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## Practical tips for prevention of cardiovascular disease in women after quarantine for COVID-19 disease.

*Anna Vittoria Mattioli<sup>a</sup>, Silvia Toni<sup>b</sup>, Francesca Coppi<sup>c</sup>, Alberto Farinetti<sup>d</sup>*

<sup>a</sup>Surgical, Medical and Dental Department of Morphological Sciences related to Transplant, Oncology and Regenerative Medicine, University of Modena and Reggio Emilia, Modena (Italy)

<sup>b</sup>Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena (Italy)

<sup>c</sup>Cardiology Division, Azienda Ospedaliero-Universitaria, Modena, (Italy)

<sup>d</sup>Department of Medical and Surgical Sciences for Children and Adults, University of Modena and Reggio Emilia, Modena, (Italy)

**Abstract** To contain the spread of CoV-19 / SARS-CoV-2 infection, several governments have imposed collective quarantine on the population. All of these restrictions have influenced women's health and induced an unhealthy lifestyle that, in some cases, could persist after the lockdown. The present commentary briefly analyzes the effects of quarantine on women's lifestyle. Quarantine is associated with stress and depression, which lead to unhealthy nutrition and reduced physical activity, particularly in women. Unhealthy diet is usually poor in fruit and vegetables, with a consequent low intake of antioxidants and vitamins. However, vitamins have recently been identified as a weapon in the fight against the Covid-19. Some reports suggest that Vitamin D could exert a protective effect on such infection. In addition, women are less likely to engage in regular physical activity and have increased sitting time and sedentary behaviors during quarantine, which have led to weight gain. During quarantine strategies to increase home-based physical activity and to encourage adherence to a healthy diet have been implemented. Following quarantine, a global action supporting healthy Diet and physical activity is mandatory to encourage women to return to a good lifestyle routine.

**Keywords:** women; prevention; quarantine; COVID-19; stress; lifestyle; nutrition

In recent years, although our knowledge of cardiovascular prevention in women has increased sharply, cardiovascular disease remains the leading cause of mortality in women worldwide. [1] It is now well known that cardiovascular risk factors exert a different weight in women than men, and that lifestyle plays a fundamental role in the prevention of cardiovascular disease. [1]

At the beginning of this year 2020 a new viral (CoV-19/SARS-CoV-2) epidemic developed across the world. [2] Several Government imposed quarantine and isolation, two measures that can prevent, or minimize, the impact of infectious disease outbreaks. [3] "Quarantine" refers to the separation of people (or communities) who have been exposed to an infectious

disease, whereas "Isolation" refers to the separation of people who are known to be infected. Quarantine led to a profound change in lifestyle that influenced the burden of cardiovascular risk. [4]

As previously reported, quarantine is an unpleasant experience: with loss of freedom, uncertainty over disease status, and boredom it can affect the health status of subjects. [5,6] Quarantine was associated with an unhealthy lifestyle mainly with regards to nutrition and physical activity. Women in particular suffered from quarantine by reporting weight gain and an increase in depression and stress and insomnia. [7,8]

Our search strategy was designed to inform this Review relating to effects of quarantine on women. We searched MEDLINE, Scopus and Web of Science.

The full list of search terms can be found in the appendix. In brief, we used a combination of terms relating to quarantine (eg, “quarantine” and “patient isolation”) and psychological outcomes (eg, “psych” and “stigma”) and “women” and “sex”. For studies to be included in this Review, they had to report on primary research, be published in peer-reviewed journals, be written in English and include data on the prevalence of psychological wellbeing, or on factors associated with psychological wellbeing (ie, any predictors of psychological wellbeing during or after quarantine). Due to the fact that very little data are available for effects of COVID-19 quarantine we included papers describing the effects of any quarantine in the last 20 years.

The present rapid review briefly analyzes the effects of quarantine on cardiovascular risk burden in women and suggests some practical tips for prevention of cardiovascular disease in women after quarantine.

