Minerva Cardioangiologica
EDIZIONI MINERVA MEDICA

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Minerva Cardioangiologica 2020 May 12
DOI: 10.23736/S0026-4725.20.05309-8

Article type: Original Article

Article first published online: May 12, 2020
Manuscript accepted: May 7, 2020
Manuscript received: April 13, 2020

WHAT ABOUT HEART AND MIND IN THE COVID-19 ERA?

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Funding: None.

Conflicts of interest: Authors declare no conflict of interests.

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ABSTRACT

From the time of Hippocratic medicine, heart-brain interactions have been recognized and contributed to both mental and physical health. Heart-brain interactions are complex and multifaceted and appear to be bidirectional. Exposure to chronic and daily stressors such as quarantine, or severe psychological trauma like a significant person in danger of life can affect the cardiovascular system and the emotional experience of the individual, leading to an increased risk of developing a cardiovascular disease or mental illness. Subjects with comorbidities between mental disorders and heart diseases are obviously more susceptible to be influenced by emotional burden due to the spread of COVID-19, with emotional responses characterized by fear, panic, anger, frustration. Psychological services and crisis interventions are needed at an early stage to reduce anxiety, depression and post-traumatic stress disorder in such a stressful period, with a special attention to special groups of patients, such as women, children, or the elderly.

Key-words: Heart; Mind; COVID-19; Quarantine; Cardiovascular Disease; Depression; Anxiety.

The "mind-heart-body connection"

It is important to pay great attention to the psychological and physiological milieu in which the heart resides (the so termed "mind-heart-body connection")[1].
Heart-brain interactions are complex and multifaceted and appear to be bidirectional. Some researchers have hypothesized that stress can play a crucial role in cerebral-cardiac interactions[2]. Exposure to chronic and daily stressors such as quarantine, or severe psychological trauma like a significant person in danger of life can affect the cardiovascular system and the emotional experience of the individual, leading to an increased risk of developing a cardiovascular disease or mental illness. In addiction social isolation and loneliness were connected with a 50% increased risk of cardiovascular disease (CVD) events[3,4].
Cardiac activity and vascular tone are modulated by the sympathetic and parasympathetic nervous systems, variations to the autonomic nervous system are likewise concerned with the interactions between depressive end anxiety disorders and cardiac consequences[5]. The consequences of heart-brain dysfunction can lead to pathological manifestations involving many organ systems and COVID era may negatively impact on cerebral-cardiac interactions. In this perspective could be useful to actively screen individuals suffering from CVD or mental illness in order to diminish the weight on quality of life and prognosis trying to foster a multidisciplinary collaboration between health professionals.

Cardiovascular disease and emotional burden during quarantine

CVD constitutes a leading worldwide health problem, and the occurrence of depression can worse cardiovascular morbidity and mortality. It is well known that depressive disorders are more prevalent in women than men (about 20-25% of female population experience depressive symptoms during life), due to the overlap of genetic, hormonal and psychological factors. It is also clear from a huge amount of literature data that women have a doubled incidence of cardiovascular disease related deaths, and there is an increase of angina, heart failure and stroke in females [6]. It has been demonstrated that depression represents an emergent risk factor for cardiovascular disease in women, and underlying mechanism explaining this link include behavioural habits and biological factors, including reduced social support and low self-esteem, emotional attitude in interpersonal relationships, sympathetic nervous system hyperactivity, impairment in hypothalamic-pituitary-adrenal function. It has also been suggested the existence of gender-specific differences in mental activation patterns and biological responses to mental stress[7,8]. Besides, there is a dramatic increase of coronary heart disease (CHD) in women following menopause, such as a greater prevalence of depressive symptoms in perimenopausal women, probably due to emotional distress related to hormone fluctuation, but also to several psychological implications (stress, body image, sexuality, fertility, aging)[9].
The outbreak of COVID-19 in China in December 2019 has been identified as a pandemic and a health emergency of global concern. Quarantine is an unpleasant experience for people who experience separation from loved ones, loss of freedom, boredom, uncertainty about disease status and evolution and can create dramatic psychological effects[10]. Investigations about prevalence and

predictors of post-traumatic stress symptoms in China hardest-hit areas during COVID-19 outbreak[11] have demonstrated that women reported significant higher PTSS in the domains of re-experiencing, negative alterations in cognition or mood, and hyperarousal.

People with heart diseases and mental health disorders in comorbidity result at elevated risk during pandemics and generally more susceptible to infections due to less awareness of risk, cognitive impairment, difficulties in accessing timely health services (also due to discrimination associated with mental disorders in health-care settings), polypharmacotherapies[12]. Besides, subjects with comorbidities between mental disorders and heart diseases are obviously more susceptible to be influenced by emotional burden due to the spread of COVID-19, with emotional responses characterized by fear, panic, anger or distress in the short-time, and anxiety and depression as delayed consequences (**Figure 1**).

