

RESEARCH ARTICLE

Flattening the Curve of COVID-19 with/without the Vaccine: An Islamic Ethical Perspective

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ABSTRACT

“Will you take the COVID-19 vaccine when it becomes available?” It seemed a simple survey question that I had to answer while taking part in a study conducted by HMC’s mental health service on “People’s attitudes towards the COVID-19 vaccine” in November 2020; however, I would admit that it did cause some uneasiness, which further exacerbated as I continued answering more questions. Suddenly, this realization dawned upon me that a decision in this regard was not entirely based on my personal choices and circumstances; it involved transferring this highly contagious virus to other people in my vicinity for which I would be held accountable. Vaccines have managed to control and eradicate specific diseases in the past. At the same time, an anti-vaccinationism campaign has taken center stage in the public health discourse, especially related to childhood vaccinations. However, in the case of COVID-19, vaccine hesitancy is of a slightly different nature,

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triggered by the fear that the vaccine has been developed too quickly and thus is not safe enough. This conflicting moral approach raises some questions that would be addressed in this paper. How has the issue of vaccination been morally evaluated in mainstream public health ethics? Will COVID-19 vanquish the anti-vaccinationism movement or has it fueled it further? How have Muslim scholars addressed the issue of vaccination, especially in the context of such pandemics?

Keywords: COVID-19, pandemic, vaccine hesitancy, anti-vaccinationism, public health ethics, Islamic ethics

1. INTRODUCTION

The coronavirus disease 2019 (COVID-19) has wreaked havoc in people's lives worldwide. Until the time of writing, approximately 5 million people have succumbed to this deadly virus.¹ With the identification of the new variant Omicron in November 2021, efforts to find an effective and permanent cure to this virus have also gained momentum with recommendations from scientific experts for a third booster shot as one of the ways to mitigate risks against this new variant.² The objective is to also achieve herd immunity by vaccinating a maximum portion of the world's population.³ After the massive outbreak of COVID-19 in 2020, Pfizer-BionTech and other sizeable pharmaceutical companies accepted the momentous challenge of developing an effective yet safe vaccine with a 95% efficacy rate, with a common pledge that "we, the undersigned biopharmaceutical companies, want to make clear our ongoing commitment to developing and testing potential vaccines for COVID-19 in accordance with high ethical standards and sound scientific principles."⁴

Nonetheless, just like in the case of other vaccines, the anti-vaccinationism movement for COVID-19 gained momentum. As a matter of fact, the campaign started months before the development of any vaccine. "We don't have a vaccine yet, and already there is an anti-vaccination voice about it," said Katherine O'Brien, Director, Department of Immunization, Vaccines, and Biologicals at the World Health Organization (WHO).⁵ What is the background of this entire movement? What are the motivating factors that have led to this hesitancy toward vaccines, especially related to this deadly coronavirus pandemic? To understand, a brief history of vaccinations will be discussed first along with their success and failure rates in eradicating various epidemics. The factors that led to the

1 As per the latest data from WHO, last updated on March 4, 2022.

2 Talha Khan Burki, "Omicron Variant and Booster COVID-19 Vaccines," *Lancet Respiratory Medicine* 10 (2022): E17, [https://doi.org/10.1016/S2213-2600\(21\)00559-2](https://doi.org/10.1016/S2213-2600(21)00559-2).

3 Until presently, 63% of the world's population has received at least one dose of the COVID-19 vaccine. See: Ritchie, Hannah et. al. "Coronavirus Pandemic (COVID-19)," Our World In Data, 2020, <https://ourworldindata.org/coronavirus>.

4 "COVID-19 Vaccine Maker Pledge," Pfizer, 2020, <https://www.pfizer.com/health/coronavirus/pledge>.

5 Katrina Megget, "Even Covid-19 Can't Kill the Anti-Vaccination Movement," *BMJ* 369 (June 4, 2020): m2184, <https://doi.org/10.1136/bmj.m2184>. <https://www.bmj.com/content/369/bmj.m2184>.

anti-vaccinationism movement will be analyzed then through the standpoints shared by its proponents and opponents, especially in terms of the COVID-19 pandemic. Finally, a comparative analysis will be made with the Islamic ethical discourse.

