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Research Article

Comparing the Impact of Social Distancing and Lockdown on Surgical versus Medical Weight Management during COVID-19 Pandemic-Cross Sectional Study

Sabrina Cheok[1], Henry Lew[3], Phong Ching Lee[2], Angelina Foo[1], Eugene Lim[1], Alvin Eng[1], Weng Hoong Chan[1], Hong Chang Tan[2], Jean-Paul Kovalik[2], Sonali Ganguly[2], Jeremy Tan[1], Chin Hong Lim[1*]

[1]Department of Upper Gastrointestinal & Bariatric Surgery, Division of Surgery, Singapore General Hospital, Singapore

[2]Department of Endocrinology, Division of Medicine, Singapore General Hospital, Singapore

[3]Department of Psychology, Division of Allied Health, Singapore General Hospital, Singapore

[*]**Corresponding author:** Chin Hong Lim, Department of Upper Gastrointestinal & Bariatric Surgery Singapore General Hospital, Academia, 20 College Road, 169856, Singapore

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Abstract

Social distancing negatively impacts dietary, exercise and psychological health of the bariatric population. We aim to evaluate the impact of quarantine on post-Metabolic Surgery (MS) compared to medical weight management patients (MM) and discuss potential strategies for their personalized care. We recruited and compared 129 MS and 143 MM patients. There was no significant change in weight and diabetic control for both groups. In the MS group, there was a significant decrease in exercise frequency (2.63 (±2.10) to 2.03 (±2.13), $p<0.001$); and increase in stress levels (4.26 (±2.25) to 5.09 (±2.72), $p<0.001$). Adjusted analysis showed significant correlation between reduction in exercise frequency and increased stress levels. Bariatric services must be ready to respond to long-term challenges posed by COVID-19. Telemedicine with continue personalized psychological support and evolution of traditional exercise programs to a hybrid model is strongly recommended for optimal care of bariatric patients.

Keywords: Bariatric surgery; Medical weight management; Pandemic; Psychological health; Telemedicine; Personalized care of bariatric population

What we already know

- COVID 19 has brought about restrictions such as quarantine and social distancing that has resulted in significant physical, emotional, and psychological distress to many.
- The bariatric program requires close follow up for medical and psychological management.
- COVID 19 has inevitably affected this service as hospital systems divert resources to the fight against the pandemic.

What this Article Adds

- Bariatric patients are a unique population, with their own unique set of challenges and difficulties that the COVID-19 pandemic and its associated restrictions have exacerbated.

- Ours is the first study to compare impact of COVID 19 on post-surgical verses medical management bariatric patients
- Highlight importance for bariatric programs worldwide to redesign and restructure the program to one that can fully meet the needs of the patient in a post COVID -19 era

Introduction

Since the declaration of COVID-19 as a global pandemic by the World Health Organization (WHO) on 12 March 2020, governments across the globes have imposed total "lockdowns" as an effort to contain and control the spread of the virus. Schools, offices, travel, and businesses have been ordered to cease operations for extended periods. This global pandemic and its ramifications have caused significant physical, mental, and emotional distress to individuals regardless of race, income, or geography.

As millions of us are confined to our homes, a shift towards habits of frequent snacking and irregular eating patterns has emerged. Bloomberg reported that consumers are gravitating towards calorie dense, ultra- processed shelf stable foods. By the middle of March, United States saw a 48% increase in popcorn, 47% in pretzel sales and 30% increase in potato chip sales compared to the same period in 2019 [1]. Similarly, a Polish study has shown that individuals with obesity had less frequent consumption of vegetables, fruit, and legumes during quarantine and higher consumption of meat, dairy, and fast foods [2]. Confinement also has direct effects on our lifestyle choices with sedentary activities and screen time increasing exponentially. Compounded with measures such as social distancing and enforced quarantine, some suggest that the additive psychological distress caused by COVID-19 can increase emotional and binge eating symptoms leading to increased risks of obesity [3].

