



# *Halal or Haram?* The COVID-19 Vaccine Discussion Among Twitter users in Malaysia

Nur Ayuni Mohd Jenol<sup>1</sup> · Nur Hafeeza Ahmad Pazil<sup>1</sup> 

Accepted: 10 March 2023 / Published online: 24 March 2023

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2023

## Abstract

Vaccine hesitancy is gaining attention due to the increasing spread of the COVID-19 pandemic in Malaysia. Malaysia is a majority Muslim country and religion has a significant influence on the acceptance or rejection of vaccines. This is clearly seen through the disagreement over the halal status of vaccines. Social media has become a platform for discussion and dissemination of information and dis-information on vaccines. Thus, it has had a relatively significant influence on vaccine hesitancy among social media users. By analysing tweets from February 2020 to February 2021 using Twitter API, this paper highlights the discussion of COVID-19 vaccines' halal status on Twitter. This study focuses on the analysis of vaccination reluctance among the Twitter users in Malaysia and found that the most prevalent theme from the discussion is the constructed religious narratives to justify scientifically misleading and false claims concerning vaccination represented on social media. This finding also calls for a deeper understanding of society's constructed knowledge concerning contemporary issues in the digital age on social media.

**Keywords** *Halal* · Social media · Vaccine hesitancy · Twitter discussion · COVID-19

## Introduction

The World Health Organization (WHO) (2020) named 'vaccine hesitancy'—a delay in acceptance or refusal of a vaccine despite its availability, as one of the top ten threats to global health. Evidently, this reflects concerns among the world population regarding the safety and usefulness of vaccines. This is also the case locally where, despite children in Malaysia receiving free vaccinations from birth until the age of fifteen under the WHO Expanded Programme on Immunisation (EPI) (Kalok

---

✉ Nur Hafeeza Ahmad Pazil  
hafezapazil@usm.my

<sup>1</sup> School of Social Sciences, Universiti Sains Malaysia, 11800 Minden, Pulau Pinang, Malaysia

et al., 2020), there is also a significant increase in cases of vaccine-preventable diseases (VPDs). A study by Kalok et al. (2020) also showed that although the rate of vaccine rejection among pregnant women in Malaysia is relatively low, Muslim parents faced with the dilemma on the halal certificate of the vaccines.

Taib et al. (2017) argue that the misunderstandings and misperceptions about immunization are due to the mass media that often disseminates false information. As social media is increasingly being used nowadays to obtain information on health issues (Tripathi & Kumar, 2018), it has become a major source of information on immunization (Azizi et al., 2017). Past studies (Bradshaw et al., 2021; Capurro et al., 2018) have also reported that parents use online internet resources, namely search engines, websites, blogs, and social media as the main reference to obtain information on immunization that have affected their perceptions and decision-making about their children's vaccinations.

On such platforms, the anti-vax movement is influencing views about the safety and efficacy of vaccines (Benecke & DeYoung, 2019). Pehora et al. (2015) reported that the majority of parents use the internet to obtain information about their children's health; however, most use public search engines instead of trusted official healthcare websites. Freed et al. (2011) also found that most parents referred to various non-official websites that partially oppose the use of vaccines, to the extent that some people tend to reject vaccine uptake because they believe vaccinations are less safe or effective. In their study, Betsch et al. (2010) found that the exposure to virtual communities via internet chat rooms and social media as well as reading information on vaccine-critical websites for 5–10 min may increase the risk of parents reducing vaccine uptake for their child.

Social media is used by the community to share their experiences and findings to provide information to other individuals with similar health issues. There are also health officials such as medical doctors who use this platform to interact with the community in an effort to provide health information. However, some discussions are moderated, while others are not. There are various issues shared such as discussions of personal experiences, sources of health information, and also question and answer sessions on health issues such as diseases and vaccines.

Eventually, it leads to vaccine scepticism that is influenced by the anti-vaccination rumours, past experiences related to adverse events following immunization (AEFI), religious prohibition, belief that the use of traditional complementary and alternative medicine (TCAM) is safer, pseudoscientific beliefs, and anti-vaccine conspiracy theories (Wong et al., 2020).

## Purpose of the Study

Until now, the topic of immunization has been a never-ending debate both academically and in public discourse. It has gained immense attention due to the recent and current COVID-19 pandemic. Any resurgence or increased mortality from VPDs necessitates an in-depth exploration to understand the phenomenon further.

Moreover, the proliferation of misinformation through social media has given the issue new urgency (Wilson & Wiysonge, 2020).

