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Contagion: society, brain and culture

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The pandemic of the century?

COVID-19 have been described as an infectious disease, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). In the last months, this virus has infected millions of individuals, and killed more than three hundred thousand people around the globe. To date, COVID-19 has been described as the pandemic of the century [1]. Governments around the world have raced to contain and fight the pandemic process, while facing relevant issues on healthcare structures, on the economic system, on the social context. The main threat posed by this new disease lies in its infectiveness. The average infected person spreads the virus to 2-3 others, leading to an exponential curve of increase. Mildly ill or presymptomatic subjects are also infective. This situation has led to a serious health threat not only to elderly people with existing health problems, but also to healthy adults. In the last months we have observed how the effect of the pandemic has extended beyond the clinical field, directly affecting our lives. Meanwhile, there is evidence supporting the view on how the COVID-related panic manifestations travel faster and further than the disease itself [2,3]. This dramatic phenomenon calls for a broad reflection, a pause and a recollection that might foster specific and accurate scientific works in the immediate future. Today, we are called upon to investigate the contagion.

The burden of contagion

As Neil Greenberg and colleagues have pointed out [4], the COVID-19 pandemic is likely to pose a serious risk to healthcare professionals around the world. Given the novel nature of COVID-19, and its sudden outbreak, many healthcare systems faced the emergency with scant supplies, inadequate testing and limited treatment options. This in many cases led to an increased workload for practitioners. As a matter of fact, the present pandemic process has all the potential to overwhelm a national health care, in the present context [5].

There are several problems at stake here. First there is the problem of medical decision, since the actual resources resulted scant in the face of the expected number of patients. At the same time, there are no true and tested protocols for this infection. Even given the increased response from research, an effective clinical management of COVID-19 may have been described too late. Moreover, we should consider the rapidly increasing number of patients, a condition that may lead to exhaustion and/or overworking. Lastly, the lethality of COVID-19, and its infectiveness, may forceably place the practitioners at risk of death. This stands true in the case of unfavorable treatment outcome and if we consider the risk of infection for healthcare professionals. The practitioner, especially when facing an infectious disease for a prolonged time, may become infected, and may pose a risk to his own family.

This point alone suggests an increase of risk of relevant psychopatologic injury, in particular of Post-Traumatic Stress Disorder (PTSD) amongst healthcare workers during COVID-19. In this context, several preliminary studies are already available, stressing the insurgence of a new, increased risk related to the pandemic [6-8].
Extending the range of our considerations, one of the primary medical concerns in a population affected by a disaster is actually PTSD [9,10]. Whether or not pandemic event fulfills the criteria for trauma required by DSM-5 can be a point for debate; however, given the death rates, such discussion may take a very academic turn, swaying from the simple empiric observation that, to some people, pandemic process has represented exposure to a very menacing risk factor.
Moreover, beyond the stressors inherent to the pandemic process and fear of infection itself, mass home-confinement governmental resolutions (implements of smart working, quarantine, social distancing and domestic confinement) are scantly represented (and understudied) in contemporary western societies, and may be a cause for raised concern and increase in stress level. As a matter of fact, preliminary studies suggest that the contemporary quarantine is likely to have a non-neutral effect on the psychological subject [11].
Thus the last few months has seen the increase of several factors of psychiatric concern, amongst both healthcare workers and the general population. It could very well be that after the COVID-19 pandemic an increase of PTSD cases will be detected.

