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Research Paper:

The Impact of COVID-19 Mandatory Lockdown on Various Aspects of Life Leading to Weight Regain in Patients Undergone Bariatric Surgery

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ABSTRACT

Background: Mandatory lockdown of COVID-19 has caused a great impact on patients' lives. Meanwhile, people who underwent bariatric surgery are very susceptible to adverse effects of this social isolation. This study investigated the effects of COVID-19 lockdown on patients with previous bariatric surgery.

Methods and Materials: Data sources included PubMed and ScienceDirect. Articles were screened and eligible data were extracted. The outcomes of this study were the effects of lockdown on previous bariatric surgery that could lead to the patient's weight regain.

Results: Our review study included eight articles on 691 patients. COVID-19 lockdown has had a profound effect on the lifestyle of people with a history of bariatric surgery. Many factors in the studies, including psychological factors, such as depression, decreased social support, and anxiety, eating habits, such as reduced healthy food intake and lack of control over eating, and ultimately physical activity was negatively affected by the mandatory lockdown.

Conclusion: The results of this review study demonstrated that social isolation during the COVID-19 pandemic has caused many complications for patients who underwent bariatric surgery, which can eventually lead to weight regain and recurrence of comorbidities in this group.

1. Introduction

The Coronavirus Disease 2019 (COVID-19) pandemic was declared by the World Health Organization (WHO) on March 11, 2020, and many governments have enforced mandatory lockdown to control the disease [1]. Social isolation has affected many aspects of public life [2]. The COVID-19 outbreak has caused lifestyle changes, including decreased physical activity, increased unhealthy eating habits, altered eating habits,

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and psychological distress, all of these increase the risk of weight gain [1, 3-5].

Patients who had bariatric surgery are highly susceptible to the complications of the mandatory COVID-19 lockdown. Currently, much face-to-face medical care has been reduced due to people's fear of contracting the disease, and this, in addition to the general complications of mandatory lockdown, has changed the lives of people who had bariatric surgery [1, 6].

Bariatric surgery is currently the most effective method to treat severe obesity, which leads to long-term weight loss and improvement of obesity-related comorbidities [7-10]. According to a recent study, bariatric surgery is associated with a lower rate of hospital admission and mortality from the coronavirus [11, 12]. However, weight regain is one of the major challenges of bariatric surgery, which can lead to the recurrence of obesity-related complications and reduced life expectancy [11, 13]. Factors, such as changes in physical activity, eating habits, and psychological distress, which are strongly influenced by COVID-19 social distancing measures, have been shown to be significantly associated with weight regain after surgery [11, 14].

We believe that by comprehensively understanding the factors that negatively affect the consequences of bariatric surgery during an outbreak of coronavirus, negative complications can be prevented and the burden on the health system will be reduced. Therefore, the aim of this study was to investigate the effects of the COVID-19 pandemic and mandatory lockdown on various aspects of life leading to weight regain in patients who had bariatric surgery.

2. Methods

We conducted an electronic search in PubMed and ScienceDirect on June 6, 2021. The following search terms were used for the titles and abstracts: ("COVID-19" OR "SARS-CoV-2" OR "coronavirus") AND ("bariatric surgery" OR "bariatric" OR "metabolic surgery"). There were no limitations to the study design.

Inclusion criteria were randomized trials or observational studies on the association between COVID-19 and weight regain after bariatric surgery. Non-English studies were excluded. Titles and abstracts were screened for all studies and their full-text was then obtained for those that met the inclusion criteria. The full-text evaluation was performed, and references from relevant manuscripts were reviewed manually for additional manuscripts. Reference lists of the relevant studies were searched manually.

A total of 349 articles were initially obtained from database searching. After duplicate removal, the titles and abstracts of 229 studies were screened and then, 13 articles were assessed for full-text reading. Finally, eight articles were included in this review study. Figure 1 represents a flow diagram of the search strategy process.

3. Results

This review study yielded eight studies [1, 4-6, 14-17] on 691 patients with a previous bariatric surgery (Table 1).