In this world of the ‘new normal’ in which society is adapting to a new way of life and practicing social distancing, it is essential for the literature to provide a new understanding of human behaviour. Although vaccine discussion often revolves around health and medical issues, the phenomenon varies within countries as well as between cultures. Hence, this study explores the religious discussion of the COVID-19 vaccine among Twitter users in Malaysia, particularly on the vaccine’s *halal* status and the misleading information that may lead to vaccine hesitancy. The purpose of this study is to examine the discussion of COVID-19 vaccines’ *halal* status among the Twitter users in Malaysia.

It is important to note that Islam is recognized as the religion of Federation because Malay, the majority population, is defined as a Muslim in Article 160 of the Constitution (Husin & Ibrahim, 2016). Article 11(1), on the other hand, adds on the freedom to practice religion, stating that everyone has the right to profess and practice his or her own religion. As a result, Malaysia’s Muslim population includes people of all races and not just Malays.

Hamid (2019) mentioned that some previous studies have focused more on the provision of immunization from an Islamic perspective. This is because there are extensive questions from Muslims in the general population about the *halal* status of vaccines. Moreover, there are controversies about vaccines that are said to cause other diseases such as paralysis, autism, and weakening of the immune system. Although the provision of immunization is controversial, it is in line with the requirements of Islam which allow the authorities to make significant policies based on the principle of public interest or *maslaha* of the entire society (Ramli et al., 2019).

However, the question raised in this study is why there are Malaysian that reject COVID-19 vaccines even though it is permissible and not against the Islamic perspective? To answer the question, this study identifies and analyses the themes that dominate the discussion on COVID-19 vaccines’ *halal* status by conducting a content analysis research method.

## Methods

This study used content analysis as a research tool to determine the presence of certain words or concepts within tweets related to any religious discussion around the COVID-19 vaccination that were posted by Twitter users in Malaysia. The researchers quantified and analysed the presence, meanings, and relationships of the relevant keyword then made inferences about the meanings within the tweets, the Twitter users, the audience as well as the culture and time frame. It is important to note that all the selected tweets were publicly accessible online accounts of individuals; no names were recorded as the usernames were anonymised. On account of the anonymity and privacy policy of Twitter users, it is difficult to identify certain demographic information such as the age and gender of each user of the tweets that were selected in this study.

However, according to Kemp (2020), the percentage of Twitter users in Malaysia is 50% male and 50% female. By using Twitter API, the searched keyword, ‘*vaksin*’, yielded a total of 6,661,143 tweets. Tweets that did not meet the specified inclusion criteria were filtered out. From this sample, 10,985 tweets that met the following criteria were extracted: (1) they were posted between February 2020 and February 2021, (2), from Malaysia, (3), included the phrases *halal haram vaksin* and *status halal vaksin*, and (4) were publicly accessible tweets from personal accounts (Table 1).

These criteria were used to exclude accounts associated with any organization as the study’s focus was on discussions of individuals. The tweets were also exclusively selected from February 2020 as it marks the month when the first Malaysian COVID-19 case was identified and when locals became more awakened to the threat of the new disease. The tweets were analysed using content analysis and coded into themes. The researcher will quantify and analyse the presence, meanings, and relationships of the vaccine discussion on Twitter before drawing conclusions about the tweets.

It is also useful for summarising key features of a dataset because it enables the researcher to handle data in a well-structured manner, resulting in a clear and organised final report. This study complied six-step procedure, which provides a clear and usable procedure: (1) becoming acquainted with the dataset, (2) coding and identifying (3) developing themes based on the codes, (4) reviewing themes, (5) defining and naming themes, and (6) writing up and relating the findings to previous studies’ sociological insights. The first dataset is made up of relevant and filtered tweets. Each tweet will be labelled and identified with potential codes.

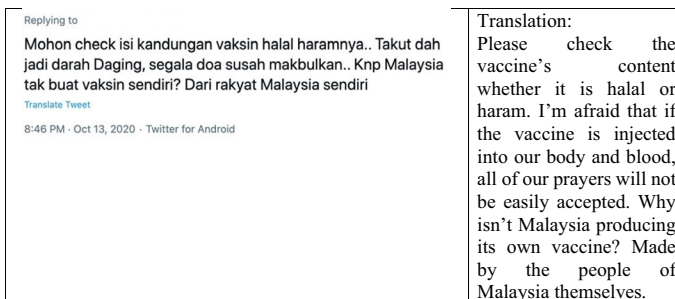
Following that, the suggested codes will be organised and assigned to appropriate themes. These themes will help to answer the research question, which is to determine topics of discussion Twitter users have about the vaccine’s Halal and Haram status. To gain a better understanding of the findings, examples of the relevant tweets will be added to the discussion.

