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Position Statement

Obesity and COVID-19: The Two Sides of the Coin

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Abstract
The World Health Organization declared COVID-19, the infectious disease caused by the coronavirus SARS-CoV-2, a pandemic on March 12, 2020. COVID-19 is causing massive health problems and economic suffering around the world. The European Association for the Study of Obesity (EASO) promptly recognised the impact that the outbreak could have on people with obesity. On one side, emerging data suggest that obesity represents a risk factor for a more serious and complicated course of COVID-19 in adults. On the other side, the health

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emergency caused by the outbreak diverts attention from the prevention and care of non-communicable chronic diseases to communicable diseases. This might be particularly true for obesity, a chronic and relapsing disease frequently neglected and linked to significant bias and stigmatization. The Obesity Management Task Force (OMTF) of EASO contributes in this paper to highlighting the key aspects of these two sides of the coin and suggests some specific actions.

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Introduction

The World Health Organization (WHO) declared COVID-19, the infectious disease caused by the coronavirus SARS-CoV-2, a pandemic on March 12, 2020. COVID-19 is causing massive health problems and economic suffering around the world. The European Association for the Study of Obesity (EASO) promptly recognised the impact that the outbreak could have on people with obesity (PwO) [1]. On one side, emerging data suggest that obesity represents a risk factor for a more serious and complicated course of COVID-19 in adults. On the other side, the health emergency caused by the outbreak diverts attention from the prevention and care of non-communicable chronic diseases (NCDs) to communicable diseases. This might be particularly true for obesity, a chronic and relapsing disease frequently neglected and linked to significant bias and stigmatization. The Obesity Management Task Force (OMTF) of EASO contributes in this paper to highlighting the key aspects of these two sides of the coin and suggests some specific actions.

Obesity as a Risk Factor for COVID-19

Emerging data suggest that adults with obesity may be at risk for a more serious and complicated course of COVID-19, the severity of the disease being exacerbated by biological and social factors associated with obesity (Fig. 1).

Adults with Obesity Are Prone to COVID-19 Infection and Its Complications

- Adipose tissue is rich in angiotensin-converting enzyme 2 (ACE2) receptors, which act as a port of entry for SARS-CoV-2 to human cells [2, 3]. The higher number of adipocytes in PwO may lead to a greater viral load and prolonged viremia.
- Increased visceral adiposity results in an efflux of pro-inflammatory cytokines. This influences systemic cellular processes and is associated with a state of low-grade inflammation that may in some cases contribute to the "cytokine storm" of COVID-19 [4, 5].
- Obesity has been shown to alter immune function and increase the susceptibility to infection from different pathogens. Elevated circulating pro-inflammatory cytokines, as well as reduced adiponectin levels, may impair the immunological response to infection. This entails disruption in the lymphoid tissue structure and shifts in leukocyte populations and inflammatory phenotypes. Also, B and T cell responses are impaired in PwO, and this causes an increased susceptibility and delay of resolution of viral infections. Finally, reduced vaccine efficacy has been observed in PwO [5, 6].
- Obesity is associated with a pro-coagulant profile that may have a role in the thromboembolic complications in COVID-19 [7].
- Obesity is associated with decreased pulmonary function, including decreased expiratory reserve volume and respiratory system compliance, which may place PwO at a higher risk of COVID-19 complications [8].

