

## **Impact and Mechanism of Covid-19 on Mental Health and Wellbeing**

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### **Abstract**

The Covid-19 pandemic has brought unprecedented pressure to healthcare systems worldwide, resulting in significant and precipitous changes in demand, burden and method of delivery. The psychosocial impact of this crisis is likely to increase over the course of the pandemic, peak later than medical cases and endure for longer thereby significantly exceeding medical morbidity. It will have far reaching impact on the individual, their family and their care providers. Frontline healthcare workers and those with pre-existing mental health difficulties are recognised at increased risk. Now that the initial surge has been expertly curtailed, it is essential that urgent consideration is now directed towards the mental health implications of the current outbreak and ensure that we are as ready for the increased MH needs of the community as we were for the intensive medical care.

### **Impact and Mechanism of Covid-19 on Mental Health**

At the initiation of the Covid-19 pandemic in Ireland, attention was appropriately directed towards anticipating and managing the direct medical effects of the illness. Concerns that a dramatic spike in cases would overwhelm Intensive Care Unit (ICU) capacity, as well as the health service more broadly, led to the implementation of extensive and restrictive physical distancing measures in an effort to "flatten the curve". The most vulnerable, such as those aged above 70 and those with certain pre-existing medical conditions, were encouraged to engage in "cocooning"<sup>1</sup>. Comprehensive public health measures and widespread compliance with government advice helped avoid hospital capacity being exceeded. Infection rates have steadily declined since their peak in mid-to-late April allowing some easing of restrictions<sup>2</sup>. By 25<sup>th</sup> May, 49% of the 2000 people surveyed believed that the worst of the Covid-19 crisis in Ireland was over, with a perception that 56% were adhering restrictions, causing justified concern by the National Public Health Emergency Team (NPHE) that complacency may emerge leading to a second spike<sup>3</sup>.

We are aware from previous pandemics and disasters that the psychosocial impact of a crisis increases over the course of the pandemic, peaking later than medical cases and enduring for longer, and carry an increased risk of suicide<sup>4</sup>. Together this has the effect of significantly exceeding medical morbidity and it is now essential that public attention is shifted towards the mental health implications of Covid-19.

Both severe acute respiratory syndrome (SARS) and Middle Eastern respiratory syndrome (MERS) had high rates of long-term mental health difficulties. Compared to SARS or MERS, survival rates are higher in Covid-19<sup>5</sup>. The high infectivity rates, asymptomatic spread and lack of known treatment are factors known to precipitate increased anxiety and stress. Given the association between duration of exposure to stress and subsequent psychological distress, it is reasonable to hypothesise that the protracted nature of this pandemic coupled with the uncertainty surrounding it, will exacerbate its psychological toll.

The far reaching psychosocial consequences of the lockdown necessitated by the pandemic are profound. The gravity and complexity of these unintended psychosocial consequences is evolving, as illustrated by the “horrifying global surge in domestic violence” and pleas by the UN Secretary-General that governments include this in their national response plans for Covid-19<sup>6</sup>. Moreover, the appalling destruction of social norms precipitated by this pandemic is drawn into particularly sharp focus by the fact that even in dying and death, families are denied the opportunity to access centuries old funeral practices, the absence of which is likely to compound guilt and grief and increase psychological distress.

The economic and psychosocial impact of the closure of non-essential businesses, predicted high unemployment and severe, long-lasting global recession will, however, undoubtedly lower population level resilience and compound individual vulnerabilities. The implications of this stark socioeconomic landscape is underscored by the known link between unemployment, mental ill-health and suicide and compounded by the high baseline suicide rate in Ireland<sup>7</sup>.

