

LIFESTYLE

&

IMMUNITY

IN THE AGE OF

BY DEVIN BOX

COVID-19



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In many ways, the COVID-19 pandemic has affected the lives of all Canadians. Dramatic changes in our social and work lives, the donning of face coverings, and increased sanitation practices are just some of the ways life has looked different over the past year. With the goal of preventing the spread of COVID-19, most of these lifestyle changes revolve around the protection of physical safety. Limiting exposure through physical distancing was and is still considered one of the best ways to slow COVID-19. In spite of this, social discourse on the health benefits of meaningful

human connection has increased, and consequently, a growing emphasis has been placed on investment in physically distant human connection. Indeed, it has become increasingly evident that the often underdiscussed social and psychological changes adopted over the past year have had direct implications on the biological health of communities. A growing body of literature in the field of psychosocial determinants of health has demonstrated the intimate connection between our biological, psychological and social health; showcasing the negative impacts of poor social connectivity

on our immune system (1). To many, the psychosocial approach may seem foreign, as the traditional view of health focuses heavily on biomedical factors. However, a more nuanced understanding of psychosocial factors can provide a more holistic approach to a healthy lifestyle, even beyond the pandemic. A summary paper written by Dr. Sheldon Cohen in *Perspectives on Psychological Science* eloquently highlights the importance of psychosocial factors for immune function in response to upper respiratory infections (2). Due to the pathological similarities of other upper respiratory infections to COVID-19, insights from the work of Dr. Cohen and colleagues has the potential to influence policy and decision making during the COVID-19 pandemic. This piece seeks to highlight and provide context for a series of experiments conducted by Dr. Cohen on psychosocial health determinants and their implications for the COVID-19 pandemic and beyond.

Lead in/biopsychosocial model

To contextualize the work of Dr. Cohen and its importance for the COVID-19 pandemic, it is first important to understand the integration of psychological and sociological factors of health into the well-known biomedical model. The biopsychosocial model of health is our current understanding of this relationship. First proposed in 1977, the biopsychosocial represented a novel conceptualization of health (3). The emergence of the biopsychosocial model directed more attention to psychological and sociological health research fields; with greater emphasis placed on the subjective experience of health today. In this context, the subjective experience of illness can exert effects on the biological course of illness, and vice versa. In examining COVID-19 through the biopsychosocial model, it becomes apparent that our physical and social environments can have a powerful effect on our illness experience and have the potential to influence our ability to mount an effective immune response.

Contrast the traditional social analysis with a more integrated one

Social determinants of health can be approached in a

myriad of ways. For the sake of the overview provided herein, social determinants will be broadly categorized into population level and individual level determinants based on the outcomes measured. At the population level, this field of research aims to identify differences in health metrics across a variety of demographics. For example, recent studies have shown emerging inequities within racial and socioeconomic groups regarding the number of cases and deaths from COVID-19.

“A doubling of the death rate has been observed in New York when comparing black and white populations (20 and 10 deaths per 100,000 respectively).”

As of April 27th, 2020, Toronto’s lowest income quantile saw 113 cases per 100,000 compared to 73 cases per 100,000 in the highest income quantile (4)(Public Health Ontario 2020). Analyzed at the population level, many determinants of health relate directly to the ability of the system to address individual health needs (i.e. access to health care, cultural barriers between physicians, and lack of financial resources)(5). Going beyond the provision of, and access to health resources, a more challenging question to answer is whether the quality of individual social connections can be considered a determinant of health, and importantly, affect immune response. Population level social determinants cannot capture the level of detail required to answer such questions. In contrast, analyzing social determinants of health at the individual level, through measures such as validated self-report questionnaires, can. The work of Dr. Cohen and colleagues emphasizes highly

controlled and individualized interventions to answer these questions on both social and psychological levels.

Psychosocial vulnerabilities to upper respiratory infections paper summary

A series of experiments outlined by Cohen and colleagues illustrate how different psychological stressors can affect our immune response to upper respiratory infections. Psychological stress occurs when an individual perceives that environmental demands exceed one's capacity to adapt (6). In their 1991 study, Cohen and colleagues found that participants who scored higher on a self-report stress index were 2.16 times more likely to develop a cold when exposed to rhinovirus particles (7). Cohen and colleagues also found that interpersonal problems and underemployment were two of the most powerful predictive factors for subsequent infection; a particularly concerning realization when considering the psychosocial consequences of the COVID-19 pandemic (8). Given the significant psychological stress associated with reported increases in underemployment caused by COVID-19, a greater emphasis should be placed on employment protection (9).



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The COVID-19 pandemic impacted the unemployment rate in many nations

Cohen et al. note that the extended duration of these types of stressors that may put the immune system at risk. In a follow up study, Cohen et al. identified proinflammatory cytokines as a mediating factor in this rela-

tionship (10). Released in response to an infection, cytokines act to coordinate the overall immune response. Appropriate amounts of cytokines are vital in the elimination of viruses; too many cytokines, however, can have toxic effects. Investigating this relationship, Cohen and colleagues measured cytokine levels in nasal secretions before, and five days after viral exposure. Participants who recorded higher perceived levels of stress at baseline, produced higher levels of cytokines and subsequently experienced more symptoms. The researchers hypothesized that chronic stressful life events could potentially alter the feedback pathway governing cytokine levels, potentially leading to more inflammation. Indeed, when exposed to synthetic cortisol, immune cells were found to be unresponsive (11, 12). Under times of high stress, it is hypothesized that immune cells may become desensitized to cortisol, resulting in decreased immune function as a consequence of increased inflammation. The implications relating to COVID-19 are quite clear: major stressful life events can interfere with our ability to coordinate our bodies' defense systems. Should high states of psychological stress be left unattended, large portions of the population could be more susceptible to severe viral infections. This very effect has already been documented in a recent study that found evidence linking increased cytokine levels to disease severity in COVID-19 (13).