**Table 1** Inclusion criteria of selected tweets

	Inclusion criteria of selected tweets
Time	February 2020–February 2021
Location	Malaysia
Keywords	<i>Halal haram vaksin</i> , <i>status halal vaksin</i>
Tweets	Publicly accessible Individual account



**Fig. 1** A tweet on the halal status of the COVID-19 vaccine from the Department of Islamic Development Malaysia (JAKIM)



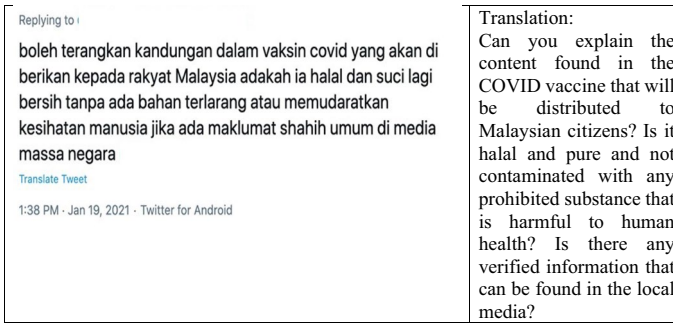
**Fig. 2** A tweet on COVID-19 vaccines' ingredients

## Findings and Discussion

### Religious Concerns and Halal Status of the Vaccine

Religion is one of the most predominant factors of vaccine hesitancy among the world population. Oxholm et al. (2021) suggest that communities' religious norms and worship practices have created significant concerns for public health. In Muslim majority countries like Malaysia, studies show that people have refrained from using certain vaccines due to doubts regarding their *halal* status (Bukhari et al., 2021). Islamic law prohibits the use of medicines or ingredients from *haram* sources such as swine and its derivatives (Zainudin et al., 2018).

However, in circumstances in which no alternative is available, necessity overrules prohibitions in order to prevent fatal diseases, and existing vaccines are deemed acceptable for Muslims (Ahmed et al., 2018). Although vaccination is not a new concern among Muslims worldwide, the recent pandemic has brought it to the public's attention as the newly developed COVID-19 vaccines have been introduced. From January 2021, Malaysia awaited its first consignment of the COVID-19 vaccine, which was expected to begin at the end of February 2021 (Roslan, 2021). Despite government approval and joint agreements with the WHO's COVAX facility for its vaccine supply, COVID-19 vaccines have received a mixed response from the Muslim community in Malaysia. Some groups are still disputing the safety and *halal* status of the vaccine shots.



**Fig. 3** A tweet on COVID-19 vaccines' ingredients

Based on the discussion among Twitter users, some expressed their worries in regard to the ingredients in the COVID-19 vaccines while demanding their *halal* verification. Some of the tweets can be seen in the following figures (Figs. 1, 2, 3):

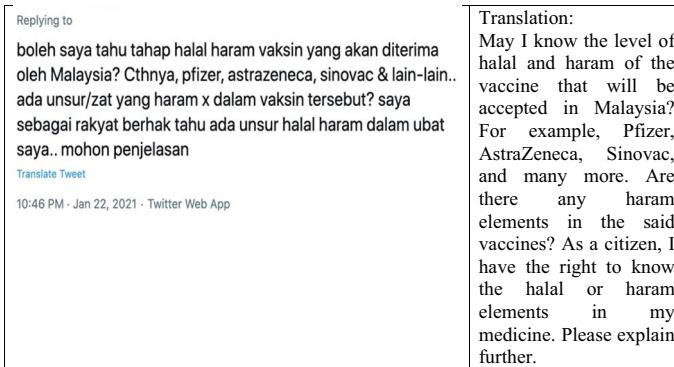
It can be seen from the tweets above that some of the users feel reluctant to accept the COVID-19 vaccine due to its probable risk that it contains non-permissible elements. This reflects the findings by Rumetta et al. (2020) that Malaysians interviewed felt vaccines were dirty and unacceptable for their children as they were contaminated with impurities such as animal DNA and aborted foetus cells that were used in their production. The fact that pork-derived gelatin has been widely used as a stabilizer to ensure vaccines remains safe and effective during storage and transport may have contributed to these views (Milko, 2020). As Malaysia is trying to find the middle ground concerning the *halal* status of COVID-19 vaccines, its religious authorities have decided that the vaccine is allowed and even mandatory for some groups.

Hassan (2020) reported, certifying the vaccine as *halal* would reassure those that are doubtful, however, vaccines are not registered through the *halal* certification process, as the Malaysian government has suggested there would be no need.

