

### The Covid-19 pandemic as an opportunity for advances in medicine

History has shown that pandemics and wars have led to major advances in medicine. The global impact of the ongoing Covid-19 pandemic has not been uniform across nations. According to an estimate, the deaths per million population attributed to Covid-19 infection stands at 621 in the UK, 642 in the USA and 72 in India.<sup>1</sup> The impact of an infection is the resultant of the inoculum and host resistance. The strategies that have been emphasized by most countries for containing the pandemic, such as lockdowns, social distancing, hand washing, masks and other types of protective gear, are designed to reduce the inoculum. Therefore, the inter-country variation in the impact of the pandemic is likely to be related to the variation in host resistance.

#### Host resistance

Well-established factors that enhance immunocompetence are physical activity; a healthy diet; abstaining from tobacco and substance abuse; proper time, duration and quality of sleep; and mental peace. There has also been a hypothesis that scrupulous personal hygiene might actually impair immunity through 'disuse atrophy'.<sup>2</sup> Of these factors, those that deserve investigation on a priority as possible determinants of the inter-country variation in the impact of Covid-19 pandemic are diet, mental stress and hygiene.

#### Diet

Indian diets are predominantly plant-based and therefore likely to be rich in antioxidants. Spices, particularly, are a concentrated source of phytochemicals, with antioxidant and other types of protective actions. In India, there is also an overlap between diet and many Ayurvedic prescriptions for prevention of disease. Ayurveda has a few combinations of spices specific for the prevention of respiratory illnesses. All these combinations are believed to act by stimulating immunocompetence.

#### Studies could be done to examine

1. Whether these combinations are really effective in enhancing immunocompetence?
2. Whether the intake of these herbs went up in India more than in the UK or the USA during the Covid-19 pandemic?

#### Psychological factors

Psycho-neuroimmunology has put the mind-body relationship on a firm scientific footing.<sup>3</sup> The psychological impact of the Covid-19 pandemic in different societies is likely to vary. It is likely that 'panic' and 'fear', emotions likely to impair immunity, would be far less prevalent responses in India than in many other countries. Due to the spiritual inclination of its people, in India, the prevalent emotional responses are likely to be 'calm resignation', 'stoic acceptance as punishment for our sins', 'stay happy in whatever state God keeps us', 'all is for the best' or 'faith in protection by a Higher Power'. Whether this assumption is true would become clearer after we have the results of studies on the psychosocial impact of the pandemic being done by the National Book Trust and the Indian Yoga Association.<sup>4,5</sup>

A study could compare the outcome in two groups of individuals who have tested positive for Covid-19 but whose psychological responses to the pandemic are different.

#### Hygiene

Countries in Asia and Africa, where populations, in general, have greater microbial exposure due to poorer personal hygiene and environmental sanitation, have lower Covid-19 death rates per million population<sup>1</sup> than countries in western Europe and North America.

Studies could compare the mortality and morbidity due to the Covid-19 pandemic and immunocompetence in:

1. two groups with contrasting standards of hygiene in the same society such as middle-class and upper middle-class populations on the one hand, and migrant workers and slum dwellers on the other hand in a country such as India;
2. two societies with contrasting standards of hygiene such as European countries and the Indian subcontinent.

#### Studies on Indian diaspora

There is a large Indian diaspora in the USA, the UK, Canada and Australia. They are likely to have retained most dietary practices of the country of their origin, and their psychological attitude to the pandemic and their standards of hygiene may also be not the same as those of their country of adoption. Studies could be done to compare the number of cases, percentage of severe cases and deaths per million in the Indian diaspora in these countries with the native populations.

The hypothesis that inter-country variation in the impact of the Covid-19 pandemic is best explained by immunocompetence has implications for the strategies that might be emphasized for containing the pandemic. Strategies aimed at boosting immunocompetence would be less expensive and would be less disruptive for daily life and economy. The suggestions for research made here, and their offshoots, can keep a large number of scientists busy for several years and can also spawn many international collaborations. It is hoped that the silver lining of the pandemic would be advances in medicine and strengthening of the one-world feeling.

*Conflicts of interest.* None declared

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