Mental health conditions among post-bariatric surgery patients during the lockdown:

According to Athanasiadis et al. [14], COVID-19 social isolation has affected many aspects of the mental health of people who previously had bariatric surgery, which can lead to weight regain. In this study, out of 208 patients, 44.2% reported depression, 36.2% loneliness, 54.7% nervousness, and 23.2% decreased social support, which unfortunately confirms the previous statement. In another recent study [4], limited access to social support was reported among half of the patients. Interestingly, cohabiting with more people reduced psychological challenges, such as fear of weight regain among the patients. A study also found that the rate of weight concern and negative urgency among patients after bariatric surgery has increased during the lockdown period [1]. Messiah et al. [15] showed that the post-operative lockdown period was directly related to the increased rate of sleep problems and anxiety. Finally, COVID-19 mandatory lockdown has created many psychological challenges for patients with bariatric surgery, which increases the risk of weight regain and this issue highlights the importance of regular follow-up [1, 4, 14, 15, 17].

Food habits among post-bariatric surgery patients during the lockdown:

Patients with previous bariatric surgery, experienced an increase in snacking [11], grazing behavior [1], losing control overeating [4, 11], and reduced healthy food eating [11] during the COVID-19 lockdown, which can play a role in increasing the risk of weight gain. Moreover, Nicoletti et al. [6] found that many post-operative patients did not receive the recommended daily protein and the recommendation for frequent animal protein in-

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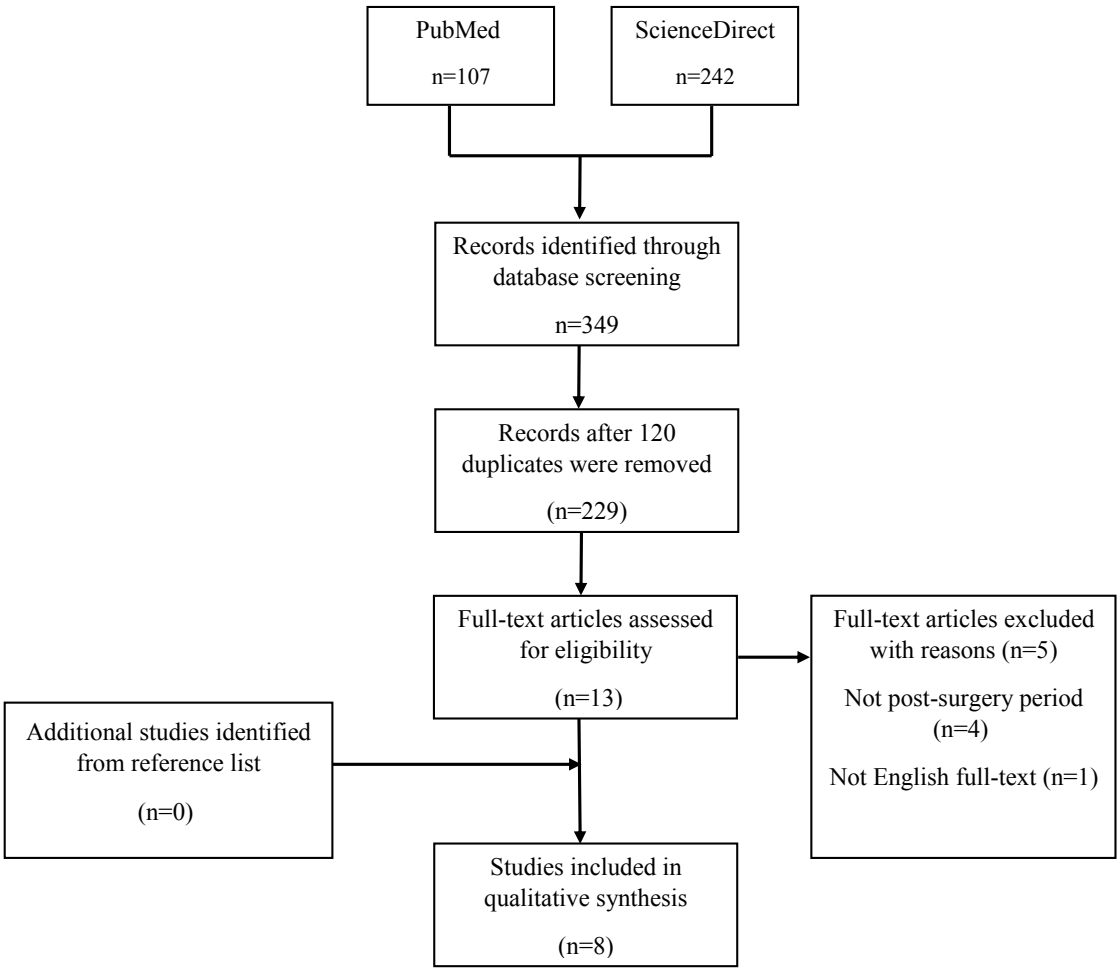