The unprecedented change to lifelong habits and ways of being required by this pandemic has provoked the single most acute change in global social patterns in living memory. Regular social supports have been consistently demonstrated as protective to wellbeing in contrast to social isolation, identified as a significant contributory factor to post pandemic psychological morbidity, even in those not infected<sup>8</sup>. It is therefore reasonable to infer that the necessary public health measures such as physical (formerly known as social) distancing and the closure of non-essential businesses, schools and universities will contribute to sustain elevated levels of stress thereby acting to perpetuate mental ill health. The myriad ways in which physical distancing can provoke increased emotional distress, while at the same time removing access to typically available social supports, is readily understandable and evident in the societal changes demanded of all citizens across the lifespan. In many cases, elderly people have become completely reliant on others while losing the comfort and reassurance of physical contact with family. Children have been abruptly removed from the daily routine of attending school and mingling with peers. Students have been forced into an entirely new mode of educational engagement with major examinations being cancelled or repurposed. Further, the closure of these institutions might leave those suffering from socio-economic hardships and reliant on school-related respite particularly vulnerable to stress. The risks attendant to lack of access to social supports is amplified for those with pre-existing mental health conditions. Nationwide regulations on travel have disrupted typical face to face appointments. Whilst efforts have been made to ensure ongoing availability and access to primary and secondary care services, changes to familiar personnel and difficulties in retrieving usual prescriptions may contribute to the worsening of mental illness.

In addition to Covid-19 acting as a psychological stressor, pandemic related mental illness may also occur secondary to the physical effects of the virus, the subsequent host immunological response or the associated treatment. SARS CoV-2, the virus responsible for Covid-19, is recognised to be neurotropic and neurotoxic<sup>9</sup>. Data from previous viral pandemics highlight the heightened risk of delirium, encephalopathies and psychosis<sup>9</sup>. Although the exact neurotoxic pathophysiology of Covid-19 is elusive, emerging data from Wuhan testify to high rates of CNS involvement<sup>10</sup>. The resultant host immunological response leading to inflammation of microvasculature may also have a profound effect on the central nervous system resulting in confusion and dementia. Iatrogenic harm may result from treatment of infection with repurposed antiviral agents or new and as yet untested (e.g. Remdesivir)<sup>11</sup>. Given that other anti-virals have neuropsychiatric side-effects, FDA approval is no substitute for proper clinical trials which are urgently needed<sup>12</sup>. Further, patients receiving treatment in high-dependency or intensive care units may be at risk of developing depression, anxiety, fatigue, and post-traumatic stress disorder in the longer term<sup>13</sup>.

Fortunately, the majority of the population will remain resilient or experience self-limiting periods of emotional distress with only a minority developing enduring mental illness or suffering exacerbations of existing conditions. The aim should therefore be to ensure best use of scarce resources, to identify and offer intervention to those most vulnerable. Frontline healthcare workers, those with pre-existing psychiatric illness and those who received intensive medical treatment for Covid-19 have been identified as particularly vulnerable groups<sup>14</sup>.

The specific psychopathology exhibited and the severity of the illness may be determined by a complex interplay of potential risk and protective factors including genetic predisposition, individual coping style, resilience and sense of self-efficacy, extent of family and social support, environmental pressures including work and financial. Many of these risk and protective factors are dynamic in nature as are the character of the psychological challenges posed at different stages of the pandemic.

It is reasonable to hypothesise, based on current models of anxiety, for example, that the pre pandemic phase involves significant anticipatory anxiety, with the requirement to adapt to functioning in a dramatically altered landscape, which may contribute to post pandemic psychological challenge. Examples of how individual vulnerabilities may interact with environmental factors are found in Table 1.

