SPECIAL COMMENTARY

Anna Vittoria Mattioli, MD, PhD, and Matteo Ballerini Puviani, MSc

Lifestyle at Time of COVID-19: How Could Quarantine Affect Cardiovascular Risk

Abstract: *COVID-19 is causing a global pandemic with a high number of deaths and infected people. To contain the diffusion of COVID-19 virus, governments have enforced restrictions on outdoor activities or even collective quarantine on the population. Quarantine carries some long-term effects on cardiovascular disease, mainly related to unhealthy lifestyle and anxiety.*

Keywords: quarantine; COVID-19; cardiovascular risk factors; prevention; physical activity; anxiety

To the Editor:

COVID-19 is causing a global pandemic with a high number of deaths and infected people.[1] To contain the diffusion of COVID-19 virus, governments have enforced restrictions on outdoor activities or even collective quarantine on the population. Quarantine and isolation can be very effective in protecting or restoring public health. For example, the experience of the 2003 SARS (severe acute respiratory syndrome) outbreak showed that infectious diseases like SARS can sometimes be contained if a series of timely measures are implemented, including the early identification of infected people, and contact tracing, as well as timely quarantine and isolation measures[2,3] (Table 1).

Quarantine is often an unpleasant experience for those who undergo it. Separation from loved ones, the loss of freedom, uncertainty over disease status, and boredom can, on occasion, create dramatic effects. Suicides, anger, domestic violence, and lawsuits have been the consequences of the imposition of quarantine in previous outbreaks. The potential benefits of mandatory mass quarantine need to be weighed carefully against the possible long-term negative effects on cardiovascular risk burden[2,3] (Table 2).

The potential benefits of mandatory mass quarantine need to be weighed carefully against the possible long-term negative effects on cardiovascular risk burden.

These restrictions will strongly influence lifestyle leading to an increased burden of cardiovascular disease. The main consequence of quarantine is the reduction of physical activity. Regular physical activity is proven to help prevent and treat noncommunicable diseases such as heart disease, stroke, diabetes, and breast and colon cancer. It also helps prevent hypertension, overweight, and obesity. It can also improve mental health, quality of life, and well-being.[4,5] The World Health Organization developed a *Global Action Plan on Physical Activity 2018-2030* titled, "More Active People for a Healthier World." According to World Health Organization indications, physical activity can be undertaken in many different ways: walking, cycling, sports, and active forms of recreation (eg, dance, yoga, tai chi).[6]

However, government regulation for prevention of COVID-19 infection diffusion prohibited the great majority of these outdoor and social activities (eg,

DOI:10.1177/1559827620918808. From Surgical, Medical and Dental Department of Morphological Sciences related to Transplant, Oncology and Regenerative Medicine, University of Modena and Reggio Emilia, Modena, Italy (AVM), and Istituto Nazionale per le Ricerche Cardiovascolari, U.O. University of Modena and Reggio Emilia, Modena, Italy (MBP). Address correspondence to: Anna Vittoria Mattioli, Surgical, Medical and Dental Department of Morphological Sciences related to Transplant, Oncology and Regenerative Medicine, University of Modena and Reggio Emilia, Via del Pozzo, 71, Modena 41100, Italy; e-mail: annavittoria.mattioli@unimore.it.

Table 1.

Measures by Preventing Exposure to People Who Have or May Have a Contagious Disease.

Quarantine: Separates and restricts the movement of people who were exposed to a contagious disease to see if they become sick
Isolation: Separates sick people with a contagious disease from people who are not sick

Table 2.

Potential Effects of Quarantine on Cardiovascular Risk Factors.

- Reduced physical activity
- Unhealthy diet
- Depression
- Anxiety
- Stress

going to the gym), leading to reduction of physical activity. Despite the indication to workout at home during quarantine, only few subjects comply.

In addition, nutritional habits will change due to reduced goods availability and to a switch to unhealthy food. A recent rapid review on the psychological impact of quarantine[7] reported negative psychological effects including posttraumatic stress symptoms, confusion, and anger. Stressors included longer quarantine duration, infection fears, frustration, boredom, inadequate supplies, inadequate information, financial loss, and stigma.[7] Having inadequate basic supplies (eg, food, water) during quarantine was a source of frustration[8] and continued to be associated with anxiety and anger 4 to 6 months after release.[8,9] Due to anxiety of future food shortage, it is plausible that people will purchase packaged and long-life food rather than fresh food.