In Singapore, a nationwide partial lockdown, termed the "circuit breaker" was imposed from 7th April until 1st June 2020 in response to the COVID-19 pandemic. Our study aims to evaluate the impact of social distancing and lockdowns during this circuit breaker period on our patients with obesity, either post-Metabolic Surgery (MS) or undergoing active Medical Management (MM). Patients will likely experience unique psychological distress and challenges that requiring personalized care strategies from the bariatric program. Results will help inform and address the challenges in patient care that this pandemic has brought to light, its long-term implications on the management of the bariatric patient and discuss potential strategies in a post COVID-19 society. To the knowledge of the authors, our study is the first to compare the impact of COVID-19 on MS versus MM patients which will allow understanding of unique stressors faced by our patients and propose changes needed in weight management program to ensure best personalized patient care.

Materials and Methods

We adopted a cross-sectional survey design which consists of the option of online survey or written questionnaire, with the aim to collect data on impact of social distancing and lockdown during COVID-19 pandemic on obese patients at a tertiary hospital. We conducted either face-to- face questionnaires in the clinic after lockdown for those who were not suitable for video consultation or questionnaires administered via telecommunication channels such as FormSG (encrypted end-to-end data collection platform). The questionnaire contains 14-questions in various formats including multiple choice, open and Likert scale. It includes questions on patient's demographics, basic anthropometrics, impact of lockdown on change in patient's weight and diabetes control. It also includes questions on medication adherence, exercise, and stress levels. The questionnaire was reviewed by a panel of multidisciplinary professionals consisting of bariatric surgeons, endocrinologists, and psychologists.

We recruited patients who met the inclusion criteria of being diagnosed with obesity (BMI≥30 kg/m^2), English literate and having mental capacity to make their own decisions. We excluded patients if they had undergone bariatric surgery ≤ 9 months ago, have active eating disorders, pregnant or had given birth ≤ 6 months ago. Patients who were admitted to hospital or tested positive for COVID-19 were excluded too. We also excluded patients who had symptoms of active severe psychological and psychiatric conditions like psychosis, self-harm, suicide, hallucinations that may hinder them from providing accurate responses. The survey started on 1st June 2020 (end of lockdown) and continued for a duration of 1 month. The study was anonymous, performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its latter amendments (Fortaleza) and approved by the Institutional Review Board. Participants were informed about the aim of the study, and verbal consent was obtained prior to the beginning of the survey. This current study has been reported in line with the STROCSS criteria [4].

Statistical Analysis

Descriptive results regarding categorical variables were given as percentages (%) of subjects affected. Results were presented as mean ± Standard Deviation (SD) or medians with interquartile range. Patients were divided into post Metabolic Surgery (MS) and Medical weight Management (MM) group. Characteristics of these two groups were compared using Student's t test for continuous variables or Chi-square test for categorical variables. When analysing the relationship between multiple independent and dependent variables, a linear regression model was used. $P<0.05$ was taken to indicate statistical significance. All analyses were performed using Stata version 16 software (Lakeway Drive, TX, USA).

Results

272 patients participated in the survey with mean age of 45.6 ± 12.3. 129 were post MS and remaining 143 were on MM program which include lifestyle modification of dietary habits and physical activity, behavioral intervention, and/or pharmacological therapy. Mean weight prior to circuit breaker was 88.2 ± 2.74 kg with mean BMI of 33.6 ± 1.2 kg/m^2. There were 194 (71.3%) females and 78 (28.7 %) males. The ethnic composition of the cohort consisted predominantly of Chinese (42.3%), Malay (32.7%) and Indian (20.6%) ethnicity. None of our patients had contact with patients with confirmed COVID-19 or were issued quarantine orders. Table 1 shows the breakdown of the patient demographics and baseline anthropometrics. We note that there was a significant difference in the weight (MS group 84.5 ± 20.7 versus MM group 97.0 ± 23.1, p<0.001), BMI (MS group 30.7 ± 1.89 versus MM group 36.6 ± 3.78, p<0.001) and Type II DM (MS group 33.3% versus MM group 48.3%, p<0.001) between the post metabolic surgery group and the medical weight management group. This is likely secondary to the increased weight loss and resolution of Type II diabetes mellitus that is commonly seen in patients following metabolic surgery. There was also a significant difference in exercise frequency (MS group 2.6 ± 2.1 versus MM group 1.4 ± 1.4, p<0.001) per week between the two groups prior circuit breaker.

