

COVID-19 Intra-muscular vaccinations during Ramadan: The permissibility of vaccines whilst fasting

Mufti Usman Maravia, *National director – BIMA Ethics team, ESRC Centre for Corpus Approaches to Social Science (CASS), Bailrigg House, Lancaster University*

Correspondence: ethics@britishima.org or u.maravia@lancaster.ac.uk

Keywords: *Fasting, fatwa, intramuscular vaccines, nutrition, Ramadan*

Abstract

The purpose of this article is to reassure British Muslims, who may be offered either the first or the second dose of any of the three COVID-19 intramuscular vaccines during Ramadan, that according to the principles of the Shariah, these vaccines have no bearing on the validity of one's fasting. As such, health professionals and British Muftis could help instil confidence in British Muslims who are willing to receive the vaccine - to proceed with the understanding that receiving intramuscular vaccines does not invalidate fasts. The substances in the COVID-19 vaccines are not known to reach the stomach and are also non-nutritional. As such, the reasons why different forms of medication invalidate fasting do not apply to the COVID-19 vaccines. Moreover, vaccination would help increase herd immunity within Muslim communities, which is vital if communal rituals are to resume normality.

Introduction

At the time of writing, three vaccines against COVID-19 were approved and made available in the UK. These vaccines include 1) Pfizer-BioNTech vaccine, 2) University of Oxford/AstraZeneca vaccine, and 3) the Moderna vaccine. All three vaccines were reported to be approximately 90% effective in late-stage trials [1]. According to statistics published by the NHS for the overall vaccination activity;

In the week ending 18th April an additional 2,828,254 NHS vaccinations for COVID-19 (both first and second doses) were reported in England. This took the total number of vaccinations administered as of 18th April to 36,213,306. Of the 2,828,254 vaccinations reported in the week ending 18th April, one-fifth (574,968) were first doses. This took the total number of people vaccinated with at least one dose as of 18th April to 27,516,197 (60.5% of the population aged 16 and over). The majority of vaccinations reported in the week ending 18th April were second doses (2,253,286). This took the total number of people

vaccinated with both doses as of 18th April to 8,697,109 (19.1% of the population aged 16 and over and 31.6% of those vaccinated) [2].

The starting point on vaccines in this article is that the three above-mentioned vaccines have been approved by a number of Muslim jurists in the UK to be Shariah-compliant, meaning that they are compliant with Islamic law [3][4][5][6][7]. Furthermore, the British Medical Islamic Association (BIMA) also published its position statements endorsing the three vaccines [8][9][10]. Both oral and intramuscular (IM) vaccinations in general, have been approved by Muslim organisations worldwide [11]. Moreover, the Federation of Islamic Medical Associations (FIMA), which is a registered body of 29 Islamic medical organisations and 17 associate members worldwide, representing about 50,000 Muslim medical and health professionals stated that '*Arguably, it is far more harmful to one's health to contract Covid-19 than to take an approved vaccine for the disease*' [12]. Other efforts in the UK include the use of mosques as COVID-19 vaccination centres to help increase trust and to

reassure Muslim communities and ethnic minority communities about the safety and effectiveness of vaccination [13][14][15][16].

Ramadan 2021 began in mid-April and will end in mid-May. In the UK, sunset in April occurs after 8pm and in May, after 9pm. In the UK, most vaccination centres are open only until 8pm, which means that the vaccination would be received in daylight hours, during fasting hours. At the time of writing, the UK government was reported to have plans for a night-time Ramadan drive [17]. If the vaccines are administered after sunset then this would not affect the validity of fasting. Nevertheless, irrespective of what time of day the vaccine is administered, the question remains about the impact of any side effects that an individual may experience. According to the CDC, a higher percentage of people reported side effects after receiving the second dose of the Pfizer—BioNTech vaccine than after receiving the first dose; injection-site pain has been reported as the most common side-effect; other side effects include fatigue, headache, and muscle pain [18]. Common side effects are expected to be mild and self-limiting within a few hours. However, fever and fatigue may be prolonged and may impair an individual's ability to tolerate the fast.

Assuming that Muslims embrace the three vaccines against COVID-19 as being Shariah-compliant, online Muslim forums, fatwa sites, and social media allow health professionals to gain insight into a different form of vaccine uncertainty; that is postponement of vaccines during Ramadan. An analysis of these discussions reveals that among the reasons for refusing vaccines during Ramadan is one based on the belief that the vaccination process would invalidate the fast. However, upon closer inspection, this belief is based upon a misplaced focus or an over-simplified understanding of what invalidates the Islamic fast. Whilst there are a number of factors that need to be considered before declaring a fast invalid, the oversimplification appears to be on the incorrect notion that if any substance enters the body, the fast is invalidated. Such beliefs have led some Muslim patients to raise concerns even against prescribed ophthalmic treatment during Ramadan [19].