In addition, social isolation induces depression, anxiety, and stress that have the potential to cause weight change via effects on both physical activity and energy intake. However, the effect of anxiety and stress on weight and on eating habits is not fully understood. Torres and Nowson reviewed the relationship between stress and eating behavior and found studies in which stress caused both increased and decreased eating. The discrepancy could be because some people cope with stress by eating and drinking in an attempt to feel better ("stress-related eating"). Stress-driven eaters and drinkers were more likely to eat unhealthy foods such as sausages, hamburgers, pizzas, and chocolate regularly and drink wine and spirits more frequently; also a lack of emotional support from close friends and relatives was predictive of stress-driven eating and drinking behaviors.[10,11] Regarding depression and weight changes, a systematic review of 15 studies (n = 58745) found that depression was predictive of the development of overweight (odds ratio = 1.11, 95% confidence interval = 1.02-1.22) and obesity (odds ratio = 2.01, 95% confidence interval = 1.11-3.65) in women. A possible mechanism is the adoption of an unhealthy lifestyle, such as insufficient physical exercise and unhealthy dietary preferences, leading to obesity.[12] However, vegetables and fruits have a high content of nutrients that may be of importance in the case of depressive disorders.[13,14]

Following the *Spagnola* pandemic occurred throughout 1918, we have observed a peak of cardiovascular events. Such events manifest from between 7 and 10 days after the emergence of influenza symptoms. In 1918, right after the end of the *Spagnola* epidemic, deaths by cardiovascular events had outmatched deaths by other causes, including superimposed pneumonia.[15,16]

We think cardiologists and lifestyle medicine physicians need to be prepared to face the likely increase in the number of cardiovascular events that will arise right after the end of the pandemic.

Author Contributions

MBP and AVM conceived the idea for the article, developed the different parts of the manuscript, and performed the final supervision. All authors contributed to and approved the final manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Ethical Approval

Not applicable, because this article does not contain any studies with human or animal subjects.

Informed Consent

Not applicable, because this article does not contain any studies with human or animal subjects.

Trial Registration

Not applicable, because this article does not contain any clinical trials.

ORCID iD

Anna Vittoria Mattioli https://orcid.org/0000-0003-1487-9530 AJLM

References

1. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72314 cases from the Chinese Center for Disease Control and Prevention [published online February 24, 2020]. *JAMA*. doi:10.1001/jama.2020.2648
2. World Health Organization. Update 58—first consultation on SARS epidemiology, travel recommendations for Hebei Province (China), situation in Singapore. http://www.who.int/csr/sars/archive/2003_05_17/en/. Published May 17, 2003. Accessed March 26, 2020.
3. Giubilini A, Douglas T, Maslen H, Savulescu J. Quarantine, isolation and the duty of easy rescue in public health. *Dev World Bioeth*. 2018;18:182-189. doi:10.1111/dewb.12165

4. Mattioli AV, Sciomer S, Moscucci F, et al. Cardiovascular prevention in women: a narrative review from the Italian Society of Cardiology working groups on "Cardiovascular Prevention, Hypertension and Peripheral Circulation" and on "Women Disease." *J Cardiovasc Med (Hagesrstown)*. 2019;20:575-583. doi:10.2459/JCM.0000000000000831
5. Nasi M, Patrizi G, Pizzi C, et al. The role of physical activity in individuals with cardiovascular risk factors: an opinion paper from Italian Society of Cardiology-Emilia Romagna-Marche and SIC-Sport. *J Cardiovasc Med (Hagerstown)*. 2019;20:631-639. doi:10.2459/JCM.0000000000000855
6. World Health Organization. *Global Action Plan on Physical Activity 2018-2030: More Active People for a Healthier World*. Geneva, Switzerland: World Health Organization; 2018. https://apps.who.int/iris/bitstream/handle/10665/272722/9789241514187-eng.pdf?ua=1. Accessed March 26, 2020.
7. Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*. 2020;395:912-920. doi:10.1016/S0140-6736(20)30460-8
8. Blendon RJ, Benson JM, DesRoches CM, Raleigh E, Taylor-Clark K. The public's response to severe acute respiratory syndrome in Toronto and the United States. *Clin Infect Dis*. 2004;38:925-931.
9. Jeong H, Yim HW, Song YJ, et al. Mental health status of people isolated due to Middle East respiratory syndrome. *Epidemiol Health*. 2016;38:e2016048.
10. Torres SJ, Nowson CA. Relationship between stress, eating behavior, and obesity. *Nutrition*. 2007;23:887-894. doi:10.1016/j.nut.2007.08.008
11. Laitinen J, Ek E, Sovio U. Stress-related eating and drinking behavior and body mass index and predictors of this behavior. *Prev Med*. 2002;34:29-39. doi:10.1006/pmed.2001.0948
12. Luppino FS, de Wit LM, Bouvy PF, et al. Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies. *Arch Gen Psychiatry*. 2010;67:220-229.
13. Głąbska D, Guzek D, Groele B, Gutkowska K. Fruit and vegetable intake and mental health in adults: a systematic review. *Nutrients*. 2020;12:E115. doi:10.3390/nu12010115
14. Mattioli AV, Coppi F, Migaldi M, Farinetti A. Fruit and vegetables in hypertensive women with asymptomatic peripheral arterial disease. *Clin Nutr ESPEN*. 2018;27:110-112.
15. Collins SD. Excess mortality from causes other than influenza and pneumonia during influenza epidemics. *Public Health Rep*. 1932;47:2159-2179.
16. Madjid M, Casscells SW. Of birds and men: cardiologists' role in influenza pandemic. *Lancet*. 2004;364:1309.