



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

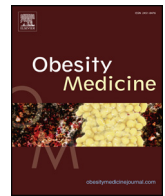
Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



ELSEVIER

Contents lists available at ScienceDirect

Obesity Medicine

journal homepage: www.elsevier.com/locate/obmed

Short communication

COVID-19: How the quarantine could lead to the depreobesity

Mohamed Mediouni^{a,*}, Riadh Madiouni^b, Karolina Elżbieta Kaczor-Urbanowicz^{c,d}^a 1420 Rue Laterrière, Sherbrooke, QC J1K 2R2, Canada^b University of Paris-Est, Créteil, Vitry sur Seine, France^c Center for Oral and Head/Neck Oncology Research, UCLA Section of Oral Biology, Division of Oral Biology & Medicine, Center for the Health Sciences, UCLA School of Dentistry, University of California at Los Angeles, USA, 10833 Le Conte Ave, Box 951668, Los Angeles, CA, 90095-1668, USA^d UCLA Institute for Quantitative and Computational Biosciences, University of California at Los Angeles, 611 Charles E. Young Drive Boyer Hall 570, Box 951570, Los Angeles, CA, 90095-1606, USA

ARTICLE INFO

Keywords:

COVID-19
Quarantine
Depression
Obesity
Depreobesity

ABSTRACT

In this paper, we will introduce coronavirus (COVID-19) and how it spreads around the globe. We will also present the term of quarantine and associated with it requirement of locking down at home in some countries. We will study how frustration related to quarantine relates to several psychological problems including depression. This environment pushes people to consume high sugar foods that increase obesity. In conclusion, countries should be prepared for the upcoming epidemic (depreobesity).

1. Introduction

In December 2019, a series of viral pneumonia cases appeared in Wuhan, Hubei, China (del Rio and Malani, 2019). Deep clinical trials indicated a novel coronavirus (COVID-19), which was named 2019 novel coronavirus (2019-nCoV). This infection is characterized by lung failure, which leads to respiratory distress. The recent outbreak has raised numerous questions about our biological understanding of the pathogen, how to respond to outbreaks (Drosten et al., 2003). Facing this situation, the world paid a price, both socially and economically. Countries have taken strict measures, including the use of protective measures such as wearing face masks and gloves, encouraging people to work from home to avoid contact with other people, and limiting the travel between provinces. From an international point of view, several flows of goods and services are blocked. Due to geopolitical distrust, cooperation between countries, in this case, becomes very difficult. According to the World Health Organization (WHO), this pandemic has now infected more than 2 million people and 193825 cases confirmed deaths across the world (<https://www.who.int/emerg>, 2019). The WHO has stated that the spread of coronavirus may be interrupted by quarantine. This strategy is defined as the separation of individuals who may have been exposed to an infectious disease like methicillin-resistant *Staphylococcus aureus* (MRSA), severe acute respiratory syndrome (SARS) or the influenza A (H1N1) virus from the rest of the population to reduce their risk of infecting others (Brooks et al., 2020). During the coronavirus epidemic (COVID-19), quarantine was used as a

public health strategy to reduce the transmission of disease. Many countries are taking measures to slow down the spread of this pandemic. The measures differ from one country to another (see Table 1).

2. From quarantine to depreobesity

The Frustration related to the quarantine involves the loss of our daily routine (for example the regular activities at home and work, the purchases of necessities), social contacts and physical limitations with others (Zhang et al., 2020). Zandifar et al. discussed that quarantine during Covid-19 can increase the psychological problems (Zandifar and Badrfam, 2020). This condition can show elevated rates of depression, anxiety, and post-traumatic stress disorder. Like other pandemics, the fear of death can develop depression among people who are quarantined (Xiang et al., 2020). On the one hand, the absence of financial sources, costs of healthcare can lead to socioeconomic distress, especially among people with low incomes. On the other hand, fear or suspicion, avoidance or exclusion from leisure, work, or school activities and perceived stigma, are some of the important factors causing depression. When the quarantine ends, returning to work and social routines can take several weeks, or even months, thus increasing even more worry, anxiety, and frustration. Specifically, media exposure should be monitored because unreliable sources can increase stress. Consequently, stress and depression push people to consume specifically high sugar food like chocolate and soft drinks, and choose to eat high calorie treats to boost their mood (Yilmaz and Gökmen, 2020;

* Corresponding author.

