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COVID-19: Psychological and Behavioral Effects and Clinical Implications

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Summary

Starting from the most recent news on the psychological, social and psychopathological consequences of the COVID-19 pandemic, the author underlines the importance of a primary and secondary multidisciplinary prevention intervention organized on individual realities. These interventions must be aimed at both those who tested positive but asymptomatic or with benign symptoms, serious patients who left the intensive care units and healthcare professionals. The latter in particular have experienced serious risk situations for their own health and have at times already developed burnout syndromes that require current and targeted interventions in order not to precipitate the symptoms in real diseases. Lastly, a level of intervention on the general population can be structured with centers equipped for multidisciplinary and multidimensional diagnoses for mostly secondary prevention.

Keywords: COVID-19; Stress related disorders; Multidimensional Assessment; Psychological Prevention

Introduction

With the most recent words of Sandro Galea [1], epidemiologist and member of the National Academy of Medicine and the American Epidemiological Society: "The ongoing Covid-19 outbreak is in many ways unprecedented, in the scale of public health response, and the historical context in which all this is unfolding. Covid-19 is the first global pandemic of the social media age, the first of the "alternative facts" era, and is occurring at a moment when politics and society seem to be in a state of accelerated flux".

The author fears a series of consequences due to the pandemic, first of all a series of psychopathological disorders, in the population of non - patients who have had to upset their life habits and who have long been under the negative influence of anxieties, fears, distress and depression, until, or in some cases, the development of PTSD. There are also consequences on the population, which proved positive with, in these cases, a fluctuating change in mood, from the satisfaction of having escaped it to the fear of recurrence. The actual patients who have been assisted in the reanimation and intubated wards, if anything for a long time represent another group of subjects. These survivors will surely be happy to be resurrected from a situation of very serious risk but in any case they will be subjects fragile both from a physical and psychological point of view. Finally those who care and take care of the sick. All healthcare professionals have been and will be under enormous psychological and physical pressure. Doctors in particular, while aware of the risks of the virus, have often shown commendable self-denial and sense of duty. However, there are certainly no "cost-free" behaviors and situations for our organism's resources.

Generally, we refer to stress conceptualizing it as a response of the organism through which it tries to adapt to different conditions of balance by trying to overcome or endure them [2]. This response appears to be part of

the so-called General Adaptation Syndrome (GAS) [3]. Alarm reaction, resistance (the persistence of facing in correspondence with a chronic harmful stimulus) and the final exhaustion with a recovery of the psychophysical balance or, conversely, the development of a psychopathological or physical disorder caused by the loss of coping ability and normal functioning are the GAS's three phases. The stress response is also characterized by physiological and hormonal hyper activation that allows the individual to cope with the stressor by mobilizing the body's energy resources: specifically, the Sympathetic Autonomous Nervous System (SANS) induces the release of neurotransmitters such as Adrenaline and Norepinephrine which promote the mobilization of glucose, the increase in heart rate and blood pressure. At the same time, the activation of the Hypothalamic-Pituitary-Adrenal (HPA) axis favors the release of the so-called stress hormones, which enhance the physical and cognitive performance more. All this, however, has a cost and, especially if protracted over time, endangers the health of the individual because of the consequences on the cardiovascular system but also on the immune system. One aspect that emerged during the first phase of this pandemic is the gap between those who have had to respond to work pressure without the possibility of stopping and those who have been forced to stop all types of activity. In other words, health professionals, for example, are already considered to be among the most stressful. High levels of work-related stress are traditionally detected among nurses. That is due to the different aspects of their job: shift work, conflicts between family and work, conflict with medical staff, emotional demands (confrontation with suffering, emotionally engaging relationships with patients), high workload (often due to staff downsizing), threats of violence or violence acts by patients and their family members [4,5]. According to Karasek's stress risk model the doctor would also result in a work with high psychological tension due to the high demands to which these professionals are subjected [6]. The possibility of being able to exercise a high degree of control in the decisions and in the use of one's skills, which is usually envisaged as a factor capable of reducing the tension exerted by work, was greatly limited during the health emergency by Covid-19. However, there is the majority of the population, which had to respect the restrictions imposed by the Government: these measures have led to a motor-behavioral block creating a strong discrepancy with what has been experienced on an emotional and psychophysiological level and what has been elaborated on the cognitive level. In fact, in this condition, the organism had to process extremely different types of messages:

- ✓ On the one hand, the numerous information on the pandemic in progress (number of infections, number of deaths, suggestions to reduce the risk of infection, repeated recommendations on compliance with the measures, etc.), were the stress factors capable of activating the organism from a physiological and psychological point of view.
- ✓ On the other hand, the impossibility of "acting", of "not being able to do much" in the place, the hospital, where people normally feel safer and more cared for, promotes a sense of anguish and helplessness.
- ✓ Finally, the most usual reaction to these components is a further involvement and commitment that risks, however, meeting further frustration with reactions of both physical and psychological fatigue with, however, a basis of central and autonomic over-arousal.