Although there is an increasing amount of papers in these weeks focusing on the impact of depressive and anxious symptoms in frontline health care workers facing the coronavirus disease 2019 (COVID-19) in China and in other countries, they lack in data regarding pre-existing rates of psychopathology in this cohort (health workers act daily in stressful settings) and necessarily lack of adequate follow-ups[13]. Even prior to this pandemic the high prevalence of burnout, the complex causes and critical consequences have been reported among medical staff. Lai et al.[14] have found that frontline workers treating patients with COVID-19 in multiple regions of China reported more severe symptoms (depression, anxiety, distress), with especially women nurses in Wuhan experiencing severe psychological burden. Noteworthy, most health professionals working in isolation units and hospital do not receive any training for providing mental health care[15].

It has been suggested that intimate partner violence might increase the risk of cardiovascular disease in women[16]. In quarantine due to COVID-19 home risks to become a very dangerous place for victims of domestic violence, because they are required to stay the whole day with partners and away from people who can validate their experiences and give help.

Psychological services and crisis interventions are needed at an early stage to reduce anxiety, depression and post-traumatic stress disorder in such a stressful period, with a special attention to special groups of patients, such as women, children, or the elderly. Psychiatrists and counselors are suggested to work over phone or internet and there is an increased need of psychological hotlines for the support of public mental health in order to exert protective effects of stress reduction and increase perception of social support. At the same time is extremely important to identify high-risk individuals to avoid the occurrence of extreme events such as suicide or impulsive behaviour.

During the COVID-19 outbreak in China mental health professionals and health authorities have provided several mental health services: online mental health surveys, online mental health education with communication programmes (WeChat, Weibo, TikTok), online psychological counseling sevices, online psychological self-help intervention systems, artificial intelligence programmes as interventions for psychological crises (for example recognition of individuals at risk for suicide)[17]. It has been demonstrated that survivors of life-threatening infectious diseases like SARS and quarantine can be affected by considerable psychological distress and develop post-traumatic stress disorder and depressive symptoms[18,19], so it is mandatory to prevent possible psychological sequelae of isolation (**Figure 2**).

Large prospective epidemiologic studies and meta-analysis have firmly established a connection between anxiety and a higher risk of coronary disease, myocardial infarction and cardiovascular death[20,21]. In a critical review and meta-analysis[22] it has been reported that anxiety was linked to a 52% increased prevalence of CVD. Anxiety is a predictor of death in middle-aged women[23,24] and Janszky et al.[20] found that patients suffering from anxiety disorders doubled the risk of developing CHD. There also is evidence that phobic anxiety may increase risk of mortality in CHD[25,26]. A

prospective study[27]confirmed a strong relationship between phobic anxiety and the risk of sudden cardiac death and fatal myocardial infarction (MI). The overall literature supports that the coexistence of anxiety and depressive disorders may confer a higher risk of cardiovascular disease[24,28].

It has been reported a cardiac involvement may happen with COVID-19 (Inciardi, 2019), among the victims of COVID-19 arterial hypertension and cardiovascular disease represented two of the most common comorbidities[29]. Inciardi et al.[30]suggested that the pathogenesis of heart involvement linked to SARS-CoV-2 may reproduce a process of replication and dissemination of the virus through the blood or the lymphatic system from the respiratory tract.

From the time of Hippocratic medicine, heart-brain interactions have been recognized and contributed to both mental and physical health. Researchers have investigated potential behavioural and biological mechanisms[4] as pathways connecting depressive and anxiety disorders with CVD. By focusing on behavioural aspects, mood disorders may greatly worsen the course and prognosis of CVD by decreasing healthy lifestyle habits such us physical activity level, smoking, body weight, alcohol intake and also with a poor adherence to cardiovascular medications. The biological mechanisms linking depression with CVD may be related to inflammatory processes, autonomic nervous system dysfunction, with increased risk of myocardial ischemia and impaired coronary flow reserve[4].

In the complexity of the current moment, the pandemic can take very intense effects on the individual and social bond, passing through the anguish of an anticipatory mourning in which the environment and the affectively invested objects can be experienced in an atmosphere of incipient loss and impending fear of the end. This can determine the risk of the withdrawal of the affected from the objects perceived as damaged or damageable, that is the psychic condition that can expressively show itself as apathy.

The comparison and dialogue between different knowledge, experiences and sciences can lay the foundations for an ethics of collaboration and solidarity, trying to help individuals to accept the uncertainty of the vicissitudes of existence, avoiding the uneconomic illusion of thinking of to be able to govern what is not completely governable. At a time when fear for the destiny of the individual predominates, mental health professionals can help people to react to the feelings of catastrophe, drawing on the work of symbolization and helping to revive the ability to think and dream of a better future, allow individuals to discover unknown energies, to be used for oneself and made available to others.

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Figure legends

Figure 1. Impact of quarantine on physical and mental well-being: short and long-term consequences.

Figure 2. Possible interventions during COVID-19 lock-down.