

# Meditation and Yoga-assisted Alteration of Dietary Behavior as a Useful Strategy for Limiting Zoonotic Pandemics: A Novel Insight

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## ABSTRACT

Vegetarian diets are known to have significant positive effects on personal and planetary health and are likely to curb zoonotic infection transmission. We propose that minimizing meat consumption should become an essential dietary shift in the post-COVID-19 era. To date, however, there is limited knowledge concerning suitable methods that could catalyze this change on a global scale. Meditation and Yoga are practical and easy to implement psychomodulatory strategies that can naturally trigger vegetarianism and related eating behaviors, lowering our reliance on animal meat. Decreasing dependence on animal meat reduces the need for animal markets and may substantially minimize the likelihood of spillover (passage of viruses from animal reservoirs into human populations). Global implementation of these strategies, in our opinion, can add to spiritual wisdom, compassion, and cooperative human behavior, thus reducing the encroachment of wild-life reserves and animal exploitation. The application of these ancient Indian approaches represents a novel and focused strategy toward curbing zoonotic pandemics.

**Keywords:** Coronavirus disease-19, Meat-eating, Meditation, Pandemics, Viral spillover, Yoga.

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## INTRODUCTION

In December 2019, many patients were diagnosed with “pneumonia of unknown origin”. Few initial patients revealed direct contact with the Huanan animal market at Wuhan, China, which became recognized as the epicenter of the coronavirus disease-19 (COVID-19) pandemic. As of 27 December 2020, the COVID-19 pandemic has resulted in 79.2 million cases and 1.7 million deaths and had a catastrophic impact on human life.<sup>1</sup> This challenging experience showcased our lack of preparedness to handle pandemics and triggered profound questions concerning human dominance over ecosystems and the inevitable repercussions of wild-life exploitation. This timing is thus a golden opportunity to reflect on some of these ideas.

## EMERGENCE OF ZOOONOTIC VIRAL SPILLOVER EVENTS

A spectrum of human activities, such as, deforestation, urbanization, and reforestation, have triggered viral spillovers globally. Besides these well-established factors, animal slaughter could also increase the likelihood of viral transmission from animal reservoirs to compatible human hosts.<sup>2</sup> Epidemics like Severe Acute Respiratory Syndrome (SARS), Middle Eastern Respiratory Syndrome (MERS), Ebola, etc., are vital reminders of such an ecological crisis.

The animal-borne viruses (that cause these epidemics) jump from vertebrates to human hosts and evolve in a step-wise manner through natural selection. Such spillovers are dependent on the overall density and distribution of animal reservoirs and are greatly influenced by factors that contribute to pathogen shedding and pathogen survival.<sup>2,3</sup> Bats are well-known viral reservoirs and harbor nearly 60 viruses.<sup>4,5</sup> Some of these viruses are responsible for highly fatal illnesses like the Nipah, Rabies, and Ebola.<sup>4,5</sup> The genetic and immunological profiles and peculiar behavioral traits make bats an ideal reservoir of viruses.<sup>6</sup> Their colonial behavior and the inverted

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hanging position may also enable viral transfer across different animals through mucosal secretions. Viral shedding in response to stressors is frequent in the bat population and could even be due to a hibernation exit.<sup>7</sup> Recent phylogenetic studies have also pointed at bats as a potential reservoir for severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).<sup>8</sup> Initial patient-derived samples showed virus strains that resembled bat coronavirus with a 96% similarity at the whole genome level.<sup>8</sup> Following a stressful event in bats, the pathogen SARS-CoV-2 most likely gained access to an intermediate host, like the Pangolin.<sup>9</sup> Coronavirus derived from Malayan Pangolin (Pangolin CoV) has a 91.02% match to the SARS-CoV-2 virus at the whole-genome level.<sup>9</sup> Pangolins are also the

most trafficked mammals and have been exploited indiscriminately for their flesh, and medicinal and decorative value.<sup>10</sup>

### Animal Markets as Venues for Viral Exchange?

Notable examples of infections acquired through animal slaughter include the variant Creutzfeldt–Jakob disease that emerged from cows infected with bovine spongiform encephalopathy (BSE) and acquired immunodeficiency syndrome (AIDS) that possibly originated from exposure to Simian blood products.<sup>11</sup> The occurrence of frequent zoonotic infections in Chinese provinces (SARS-CoV, Avian influenza, etc.) further indicates the link with animal markets.<sup>3,12</sup> Furthermore, in some parts of China, bats (which are a high-risk reservoir) are frequently hunted and traded for food; this dietary interest could itself significantly increase the likelihood of future zoonotic pandemics.<sup>3,12</sup>