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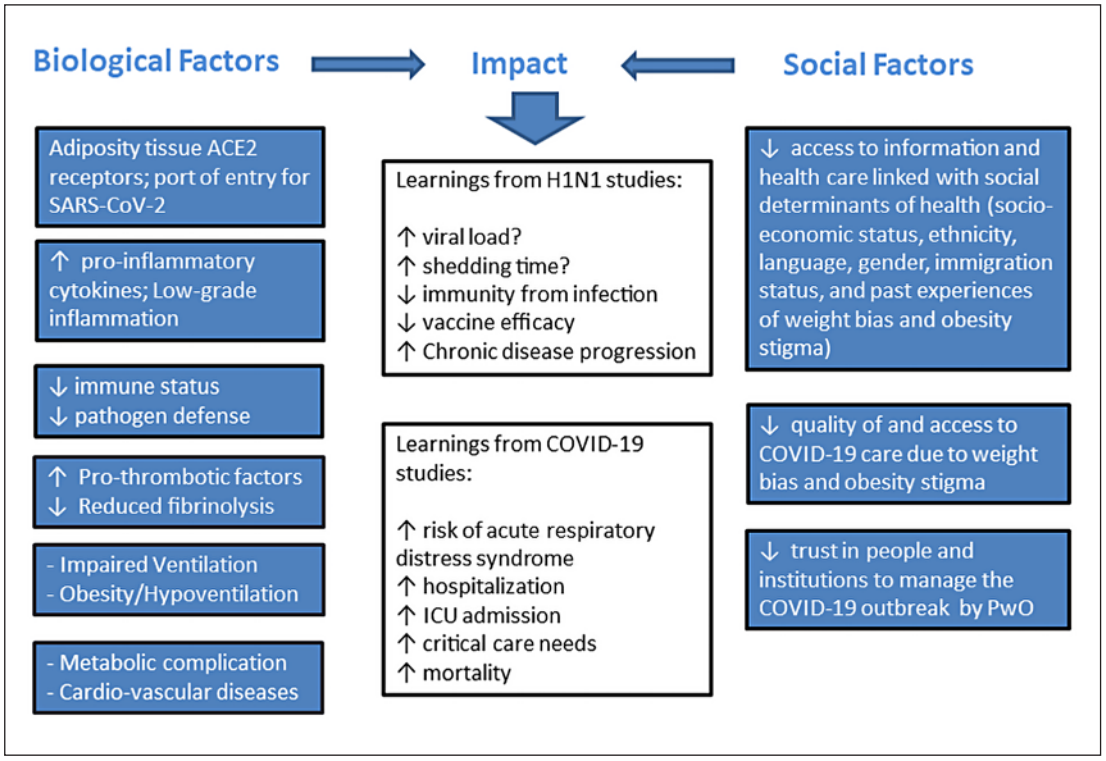


Fig. 1. Biological and social factors linking obesity with COVID-19 illness severity. ACE, angiotensin-converting enzyme; ICUs, intensive care units; PwO, people with obesity.

- Obesity and dysfunctional adipose tissue are related to comorbidities such as type 2 diabetes, hypertension, and cardiovascular and renal diseases, which may deteriorate during COVID-19 and affect the overall health of patients [8].

Adults with Obesity Are at a Higher Risk for Admission to Intensive Care Units (ICUs) and Intubation

PwO are more likely to develop serious or fatal COVID-19-related complications [9]. Among individuals under the age of 60 affected by COVID-19, adults with obesity are almost twice as likely to need treatment in the ICU than those without obesity [9]. Severe obesity increases the risk of acute respiratory distress syndrome, which is a major complication of COVID-19. Several studies demonstrated an association of obesity with ICU admission and mortality among individuals with COVID-19 [8–13].

Adults with Obesity Have Longer Viral Load and Lower Vaccination Effect

- Adults with obesity were shown to have higher viral load and longer shedding time in H1N1 [14]. During and after the 2009 influenza A/H1N1 pandemic, higher body mass index was recognized as an independent risk factor, which resulted in increased disease severity, hospitalization, risk of spreading the disease, and death [6].
- Vaccination efficacy in adults with obesity may be compromised. Obesity-related metabolic dysregulation has been proposed as the driver of poor effector T cell and helper T cell function, and in impaired memory T cell responses and vaccine efficacy. This may be due to alterations in T cell metabolism. In obese mice, the protectiveness of the 2009 A/H1N1 vaccine was reduced [15]. It was demonstrated that the SARS-CoV-2 infection may

affect primarily T lymphocytes, particularly CD4+ and CD8+ T cells, resulting in a decrease in numbers as well as IFN-γ production by CD4+ T cells [16]. Thus, specific vaccination strategies for high-risk groups, including for PwO, are required.