2. VACCINATIONS: MORAL DELIBERATIONS IN PUBLIC HEALTH ETHICS

2.1 History of Vaccination

The development of vaccines is a significant phase in the history of humanity. In this regard, the contribution of Lady Montagu⁶ holds great significance as the individual who introduced the smallpox variolation⁷ in Europe in 1721, after her return from the Ottoman empire in Turkey.⁸ She was followed by Edward Jenner, a country doctor from England, who in 1796 introduced the shift from variolation to vaccination⁹ and performed the world's first vaccination on the local peasant population.¹⁰ However, this proved to be a sore point for the intellectual elite and was the source of several acrimonious discussions. Subsequently, opposing voices were heard from some physicians who advocated the eradication of smallpox through hygiene, quarantine, and disinfection.¹¹ With the progress of the 19th century, the initial wave of enthusiasm for vaccination subsided when difficulties were experienced in sustaining the virus through arm-to-arm inoculation and when it was found that, on some occasions, syphilis¹² was transmitted in the process. In some areas, there was significant opposition from religious leaders and anti-vaccinationist societies who opposed the principle of infecting humans with an animal disease. Confidence in the procedure was also diminished by the occurrence of smallpox in some cases which had previously been successfully vaccinated. This arm-to-arm vaccination in England continued until the end of the 19th century until it was finally banned in 1898.¹³

2.2 Anti-Vaccinationist Campaign

The above discussion clearly illustrates that there has been opposition to vaccination since its inception. Although anti-vaccine thinking receded in importance post-1940s owing to advancements in vaccine science and public awareness to protect children from widespread

6 An English aristocrat, writer, and poet in 18th century Europe.

7 The method of inoculation first used to immunize individuals against smallpox.

8 Herve Bazin, *Vaccination - A History: From Lady Montagu to Genetic Engineering*, 30.

9 Vaccination was a new step forward in variolation, based on the common observation amongst rural residents that a person who had been exposed to cowpox (belonging to the same genus as the smallpox virus) would develop immunity against smallpox.

10 *Ibid.*, 60.

11 *Ibid.*, 56

12 Syphilis is a bacterial infection usually spread by sexual contact. The disease starts as a painless sore, typically on the genitals, rectum, or mouth. Syphilis spreads from person to person via skin or mucous membrane contact with these sores.

13 Donald A. Henderson and Bernard Moss, "Smallpox and Vaccinia," in *Vaccines*, eds. SA Plotkin, WA Orenstein (Philadelphia: Saunders, 1999).

outbreaks of infectious diseases like measles and polio, anti-vaccine thinking started flourishing again in the 1970s because of increased media and internet coverage.¹⁴

2.3 Arguments of Anti-Vaccinationists

2.3.1 Scientific Arguments

Vaccines cause diseases

Anti-vaccinationists argue that vaccinations are the cause of various diseases like diabetes, cancer, and hearing/vision loss. The link between vaccination and autism created a huge uproar when a worldwide controversy was created from an article by British gastroenterologist Wakefield and his co-authors.¹⁵ It claimed that the MMR vaccine played a causative role in autism in children, which then led to a notable decrease in MMR vaccination in Europe and the United States.

Vaccines do not work

This claim stems from the belief that the incidence and prevalence of disease have not decreased due to vaccines but due to other factors such as improvements in public health practices. As proof of point, evidence has been used such as graphs prepared by Raymond Obomsawin,¹⁶ which show the drop in the incidence of an infectious disease prior to the introduction of its vaccine.

Alternatives to vaccination

A number of alternatives are available for disease protection as proposed by some nutritionists, which include a healthy diet to strengthen one's immune system naturally.

2.3.2 Socioeconomic Political Arguments

Taking control of people's lives

The anti-vaccinationists consider this as a scheme of the medical profession to take charge of people's lives by controlling the health of their children and making decisions on their behalf.

