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REVIEW

Twenty-five years of research on the behavioural malaise associated with influenza and the common cold

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Summary Minor illnesses such as the common cold and influenza are frequent and widespread. As well as specific symptoms such as nasal problems and fever, these illnesses are associated with a behavioural malaise. One feature of this malaise is reduced alertness and this has been confirmed using subjective reports and objective measures of performance. Such effects have been obtained with both experimentally induced infections and in studies of naturally occurring illnesses. The mechanisms underlying the effects are unclear but possibly reflect effects of cytokines on the CNS which result in changes in neurotransmitter functioning that lead to reduced alertness. The malaise induced by these illnesses has many real-life consequences and activities such as driving and safety at work may be at risk. These illnesses not only have direct effects on performance and mood but also make the person more sensitive to effects of other negative influences such as noise, alcohol and prolonged work. Countermeasures include ingestion of caffeine and other drugs known to increase alertness.

Contents

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1. Introduction

Upper respiratory tract illnesses (URTIs) such as the common cold and influenza are frequent and widespread. Psychologists have conducted research on such illnesses for a number of reasons. The first area of research has examined associations between psycho-social factors such as stress and susceptibility to infection and illness (e.g. Cohen and Williamson, 1991; Cohen et al., 1991, 2012; Cohen, 2005). A second area of research has investigated whether influenza during pregnancy is a risk factor for schizophrenia (e.g. Crow, 1996). More recently there has been research on the role of psychosocial factors in awareness of the risk of swine flu and uptake of vaccination (e.g. Rubin et al., 2010). Animal studies have also assessed the interaction between the immune system and neurochemistry (e.g. Dunn, 2006) and between cytokines and sickness behaviour (e.g. Dantzer and Kelley, 2007).

These illnesses have a large impact on healthcare costs and are a major cause of absenteeism from work and education. A review of the area (Bramley et al., 2002) concludes that in the USA the economic cost of lost productivity due to the common cold approaches $25 billion, of which $16.6 billion is attributed to productivity loss, $8 billion absenteeism, and $230 million to caregiver absenteeism. Other research has shown that URTIs impact on academic and work performance (Nichol et al., 2005, 2006; Palmer et al., 2010). In addition, quality of life is reduced by such illnesses and the malaise associated with them has been the subject of research for over 25 years. As well as the specific local (e.g. increased nasal secretion; nasal stuffiness) and systemic (e.g. fever; sore throat) symptoms these illnesses are associated with behavioural problems. Changes in subjective mood, psychomotor speed and cognitive function are often referred to as malaise. The research described in this article aimed to describe the behavioural changes associated with URTIs, elucidate underlying mechanisms, and consider the practical implications of such effects. The aim of the present review is to provide a historical account of research on this topic. The review starts with a summary of some early anecdotal accounts which led to more controlled studies. This is then followed by a review of studies of experimentally induced URTIs. Both of these topics have been reviewed in detail before (Smith, 1990, 1992a) and this research was followed by research examining the effects of naturally occurring illnesses. This later research has not been reviewed before and is the main focus of the present article. No single method of searching the literature reveals the extent of the literature on this topic. The review presented here reflects the unique personal knowledge that the author has gained over the last twenty-five years. Such an article not only provides an immediate knowledge base but will form a foundation for future reviews of the area.

2. Case histories of impaired function

An initial article (Tye, 1960) described a number of case histories that suggested a link between influenza and accidents. These case histories were supported by road accident statistics from the 1950s which showed an increase in accidents in years when there was an increased prevalence of influenza. This article also cites cases where performance was impaired even when the person was not symptomatic (during the incubation period of the illness and after the symptoms had gone). This is an important observation in that a person with severe symptoms may go to bed and refrain from normal activities but this is unlikely to be the case prior to or after the illness.

Another early paper (Grant, 1972) describes case histories of post-influenzal effects on the decision making of highly skilled technicians. The primary features of these errors were that they were made by individuals who had been ill with influenza but no longer had the primary symptoms; the errors went unnoticed and the person rejected advisory comments from colleagues; and the errors could not be attributed to poor motivation or general lack of ability. Overall, these results suggested that further research was required on the effects of such illnesses on performance efficiency. In parallel with the reporting of these case studies other