Other reasons for misunderstanding what invalidates fasting involves conflating oral vaccines with intramuscular ones. One might attribute this understanding to the fact that in some instances, IM vaccines have been likened to blood transfusion, dialysis, IV fluids, and nutritional injections – which have been considered by some Muslim jurists to invalidate fasts. Nevertheless, this article aims to clarify the way in which

intramuscular vaccines differ from other forms of medicinal treatments that are believed to invalidate fasts.

Fasting in Ramadan, as pointed out by Waqar and Ghouri, *'is an individualised choice and should be supported through a shared decision-making process'* [20]. The decision of a Muslim patient to fast or choose not to is likely to be posed not only to health professionals but also to Muslim theologians and ethicists, commonly known as an imam or a mufti [21]. Consequently, by having a clear understanding of what the three vaccines contain, how these substances enter the body and are transported within as well as how these substances affect the body - health professionals, imams, and muftis would be better equipped to advise British Muslims regarding vaccination against COVID-19 in Ramadan 2021 and perhaps provide the British Muslim community with clear guidelines [22].

1. Why Muslims fast

Islam revolves around expressing gratitude for life. For Muslims, this involves showing gratitude to Allah, also referred to in the Qur'an as *'Al-Muhyee'* meaning the One who grants life. Expressing gratitude to Allah takes many different forms, among which fasting in Ramadan is pivotal as one of the five pillars of Islam [23]. Ramadan is the ninth month of the Hijri (Islamic lunar calendar) during which Muslims worldwide collectively fast and congregate to break bread together at the end of their fasts. Fasting in Ramadan is, therefore, important to all Muslims, theologically as well as socially and culturally. Notably, the NHS itself has a workforce of over 45,000 Muslim workers [24]. Despite the fundamental position of fasting in a Muslim's life, the Shariah allows dispensation for medical reasons to categories of people who are deemed as being exempt from this obligation. Such dispensations allow Muslims to ensure that their health is neither affected physically nor affected psychologically by feelings of guilt or regret over terminating or postponing their fasts.

Exemptions from fasting

The Qur'an explicitly states, *'if anyone is ill or on a journey, then let them fast an equivalent number of days later'* [25]. The Qur'an, thereby, exempts from fasting those who are ill as well as anyone who needs to travel; considering the fact that people need to commute for several reasons such as for work purposes, visiting the sick, and attending funerals.¹ Muhammad Rasulullah (Peace be upon him), the Prophet of Islam, further clarified that a woman who is pregnant or is

breastfeeding also need not fast [26]. Such dispensations are in line with the Qur'an which encourages the preservation of life [27] and warns against self-harm as well as afflicting harm on others [28]. According to the late Mufti of Tunisia, Muhammad al-Aziz al-Ju'ayyit, harm could include both direct harm whereby fasting would make one's health worse, or indirect harm whereby a sick person's recovery could be delayed. If, however, one's life is at stake then under the circumstances, fasting is actually forbidden [29].

A question that could be raised at this point is - why would a Muslim want to consciously choose to fast and risk delayed recovery or permanent illness? While the reason for this may be based on sincerity and devotion to one's faith - the Qur'an and Muhammad Rasulullah encourage otherwise. In fact, the Qur'an urges Muslims to seek sound knowledge and verify information in order to avoid misinformation leading to causing harm to others [30]. Whilst a Muslim may believe that the greater the patience, the greater the reward, a hadith states that even if a sick person were unable to perform rituals, they would continue to be just as close to Allah as they would be - had they been observing the rituals when they were healthy [31]. Another factor that may influence decisions to fast, as highlighted and opposed by Ilkilic and Ertin, could be the ethically problematic intense family relations and social pressure [32].

In relation to diabetes, a large population-based study by Salti et al. found that about 79% of Muslims, from 13 countries, with Type 2 diabetes would fast for at least 15 days during Ramadan [33]. Abolaban and Al-Moujahed highlight that '*Ramadan could be an important cause for noncompliance with prescribed medications*' [34]. As a result, Abolaban and Al-Moujahed also highlight that primary care physicians need to be '*culturally competent and knowledgeable about the basics of Ramadan, exemptions from fasting, treatments and procedures that invalidate fasting*'.

Likewise, Randhawa and Griffin emphasise that the UK government need to take a traditional public health approach to tackle the pandemic - by developing a bespoke and sophisticated response to building trust among ethnic groups by co-designing culturally competent messaging with communities, which would enable a dialogue that would support increased rates of vaccine uptake [35].