E-mail address: mohamed.Sherbrooke@gmail.com (M. Mediouni).<https://doi.org/10.1016/j.obmed.2020.100255>

Received 21 April 2020; Received in revised form 3 May 2020; Accepted 4 May 2020

Available online 15 May 2020

2451-8476/ © 2020 Elsevier Ltd. All rights reserved.

Table 1
Requirement in lockdown.

Country	Procedures (quarantine)
China	Since January 23, the city of Wuhan (11 million people) has been completely locked. China cut transportation links to the city and ordered the closure of many public spaces. All shops are closed except those selling food. Schools and universities have been already temporarily closed due to holidays. The government policy became very strict, officials kept going from door to door to force person stay home in isolation.
Italy	11 cities are in strict quarantine, all public places (bars, restaurants, town halls, libraries, schools), except pharmacies, has been closed. The government has imposed penalties of up to three months' imprisonment for violators.
France	Work is permitted if it is essential. Shopping is allowed and supermarkets are open throughout the lockdown. The person who wants to get out of his house must sign attestation explain the reason for leaving. Also, all sports activities have been stopped.
USA	Quarantine was delayed in the USA compared to China and Europe due to government strategies. The decision of U.S. president about COVID-19 has confused the country.

Banik et al., 2020). Thus, they easily gain weight (Campana et al., 2019). This desire to eat this unhealthy food will be much enhanced by the people. Quarantine-related depression also results in sleep disturbances that, in turn, further increase food intake, thus giving rise to a dangerous vicious cycle (Sharafi et al., 2020). Mediouni et al. explained the impact of depression on obesity and this phenomenon was called depreobesity (Mediouni et al., 2020a). Besides, physical activity has been reduced because of school closures which have derailed the lives of children (Rundle et al., 2020). For that purpose, they eat more unhealthy food, have much longer screen time, and have irregular sleep patterns; all of which are linked to obesity (Campana et al., 2019). In the period of quarantine, reducing energy expenditure contributes to the development of obesity. (Fonseca et al., 2018). Waiting for developing a COVID-19 vaccine, the quarantine will be prolonged and doubled for many countries. Physical exercises can be a good solution not only for losing weight, but also can be beneficial for the immune system (Zheng et al., 2015).

3. Conclusion

In the period of quarantine, psychiatrists and psychologists will play a crucial role to help peoples to overcome the stress and depression and to create a sense of trust and safety. The stressful environment of quarantine has a unfavourable impact on body weight. After the disappearance of pandemic (COVID-19), policymakers need to focus more on these challenges and try to predict the upcoming epidemic (depreobesity). Coronavirus will be a lesson for humanity to focus more on the science of prediction (Mediouni et al., 2019). The emerging of new techniques of translational medicine will help researchers to accelerate the treatment of this pandemic (Mediouni et al., 2018; Mediouni et al., 2020b). We hereby would like to alert public health officials to minimize as possible the depreobesity and we propose some solutions that can help people to be healthier.

Declaration of funding

This manuscript received no funding.

CRedit authorship contribution statement

Mohamed Mediouni: Writing - original draft, Project administration, Supervision. **Riadh Madiouni:** Writing - review & editing. **Karolina Elżbieta Kaczor-Urbanowicz:** Writing - review & editing.

Declaration of competing interest

The authors declare that they have no conflicts of interest regarding

this publication.