Big business and big government

They further argue that by taking control of civilians' lives, governments have conspired

14 Jason L. Schwartz and Arthur L. Caplan, *Vaccination Ethics and Policy: An Introduction with Readings*, 39.

15 Recently got retracted by Lancet.

16 The source that I consulted mention his claim as having a doctoral degree in health science and human Ecology. His biography online is limited, with access to only one article entitled "Traditional Life Styles and Freedom from The Dark Seas of Disease" published by OUP in 1983. According to this article, Obomsawin served as the executive director of the California Rural Indian Health Board; manager of Overseas Operations for CUSO, Canada's largest non-governmental development organization; and chairman of the National Commission Inquiry on Indian Health.

with pharmaceutical companies to impose mandatory vaccination programs on the general population to generate large profits.¹⁷

2.3.3 Religious Arguments

At the individual level, religion is a common reason to refuse vaccination. The MMR vaccine, combined with the rubella vaccine, was originally derived from the cells of aborted fetal tissue. Furthermore, the MMR vaccine contains porcine gelatin as a stabilizer, a means for ensuring effective storage. As there is a wide range of practice preferences in every religion, some individuals belonging to religions such as Judaism, Islam, and Hinduism may be opposed to injecting a porcine product into their body along with the vaccine. In addition, other religious views, such as the ones held by Dutch-Protestant Christian congregations, consider vaccinations as “inappropriate meddling in the work of God.” These groups, therefore, believe that we should not change the predestined fate of someone who becomes ill.¹⁸

2.4 Response to the Anti-vaccination Movement

The World Health Organization (WHO) claims that vaccinations prevent more than two million deaths every year and have led to the eradication of smallpox, polio, and whooping cough.¹⁹ The proponents of vaccination thus call this anti-vaccinationism movement irrational, based on conspirational thinking and falsified data. They substantiate their point by claiming that the 19th century resistance to smallpox vaccination led to further outbreaks of the virus and needless deaths. They further blame this group for their disruptive efforts against the well-being of the community by causing outbreaks of previously controlled diseases and causing huge financial losses to vaccine manufacturers by keeping them out of the market. Pro-vaccination proponents thus propose certain measures that will hasten the eradication of anti-vaccinationist campaigns by continuing to fund and publish high quality studies to investigate concerns about vaccine safety and providing compensation for legitimate cases of injury caused by a vaccine. Most importantly, they believe in educating healthcare professionals, parents, and patients to counter false claims of anti-vaccinationist groups, ensuring that accurate vaccine information is accessible to the general public so that they are able to make informed decisions after evaluating the risks and benefits.²⁰

3. COVID-19 AND THE ANTI-VACCINATION MOVEMENT

The above discussion clearly shows that the anti-vaccinationism campaign has taken center stage in the public health discourse over the past decade or so, expressing a moral outrage and suggesting conspiracy-styled beliefs, especially related to childhood

17 David E. Newton, *Vaccination Controversies*, 90.

18 Azhar Hussain, Syed Ali, Madiha Ahmed, and Sheharyar Hussain, “The Anti-vaccination Movement: A Regression in Modern Medicine,” *Cureus* 10, n.7 (2018): e2919, <https://doi.org/10.7759/cureus.2919>.

19 David E. Newton, *Vaccination Controversies*, 85.

20 Jason L. Schwartz and Arthur L. Caplan, *Vaccination Ethics and Policy: An Introduction with Readings*, 41.

vaccinations.²¹ However, in the case of COVID-19, the concerns leading to vaccine hesitancy are slightly different. Thus, we observe that even people who favored vaccinations in the past are hesitant in getting vaccinated against this virus as is explained below.

3.1 Reasons for Vaccine Hesitancy

Vaccines have managed to control and eradicate various diseases in the past, yet recent public polls have shown concerns regarding the efficacy and safety of the COVID-19 vaccine, a term called “vaccine hesitancy.” Some arguments by anti-vaccinationist groups are detailed in previous sections. I will now expand on the same arguments in the context of COVID-19.

Safety of the new vaccine

Considering the unprecedented nature of the virus, one dominant concern is the rapid pace of vaccine development.²² In addition to a segment of population that has refused vaccines to date, the novelty of the disease and concerns over safety and efficacy of the vaccine have a sizable proportion of the American population indicating reluctance to getting vaccinated against COVID-19.²³ Unfortunately, high levels of COVID-19 vaccine hesitancy are reported even from countries severely affected by the pandemic.²⁴

Immunity building through a holistic lifestyle and improved hygiene

The avoidance of vaccines also stems from the belief that boosting immunity is the most effective way to combat the virus. Although this is a common argument for protection against all diseases, this has gained significant momentum in the case of COVID-19—especially considering the apparent source of this deadly virus from the Hunan seafood market at Wuhan, China, where bats, snakes, raccoon dogs, palm civets, and other animals are sold.²⁵ Although this claim has been challenged by public health organizations as mere myths,²⁶ there are a few studies that have proven that COVID-19 in people with underlying

21 Naomi Smith and Tim Graham, “Mapping the Anti-vaccination Movement on Facebook,” *Information Communication and Society* 22, n.9 (2019): 1310-27, <https://doi.org/10.1080/1369118X.2017.1418406>.