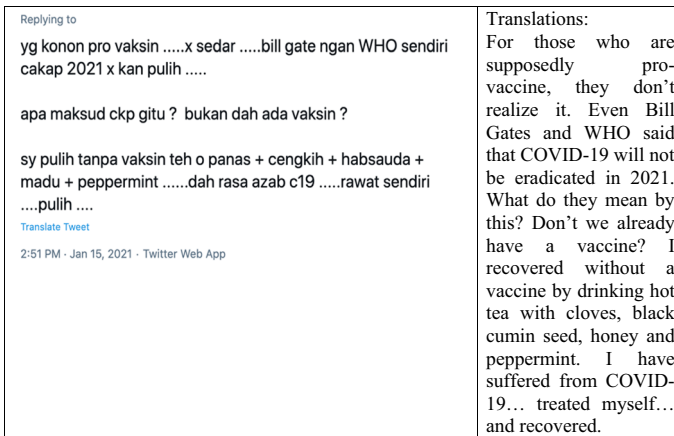
### **Lack of Trust in Professionals and Favour for Alternative or Complementary Treatments**

Based on the questions to official accounts, some users appear curious to know more about the vaccine. Most of the vaccine-related tweets were responses and inquiries to official accounts of local government, agencies, media, and even ministers.

As can be seen in the tweet in Fig. 4, one user shared the view that society has the right to be well informed and understand what constitutes a vaccine and what goes into their body. As previously mentioned, some Muslims are sceptical of vaccines due to the possibility that they contain forbidden elements, or what Muslims refer to as *haram*. As suggested by Ahmed et al. (2018), information addressing such religious concerns must be made a priority and communicated well to the general public.



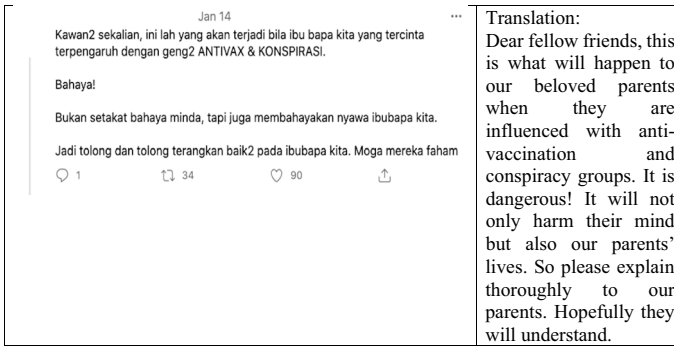
**Fig. 4** A tweet on the COVID-19 vaccines halal status



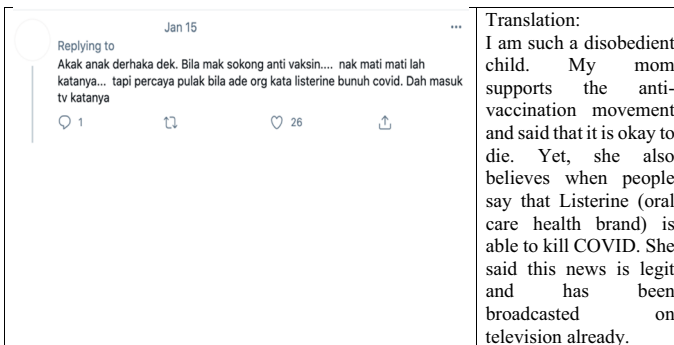
**Fig. 5** A tweet on alternative or complementary treatments (TCAM) for COVID-19

According to Taib et al. (2017), vaccine hesitancy in Malaysia is normally due to people's lack of trust in healthcare professionals and the government. As a result, they prefer to choose an alternative or complementary treatments (TCAM) (Taib et al., 2017). This view can be illustrated by the following tweet that mentioned how the person had recovered from COVID-19 without any vaccine, as depicted in the following figure (Fig. 5):

The user justified his belief that the healing nutrients were obtained only from drinking hot tea with cloves, black cumin seed, honey, and peppermint. Wong et al. (2020) mentioned how health professionals noted that there are groups that hold TCAM in high regard for disease prevention and treatment. Some people also believe that traditional treatments and the use of natural remedies are safer than modern medicine. As a result, biased judgements and remarks that favour such ideology are being spread over social media.