Social Determinants of Health, Weight Bias, and Obesity Stigma May Affect Patients' Behaviour and COVID-19 Outcomes

- Other mediating parameters between obesity and COVID-19 complications may include social determinants of health, access to care, weight bias, and obesity stigma [17–19]. Intersecting vulnerabilities such as socio-economic status, ethnicity, language, gender, immigration status, and past experiences of weight bias and obesity stigma may prevent PwO from accessing COVID-19 information and health care services.
- PwO who have experienced weight bias in health care may avoid or delay accessing health care services. If PwO are diagnosed and treated for COVID-19 and later compared to people with normal weight, the severity of the coronavirus disease progression may escalate further and this could have implications for critical care needs [20].
- Past experiences of weight bias and discrimination may also impact patient behaviour such as having less trust in people and institutions to manage the COVID-19 outbreak. This may have implications for future governmental interventions to mitigate this pandemic [21].
- Weight-biased beliefs, attitudes, and a lack of recognition of obesity as a chronic disease may influence clinical judgement and behaviours. For example, unconsciously, health care professionals (HCPs) may conduct less monitoring of PwO and may also lack an adequate understanding of patients' obesity-related complications to tailor the management of COVID-19.
- Special considerations, adaptations, and accommodations may not be available for PwO. For example, hospitals may lack adequate protective equipment and other health care equipment to accommodate staff and patients affected by obesity. This may result in higher risk of spreading of COVID-19 to persons living with obesity (both HCPs and patients).

COVID-19 as a Barrier to Obesity Treatment

The health emergency linked to the outbreak of COVID-19, with millions of cases and hundreds of thousands of casualties worldwide, caused a severe stress to health systems, diverting attention from the care of NCDs to emergency rooms and ICUs. As a consequence, patients with NCDs may suffer significant delay in diagnosis as well as under-treatment during these difficult times. This caveat may be particularly severe in PwO. Despite sharing in part common aetiologies with other NCDs, obesity receives little attention and care even under normal circumstances [22] and its management could be particularly at risk during the COVID-19 outbreak.

To have a clearer picture about the situation of obesity care in Europe during the COVID-19 epidemic, EASO launched an electronic survey exploring the topic across the EASO Collaborating Centres for Obesity Management (COMs) network. The COMs initiative is a network of accredited adult and paediatric multidisciplinary treatment centres from across Europe. Entries in the network are accredited in accordance with accepted European and academic guidelines, ensuring a network of high-level structured centres [23]. The survey was conducted during a short period, from May 18 to May 26, 2020. Seventy out of the 123 active COMs responded, with a 56.9% response rate. A graphic representation of the responses received for the more significant questions is given in Figure 2.