## Lifestyle and Diet

The great majority of western health care systems developed around the concept of patient-centered care, but during pandemic there was a change from patient-centered to community-centered care. [9] This contributes to maintain anxiety and stress in people who have concerns about their own health. In addition, quarantine and isolations induce anxiety and stress. [6,8] Patients experienced psychological distress and disorder symptoms: i.e. emotional disturbance, insomnia, depression, stress, low mood, irritability, post-traumatic stress [6,7,8]. Also, people are afraid of stigma. It is known that the degree of stigma associated with a disease depends on how much it is known and how curable it is, and in the case of the stigma of the COVID-19 disease it may be high [10].

Under the powerful influence of the media and the relative impotence of those stigmatized, the associative stigma can extend to a city, a country, or a region perceived at high risk of COVID-19 disease. [10,11]

Some studies suggest that women are at increased risk of psychological distress.

Qiu et al. identified greater psychological distress during the COVID-19 pandemic in women, population over 60 and with higher educational level. [12]

Women are found to suffer greater distress during the H1N1 influenza outbreak, during equine influenza and during SARS outbreak in Hong Kong. [13,14,15] One of the first studies conducted during the COVID-19 epidemic identified an increased risk of anxiety, depression, and stress among women [16]

Gómez-Salgado and coworkers found that women have significantly higher levels of stress and this could be an individual risk factor in the face of the impact of the COVID-19 epidemic. [17]

Practical tips for reducing stress after quarantine are: resume contact with family and friends; performed relaxing activity such as meditation and yoga; in case of persisting sign of anger and stress ask for psychological support.

Depression has been identified as an important cardiovascular risk factor in women.

It is known that atherosclerosis developed under the effects of cardiovascular risk factors, women has sex specific risk factors, i.e. menopause, gestational diabetes and hypertension, preterm delivery, depression, breast cancer treatment, autoimmune disease leading to a different. [1]

The main consequence of stress related to quarantine is a change in lifestyle; women adopted an unhealthy diet and reduced physical activity.

Unhealthy diet is rich in energy-dense foods, foods rich in sugar and fat whether is poor in fresh fruit and vegetables. [18-21]

The craving for carbohydrates facilitates the production of serotonin, which acts positively on mood. This effect on mood is proportional to glycemic index of foods. [22]

This unhealthy nutritional habit may contribute to excess energy intakes and weight gain, increasing the risk of developing obesity. Obesity is important risk factors for women mainly after menopause. Obesity is associated with chronic inflammation, and seems to increase the risk of serious complications of CoVID-19 [19,21].

After quarantine is mandatory to recover a healthy Diet: i.e. Mediterranean Diet (MedD) rich in antioxidants. In addition MedD has been shown to be resilient and sustainable supporting the economy of the Italian Country [23-24].

Practical tips for recovery healthy Diet after quarantine:

- Increase the intake of fresh fruit and vegetables,
- Choose seasonal fruit and vegetables,
- Wash carefully fresh fruit and vegetables
- Prefer small farm market,
- Reduce the intake of food rich in sugar and fat,
- Increase outside physical activity, i.e. taking walks.

It can be useful to take vitamin and minerals supplements. Experimental data showed a potential benefit of Vit. D supplementation in patients with COVID-19. However, this effect should be investigated in trials to determine the appropriate doses, and the beneficial from supplementation. [6]

To avoid vitamin D deficiency after quarantine will be useful take short walks outside, increase sun exposure, consume foods rich in vitamin D (i.e. fish); and/or vitamin supplementation. [6]

### Sleep Disorders

Muscogiuri et al. recently pointed out that quarantine-related stress translates into sleep disturbances that further worsen stress and increase food craving. [20]

Sleep disorders, and in particular, obstructive sleep apnea (OSA) are cardiovascular risk factor [11]. Some authors suggest that hormonal levels are protective against sleep-disordered breathing in women. [1] Furthermore, OSA is more prevalent in postmenopausal than in premenopausal women and estrogens, when administered as hormone replacement therapy, are associated with a lower prevalence of sleep apnea in postmenopausal women. [25,26]

In addition, other sleep disturbances (i.e. insomnia) are thought to be associated with hypertension in women. However, very few studies evaluated the relationship between sleep disturbances and hypertension in women, although insomnia is more frequent in women than in men.[1]

Both the quantity and quality of sleep might predict the development of hypertension in women. The detrimental effects of sleep restriction and lack of sleep on hypertension has been demonstrated: sleep durations of 5 h or less per night were associated to increased risk for incident hypertension [26]