**Fig. 6** A tweet on misleading and harmful claims about COVID-19



**Fig. 7** A tweet on misleading and harmful claims about COVID-19

### Misleading Information and False Claims About Vaccines on Social Media

Although there are assurances from religious authorities and the government regarding the safety of the COVID-19 vaccine, the misconception among Malaysian Muslims about vaccines is seemingly here to stay. Apart from the *halal* status, misinformation and conspiracy theories are also noted as part of the challenge to roll out vaccines locally. One of the famous COVID-19 vaccine conspiracy stories that have been propagated through social media is about the 5G network that speculates the vaccine is an attempt by US corporations to insert a nanotechnology microchip that allows humans to be controlled. Such a myth has been further adopted by some religious leaders (Olagoke et al., 2021).

This myth is due to the emergence of the internet as a source of heterogeneous information (Rumetta et al., 2020). Through the internet, anyone is able to create and curate unfiltered and unfounded content while reaching a massive audience, especially on social media. For a country like Malaysia that has one of the highest rates of internet connectivity in the region and is ranked top five globally for mobile social media penetration, it is definitely a powerful and prevailing tool (Kemp, 2020). The discussion by Twitter users included how worrying it is that the harmful



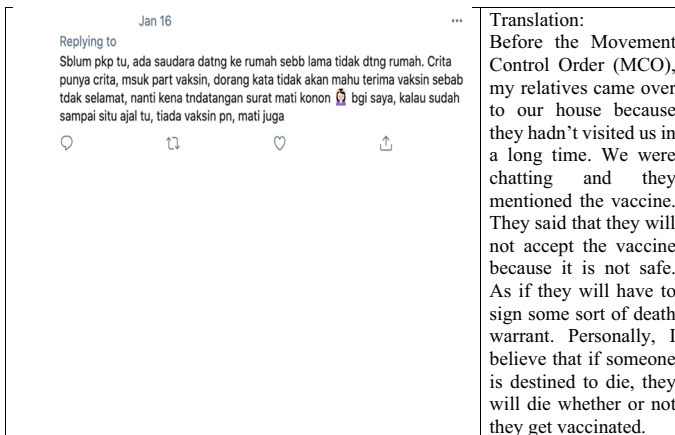
false claims about COVID-19 vaccines are affecting older family members such as their parents (Figs. 6, 7).

### Vulnerable Groups Evaluating Information Regarding Vaccine

Batumalai (2021) reported that some Malaysians aged above 60 were still hesitating to register for their jabs even 2 weeks before senior citizens were eligible to start receiving the COVID-19 vaccination. Their concerns were that they did not have any confidence in the vaccine and their friends had not registered for the shots. This also suggests that older people are particularly vulnerable and easily swayed by their own relatives and friends. Based on the tweets from Twitter users in Fig. 8, their families are being influenced by hearsay as well as anti-vaccination propaganda which leads to negative and deceiving perceptions about vaccines.

As mentioned by Wong et al. (2020), health professionals have acknowledged that those who are promoting views against vaccination or so-called anti-vaxxers are still free to disseminate anti-vaccine content via social media. It is worrying since such propaganda has a snowball effect that could garner massive influence with the public. Additionally, Nordin (2020) has argued that in Malaysia, Malays, especially Malays living in rural areas, are particularly hesitant toward the vaccines and they are usually influenced by their local *ustaz*—a Muslim preacher and religious leader. However, on social media platforms, this phenomenon is no different.

Some messages are being spread that also include religious justification to persuade others of their vaccine-related beliefs. For example, a user shared a post about a religious figure who has over 53,000 followers who actively shared false claims on his Instagram account that vaccines result in autism. These have gained local Twitter communities' attention and raised anger among some, as depicted in Figs. 9 and 10.