22 Shingai Machingaidze and Charles Shey Wiysonge, “Understanding COVID-19 Vaccine Hesitancy,” *Nature Medicine* 27, n.8 (2021): 1338-9, <https://doi.org/10.1038/s41591-021-01459-7>.

23 Wen-Ying Sylvia Chou and Alexandra Budenz, “Considering Emotion in COVID-19 Vaccine Communication: Addressing Vaccine Hesitancy and Fostering Vaccine Confidence,” 35, n.14 (2020): 1718-22, <https://doi.org/10.1080/10410236.2020.1838096>.

24 Wojciech Feleszko, Piotr Lewulis, Adam Czarnecki, and Paweł Waszkiewicz, “Flattening the Curve of COVID-19 Vaccine Rejection—A Global Overview,” *Vaccines* 19, n.1 (2021): 44, <https://doi.org/10.3390/vaccines9010044>.

25 Muhammad Adnan Shereen et al., “COVID-19 Infection: Origin, Transmission, and Characteristics of Human Coronavirus,” *Journal of Advanced Research* 24 (2020): 91-8, <https://doi.org/10.1016/j.jare.2020.03.005>.

26 Swapnajeet Sahoo et al., “Demystifying the Myths about COVID-19 Infection and its Societal Importance,” *Asian Journal of Psychiatry* 54 (2020): 102244, <https://doi.org/10.1016/j.ajp.2020.102244>.

health conditions or comorbidities has an increasingly rapid and severe progression, often leading to death.²⁷ The importance of an ecosystem-based lifestyle as a potential way to cope with the pandemic is also being argued as one of the reasons behind Japan's success in the initial flattening of the curve despite being in close proximity to China, the epicenter of the disease. In addition to a healthy lifestyle, sanitary practices such as regular hand washing, gargling of the throat, the use of chopsticks while eating, and utilizing hot towels are all being termed as contributing factors for this.²⁸

Low incidence of COVID-19 in children

There are many ethical considerations in vaccinating children against COVID-19. As the incidence and disease burden of COVID-19 is low in children, the argument is that vaccination should not be primarily performed for their self-protection but for that of the community, mainly the elderly or high-risk individuals.²⁹

Inverse correlation of BCG vaccination vs. COVID-19

Scientific data suggests that Bacille Calmette-Guerin (BCG) immunization is associated with lower incidence and gravity of the COVID-19 disease across different countries, even when BCG immunization was performed in childhood. This makes for another solid reason to resist the COVID-19 vaccine.³⁰

Media coverage and misleading narratives

The online anti-vaccine movement against COVID-19 also plays a huge role in this resistant approach towards vaccination. The Centre for Countering Digital Hate (CCDH) has lambasted social media companies for allowing the anti-vaccine movement to remain on their platforms.³¹ A conspiracy theory against COVID-19 vaccine was also spread in Pakistan when a renowned political commentator and columnist claimed that the virus was a grand scheme to target Islamic nations, designed to allow Jews to rule the world, and to embed nano-chips in the bodies of people to gain control through 5G towers.³²

27 Adekunle Sanyaolu et al., "Comorbidity and its Impact on Patients with COVID-19," *SN Comprehensive Clinical Medicine* 2, n.8 (2020): 1069-76, <https://doi.org/10.1007/s42399-020-00363-4>.

28 Ai Tashiro and Rajib Shaw, "COVID-19 Pandemic Response in Japan: What Is Behind the Initial Flattening of the Curve?" *Sustainability* 12, n.13 (2020): 5250, <https://doi.org/10.3390/su12135250>.

29 Christiane Sigrid Eberhardt and Claire-Anne Siegrist, "Is There a Role for Childhood Vaccination Against COVID-19?," *Pediatric Allergy and Immunology (Wiley Online Library)* 32, n.1 (2021): 9-16, <https://doi.org/10.1111/pai.13401>.

30 Abhibhav Sharma et al., "BCG Vaccination Policy and Preventive Chloroquine Usage: Do They Have an Impact on COVID-19 Pandemic?" *Cell Death & Disease* 11, n.7 (2020): 516, <https://doi.org/10.1038/s41419-020-2720-9>.