Figure 1. Literature search process flow diagram

take during the lockdown and the intake of highly processed foods had increased.

Physical activity among post-bariatric surgery patients during the lockdown:

Social isolation has reduced physical activity in patients with a history of bariatric surgery, which plays an important role in weight regain in the post-operative period [5, 16].

4. Discussion

As we observed, there are several psychosocial and physical factors that can cause weight gain and other complications for patients with a history of bariatric surgery during the outbreak of COVID-19. In this review study, we categorized factors affected by the pandemic era into three categories: mental health, eating habits, and physical activity. It should be noted that each of these factors, especially psychological conditions can have aggravating and bilateral effects on each other.

Among the eight articles included in our study, five articles used a questionnaire to examine the psychological effects of mandatory lockdown on patients' lives and the results showed that the mental condition of these patients has deteriorated. In this review study, we found that the rate of depression, loneliness, nervousness, mental anxiety, sleep problems, stress, and fear of losing control over eating increased significantly in patients after surgery during the COVID-19 outbreak compared to before [1, 4, 14, 15, 17]. However, in only one study, the rate of depression was not affected by lockdown and was high in both groups of patients before and after social isolation and this may be due to self-reports and different perceptions of patients [15].

Receiving mental support from others can reduce psychosocial distress [4]. On the other hand, during the COVID-19 outbreak, with the forced isolation and reduced

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Table 1. Impact of COVID-19 mandatory lockdown on various aspects of patients undergoing bariatric surgery

ID	First Author	Study Design	Sample Size	Average time after surgery	Survey design	Results
1	Dimitrios I. Athanasiadis		208	30.6 months	online questionnaire	The patient's mental health condition was deteriorating during social isolation. Nearly half of patients reported increases in their depression, nervousness, snacking, loss of control when eating and decreases in healthy food eating and activity, all of which led to weight regain. . Weight regain was more prevalent among patients after 18 months of surgery and they regained more than 2 kg during an average of 47 days of COVID-19 lockdown. It is noteworthy that the authors considered the postoperative time as a confounder; however, this does not change the association between the studied parameters and postoperative weight regain.
2	Sílvia Félix	cross-sectional study	24	42.8 months	online questionnaire and telephone interview	Weight gain, limited access to social support, and limited access to medical care were seen in almost half of the patients during the lockdown. Furthermore, cohabiting with more people during follow-up time showed fewer challenges in dealing with emotional situations, less fear of gaining weight, less fear of losing control overeating, and less disordered eating.
3	Daniel de Luis	cross-sectional study	48	41.1 months	telephone interview	An increase in self-reported body weight among the patients during the interview was associated with a decrease in physical activity and the loss of face-to-face visits to the nutrition unit.
4	Eva Conceic¸˜ao	longitudinal study	101	3 years	telephone interview	COVID-19 lockdown resulted in higher weight concern, grazing behavior, and negative urgency that increase the risk of weight regain among post-bariatric patients.
5	Carolina Ferreira Nicoletti	observational study	65	7.4 months	telephone interview	Screening of dietary habits and food intake of patients with a history of bariatric surgery through three non-consecutive 24-h food recalls showed that many patients failed to receive the recommended daily protein and the recommendation for frequent animal protein intake during social isolation. Furthermore, about a quarter of these patient's diets consisted of ultra-processed foods.
6	Sarah E. Messiah	retrospective chart review	189	97 months	online questionnaire	Mandatory COVID-19 lockdown had a durable negative effect on the health of people undergoing bariatric surgery. Patients who completed their postoperative period during lockdown experienced more sleep problems, anxiety, and substance use than other patients who followed up before social isolation. The depression rate was high in both groups.
7	Diego A. N. Rezende	cross-sectional study	33	7.1 months	accelerometer and questionnaire	Adherence to social distance reduced physical activity among patients undergoing bariatric surgery.
8	Alaa Youssef	nested-qualitative study	23	2.4 years	telephone interview	Patients undergoing previous bariatric surgery, face many challenges during COVID-19 social isolation; therefore, they need personalized care to manage their obesity and achieve physical and mental well-being.