A point worthy of note is that the Qur'an does not encourage postponing necessary travel but rather encourages postponing Ramadan fasts. To demonstrate

this in practice, Muhammad Rasulullah himself avoided fasting during travel. In 8 A.H., which took place two years prior to his demise, Muhammad Rasulullah journeyed from Madinah to Makkah in Ramadan. During this journey, some people had initially decided to fast but later began to find it difficult [36]. The verse which encourages postponing Ramadan fasts due to illness or travel had been revealed six years earlier. The same verse further reads '*Allah wants ease for you, not difficulty*'. In light of this verse, Muhammad Rasulullah, while still on the outskirts of Madinah and perhaps just an hour or two before sunset, halted the journey, asked for a bowl of water, raised it, and drank the water visibly, before the eyes of the people - to demonstrate that it was recommended to not fast during travel. In another hadith, Muhammad Rasulullah highlighted that '*fasting during travel is not some righteous act*' [37].

Moreover, Muhammad Rasulullah added that those who continued to fast on the way to Makkah had disobeyed [38] i.e., disobeyed the Qur'an. On this note, al-Sarakhsi [d. 1090] points out that a number of Muhammad Rasulullah's companions considered fasting to be invalid when travelling because doing so is antithetical to the Qur'anic guidance [39]. Likewise, fasting when seriously unwell is also not advised in the Qur'an.

Returning to the question related to vaccines - Why might Muslims not want to receive a vaccine against COVID-19 during the Ramadan of 2021? Whilst there could be a number of reasons for not wanting a vaccine, this article focuses on a particular reason - that is the belief that a vaccine would invalidate the fast. This belief could result in a significant number of patients who need the vaccine to delay receiving it. Because observant Muslims engage in many communal events such as congregating for the five daily prayers alongside fellow Muslims in mosques, the majority of the worshippers would need to be immunised to reduce the spread of COVID-19.

Culturally, Muslims nominate their family members to prepare the funerary rites, which include bathing, shrouding, and burying their deceased loved ones. To offer such rites and rituals, family members would also need to be immunised against COVID-19. Moreover, the UK government has prioritised the vaccines for frontline funeral workers [40]. In the UK, during Ramadan 2020, since no vaccine was available, Muslim jurists decided to suspend the Friday prayers and funerary rites in the hope to curb further spread of COVID-19 [41].

2. Rules of fasting

The ritual of fasting involves following a set of rules for the fast to be considered valid. These rules include avoiding the *muftiraat* - meaning actions that would invalidate the fast, such as intentionally eating and drinking. As such, Muslim jurists are unanimous in their understanding that eating or drinking items that provide nutrition as well as those that are socially accepted as food and drink and are ingested via the throat, would invalidate the fast.

However, a number of scenarios have led Muslim jurists to delve further into the principles of what would invalidate a fast. Different scenarios that Muslim jurists face and have tried to resolve include the fasting person smoking, vaping, and using oral asthma inhalers. Likewise, Muslim jurists have investigated the validity of fasting with regard to swallowing non-nutritional items such as paper, dirt, or a bead, or swallowing a fly; or eating a substance that is commonly not considered food such as a stone or an unripe vegetable. Moreover, Muslim jurists have explored additional scenarios such as if a substance entered the body through the skin – for instance, as a result of a bee sting or a snake bite. In relation to modern medicine, Muslim jurists have looked at whether or not using insulin pumps or transdermal medications such as nicotine and analgesic patches, or insertion of suppositories, creams or ointments for internal haemorrhoids would affect the validity of one's fast. How about receiving blood transfusion or dialysis; both haemodialysis (via the blood) and peritoneal (via fluid exchange in the abdomen) dialysis? Receiving intravenous fluids, being fed through a PEG tube, and receiving glucose or vitamin injections whilst fasting are likewise matters of concern for Muslim jurists. Each of these scenarios requires careful consideration of a number of factors to determine whether the fast would be valid or not. For the same reason, Muslims must bear in mind that the matter is complex and one scenario should not be conflated with another.

The Qur'an states that one may continue to eat and drink until *fajr* and thereafter to remain in a state of restraint until *lail*.ⁱⁱ The implication is, therefore, to not eat or drink during daylight hours. One major issue that arises in relation to what invalidates fasting is the discussion of what qualifies as the act of eating and drinking. Muslim jurists have taken different approaches to interpret this matter; ranging from a literal interpretation to more pragmatic and cultural interpretations. From among the various schools of Islamic jurisprudence, the Hanafi and the Ja'fari [42] schools are of the view that anything that

enters the body through the skin is not considered eating or drinking irrespective of where the substance could reach within the body.