31 Talha Burki, "The Online Anti-vaccine Movement in the Age of COVID-19," *Lancet Digital Health* 10 (2020): E504-5, [https://doi.org/10.1016/S2589-7500\(20\)30227-2](https://doi.org/10.1016/S2589-7500(20)30227-2).

32 Yusra Habib Khan et al., "Threat of COVID-19 Vaccine Hesitancy in Pakistan: The Need for Measures to Neutralize Misleading Narratives," *The American Journal of Tropical Medicine and Hygiene* 103, n.2 (2020): 604-5, <https://doi.org/10.4269/ajtmh.20-0654>.

4. ISLAMIC PERSPECTIVE ON VACCINATION

With the advancements in science and medicine over the last few decades, new ethical dilemmas have arisen calling for a renewed religious bioethical discourse.³³ As anti-vaccinationism currently poses one of the biggest global threats to human health, it is extremely important to shed some light on this topic through the lens of the Islamic tradition. Abul Fadl Mohsin Ebrahim³⁴ addressed this sensitive issue in his book *Islam & Vaccination*,³⁵ where he not only gives rebuttals to the anti-vaccine arguments posed by some Muslim scholars but has also dedicated a separate chapter addressing the issue in the light of Islamic medical jurisprudence. Some of these arguments are as follows:

4.1 Theological Arguments

Ebrahim refers to an argument by the late Dr. Ayesha Hamdan³⁶ who was of the view that vaccination undermined Islamic teachings. According to her, the verse in Surah at-Tin [95:4] “Indeed, We created humans in the best form” proves the point that Allah has created man in the best form spiritually, mentally, and physically. Why does man then challenge the perfect creation of Allah in an attempt for more efficacy? She further argues that implementation of a vaccination schedule means that the human body is not perfect enough to withstand infectious diseases and that Allah did not do His job well by producing a baby who needs human intervention to survive.

Counter Argument: Ebrahim rebuts by arguing that protection against diseases does not mean tampering with Allah’s creation; rather it shows man’s active role as His vicegerent on earth when he takes care of his body. With regard to protection against diseases, Prophet Muhammad (peace be upon him) gave detailed guidance in this regard on avoiding plague-stricken areas, including in his hadith, “When plague is rampant inside a locality, do not go inside it, but if you are already inside, do not come out of it.”³⁷ Relating this hadith concept with the modern-day concept of vaccination, choosing not to vaccinate will place other people at risk.

4.2 Juristic Arguments

Ebrahim shares the case made by Dr. Abdul Majid Katme,³⁸ who argues on the basis of impure ingredients used in various vaccines, thus making them unlawful. He also raises the concern that the HPV³⁹ vaccination causes immorality in young girls.

Counter Argument: According to the concept of *istihāla*, Muslim scholars justify the use

33 Eich Brockopp, *Muslim Medical Ethics, From Theory to Practice*, 213.

34 Seychellois scholar of Islamic bioethics and an emeritus professor of Islamic Studies in the School of Religion and Theology at the University of KwaZulu-Natal in South Africa.

35 Fadl Mohsin Ebrahim, *Islam & Vaccination*.

36 Dr. Ayesha Hamdan was the Assistant Professor of Clinical Psychology in the College of Medicine, Saudi Arabia, and died in 2019.

37 Al-Bukhari (5739) and Muslim (2219).

38 British psychiatrist and Chairman of the Islamic Medical Association in the UK.

39 Human papilloma virus usually transmitted through sexual contact.

impure substances if they are converted to something else in the finished product. With regard to the HPV vaccine, its sole purpose is to protect against cervical cancer and not promoting promiscuity.

4.2.1 Benefit-Harm Assessment

The author refers to the fatwa issued by Sheikh Abdal-Aziz ibn Bāz,⁴⁰ who allowed immunization before the onset of disease even if there are some minor side effects such as fever, bodily pain, and so forth, on the basis of the legal maxim “lesser of the two evils.” However if the harm is greater, then the legal maxim, “There should be no harm or reciprocation of harm,” should be followed.

Ebrahim further concludes that vaccinations protect both the person and others who come in contact, that is, provide herd immunity. Thus, they fulfil the requirements of *Maqāsid al-Sharī‘a* as well.

Preservation of religion

Since vaccination acts as a preventive measure that promotes the wellbeing of a Muslim, he can successfully perform his religious obligations.

