

# Mental Wellbeing and Upper Respiratory Tract Virus Infections (URTIs): Implications for COVID -19

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## Abstract

This article briefly reviews evidence showing that reduced mental wellbeing is associated with a greater risk of infection from URTIs. It then reviews evidence showing that URTIs can influence the brain and behavior. A detailed bibliography provides information on the extensive literature on these topics. It is argued that both these areas of research are relevant to COVID-19 and the prevention and management of it.

## Keywords

COVID-19, URTIs, Stress, Cognition, Mental wellbeing, Common cold, Influenza

## Stress and Susceptibility to Infection

The purpose of the first section of this article is to draw attention to an area of research that has investigated the effects of stress and negative affect on susceptibility to respiratory tract illnesses. Policy and practice associated with COVID-19 also has an effect on our behavior. Increased stress and reduced wellbeing may result from social isolation [1]. Indeed there are reports of an increase in social conflict following lockdown. Perceived risk of infection, concern for others and grief will also reduce wellbeing. Longer term concerns about job security have also become more widespread following the closure of many businesses. In China, healthcare professionals who have had to care for those with COVID-19 have also reported an increase in mental health problems due to the stressful working conditions [2]. High levels of stress and mental health problems are currently present and are caused by a number of factors: risk of infection; grief; social isolation; social conflict; job insecurity; information overload and contradictory messages; and having to provide healthcare in extremely demanding circumstances. Based on prior research, the increase in stress is likely to increase the risk of infection and illness severity. Stress may have direct effects or it may combine with other known risk factors (e.g. smoking and the presence of chronic disease) to influence the occurrence of COVID-19. Most of the other stressors have been discussed in the popular press and it is acknowledged that reduced wellbeing is now widely reported in many countries. Stress and infections from respiratory tract infections have been studied for over fifty years. Early research failed to control for exposure and relied on subjective reports rather than objective clinical or virologic assessment of the illness. This led to studies of experimentally-induced colds and influenza [3, 4] which used prospective designs and objective assessment of infection and illness. Chronic stress was repeatedly shown to be related to susceptibility to upper respiratory tract illnesses, and the strongest predictors were job insecurity and low levels of social support. A plausible explanation for these

findings [5] is that chronic stress increases the glucocorticoid response (GCR) and GCR reduces the sensitivity of immune cells to the glucocorticoid hormones that normally turn off the inflammatory response. This leads to the production of more pro-inflammatory cytokines (IL-6, IL-beta and TNF-alpha) and URTI symptoms.

From the point of view of policy and practice it is important to realize that methods which are going to reduce exposure will increase stress. The social isolation will reduce exposure and the risk of infection but the resulting stress will subsequently increase the risk of infection. People need to be aware of this and the prevention and management of stress should be part of the overall public health campaign associated with COVID-19.

## Behavioral Effects of URTIs

Prevention of COVID-19 requires adopting appropriate behavior relating to hygiene [6] and isolation [7]. Similarly, the management of those with the disease requires use of appropriate personal protective equipment and the following of correct procedures by the healthcare professionals. Viral infections will also have an effect on the mood and cognitive functioning of the person. Extensive research on the effects of upper respiratory tract infections (URTIs) such as the common cold and influenza [8] has demonstrated that these illnesses are associated with an increase in negative affect and impaired cognitive functioning. These effects have been observed with both experimentally-induced and naturally-occurring illnesses. The impairments are not restricted to the time the person is symptomatic, but occur during the incubation period, with sub-clinical infections and days after the symptoms have gone. As well as having direct effects on behavior, these illnesses make the person more sensitive to other risk factors such as fatigue, stress and consuming alcohol. Most of the studies have used artificial tasks but some have demonstrated impairments using simulations of safety critical tasks such as driving [9].

Much of the concern about COVID-19 has focused on those who are at risk of dying or who are going to require intensive care. These represent a small proportion of those infected with the virus. Those with mild symptoms, and even sub-clinical infections, may feel fatigued and be less able to perform efficiently. This has important implications for issues such as when to return to work or education, especially for those with safety-critical jobs. For others, the impaired function may manifest itself as a reduction in quality of life, which will add to the mental health problems related to the current COVID-19 situations.

In terms of policy and practice, the initial approach should provide information on this topic. This should be carried out in a clear, succinct way otherwise it may be perceived as giving mis-information or may contribute to

information overload which in itself may affect wellbeing. Treatment should also consider methods of removing this malaise associated with viral infections [10, 11] rather than just providing symptomatic relief. It should also be noted that unlike most URTIs severe neurological effects may occur with COVID-19 [12] which suggests further investigation of CNS problems associated with the disease.

## Conflict of Interest

None

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