This divergence between physiological and behavioral indices can be illustrated by referring to the Polyvagal Theory of Porges [7]. This theory [7,8] maintains that the functioning of the Autonomic or vegetative Nervous System (ANS) reflects the three successive stages with which it evolved phylogenetically.

There would be three different systems of action: the first is that of mobilizing resources, the Mobilization System, which is managed by the SANS and mainly responsible for fight-or-flight behavior. The second is the blocking, the Immobilization System, mainly influenced by the Parasympathetic Autonomic Nervous System (PANS), and in particular by the unmyelinated Vagus (X cranial nerve). Finally, the control system, the Social Engagement System, manages the individual's commitment to social relations; it is mainly managed by the PANS and in particular by the Vagus Nerve. Generally, stressful events evoke the fight-or-flight response in order to facilitate the survival of the individual and therefore the solution of the problem immediately, while conditions that promote a state of physiological calm and alert relaxation are related to activation of the Parasympathetic-vagal System. So, an organism that is reacting to stress

has the energy to deal with it thanks to the physiological response of the organism. We could say that, during this health emergency, the Mobilization System was activated in most people even if it was not functional for everyone and the fact that the activation of the SANS inhibits the parasympathetic branch highlights the normal difficulty in reaching a state of relaxation and the need to lower the level of activation first.

Taking these two sections of the population into consideration, it is also possible to hypothesize that the coping strategies used may be different [9]: it is more likely that the health care workers have adopted, and are still adopting, a problem-oriented coping style in order to face the medical emergency and the related work reorganization that has ensued. Instead, people stuck at home are more likely to have adopted emotion-oriented coping strategies: this highlights how it is essential to consider cognitive patterns in relation to the event being experienced.

However, it should not be underestimated that a part of the population may have implemented maladaptive coping strategies and may represent the portion that needs more attention by clinicians.

Another aspect that emerged during this emergency and that most affects the cognitive-verbal level is the loss of predictability of reality and control over events: the ability to have sufficient knowledge of reality and active control over oneself are aspects of fundamental importance in order to avoid high levels of physical and psychological stress or chronic fatigue [10]. The inability to plan, to anticipate future events and to exert, at least partially, control over external variables inevitably generates stress and tension. Subsequently, this condition can generate more or less discomfort depending on the subjective evaluation of the individual, strongly influenced by stable personality traits: for example, a subject with high levels of trait anxiety, therefore with a general propensity to perceive stressful situations as dangerous, is particularly prepared to anticipate problems, possible solutions and related concerns. Instead, the current health emergency forces us to focus attention on the present moment, on the "here and now". Among the methods that can be used effectively to achieve this goal and develop what can be considered a real skill is Mindfulness, a two-dimensional construct well represented by terms such as awareness and acceptance [10].

Whose purpose is to teach to pay attention to external and internal events and to observe them for what they are, in a non-judgmental way.

Mindfulness, together with Acceptance and Commitment, is one of the techniques of Acceptance and Commitment Therapy (ACT), a clinical-therapeutic intervention that is part of what is called the "third wave" of Cognitive Behavioral Therapy [11]. ACT is based on three fundamental points:

1. Learn to look at one's suffering, and not to see the world through it;
2. Acceptance that corresponds to a vital and conscious contact with one's own experience, aware of the fact that internal experiences are not the same as external events and the methods to try to resolve/eliminate them do not work; finally,
3. Commitment urges to undertake committed actions in the direction of what are their values.

What is possible to do?

The neurosciences, PNEI and the behavioral researches of the last decades, allowed extraordinary advances in discover of new mechanism of functioning and control that have been only minimally applied in the reality of health services of more developed countries, especially on the investigation and prevention of psychopathological consequences of physical illness. In particular, in such complex situations as particularly arduous work and/or works with huge responsibilities on the lives of other people as for the entire teams of healthcare professional. Physicians, Nurses, Surgeon, could be need an initial multidimensional and multidisciplinary medical and psychological assessment to provide a kind of baseline able to offer an idea of their level and possibility of stress management. The same have to be done for several more jobs a risk for the population as the aircraft pilots [12], TIR, bus and train drivers, and the entire transportation field [13,14].

One more important none strictly clinical application of the scientific knowledge, is the prevention. I want underline here that prevention consists of a set of interventions aimed at promoting and maintaining the

state of well-being and avoiding the onset of diseases, at the individual level, the community and the environment.