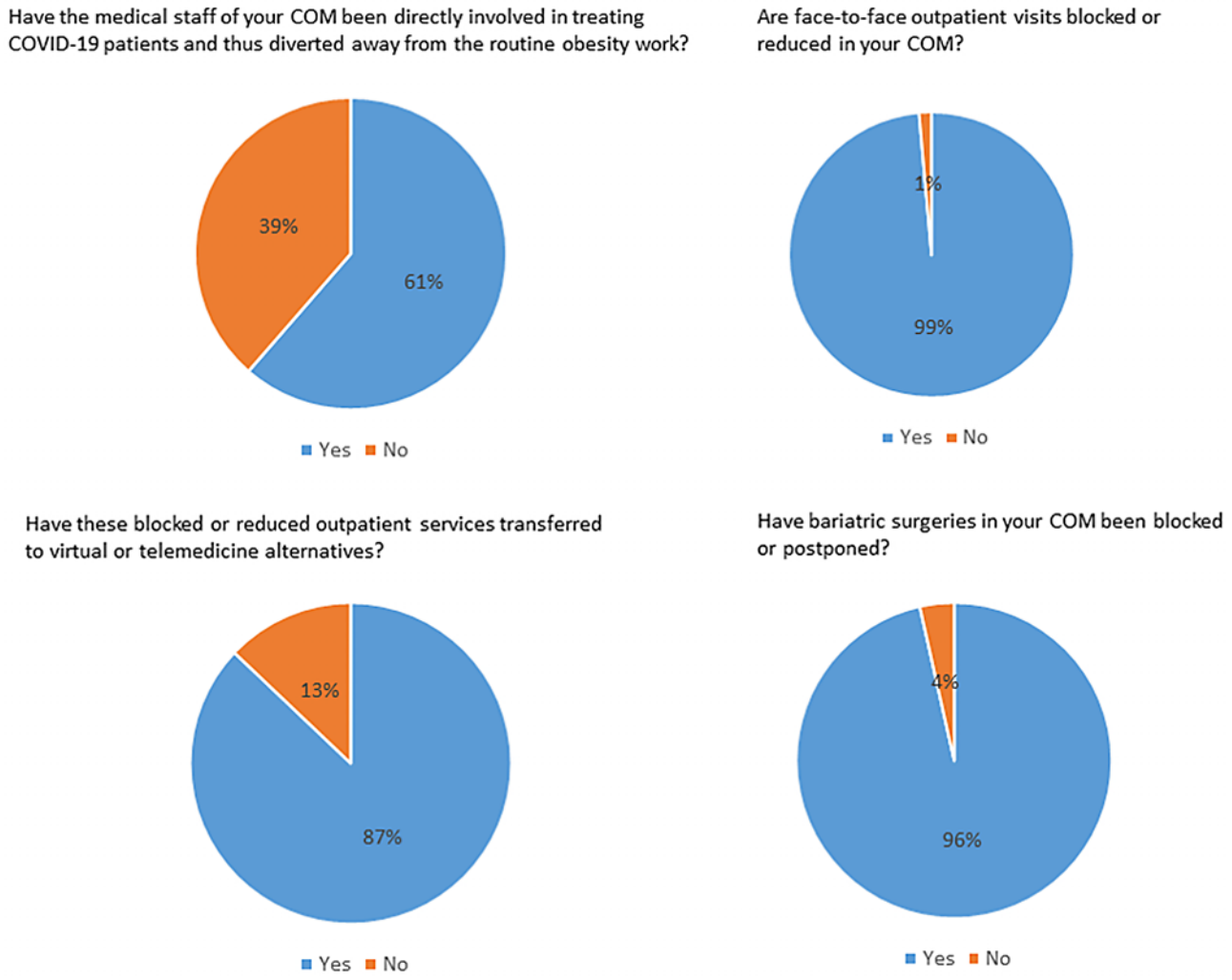


Fig. 2. Responses received for the more significant questions in the survey conducted across the EASO Collaborating Centres for Obesity Management (COMs) network in order to understand how COVID-19 epidemic affected obesity care in Europe.

Health Care Professionals Dedicated to Obesity Management Diverted to COVID-19 Care

- The shortage of HCPs in ICUs and medical wards dedicated to the care of COVID-19 adult patients, caused by the rapid increase in the number of cases, required in several European countries the diversion of HCPs form other services to COVID-19-dedicated ones. This shift affected obesity medical services too.
- According to the survey, 61% of the responding COMs had their staff directly involved in treating COVID-19 patients and thus diverted away from routine work at the obesity clinic (Fig. 2). Almost half of these COMs (46.5%) reported that the diversion of health care services displaced more than 75% of their personnel. The large majority of COMs (72.1%) reported 50% of their personnel were diverted to COVID-19 care. The HCPs most affected by the change were physicians and nurses.
- These figures suggest a substantial reduction in the number of HCPs available for obesity care. In the COMs not affected by the diversion of health care personnel, the main reasons provided were: (1) low incidence of COVID-19 cases in their community or health care

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systems not requiring the shift (40.7%); (2) the fact that some of the COMs were represented by private or outpatients services not linked with hospitals (22.3%); (3) the fact that some of the COMs were specifically dedicated to childhood obesity (18.5%).

