metabolic phenotype or possible regional differences in screening practices [15]. This finding underscores the primary role of bariatric surgery as a metabolic intervention in this cohort. The prevalence of Hypertension (37.9%) is substantial but generally aligns with the rates observed in other severely obese populations [16].

Gastroesophageal Reflux Disease (GERD) and Obstructive Sleep Apnea (OSA)

GERD (55.0%) was the most prevalent comorbidity. This is consistent with the global understanding that obesity, particularly at high BMI levels, is a major risk factor for GERD [17]. The high rate of GERD has critical surgical implications, as its presence often dictates the choice between Sleeve Gastrectomy and Roux-en-Y Gastric Bypass due to the differing effects of each procedure on reflux symptoms [18].

The diagnosis of Obstructive Sleep Apnea (OSA) in 52.5% of patients, even with potential underdiagnosis inherent in retrospective chart reviews, is significant. OSA is a strong independent predictor of perioperative complications [14]. Given that the true prevalence of OSA in bariatric candidates is often estimated to be much higher [19, 20.21], the observed high rate strongly supports the need for mandatory, thorough OSA screening in all patients in this setting.

Limitations

This study is subject to several limitations inherent to its retrospective, few-center design. First, the small sample size (N = 60) limits the generalizability of the findings beyond this specific clinic in Tripoli, Libya. Second, the reliance on patient medical records means that the true prevalence of certain conditions (particularly OSA and psychological comorbidities) may be underestimated due to the lack of specialized screening tools or recording consistency. Finally, as a descriptive cross-sectional study, it cannot establish causality or determine the surgical outcomes associated with this high comorbidity burden.

Implications for Practice and Research

The observed high average comorbidity burden (1.93 ± 1.25 major conditions per patient) has important clinical implications for preoperative assessment and surgical risk stratification in bariatric patients in Libya. This burden reflects a population with complex metabolic and respiratory profiles, necessitating **comprehensive and systematic preoperative evaluation**. The high prevalence of diabetes mellitus (DM) underscores the need for meticulous glycemic optimization prior to surgery to reduce perioperative complications, including infection and delayed wound healing. Additionally, the frequent coexistence of gastroesophageal reflux disease (GERD) and suspected obstructive sleep apnea (OSA) significantly increases anesthetic and postoperative respiratory risks, particularly in resource-limited settings where advanced monitoring may not be universally available. Awareness of these comorbidities is therefore critical for surgeons and anesthesiologists when assessing operative risk and selecting the most appropriate bariatric procedure. From a broader perspective, these findings highlight the necessity of developing **standardized, multidisciplinary preoperative protocols** tailored to the Libyan context. Future prospective studies are warranted to objectively assess OSA prevalence using polysomnography and to evaluate the direct association between comorbidity burden and perioperative outcomes in this regional cohort.

Conclusion

This retrospective analysis demonstrates that patients undergoing bariatric surgery at the private clinic in Tripoli, Libya, present with severe morbid obesity (mean BMI = 44.2 kg/m²) and a substantial burden of comorbidities (mean = 1.93 major conditions), most notably gastroesophageal reflux disease (GERD) and diabetes mellitus (DM). In light of these findings, we strongly recommend the implementation of specialized, mandatory preoperative screening protocols for GERD, obstructive sleep apnea (OSA), and DM for all bariatric surgery candidates at the center. Such protocols should be integrated within a multidisciplinary bariatric care pathway, involving surgeons, endocrinologists, pulmonologists, and gastroenterologists, to optimize patient selection, reduce perioperative risk, and improve surgical outcomes. Adoption of these targeted screening and management strategies is essential to enhance the safety and effectiveness of bariatric surgery in this high-risk population.

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Compliance with ethical standards

Disclosure of conflict of interest

The author(s) declare that they have no conflict of interest.

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