The objectives are therefore:

- protect the individual,
- control diseases in populations,
- limit disease,
- eradicate them.

Not all of these objectives are realistically achievable, but according to them (in addition to the timing of the intervention); there are three levels of prevention: primary, secondary and tertiary.

- ✓ Primary prevention aims to prevent the disease from arising (increasing the body's defenses, eliminating the causative factors of the diseases and selecting and treating the states of risk), for example by resorting to vaccination or the elimination of pathogens.
- ✓ Secondary prevention, on the other hand, concerns clinically healthy individuals who have biological damage already in place, with the aim of healing the lesion before the disease manifests itself clinically. The instrument of secondary prevention is early diagnosis (it is the typical situation regarding tumors), who is feasibility and usefulness differ according to the characteristics of the various diseases.
- ✓ Tertiary prevention is identified with rehabilitation and prevention of recidivism, with the aim of improving the patient's reintegration into the family and social context.

In particular, with regard to the clinical and psychological assessment, attitudes and personality traits, temperament (that is biologically and genetically influenced), coping mechanisms of the inherent difficulties of the subject should be assessed and well evaluated. Along with behavioral traits such as "harm avoidance" or "excessive reinforcement dependence", this may represent important indicators for a possible failure in the goals. In doubtful cases, it is possible and helpful perform a more rigorous clinical examination and a psychiatric consultation [15]. From a strictly medical point of view, many indicators could come from hormonal and neuro hormonal evaluations, that can be used for a suitable checkup. Screening of blood tests, and, in particular, dose of thyroid hormone, cortisol (especially the delta between morning/zenith and evening/nadir values), prolactin, GH etc. [16,17]. The field of clinical psychophysiology is then, and for some time now, full of extremely precise as molecular tools and methods for detecting. It is possible, to make registration and storage, with specific devices and appropriate software, physiological functions under the control of the Central and Autonomous Nervous System (CNS and ANS). All the procedures described above are painless and do not require any commitment or effort on the part of the subject.

There are many possibilities for recording and analyzing physiological variables that can be rightly considered at the basis of the emotional response. Among the others, the most used, are undoubtedly the skin conductance or galvanic skin response (SCL/SCR, GSR), heart rate (HR), inter beat in-terval (IBI) and heart rate variability (HRV), the respiratory frequency and amplitude (RR and RA) surface electromyogram (sEMG) and more [10,17].

Having a picture first, then periodic, for example every two or three months, of the psycho-physiological pattern and hormonal dosages of at least the aforementioned "stress hormones" such as the aforementioned cortisol, would be able to detect any deviation from the level of functioning optimal for each individual. The evaluation of some parameters strictly related to the stress response such as electrolyte balance, iron metabolism (sideremia, ferritin), thyroid hormones (TSH, FT3, FT4) PRL, in addition to the circadian trend of cortisol can be a complement of the proper evaluation of the health professionals [18,19].

Furthermore, a system of counseling could be implemented and optimized in order to encourage the subject to submit willingly and to these evaluations. That for the implementation of the general health of the individual not only to avoid missing the opportunity to do their jobs well. The guarantee of privacy could be a good incentive, unless cases of observed inability or severe psychopathological deviations.

An example over all: pathological reactions such as "burnout" for healthcare personnel are well known internationally. However, few are the controls of occupational medicine for heart surgeons or neurosurgeons or, in this situation, for virologist or internal physicians or

nurses who often have very stressful pace of work and, in this period, full of risks, fears and anxieties.

Much is already been done but it is certainly my opinion that save on prevention is a huge mistake, and often counterproductive. An error of a surgeon, a pilot or a driver of a train can lead to very considerable damages in terms serious economic damage as well as loss of human lives. The proposal, probably trivial in its formulation but specific in its articulation, is a strengthening of the control mechanisms that support more transnational companies including their subsidiaries for the assessment of global health and not just medical routine. In addition, it seems essential that qualified team of doctors and psychologists work, side by side, for the initial assessment and the setting of subsequent checks. For the latter, may be enough a few times, because the sample taking could be performed on saliva, blood and urine. Psychophysiological registration, at rest or during a stress, may be carried out in a painless way and with appropriate software in 10 minutes. In other words, at least two doctors of various specialties and a clinical psychologist are able to perform a periodic check even in less than 30 minutes, after a complete initial multidimensional checkup, for example, every 2–3 months. The cost of the multidisciplinary assessment made using not expensive apparatus and methodologies will be enormously less than the loss of work –days and sanitary cost for the community in case of full-blown diseases. Last but not at least, the prevention of human errors in all the described categories, from healthcare professionals to aircraft pilots, it can mean that many human lives can be preserved.

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