In examining social determinants of health, two main factors can be considered: social integration, and social support. Social integration refers to the degree to which an individual participates in a broad range of social relationships (14), and is generally defined as the number of social roles one plays (spouse, parent, volunteer etc.). Greater social integration is predictive of many health metrics and is thought to operate based on social pressures to adopt healthy behaviours. These healthy behaviours then reinforce healthy psychological states. Cohen and colleagues found that individuals with the lowest social integration scores were 4.2 times more likely to develop a cold following viral exposure. In contrast, the most socially integrated individuals were not only at decreased risk of developing colds, but those who did also experienced less severe symptoms (15). In mediating the effects of social integration, social support refers to the resources provided by an individual's social network in the face of adversity (16).

“It has been shown that greater levels of perceived social support can protect against the increased infection susceptibility caused by lower levels of social integration.”

Individuals with a lower number of social roles can benefit from higher levels of social support (17). In examining the COVID-19 pandemic from this lens, it becomes increasingly important to adopt balanced and targeted approaches to reducing transmission whilst considering the implications of meaningful social interaction and connection. Finding this balance has not only illuminated the impact of quality social interactions on overall health, but also expanded our understanding of which social and environmental factors have the greatest impact on our immune function.

Conclusions

The variety of lifestyle changes brought forth by the pandemic highlight the importance of holistic approaches to health. Under the guidance of the biopsychosocial model of health, continued efforts to promote psychosocial wellbeing should be undertaken in conjunction with physical forms of health promotion. Evidence suggests that the often-forgotten psychological stress and social isolation experienced during the pandemic may serve to negatively impact the ability of our immune systems to fight future infections. Moving forward a variety of steps can be taken to better promote our collective health. It is imperative that both individuals and communities play a vigilant role in upholding physical distancing practices whilst addressing and nurturing overall psychosocial health. Raising awareness about the importance of psychosocial wellbeing during the pandemic has the potential

to protect communities from potentially deadly consequences of COVID-19. In a technologically advanced society, it has never been easier to connect with those around us at a distance. Successfully navigating the pandemic requires a delicate balance of policies, practices, and individual actions. Although a great challenge, the importance of psychosocial health during the COVID-19 pandemic serves as a message of empowerment. Our understanding of health need not be limited to a narrow view of pathology alone. The role we all play in the promotion of collective health may indeed, be more important than we previously thought.

References

1. Stansfeld S, Rasul F. Psychosocial factors, depression and illness. 2007.
2. Cohen S. Psychosocial Vulnerabilities to Upper Respiratory Infectious Illness: Implications for Susceptibility to Coronavirus Disease 2019 (COVID-19). *Perspectives on psychological science*. 2020;174569162094251-1745691620942516.
3. Engel GL. The clinical application of the biopsychosocial model. *The American journal of psychiatry*. 1980;137(5):535-44.
4. Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 – What we know so far about... social determinants of health. . Toronto, ON: Queen’s Printer for Ontario; 2020.
5. Asanin J, Wilson K. “I spent nine years looking for a doctor”: Exploring access to health care among immigrants in Mississauga, Ontario, Canada. *Social Science & Medicine*. 2008;66(6):1271-83.
6. Lazarus RS, Folkman S. *Stress, appraisal, and coping*: Springer publishing company; 1984.
7. Cohen S, Williamson GM. Stress and infectious disease in humans. *Psychological bulletin*. 1991;109(1):5.
8. Cohen S, Frank E, Doyle WJ, Skoner DP, Rabin BS, Gwaltney Jr JM. Types of stressors that increase susceptibility to the common cold in healthy adults. *Health Psychology*. 1998;17(3):214.
9. Statistics Canada. Employment and unemployment rate, monthly, adjusted for seasonality. Table 14-10-0374-01. [Internet]. 2020.
10. Cohen S, Doyle WJ, Skoner DP. Psychological stress, cytokine production, and severity of upper respiratory illness. *Psychosomatic medicine*. 1999;61(2):175-80.
11. Cohen S, Janicki-Deverts D, Doyle WJ, Miller GE, Frank E, Rabin BS, et al. Chronic stress, glucocorticoid receptor resistance, inflammation, and disease risk. *Proceedings of the National Academy of Sciences*. 2012;109(16):5995-9.
12. Miller GE, Cohen S, Ritchey AK. Chronic psychological stress and the regulation of pro-inflammatory cytokines: a glucocorticoid-resistance model. *Health psychology*. 2002;21(6):531.
13. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The lancet*. 2020;395(10223):497-506.
14. Brissette I, Cohen S, Seeman TE. *Measuring social integration and social networks*. 2000.
15. Cohen S, Doyle WJ, Skoner DP, Rabin BS, Gwaltney JM. Social ties and susceptibility to the common cold. *Jama*. 1997;277(24):1940-4.
16. Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. *Psychological bulletin*. 1985;98(2):310.
17. Cohen S, Janicki-Deverts D, Turner RB, Doyle WJ. Does hugging provide stress-buffering social support? A study of susceptibility to upper respiratory infection and illness. *Psychological science*. 2015;26(2):135-47.