From culture to brain, and all the way back

Many words related to infective disease have semantic and philological roots in the broad idea of "touching". The word "infection" comes from the latin *inficio*, a verb whose original meaning is "to stain, to dye by immersion". *Inficio* proposes the idea that "something may pass" from one object to another, in certain conditions. Precisely in the way that a tissue, put in a vat containing colourants, changes is colour through contact, so the human being, in certain environments, may be "infected" with something, causing a move towards change. A similar etymology furnishes the now outdated word *miasma*, which has been for a long time a staple for medical etiology. Its origins lie in the greek word μιαίνω, another verb related to dying. Unsurprisingly, even the word "contagion" recalls the idea of touch. It comes from latin *contagium*, meaning "contact" and is a derivative of *tangere,* "to touch".
In psychiatry, touch has been described as a relevant dimension in human psychology and psychopathology. Physical contact is not a neutral stimulus, and depending on the context it is an element of comfort or distress [12]. Classical anthropologists have suggested that "contagion" is one of the main "laws" of primitive/magical thinking, according to the principle "once in contact, always in contact": a number of cultures and societies have "models" that describe or account for "contagious magical effects" [13].
In this broader sense, contagion is somewhat of a "total concept", an almost ubiquitous category. As touch is an immediate effect of the division between the Self and the Other, contagion appears as the broad field of experiences and phenomena fostered by the effect of touch. In this sense, contagion may be "good" as well as "bad". Touching (or being "dyed by") the wrong environment may "magically" transform the healthy individual into a "sick" one. However, the contact with pure persons or things can heal. We all recall how many European kings claimed to possess a holy "healing touch"; and at the same time contact with a sacred relic or place has long been believed to be a powerful cure towards many bodily ailments [14].
One might wonder why contact is so important in human cultures, how this bodily sensor gateway has long being suspected of being strictly linked to concepts such as "health" and "illness". The principle "contact cause influence" might be learned during the development, a theory already suggested by some classic literature.
From a neurobiological point of view, it is not a surprise. As an example, in preterm infants, massage has shown positive effects on neurodevelopment as detailed by neuroimaging studies [15].

Inquiring contagion: psychiatric perspectives

Contagion is thus a cultural and a biological fact, a reality of the body and a relational one. As such, we have tried to investigate this dimension in the recent book, *Contagi*, which focuses on the current impact of COVID-19 on our society. Starting from the development of Italian lockdown and proceeding through the psychobiography of painter Edvard Munch, we have tried to describe how the empirical reality of contagion, and its cultural significance and value, translate into psychopathology. Contagion, as a whole, is a historical and anthropological fact, with complex branching effects that range from art to literature. In Munch's life, the effect of illness and death is reflected by the artistic path, a theme that dominated his life and his illness trajectory, in which post-traumatic stress symptoms are the first step. How the remission of psychiatric symptoms changed Munch's artistic expression, from The Scream (1893) to The Sun (1916) of the Aula of the University of Oslo, is probably not an idle observation [16].
There are several points of interest in the complex subject of contagion, considered under a psychopathologic light. The first and most obvious one has been

discussed above, and it is represented by the effect of trauma and stress on individuals [17]. A disease such as COVID-19 poses a potentially fatal threat, and should be considered as such. High levels of stress may be detected in healthcare professionals, public workers, infected individuals, and families under strict quarantine (or those with one or more members affected by the disease). Moreover, there are collateral stressors to be considered such as complicated grief [18], for instance, in those survivors who lost a beloved one and were also unable to perform proper funerals.

However, stress is not the only relevant stimulus here. Stringent lockdown conditions mark an unusual situation, and one that can cause otherwise stable situations to suddelny worsen. The "pandemic state" of our society may lead to a recurrence of previously remitted clinical pictures for many psychiatric patients, or amplify sub-threshold anxiety symptomatology even precipitate mood symptom onset and psychotic breakdowns. However, a very productive approach may also be one able to analyze the many factors (genetic, developmental, environmental) related to the trajectory of illness, ranging from subthreshold and atypical symptoms to full-blown, overthreshold disorders. In the population facing pandemic (considered both on a social and on a epidemic level) a continuous distribution of effects could be expected, in the shape of a Gaussian curve Also, parameters such as suicide rates, self-harm behaviours incidence, and suicidal risk should all be closely monitored, as these variables are likely to fluctuate during and after quarantine measures, both for the immediate stressors and for the long term economic effect of this pandemic.

Concluding, it can hardly be denied that the COVID-19 pandemic will be posing new challenges to contemporary psychiatry. Psychopatologic research, among all other branches and sub-specializations of our field, should be ready to answer this call to action.

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