Preservation of life

Vaccinations successfully preserved millions of lives around the world by reducing mortality.

Preservation of lineage

Vaccines safeguard future generations when parents immunize their babies against deadly diseases, thus preserving the progeny.

Preservation of intellect

Islam promotes peace and mercy, which is achieved through the mental satisfaction that oneself and one’s family is safe from disease.

Preservation of wealth

Vaccination provides an exceptionally cost-effective measure in preventing the later occurrence of the disease.⁴¹

Ghaly⁴² also shares similar views on the topic. He quotes the response of al-Qaradāwī⁴³ on the fatwa issued by scholars in Nigeria calling polio vaccination unlawful on the basis of some impure hormones that cause women to become infertile. Al-Qaradāwī unequivocally disapproves of their opinion on the basis of various Qur’anic verses and incidents from the Prophet’s life regarding safeguarding one’s body, which is a trust from Allah. He has the backing of notable religious scholars from the International Islamic Fiqh Academy (IIFA).⁴⁴

40 Grand Mufti of Saudi Arabia from 1993 till his death in 1999.

41 Abul Fadl Mohsin Ebrahim, *Islam & Vaccination*, 45-66.

42 Professor of Islam & Bioethics at CILE (Center of Islamic Legislation & Ethics).

43 Egyptian Islamic theologian & chairman of the International Union of Muslim Scholars.

44 Mohammed Ghaly, *Islam and Disability* (Oxon: Routledge, 2010), 123-5.

Istihāla and Ḍarura

Moreover, al-Qaradāwi further clarifies the use of istihāla and gives three requirements which must be satisfied in advance before using impure ingredients in medical treatment:

1. The medicine must be vital for the life of the individual taking it.
2. The product must be recommended by a knowledgeable and trustworthy Muslim physician.
3. No source from a permissible product is available as an alternative medicine.

Based on this concept of Ḍarura (necessity), the use of Biothrax (anthrax vaccine) and Rotateq (rotavirus vaccine) was not permissible by the 81st Conference of the Malaysian Fatwa Committee by the National Council of Islamic Religious Affairs held in March 2006.⁴⁵

5. ANALYSIS AND CONCLUSION

Vaccines are an important tool for controlling and eventually eradicating COVID-19 from the global populace. However, vaccine hesitancy still poses as a major hindrance against achieving this goal. To improve vaccine uptake and increase the global vaccinated population from 63% to 80% and above, it is imperative that any vaccine to be administered to the public be rigorously tested after considering all the associated risks and benefits and not be perceived as premature in its dissemination.⁴⁶ The Prophet (peace be upon him) was reported to have said, “There is no disease that Allah has created, except that He also has created its treatment.”⁴⁷

Although it is incumbent on every Muslim to take ethical decisions that do not conflict with their moral and religious values, Islam places high importance on the overall wellbeing of the community. It has been scientifically proven that vaccines have not only managed to eradicate various deadly diseases, but also strengthened individuals’ immunity as well as that of their communities. Nonetheless, the benefits must be balanced with the risks, especially in terms of rapid vaccine development as in the case of the one against the COVID-19 virus and its associated variants. Ethical considerations are vital to decision-making when deploying such vaccines in crisis situations. Special consideration should be given to high-risk populations first, which in this case are older individuals or those with compromised immunity. It is incumbent on the concerned health authorities to put in the best possible effort and implement evidence-based guidelines to avert preventable harm from any new COVID-19 vaccine. Any mandatory laws regarding COVID-19 vaccination should be enacted considering the four principles of bioethics: respect for autonomy, beneficence, non-maleficence, and justice.

45 Engku Nuraishah Huda E. Zainuddin, Khairool Azizul Mohammad, Athirah Aris, and I. A. Shahdan, “Vaccination: Influencing Factors and View from an Islamic Perspective,” *International Medical Journal Malaysia* 17, n.2 (2018): 273-80, <https://doi.org/10.31436/imjm.v17i2.997>.

46 Steven Taylor et al., “A Proactive Approach for Managing COVID-19: The Importance of Understanding the Motivational Roots of Vaccination Hesitancy for SARS-CoV-2,” *Frontiers in Psychology* 11 (2020): 575950, <https://doi.org/10.3389/fpsyg.2020.575950>.

47 Sahih Bukhari, 5678.

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