Obesity Clinics Closed and Outpatient Visits Blocked or Postponed

- Most of the European states reacted to the outbreak by limiting physical contacts and by enforcing partial or complete lockdown measures affecting the organization of health care services. In order to reduce the spread of the virus in health care settings, the use of hospitals for non-urgent health problems was discouraged and many outpatient services were reduced or temporarily closed.
- In the survey, 98.6% of the COMs reported a complete block or a reduction in their in-person outpatient visits during the COVID-19 outbreak (Fig. 2). Only 7% of COMs reported that this reduction was limited to less than 50% of the normal activity. Access to hospital care for patients with NCDs therefore became more restricted. Considering that PwO may already have hesitations about accessing health care services for fear of experiencing bias and stigma, this reduction in obesity care could have significant implications for patients [20].
- Information and communication technologies (ICTs) have great potential to address some of the challenges faced by countries in providing accessible, cost-effective, high-quality health care services for people living with NCDs, like obesity. Telemedicine uses ICTs to overcome geographical barriers and increase access to health care services. This is particularly beneficial for rural and underserved communities or in low- and middle-income countries that may already have scarce health care resources [24]. Virtual contacts or telemedicine could offer the opportunity to overcome the limits imposed by lockdown measures and they have been proposed as an alternative to in-person contacts during the epidemic. Many (87.1%) of the COMs respondents in the EASO survey reported that they had shifted some or most of their obesity care services to a virtual alternative (Fig. 2).
- Almost half (41%) of the COMs reported that they had shifted between 75–100% of their obesity services to a virtual alternative. Over a quarter of the respondents (26.5%) reported that 50–75% of their obesity services had shifted to a virtual alternative, while 32.8% of them reported that less than 50% of their obesity services had moved to a virtual platform. The virtual obesity care services were provided by interdisciplinary HCPs, with a significant involvement of dietitians, clinical psychologists, physiotherapists, and nurses.
- The main reasons for not shifting obesity care services to virtual alternatives were the lack of availability of secure platforms, legal issues, and poor infrastructure or internet access for patients. To date, the use of telemedicine for obesity management remains largely unexplored. The survey results indicate that the pressure of the COVID-19 outbreak on health care systems may have fast-tracked the implementation of virtual alternatives for obesity care. This could be a positive legacy of the pandemic for obesity management.

Bariatric Surgery Postponed, and Then Relegated to the Bottom of Surgical Lists When Wards Re-Open

- A negative consequence of COVID-19 in many European countries has been the cancelation or the reduction of elective surgery, due in part to the shift in the use of ICUs for post-operative care to COVID-19 critical care. The decision to cancel elective surgeries was also made in order to prevent peri-operative SARS-CoV-2 infections, thus affecting bariatric/metabolic surgery procedures.

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- According to the survey, obesity surgery was cancelled or postponed in 96.5% of the responding COMs due to the COVID-19 outbreak (Fig. 2). Almost all (96.4%) of the centres reported that this measure affected more than 90% of planned procedures. Even before the COVID-19 outbreak, the availability of bariatric surgery in Europe was poor, with long waiting times for surgery. The measures imposed by the COVID-19 pandemic have further decreased the access to bariatric surgery for patients. This may have significant consequences for PwO, including increased mortality risk in patients with more advanced obesity and related comorbidities.
- Restarting bariatric surgeries may present some additional difficulties for health systems. Additional care and pre-operative testing are required to avoid SARS-CoV-2 spreading. PwO facing prolonged bariatric surgery delays during the COVID-19 pandemic may present with increased disease progression and more severe obesity-related complications. Recommendations for managing bariatric and metabolic surgical candidates and postoperative patients during the COVID-19 pandemic and for prioritizing patients to surgery when surgical activity restarts have been recently released by the Diabetes Surgery Summit [25]. In many countries, the restart of bariatric surgery was relegated to the bottom of the surgical lists when elective surgery activity reopened, which may indicate inequity, systematic bias, and discrimination towards PwO.