**Table 1.** Mechanism of Covid-19 related mental health disorders

Cause/Predisposition		Suggested Mechanism/Action	Clinical Outcome
Direct effect of Virus		<ul style="list-style-type: none"> <li>➤ Direct neuro-toxic effect</li> <li>➤ Hypoxia of CNS secondary to respiratory infection/inflammation</li> <li>➤ Atypical host auto-immunological response causing auto-antibodies</li> <li>➤ Virus associated coagulopathies involving CNS</li> </ul>	<ul style="list-style-type: none"> <li>➤ Neurological and neuro-psychiatry conditions</li> <li>➤ PANDAS type presentations</li> </ul>
Iatrogenic: Treatment related effects Treatments targeting virus Supportive medical care		<ul style="list-style-type: none"> <li>➤ Adverse side effects of novel or repurposed anti-viral agents</li> <li>➤ Adverse effects other medications</li> <li>➤ ICU care</li> <li>➤ Psychological effect linked with critical care but with social distancing, clinician PPE</li> </ul>	<ul style="list-style-type: none"> <li>➤ Steroid induced mania/psychosis/depression</li> <li>➤ PTSD post ICU care</li> <li>➤ Depression due to inability to maintain social supports</li> <li>➤ Anxiety due to ambiguous facial expressions and communications issues</li> </ul>
Pre-existing individual personality and cognitive styles	Avoidant coping style	<ul style="list-style-type: none"> <li>➤ May respond to the threat of infection by avoidance thereby becoming socially isolated or by denial, exposing self to risk</li> </ul>	<ul style="list-style-type: none"> <li>➤ Anxiety disorder</li> <li>➤ Anti-social type behaviours</li> </ul>
	Hypochondriac	<ul style="list-style-type: none"> <li>➤ Excess focus on bodily symptoms</li> </ul>	<ul style="list-style-type: none"> <li>➤ Health anxiety</li> </ul>
	Low mood and self-esteem	<ul style="list-style-type: none"> <li>➤ May interpret lack of family contacts as being unlovable</li> </ul>	<ul style="list-style-type: none"> <li>➤ Depression</li> </ul>
	Constitutionally suspicious or paranoid predilection	<ul style="list-style-type: none"> <li>➤ Perceive the government containment measures as an indication of external control and manipulation</li> <li>➤ Unjust government financial assistance</li> </ul>	<ul style="list-style-type: none"> <li>➤ Paranoid ideation or psychosis</li> </ul>
Pre-existing neuro-developmental or intellectual difficulties	Intellectual disability Autistic spectrum disorder	<ul style="list-style-type: none"> <li>➤ Difficulty coping with the suddenly imposed changes, lack of routine, inability to understand pandemic and need for restrictions</li> <li>➤ Inability to use tele-psychiatry treatments</li> </ul>	<ul style="list-style-type: none"> <li>➤ Agitation or challenging behavior</li> <li>➤ Anxiety</li> <li>➤ Self-aggression or self-stimulatory behaviours</li> <li>➤ Excessive engagement in rituals</li> </ul>
Pre-existing mental illness	Vulnerable to additional stressors	<ul style="list-style-type: none"> <li>➤ Difficulty accessing MH services</li> <li>➤ Difficulty with supply of medication</li> <li>➤ Lack of usual social supports</li> <li>➤ Reduction in group treatments</li> <li>➤ Contamination fears amplified by directives to engage in regular hand washing</li> </ul>	<ul style="list-style-type: none"> <li>➤ Deterioration of existing condition</li> <li>➤ Adoption of maladaptive coping strategies such as excess alcohol use</li> <li>➤ Exacerbation of OCD symptoms</li> </ul>
Front Line Health Care Workers		<ul style="list-style-type: none"> <li>➤ Increased risk of infection &amp; transmission of virus</li> <li>➤ Lack (real or perceived) of PPE</li> <li>➤ Excess work load and long hours</li> <li>➤ Moral trauma and complex ethical challenges</li> <li>➤ Reduced manpower due to sick leave</li> <li>➤ Presenteeism or absenteeism</li> <li>➤ Conflict of care to patients and family</li> </ul>	<ul style="list-style-type: none"> <li>➤ Occupational stress and burnout</li> <li>➤ Mental illness</li> <li>➤ Patient safety issues</li> </ul>

A reasonable defence against impairment can be mounted by adhering to the foundational pillars of physical and mental health, such as healthy eating, sleeping and exercise habits. Likewise a good work-life balance and mindful relaxation can aid in managing stress. The role of psychiatrists in identifying and remediating both short-term and long-term effects on mental health is distinctive and valuable. Some of the suggested interventions include providing widespread psycho-education, management of common symptoms of stress (sleep hygiene, relaxation and others), encouraging precautionary measures, limiting exposure to media-related misinformation and promoting self-efficacy by problem-solving. It is not without irony that the pandemic has forced many into these healthier practices as people have been moved from a frantic modern lifestyle to a more serene pace, spending quality time with family and engaging in wholesome and rewarding hobbies and pursuits. However, while some will embrace this opportunity, leading to post traumatic growth, others will fall into less healthy coping strategies such as alcohol or substance misuse.

It is critical that we guarantee the availability of adequate mental health input to those who are adversely affected by Covid-19. Given the position of mental health services as poorly resourced and underfunded before the pandemic, this will require a paradigm shift in government policy towards and commitment to mental health service provision. Just as with the containment of Covid-19, the prioritization of mental health is 'in our hands'. Whether we commit or not -will be a litmus test of the true value we place on the mental health wellbeing of our frontline healthcare workers and those most vulnerable in society to enduring psychological and psychiatric morbidity.

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