	Post Metabolic Surgery N=129	**Medical Weight Management N=143**	***p***
Mean age (SD)	46.1 ± 10.6	46.7 ± 13.7	0.698
Gender			
Male, n (%)	35 (27.1)	43 (30.1)	0.569
Female, n (%)	94 (72.9)	100 (69.9)	
Race			
Chinese, n (%)	42 (32.6)	73 (51.0)	0.096
Malay, n (%)	56 (43.4)	33 (23.1)	
Indian, n (%)	24 (18.6)	32 (22.4)	
Other, n (%)	7 (5.4)	5 (3.5)	
Type of procedure			
LSG	97 (75.2)	0	
RYGB or OAGB	32 (24.8)	0	
Height (cm) ± SD	165.9 ± 11.2	162.9 ± 9.0	0.366
Weight (kg) ± SD	84.5 ± 20.7	97.0 ± 23.1	<0.001
BMI (kg/m^2) ± SD	30.7 ± 1.89	36.6 ± 3.78	<0.001
Type II Diabetes, n (%)	43 (33.3)	69 (48.3)	<0.001
Exercise Frequency (time perweek)	2.6 ± 2.1	1.4 ± 1.4	<0.001
Stress Level at baseline	4.3 ± 2.3	4.6 ± 2.4	0.388

Table 1: Demographics and baseline anthropometrics between the patients underwent metabolicsurgery or medical weight management.

There was no significant change in weight between the pre and post circuit breaker period for the MS and MM group. There was no significant change in exercise frequency but slight increase in stress levels (4.56 (± 2.38) to 4.94 ± (2.56), p=0.049) for the MM group before or after the circuit breaker however we note a significant change in both aspects for the post MS group.

This group showed a significant decrease in exercise frequency from 2.63 (±2.10) to 2.03 (±2.13), p=0.0003; and a significant increase in stress levels pre 4.26 (±2.25) and post 5.090 (±2.72) circuit breaker, p =0.0004 (Table 2). When adjusted for other variables (age, gender, race, and weight change) with linear regression analysis, we found exercise frequency and stress level were closely related (95% CI: 0.064-0.258, p =0.0024) although the Pearson's correlation coefficient of showed a weak association. (-0.2204).

	Before Lockdown	After Lockdown	Mean difference (95% CI)	*p*
Post MS Weight (kg) ± SD	84.3 ± 20.7	83.3 ± 19.1	-1.01 ± 7.9 (-0.4 to 2.42)	0.157
MM Weight (kg) ± SD	97.2 ± 23.2	97.2 ± 23.1	-0.003 ± 4.42 (-0.77 to 0.76)	0.994
Post MS Exercise sessions per week	2.63 ± 2.10	2.03 ± 2.13	-0.60 ± 1.76 (-0.28 to -0.92)	0.0003
MM Exercise sessions per week	1.44 ± 1.34	1.57 ± 1.74	0.13 ± 1.60 (-0.40 to 0.13)	0.323
Post MS Stress Level	4.26 ± 2.25	5.09 ± 2.72	0.83 ± 2.35 (0.38 to 1.28)	0.0004
MM Stress Level	4.56 ± 2.38	4.94 ± 2.56	0.37 ± 2.15 (0.002 to 0.75)	0.049

Table 2: Comparing the changes in weight, exercise frequency and stress level before and afterlockdown. Post MS: Post Metabolic Surgery; MM: Medical weight Management.