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access to social support, psychological challenges and coping with them became more difficult. Following this social distance, a decrease in physical activity and engaging people in sedentary tasks could ultimately lead to weight regain in people with a history of bariatric surgery, in addition to endangering them into many psychosocial distresses [1, 16].

Several studied psychological factors, such as anxiety, not only directly cause weight gain, but also cause more gaps in patients' lives by affecting their eating habits and physical activity. Therefore, one of the important goals of this study was to show the role of virtual psychosocial care during COVID-19 lockdown for patients who underwent bariatric surgery, especially patients with a history of mental disorders. Regular follow-up of these patients with a team of psychologists in addition to physicians and nutritionists can help them to achieve self-management and reduce the burden on the health system in long term.

According to our observations in this review study, the prevalence of COVID-19 has caused changes in eating patterns, followed by weight changes in patients receiving bariatric surgery. Increased snacking, grazing behavior, loss of control when eating, failure to receive the recommended daily adequate of protein, reduced consumption of healthy foods, and subsequently, increased intake of highly processed foods were among the factors related to weight gain [1, 4-6, 11]. These results indicate the importance of follow-up patients with a nutritionist and psychologist for preventive action. In this regard, a recent study showed that about half of patients with a history of bariatric surgery did not attend nutrition counseling sessions during the lockdown, and this was a risk factor for their weight regain and other nutritional complications [5].

A study by Violant-Holz et al. [18] showed that physical activity decreased dramatically during the COVID-19 pandemic. A similar result was seen in patients with a history of bariatric surgery and increased self-reported body weight was associated with decreased physical activity rather than dietary factors [5]. Adherence to mandatory lockdown in these patients has led to more time in sedentary behavior and reduced moderate to severe physical activity. Therefore, based on previous findings, we hypothesize that scientific planning and counseling to increase the physical activity of patients after bariatric surgery is an important factor in creating favorable outcomes of surgery.

Our study is the first review study on the effects of forced closure due to COVID-19 mandatory lockdown on factors leading to weight gain in patients with a history of bariatric surgery, which has important practical recommendations in the clinic. Scheduling follow-up sessions for these people by a team of physicians, nutritionists, and psychologists can prevent possible side effects [18]. During the outbreak of COVID-19, when the stressors on these patients increase spontaneously, online video calls, regular phone calls, and if necessary, face-to-face meetings can be helpful. In addition, making health tools available, such as smartwatches, pedometer apps, and food history record apps can help patients increase motivation and self-care.

5. Conclusions

Patients with a history of bariatric surgery during the COVID-19 pandemic are both mentally and physically prone to complications of lockdown and many of these patients have reported weight gain during this period. These results warn that weight regains after bariatric surgery will be associated with recurrence of obesity comorbidities and ultimately an increase in the burden on the health system in the coming years. Informing patients and considering a regular follow-up program to follow a healthy diet and adhere to physical activity, and mental health self-care can be effective in improving the outcomes of bariatric surgery.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

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