References

- Banik, Rajon, Nahar, Shabnam, Pervez, Sabbir, Moazzem Hossain, Md, March 2020. Fast food consumption and obesity among urban college going adolescents in Bangladesh: a cross-sectional study. *Obes. Med.* 17, 100161.
- Brooks, Samantha K., Webster, Rebecca K., Smith, Louise E., Woodland, Lisa, Simon, Wessely, Greenberg, Neil, Rubin, Gideon James, 2020. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 395 (10227), 912–920.
- Campana, Bruna, Brasie, Poliana Guiomar, Aguiar, Aline Silvade, Dutra, Sheila Cristina Potente Luquetti, 2019. Obesity and food addiction: similarities to drug addiction. *Obes. Med.* 16 (December), 100136.
- del Rio, C., Malani, P.N., 2020. 2019 Novel coronavirus—important information for clinicians. *JAMA*. <https://doi.org/10.1001/jama.2020.1490>. Published online February 05.
- Drosten, C., Günther, S., Preiser, W., et al., 2003 May 15. Identification of a novel coronavirus in patients with severe acute respiratory syndrome. *N. Engl. J. Med.* 348 (20), 1967–1976.
- Fonseca, Danielle Cristina, Sala, Priscila, Ferreira, Beatriz de Azevedo Muner, Reis, Jessica, Torrinhas, Raquel Susana, Bendavid, Itai, Waitzberg, Dan Linetzky, 2018. Body weight control and energy expenditure. *Clin. Nutr. Exp.* 20, 55–59. <https://www.who.int/emergencies/diseases/novel-coronavirus-20195>.
- Mediouni, M., R Schlatterer, D., Madry, H., et al., 2018. A review of translational medicine. The future paradigm: how can we connect the orthopaedic dots better? *Curr. Med. Res. Opin.* 34 (7), 1217–1229.
- Mediouni, M., Kaczor-Urbanowicz, K.E., Madiouni, R., 2019. Suggestions for creating the international scientific foundation of saliva diagnosis (ISFSD): new research strategies, development, and technologies. *Oral Sci. Int.* 16 (3), 138–146.
- Mediouni, M., Kaczor-Urbanowicz, K.E., Madiouni, R., 2020a. Future epidemic: depreobesity. *Obes. Med.* 19, 100240 September.
- Mediouni, M., Madiouni, R., Gardner, M., Vaughan, N., 2020b. Translational medicine: challenges and new orthopaedic vision (Mediouni-Model). *Curr. Orthop. Pract.* 31 (2), 196–200.
- Rundle, Andrew G., Park, Yoosun, Julie, B. Herbstman, Kinsey, Eliza W., Wang, Y. Claire, 2020. COVID-19 related school closings and risk of weight gain among children. *Obesity*.
- Sharafi, S.E., Garmaroudi, G., Ghafouri, M., Bafghi, S.A., Ghafouri, M., Tabesh, M.R., Alizadeh, Z., March 2020. Prevalence of anxiety and depression in patients with overweight and obesity. *Obes. Med.* 17 Article number 100169.
- Xiang, Y.-T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., Ng, C.H., 2020. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatr.*
- Yılmaz, C., Gökmen, V., 2020. Neuroactive compounds in foods: occurrence, mechanism and potential health effects. *Food Res. Int.* 128, 108744.
- Zandifar, Atefeh, Badrfam, Rahim, 2020. Iranian mental health during the COVID-19 epidemic. *Asian J. Psychiatr.* 51, 101990.
- Zhang, J., Wu, W., Zhao, X., Zhang, W., 2020. Recommended psychological crisis intervention response to the 2019 novel coronavirus pneumonia outbreak in China: a model of West China Hospital. *Precis. Clin. Med.*
- Zheng, Q., Cui, G., Chen, J., et al., 2015. Regular exercise enhances the immune response against microbial antigens through upregulation of toll-like receptor signaling pathways. *Cell. Physiol. Biochem.* 37, 735–746.