Discussion

The COVID-19 pandemic has shown no signs of abating, with long term socio-economic repercussions. To contain the virus, the Singapore government increased its alert level to DORSON (Disease Outbreak Response System) Orange on 7 February 2020. The DORSCON framework (Figure 1) is a color-coded framework that reflects our response to the current disease situation and is meant to provide general guidelines on what needs to be done on a national scale to contain the spread of the virus. Following the escalation of Singapore's alertness level, Singapore witnessed a continued increase in both new community and imported COVID-19 cases. In response, the Singapore multi-ministerial COVID-19 task force announced the implementation of "Circuit Breaker" measures on 7th April 2020 consisting of a series of enhanced and stricter safe distancing measures with a specific aim to significantly reduce unnecessary movements and interactions in both public and private places.

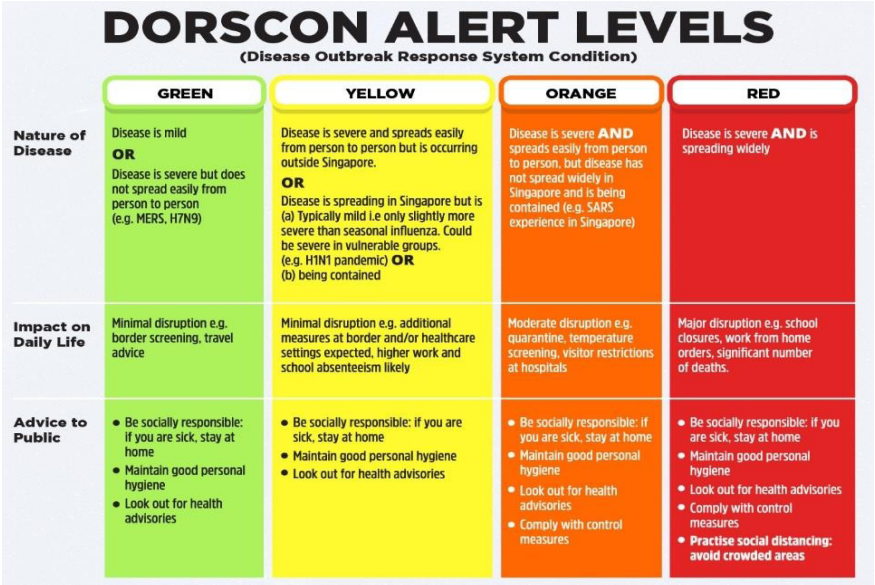

Figure 1: DOSRCON color coded framework utilized by the Singapore Government. Each level- Green, Yellow, Orange, and Red details their respective set of guidelines in response to the increasing severity and transmissibility of the disease.

Healthcare is deemed as an essential service and can continue operation [5]. However, to ration valuable healthcare resources to the management of COVID-19 and to limit the potential spread of the coronavirus within healthcare facilities, the Ministry of Health in Singapore mandated the cancellation of non-urgent healthcare services. This has caused significant disruption to Singapore's metabolic surgical program with the postponement of all non-essential outpatient follow-up visits. The International Federation for Surgery of Obesity (IFSO) and the Diabetic Surgery Summit (DSS) has endorsed such recommendations to cancel and defer all elective bariatric procedures and outpatient follow-up appointments to preserve healthcare resources for essential and COVID-19 related operations [6]. Kumar, et al. [7] reported that patients with diabetes and obesity have high risks of morbidity and mortality from COVID-19 infections hence it is reasonable to postpone any elective services for these patients to reduce the risk of contagion and COVID-19 related complications to both the patient and the attending healthcare staff.

The uncertainty on the predicted time course of COVID-19 beyond a critical inflection point implies that post-MS patients may be deprived of access to timely medical care or in person support, resulting in not only a potential delayed recognition of postoperative surgical or nutritional complications but also negatively impact a patient adherence to lifestyle modifications that are necessary to sustain healthy weight loss post-operatively [8-11]. Arguably, the potential fallout from clinic cancellations may have a more dramatic and immeasurable impact on the long- term health of our communities than the morbidity and mortality inflicted by the novel coronavirus disease. The World Health Organization describes that fear, anxiety, and uncertainty about the disease itself is co-occurring with requirements for social distancing and increasingly difficult economic realities. The pandemic may have caused significant clinical and financial stress as patients worry not only about contagion of the virus but also income and job security from the economic instability caused by the lockdown period. This observation is also reflected in our study as we note a significant increase in stress levels in post-metabolic surgery group from 4.26(±2.25) to 5.090 (±2.72), $p<0.001$ and trends of increased stress in the medical management group from 4.56 (±2.38) to 4.94 ± (2.56), $p=0.049$. Contrary to existing literature that demonstrate sustained weight loss, improved quality of life and lower rates of mental health conditions within 2-years post bariatric surgery [12,13], our results highlight the severity and gravity of stress impact of COVID-19 and its associated restriction measures. Our study suggests that COVID 19 and its implications has moderated the benefits of improved stress associated with metabolic surgery in the short term.