**Fig. 8** A tweet from concerned Twitter user on anti-vaccination propaganda

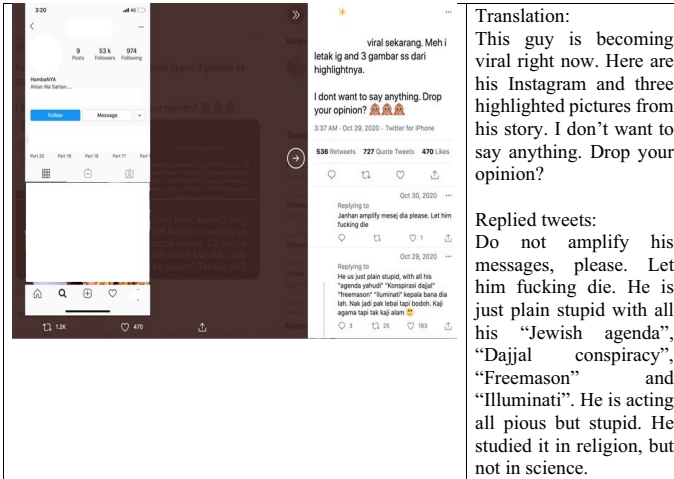


Fig. 9 A tweet on misleading claims from religious leader on COVID-19 vaccine

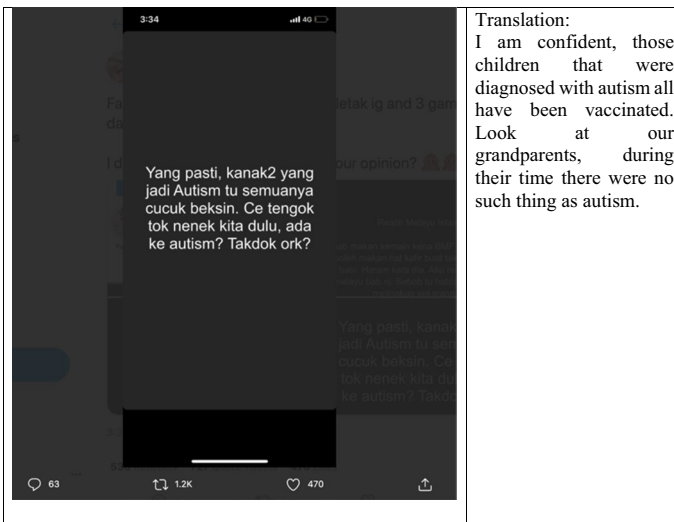


Fig. 10 A tweet on misleading claims from religious leader on COVID-19 vaccine

### Overcoming the Religious Stigma Associated with Vaccines

These findings show the importance to overcome such religious stigma and religious figures need to be educated about the benefits of vaccination. Being a key leader, such as an *ustaz* that is seen to protect the nation and to have people's best interest at heart, circulating any fake news and groundless rumours will have an impact on their followers' perception. *Ustaz* are known to be the most respected figures in

many communities. Their influence on informing the benefits of vaccination to their followers could make a great impact toward the efforts against COVID-19.

Therefore, the collaboration of spiritual leaders with healthcare professionals is needed to reach an optimal therapeutic outcome (Hashmi et al., 2020). Spiritual leaders' influence should be utilized to raise awareness and change the attitudes and practices of the community. Such concerns regarding misleading information about COVID-19 have also been addressed by one of the Malaysian minister. The minister expressed his worries about Malaysians' acceptance of the COVID-19 vaccine on his Twitter account. He shared a screenshot from his Facebook comments that shows a fraction of the misconceptions the public have about the vaccine.

Most of the comments portrayed religious justifications for their hesitancy or even rejection of the vaccination programme. This also depicts one of the biggest challenges for the country approaching the national immunisation rollout. It can be inferred that the rapid consumption of health information about the novel COVID-19 disease from informal sources has resulted in the dissemination of unclear, false, or misleading health information and myths or conspiracy theories. According to Hashmi et al. (2020), particular religious interpretations are believed to have provided explanations and answers to nearly all questions and queries.

Certain faith-based practices have resulted in the avoidance of established disease-prevention measures such as vaccination. However, based on the current findings, people's reluctance towards vaccination is most likely due to the exposure of constructed religious narratives to justify scientifically misleading and false claims concerning vaccination represented on social media.

## Study Limitations

While collecting data from Twitter is considered appropriate for research that seeks a viewpoint from users in vaccine-related public discussions, more detailed data may be limited due to the maximum length of 280 characters per tweet. Additionally, despite the massive numbers of tweets on the search topic, it is difficult to identify certain demographic information such as the age and gender of each user of the tweets that were selected in this study. Hence, the results cannot be generalised to a larger population. Due to the current National Immunisation Programme that has been carried out during the data collection, it is also possible that there may be a shift in society's perceptions and change in attitude towards vaccination.

## Conclusion

As discussed, the most prevalent themes from the COVID-19 vaccine discussion among Twitter users in Malaysia about the *halal* status of the vaccine are factually incorrect claims and misleading information about it. Although the majority of

Twitter users in this study are questioning and seeking more information about the vaccine because they believe it is part of their human right to be aware and well-informed by the government, some posts typically included elements of mockery and sarcasm while addressing baseless rumours and conspiracy theories about vaccines. Most importantly, this study also found that the exposure to constructed religious narratives leads to scientifically incorrect and false vaccination claims. These initial findings create new opportunities for a deeper understanding of society's vaccination behaviour through the discussion on different platforms of social media.