### Underestimated Determinants of Viral Spillovers: How Animal Killing/Sacrifice Relates to Spillover Events

The emotional storm and “fear” induced during animal killing may lead to a decline in the animal’s immune response, resulting in viral shedding from intermediate hosts. Additionally, the animal handlers may be a vulnerable group for the entry of such viruses because stress and anger precipitated during the act of harming/killing an animal may itself result in a transient decline in immune surveillance—a concept well-addressed in the psychoneuroimmunology literature.<sup>13</sup> Thus, fear in the animal, and stress and anger in the animal handler, are likely to create conditions necessary for pathogen survival and entry into a compromised human host. However, this viral spillover theory is only speculative, and there is limited understanding concerning the exact contributing mechanisms of spillover events. Assessments of viremia (associated with emotional trauma) in farm animals during sacrifice and validation of sudden immunological decline (due to anger/stress) in butchers could lead to valuable insights into this hypothesis; these efforts will validate the contribution of animal slaughter in viral zoonosis.<sup>2</sup> In any case, the occurrence of SARS cases in restaurant workers and serological evidence in those working in wet markets indicates that individuals possessing higher contact with animal flesh may be at a higher risk of disease transmission.<sup>14</sup>

## NEED TO ALTER OUR HOSTILE DIETARY PATTERNS

Because human reliance on animal meat is central to wet markets’ sustenance and poaching for wild animals, this behavioral pattern needs to be managed appropriately. If we do not take the necessary actions, a spillover similar to SARS-CoV-2 may recur in the future due to the careless and unregulated butchering of animals! Although there is a need for a strict global policy on animal trade restriction, it is essential to realize that responsible personal judgment and conscious efforts are a critical first step. Abstinence or minimization of meat consumption at the individual level is necessary to control animal trafficking and trade globally.

### Switching to a Vegetarian Diet: A Potential Health Solution

Plants are rich in numerous phytochemicals like curcumin, carotenoids, flavonoids, polyphenols, etc., that have immense preventive and therapeutic value in a spectrum of human diseases. Interestingly, there is no evidence of such protective compounds

in meat products. This factor is worth considering, further favoring plant-based foods over animal-based diets. Animal meat may be a rich source of protein, vitamin D, vitamin B12, etc.; however, choosing the right vegetarian alternatives could be a worthy compensatory approach. A deficiency identified in vegans is most likely due to poor meal eating; therefore, balanced vegetarian diets are highly recommended.<sup>15</sup> For example, frequent consumption of vegetarian alternatives like coconut milk, nutritional yeast, and soy milk fortified with cyanocobalamin may compensate for a possible deficiency of vitamin B12 in Vegans. Because dairy products are an essential nutrient source, they can be combined with plant-based diets to yield maximal benefits. There is significant literature concerning ideal globally sustainable diets, which suggests that reliance on plant-based diets could be preferable over animal-based diets in terms of human health and nutrition, prevention of chronic disease, and overall environmental impact.<sup>15–18</sup> Switching to a vegetarian diet can also reduce overall cancer risk (often associated with meat products) and metabolic disease, which are emerging global health problems.<sup>19–21</sup>

### Critical Determinants of Dietary Behavior

Dietary patterns are influenced by individual choice, mental and emotional factors, and cultural and societal aspects; therefore, dietary behavior modification is exceptionally challenging. The consumption of bushmeat (a reservoir of the Ebola virus), e.g., is a cultural norm in the African communities.<sup>22</sup> Stress and anxiety patterns can also determine the foods we choose. Impulsive eating of junk foods and animal meat is noticed in some individuals suffering from depression, anxiety, and worry.<sup>23</sup> Individuals who initially show interest in quitting meat consumption face significant challenges in controlling their urges and are quite likely to relapse into their previous dietary patterns. This experience is familiar to many beginners, and handling such cravings should be considered an essential first step in gaining control over such practices.

Interestingly, some studies have shown an inverse relationship between meat consumption and the emergence of depression.<sup>24</sup> Dietary habits are deeply linked with satisfaction, and sudden and aggressive withdrawal can result in an overall compromise in quality-of-life. Therefore, it is recommended that willing individuals gradually reduce meat-eating through appropriate lifestyle modification. Taking charge of emotions and gaining control over stress and anxiety patterns can improve our dietary preferences. However, so far, no such methods have been described in nutrition or psychology literature.