The significant decrease in exercise by the post-MS group, coupled with a trend of increase in stress level suggests psychological factors could have been present to impact exercise participation or vice versa. MS patients must deal with psychological factors that obese patients face when exercising e.g., lack of confidence to exercise, past negative experiences when exercising, or fear of increasing musculoskeletal pain and getting injured [14]. MS patients also must deal with decreased motivation to exercise after surgery [15,16]. Post-surgery patients have reported a participation rate of only 19% in exercise on their own despite prescribed exercise interventions [17]. With regards to exercise, MS patients also face unique stressors due to COVID-19 that limits their physical activities. Lockdown heavily reduced people's range of opportunities to exercise due to closure of sport infrastructure, cancellation of sport events and absence of friends to exercise with. This is especially pertinent to post-MS patients because most have sign-up for fitness program or gym membership as part of post-operative management. Hence our study results of reduced exercise frequency in MS patients suggests the multiple stressors that they must cope with during a pandemic and its adverse effect on their daily habits.

Our results indicate that the pandemic and its lockdown measures have been detrimental to the coping mechanism of MS patients. Previous research indicates that MS patients who have more confidantes or share their surgery experiences with others were better equipped to cope with surgery-related stress and thus experience more weight loss [18]. Furthermore, patient support groups were also suspended during the lockdown, hence further limiting avenues of support for MS patients. Continued psychological support and interventions have been recommended to help support patients. The National Institute for Health and Care Excellence (NICE) guidelines [19] and American Association of Clinical Endocrinologists (AACE)/American Association of Metabolic and Bariatric Surgery (ASMBS)/The Obesity Society (TOS) [20] recommend multidisciplinary team that provide psychological support for bariatric patient population during this pandemic. Patients often feedback regarding the lack of and need for support in the areas of psychological aftercare to facilitate adjustment following drastic weight loss, and acceptance of their non-obese self and perceived stigma [21,22]. Programs and services that provide support and psychological interventions have been found to lead to better adherence to dietary and lifestyle recommendations [23].

There are several limitations to this study. First, this was a sample of convenience which can produce selection bias. Second, the questionnaire was administered within 1 month after lockdown and patients were asked to recall their weight, exercise frequency and stress hence bringing up the possibility of recall bias. Another limitation is that our approach to use closed- ended questions could bias respondents into giving a certain response. Furthermore, since our study was executed only two months after the start of the lockdown, future study is needed to investigate potential long-term effects by social distancing and lockdown.

COVID-19 has exposed the vulnerability of our current bariatric program, but it has also provided us with an unprecedented opportunity to redesign and reorient bariatric care around patients. Healthcare systems all around the world are embracing telemedicine like never. Countries like the USA and Scotland have seen an almost tenfold increase in the use of virtual healthcare in the last few months [24,25]. Our study highlighted the negative impact of COVID-19 on bariatric patients. Bariatric programs must be ready to respond to challenges posed by COVID-19, especially for post-MS patients. No matter what we do to curb the novel coronavirus, one thing is almost certain is this virus will never go away completely. The rate of mutations and new variants means that COVID 19 will likely become endemic and will continue to circulate in pockets of the global population for years to come. Bariatric services must thus evolve to provide a hybrid model of virtual and in-person care. The ability to switch between telemedicine and physical consultation tailored based on patient's needs and the local COVID-19 situation will ensure the continuity of personalized care to our patients during this especially challenging era.

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