**Funding** This study was funded by Ministry of Higher Education Malaysia for Fundamental Research Grant Scheme (FRGS) with Project Code: FRGS/1/2020/SS0/USM/02/3.

## Declarations

**Conflict of interest** The author declares that there is no conflict of interest.

**Ethical Approval** This study under the research project has been granted approval for implementation by the Jawatankuasa Etika Penyelidikan Manusia Universiti Sains Malaysia (JEPeM-USM) (USM/JEPeM/21010007).

**Human and Animal Rights** This article does not contain any studies performed on animals by the author.

**Informed Consent** Selected tweets in this study were publicly accessible online; no names were recorded as the usernames were anonymised.

## References

- Ahmed, A., Lee, K. S., Bukhsh, A., Al-Worafi, Y. M., Sarker, M. M. R., Ming, L. C., & Khan, T. M. (2018). Outbreak of vaccine-preventable diseases in Muslim majority countries. *Journal of Infection and Public Health*, *11*(2), 153–155. <https://doi.org/10.1016/j.jiph.2017.09.007>
- Azizi, F. S. M., Kew, Y., & Moy, F. M. (2017). Vaccine hesitancy among parents in a multi-ethnic country, Malaysia. *Vaccine*, *35*(22), 2955–2961. <https://doi.org/10.1016/j.vaccine.2017.04.010>
- Batmalai, K. (2021). Why some elderly Malaysians aren't registering for Covid-19 Shots. *CodeBlue*. <https://codeblue.galencentre.org/2021/03/15/why-some-elderly-malaysians-arent-registering-for-covid-19-shots/>. Accessed 25 April 2021
- Benecke, O., & DeYoung, S. E. (2019). Anti-vaccine decision-making and measles resurgence in the United States. *Global Pediatric Health*, *6*, 1–5. <https://doi.org/10.1177/2333794x19862949>
- Betsch, C., Renkewitz, F., Betsch, T., & Ulshöfer, C. (2010). The influence of vaccine-critical websites on perceiving vaccination risks. *Journal of Health Psychology*, *15*(3), 446–455. <https://doi.org/10.1177/1359105309353647>
- Bradshaw, A. S., Shelton, S. S., Wollney, E., Treise, D., & Auguste, K. (2021). Pro-vaxxers get out: Anti-vaccination advocates influence undecided first-time, pregnant, and new mothers on Facebook. *Health Communication*, *36*(6), 693–702. <https://doi.org/10.1080/10410236.2020.1712037>
- Bukhari, S. N. Z., Isa, S. M., & Yen Nee, G. (2021). Halal vaccination purchase intention: A comparative study between Muslim consumers in Malaysia and Pakistan. *Journal of Islamic Marketing*, *12*, 670–689. <https://doi.org/10.1108/JIMA-10-2019-0209>
- Capurro, G., Greenberg, J., Dube, E., & Driedger, M. (2018). Measles, moral regulation and the social construction of risk: Media narratives of “Anti-Vaxxers” and The 2015 Disneyland Outbreak. *Canadian Journal of Sociology*, *43*(1), 25–48.