Health Systems Do Not Prioritize Obesity Care

In conclusion, the experience of the COMs network during the COVID-19 epidemic demonstrates the continued lack of recognition and prioritisation of obesity as a serious NCD by most European health systems, even or despite the fact that obesity adversely affected the outcomes of COVID-19. During emergency situations or pandemics, a reallocation of health care resources is essential. However, the significant reduction or complete cancelation of health services for obesity, as well as for other NCDs, may result in substantial challenges for patients living with the disease, health care providers, and health systems. The results from this survey suggest that obesity care has been affected in an unprecedented way, with most of the medical and surgical activities reduced or completely cancelled, leaving many PwO without adequate care or support. The survey results also indicate that despite the pandemic, many HCPs are making significant efforts to continue to provide obesity care using innovative technologies and platforms such as telemedicine. Considering that adults with obesity are at increased risk for severe course of SARS-CoV-2-related disease, our survey results highlight the importance of forward planning and preparedness studies for future waves of coronavirus.

Call for Actions

Following from the above, we call to prioritise PwO care in current and future pandemics in the following aspects:

- Early detection and testing of COVID-19 in PwO.
- Prompt therapy for PwO affected by SARS-CoV-2 or by other viral diseases, to avoid further deterioration in health.
- Due to prolonged viral shedding, isolation of positive cases and physical distancing should be implemented immediately. This is to prevent further spreading of the disease and requires substantial planning in terms of minimising economic hardship and food insecurity.
- Once a safe vaccine becomes available, the immune response should be assessed in PwO. Specific interventions to encourage vaccination may be necessary to avoid infections and further complications in PwO.

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In addition, we suggest further interventions that are aimed at improving the immune response of PwO:

- Supporting and promoting access to healthy food and dietary patterns, to reduce levels of ACE2. In mice, ACE2 is expressed in adipose tissue and is induced by a high-fat diet [26].
- Facilitating and encouraging mild-to-moderate physical activity through COVID-19-related strategies and interventions, including tailored modification for those with barriers and physical limitations. Physical exercise has an anti-inflammatory effect and has been shown to improve the hormone milieu, increasing adiponectin and insulin sensitivity and decreasing insulin and leptin levels, and to enhance immune function [27].
- Attention should be focused on addressing the social determinants of health associated with obesity such as poverty, low levels of education, the physical environment (e.g., overcrowded neighbourhoods where poor diet, sedentary behaviours, and obesity often coexist), marketing of non-nutritious edible products, and access to COVID-19 information and health services for vulnerable communities.
- Developing awareness and consideration of how weight bias and obesity stigma may impact COVID-19 testing, treatment, care, and health outcomes for PwO.

Finally, the following health services policy actions are recommended in order to maintain adequate obesity care during the pandemic:

- Maintain chronic disease care (including obesity care), as much as possible, by preventing significant numbers of HCPs from being displaced to critical care.
- Assure safe pathways for the continuation of in-person consultation for PwO including provision of suitably sized and personal protective equipment and staff for patients.
- Encourage and facilitate the complementary use of virtual contacts and telemedicine in obesity care and prepare for future situations where access to in-person visits will be difficult.
- Assure an adequate number of bariatric surgery procedures and reduce waiting times while allowing for more timely pre-operative care.

Conflict of Interest Statement

All authors declare no conflict of interest in the development of this position statement, which was authored under the auspices of EASO. All authors are members of the Executive Committee of EASO and receive no funding for that role.

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