Recent studies evaluated the quality of sleep during COVID-19 outbreak and found that the Italian lockdown had a significant impact both on sleep and on psycho-emotional well-being. The impact was greater in females than in males. [27,28]

It is mandatory to plan strategies for more vulnerable groups, e.g., women and patients with cardiovascular disease, and consider the role of the internet on communication and stigmatization. [29]

### Physical Activity and Leisure Time

During quarantine several Governments prohibited the great majority of outdoor exercise and social activities (e.g. going to the gym) resulting in a reduction of physical activity. Women are less likely to perform physical activity and the gap increase after menopause. [21] However regular exercise helps in maintain weight after the menopause has a strong effect on bones, contrasting osteoporosis and prevents the reduction of skeletal muscles. [21,30,31]

In addition, physical activities have the long-term positive effects of reducing stress, enhancing mood, and promoting long-term mental health.

Cardiovascular exercise can benefit an individual by improving the heart and lung functional capacity, decreasing systemic inflammatory levels, and supporting the human body in fighting the infection. Adequate physical activity and an healthy diet can enhanced immune system. [32]

Quarantine during COVID -19 outbreak determines a reduction of physical activity and an increase in the sitting time leading to an increase of cardiovascular risk in general population, no paper analyzed this effect in women. [1,31, 32,33,34,35] Sedentary behaviour and physical inactivity contributes to obesity. Sedentary behavior is defined as any waking behaviour characterized by an energy expenditure  $\leq 1.5$  METs while in a sitting, reclining or lying posture [9]. Physical inactivity is used to describe people who are performing insufficient amounts of moderate- and vigorous-intensity activity by not meeting specified physical activity guidelines.(e.g. World Health Organization (WHO) /American College of Sports Medicine (ACSM) physical activity guidelines). [31]

After quarantine, during the so-call “phase 2” of disease management, with less restrictions, people are still required to reduce movements. In addition, many women feel home as “safe zone” reducing outside activity and subsequently outside physical activity. [32]. Moreover, Pieh and coworkers found that mental quality of life was lower (67 vs. 73) in women compared to men. In line with previous studies [44] well-being was lower for women than for men (14.5 vs. 15.6). [36] The Authors also found an association between physical activity and mental health. Increased duration and greater intensity of physical activity were both associated with further reduction in prevalence of depression in men [36]

### Practical tips for Physical Activity

- Take daily short walks,
- Start or recover gym activity,
- During the summer use the good weather to walk, swim or ride a bicycle.
- Play with children
- Go dancing
- Use step-counter

As help, almost all-modern Smartphone provide step-count, monitoring physical activity and also has application for nutrition. Many people to control their diet and maintain their personal ideal weight use mobile applications related to nutrition. The increasing number of health and nutrition applications available on Google Play and the Apple App Store proves the awareness of community regarding adopting a healthy lifestyle. App programs may be more effective when social support is advocated and could be a useful instrument in order to recover the impact of quarantine on lifestyle.

### Conclusions

We need to be prepared to confront the likely increase in cardiovascular risk burden following the pandemic. After quarantine we need to re-evaluate the cardiovascular risk in women, including biometrical and metabolic parameters. Some women would need to be evaluated by psychologist to early identify the

persistence of anxiety and stress and of related side effects. Global action supporting healthy Diet and physical activity is mandatory to encourage people to return to a good lifestyle. This process is dynamic and will require adaptive strategies over time to respond to the potential spread of the infection and the psychological damage that will be reported in women and in the general population. This action needs to be stronger for frail individuals that include women, subjects of a low socio economic level that will suffer to a higher degree from the economic crisis following a vast and prolonged quarantine.

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### Author contribution

AVM, ST, AF conceived of the idea at the basis of the article, AVM, FC developed the different part of the manuscript, AVM, ST, FC, AF performed the final supervision. All authors contributed to and approved the final manuscript.

### Orcid

Anna Vittoria Mattioli: 0000-0003-1487-9530

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**Address for correspondence:**

Prof 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 41100 Modena (Italy)  
E-mail: [annavittoria.mattioli@unimore.it](mailto:annavittoria.mattioli@unimore.it)