- Freed, G. L., Clark, S. J., Butchart, A. T., Singer, D. C., & Davis, M. M. (2011). Sources and perceived credibility of vaccine-safety information for parents. *Pediatrics*, *127*(Suppl 1), S107–S112. <https://doi.org/10.1542/peds.2010-1722P>
- Hamid, S. A. (2019). Anti Vaksin: Apakah natijahnya kepada masyarakat? [Special issue]. *e-Bangi: Journal of Social Sciences and Humanities*, *16*, 1–5. <https://ejournal.ukm.my/ebangi/article/view/31354/9059>
- Hashmi, F. K., Iqbal, Q., Haque, N., & Saleem, F. (2020). Religious Cliché and Stigma: A brief response to overlooked barriers in COVID-19 management. *Journal of Religion and Health*, *59*(6), 2697–2700. <https://doi.org/10.1007/s10943-020-01063-y>
- Hassan, H. (2020). Malaysia says halal issue won't affect Covid-19 vaccine roll-out amid concerns among Muslims. *The Straits Times*. <https://www.straitstimes.com/asia/se-asia/halal-issue-will-not-impede-muslims-vaccine-roll-out-says-health-chief-amid-muslim>. Accessed 27 March 2021
- Husin, W. N. W., & Ibrahim, H. (2016). Religious freedom, The Malaysian Constitution and Islam: A critical analysis. *Procedia - Social and Behavioral Sciences*, *217*, 1216–1224. <https://doi.org/10.1016/j.sbspro.2016.02.152>
- Kalok, A., Loh, S. Y. E., Chew, K. T., Abdul Aziz, N. H., Shah, S. A., Ahmad, S., Mohamed Ismail, N. A., & Abdullah Mahdy, Z. (2020). Vaccine hesitancy towards childhood immunisation amongst urban pregnant mothers in Malaysia. *Vaccine*, *38*(9), 2183–2189. <https://doi.org/10.1016/j.vaccine.2020.01.043>
- Kemp, S. (2020). Digital 2020 Global Digital Overview. *Hootsuite & We Are Social*. <https://datareportal.com/reports/digital-2020-malaysia>. Accessed 13 March 2021
- Milko, V. (2020). Concern among Muslims over halal status of COVID-19 vaccine. *ABC News*. <https://abcnews.go.com/Health/wireStory/concern-muslims-halal-status-covid-19-vaccine-74826269>. Accessed 27 March 2021
- Nordin, M. M. (2020). Coronavirus Pandemic: Malaysian company says will get Chinese vaccine certified as Halal. China Global Television Network (CGTN). <https://news.cgtn.com/news/794d444d77554464776c6d636a4e6e62684a4856/index.html>
- Olagoke, A. A., Olagoke, O. O., & Hughes, A. M. (2021). Intention to vaccinate against the Novel 2019 Coronavirus disease: The role of health locus of control and religiosity. *Journal of Religion and Health*, *60*, 65–80. <https://doi.org/10.1007/s10943-020-01090-9>
- Oxholm, T., Rivera, C., Schirrmann, K., & Hoverd, W. J. (2021). New Zealand religious community responses to COVID-19 while under level 4 lockdown. *Journal of Religion and Health*, *60*(1), 16–33. <https://doi.org/10.1007/s10943-020-01110-8>
- Pehora, C., Gajaria, N., Stoute, M., Fracassa, S., Serebale-O'Sullivan, R., & Matava, C. T. (2015). Are parents getting it right? A survey of parents' Internet Use for Children's Health Care Information. *Interactive Journal of Medical Research*, *4*(2), e12. <https://doi.org/10.2196/ijmr.3790>
- Ramli, M. A., Fauzi, T. F. A. T. M., & Razif, N. F. M. (2019). Autoriti Kerajaan Dalam Mewajibkan Vaksinasi Kanak-kanak: Kajian Menurut Perspektif Hukum Islam. *UMRAN - International Journal of Islamic and Civilizational Studies*, *6*(2), 21–35. <https://doi.org/10.11113/umran2019.6n2.243>
- Roslan, M. B. (2021). Understanding The Islamic Perspective Of COVID Vaccines. *BERNAMA*. <https://www.bernama.com/en/news.php?id=1925294>. Accessed 24 February 2021.
- Rumetta, J., Abdul-Hadi, H., & Lee, Y. K. (2020). A qualitative study on parents' reasons and recommendations for childhood vaccination refusal in Malaysia. *Journal of Infection and Public Health*, *13*(2), 199–203. <https://doi.org/10.1016/j.jiph.2019.07.027>
- Taib, W. R., Yusoff, N. A. M., Tengku, M. A., & Aryati, A. (2017). Issues in Vaccine Hesitancy in Malaysia: A Countering Approach. *Journal of Biomedical & Clinical Sciences*, *2*(1), 42–46. <http://apps.amdi.usm.my/journal/index.php/jbcs/article/view/84/Pg%2042-46>
- Tripathi, M., & Kumar, S. (2018). Effect of social media on Human Health. *Virology & Immunology Journal*, *2*(2), 1–3. <https://doi.org/10.23880/vij-16000144>
- Wilson, S. L., & Wiysonge, C. (2020). Social media and vaccine hesitancy. *BMJ Global Health*, *5*(10), 1–7. <https://doi.org/10.1136/bmjgh-2020-004206>
- Wong, L. P., Wong, P. F., & AbuBakar, S. (2020). Vaccine hesitancy and the resurgence of vaccine preventable diseases: The way forward for Malaysia, a Southeast Asian country. *Human Vaccines and Immunotherapeutics*, *16*(7), 1511–1520. <https://doi.org/10.1080/21645515.2019.1706935>
- World Health Organization. (2020). *Ten threats to global health in 2019*. <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>. Accessed 11 January 2021.

Zainudin, E. N. H. E., Mohammad, K. A., Aris, . A., & Shahdan, . I. A. . (2018). Vaccination: Influencing Factors and View from an Islamic Perspective. *IIUM Medical Journal Malaysia*, 17(2). <https://doi.org/10.31436/imjm.v17i2.997>

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.