## MEDITATION AND YOGA-ASSISTED ALTERATION OF DIETARY PATTERNS: AN APPROACH THAT COULD NATURALLY TRIGGER VEGETARIANISM AND ASSOCIATED BEHAVIOR

Meditations include a gamut of techniques that implement breath observation, mantra chanting, or awareness in action (popularly referred to as mindfulness).<sup>25,26</sup> These yogic techniques enable individuals to experience the present moment with serenity and totality.<sup>25,26</sup> They improve self-control, reduce impulsivity, and reactivity to food cues—which are among the critical emotional and psychological determinants of dietary choices.<sup>27–29</sup> These neuromodulatory and psychomodulatory practices may, therefore, help us achieve goals concerning dietary shift. Meditation is useful in managing other deep-seated cravings like smoking and drug

abuse, indicating their potential in facilitating self-control.<sup>27,28</sup> Such evidence adds significant knowledge to the overall potential of these behavioral techniques. Through mindfulness/awareness (the underlying working principle), we believe the practice of meditation can override the mind from the dominating influence of deep-rooted cravings like meat-eating. Many treading the meditation and Yoga path begin to rely on balanced vegetarian diets.

According to a nation-wide Australian survey on 28,695 women, practitioners of Yoga and/or meditation had a higher likelihood of following a vegan diet.<sup>30</sup> Another Australian survey (on 3,892 respondents) indicated the possibility that a regular yoga routine could induce vegetarianism and other lifestyle benefits.<sup>31</sup> In another cross-sectional study based on the United States population (4,307 randomly selected individuals), practitioners of gentle Yoga poses had higher odds of following a vegetarian diet, besides higher odds of following a diet rich in fruit/vegetables.<sup>32</sup> Such reports (although limited) favor the presented hypothesis on the likely impact of such lifestyle interventions on dietary behaviors.<sup>30-33</sup> We recommend further studies, especially evaluating the proportion of non-vegetarian diet and the frequency of such meals in the practitioners of meditation and/or Yoga; we believe this is a crucial research direction. Meditation and a vegan diet together can also profoundly affect the intestinal microbiome, which could have potential health benefits (via alterations in immune, endocrine, and metabolic profiles).<sup>34</sup> Furthermore, each meditation-type and yogic practice, in our opinion, could have a distinct impact on dietary behaviors.

Engaging in meditation and Yoga can also have a more profound impact on human personality as they could significantly improve the quality of emotions. They trigger compassion (for fellow beings), loving-kindness, empathy, and oneness, resulting in inner transformation, as documented in the scientific literature.<sup>35</sup> The insight gained through years of diligent practice and accumulating scientific evidence inspires us to recommend these interventions as a relevant lifestyle modification for current societies. They realign the natural existential (harmonious) behavior in each of us. Because of elevated spiritual awareness or oneness, they may also decrease the tendency to encroach into wild-life territories. As individuals shape society, enriching the individual should be considered the best strategy to impact the community. Because meditation and Yoga are individually implementable non-sectarian practices, they are globally feasible strategies.

The interesting pro-health and pro-environmental effects mentioned above could be a collective result of attention regulation (due to changes in the anterior cingulate cortex and striatum), emotion regulation, reduced reactivity (due to changes in multiple prefrontal regions, the limbic system, and the striatum), and enhanced self-awareness (due to changes in the insula, medial prefrontal cortex, and posterior cingulate cortex and precuneus), which are all central to many meditation methods.<sup>36,37</sup> The addition of physical Yoga to meditation (integrated approach) could further catalyze these benefits.

### Few Concluding Remarks

The observation of the International Day of Yoga (on 21st June) recommended by the United Nations has motivated many individuals to tread this path of inner transformation.<sup>38</sup> Similarly, a World Meditation Day and no-meat week/month could also be complementary efforts to promote global health and spiritual oneness. Meditation and Yoga deserve to occupy a special place

in the post-COVID era. The deeper thinking that emerges through these practices can enable well-being even during crises.<sup>39</sup> Although meditation and/or Yoga are well-accepted approaches and frequently considered for their ability to shift human thinking and deepen relaxation,<sup>39</sup> their hidden potential to naturally trigger vegetarianism and thus help curb zoonotic pandemics has never been discussed previously. A global initiative on meditation and Yoga can have innumerable positive benefits with significant ramifications to human health and, at a larger scale, to planetary health.

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