While no one disputes that such a process is not eating or drinking, the Shafi'i and Hanbali schools argue that any substance which provides strength to the body through nutrition, irrespective of how it enters the body, would invalidate the fast. The Maliki school restricts the matter to '*shahwat al-batn*' meaning the pleasures of the abdomen. As such, if the substance were to reach the abdomen, the fast would be invalidated irrespective of how it entered the body. Moreover, although injecting nutritional substances into the body is not literally eating or drinking, it may be accepted as such, metaphorically speaking - in the case of those who are for instance "nil by mouth" and would be unable to swallow via the throat. Whether such patients should even fast is a separate discussion. For a comprehensive discussion on what invalidates fasting related to the throat and bodily cavities in light of modern medicine, read Rashid [43][44].

Based on the above basic principles, the following sections will look at ways in which intramuscular (IM) vaccines are different to other forms of *muftiraat* and why IM vaccines do not invalidate fasting. From another perspective, how is it that a group of Muslim jurists have considered receiving blood, IV fluids, saline drops, glucose, vitamin injections, dialysis, and even smoking to invalidate fasting but have considered IM vaccines to not invalidate fasting?

3. Blood transfusion, dialysis, and IV fluids

Some Muslim jurists view receiving blood via transfusion [45][46][47], undergoing dialysis, and receiving IV fluids to invalidate the fast. This ruling is based on the views of earlier Muslim jurists who concluded that the rules of fasting should not be subject to simple rationalisations. For these jurists, all that is of importance is abstinence from benefiting from any form of nutrition whether it entered the body via the throat or otherwise (e.g. via the skin or any bodily orifices). As such, a patient who suffers for instance from anaemia, sickle cell disease, haemophilia, or cancer, may postpone fasting on days when blood transfusion is required.

In addition to blood transfusions, bin Baz [d.1999] argued that injections that provide nutrition are an alternative form of feeding for those who are unable to swallow naturally. Bin Baz, therefore, stated that such injections are to be treated the same as eating and

drinking in relation to fasting i.e., that injecting nutrients invalidate the fast [48]. Likewise, according to this view, glucose injections and receiving nutritious fluids by PEG feeding would also invalidate the fast especially since the substance would directly reach the stomach. In the same vein, *al-Lajna ad-Da'imalil-Buhuth al-'Ilmiyyawal-Ifta* (The Permanent Committee for Scholarly Research and Ifta) considers dialysisⁱⁱⁱ to also invalidate fasting because the blood returning to the body is corrected by dialysis fluid which contains sugars and salts [49] such as glucose and sodium bicarbonate. For further discussion on the difference between haemodialysis and peritoneal dialysis, see Malik et al. [50]

By contrast, other Muslim jurists argue that the rules of fasting *can* be subject to a degree of contextually appropriate rationalisation. As such, receiving nutrients through the skin is neither generally considered to be eating or drinking, nor do such absorbed substances reach the stomach. Likewise, receiving blood, or undergoing dialysis, and receiving IV fluids do not invalidate fasting [51][52][53]. According to this view, saline fluid, which contains sodium chloride, that is used by physicians to rehydrate patients, to flush out wounds, and to deliver medication by intravenous infusion also does not affect the validity of fasting. Patches used in nicotine replacement therapy (NRT), which allow nicotine to be absorbed into the bloodstream also does not affect fasting. The same ruling applies to local and general anaesthesia [54]. During the seventh cholera pandemic of the 1960s, Abdul Majeed Saleem [d.1954], the then Grand Mufti of Egypt, was asked for his opinion - for the purpose of the annual hajj - regarding receiving vaccine injections against cholera and typhoid, whilst fasting in Ramadan. Saleem explained that the substances in these injections do not reach the stomach or intestines and, therefore, do not affect the validity of one's fast [55].

COVID-19 vaccines whilst fasting

With regard to the COVID-19 vaccinations, the three vaccines in question, as with most other conventional vaccines, are neither nutritional nor considered food or drink – neither for those who are healthy nor for those who are unable to swallow.

Moreover, all three COVID-19 vaccines are intramuscular and their contents are not known to reach the stomach or the intestines. The following is BIMA's response to the question on taking COVID-19 vaccines whilst fasting:

Taking the Covid-19 vaccines currently licensed in the UK does not invalidate the fast, as per the opinion of Islamic scholars. Individuals should not delay their Covid vaccinations on the account of Ramadan. Subcutaneous, subdermal, intramuscular, interosseous, or intra-articular injections for non-nutritional purposes whilst fasting do not invalidate the fast, regardless of the injected content entering the blood circulation. These routes are not classed as entry sites that would invalidate a fast. Receiving the Covid-19 vaccine as an intramuscular injection, the only route for the vaccines currently available, therefore does not invalidate the fast [56].

Other medicinal injections such as penicillin and insulin, which are also not considered to be nutritional, have also been considered to not affect the validity of fasting [57]. Such Islamic rulings are based on similar scenarios such as snake or scorpion bites - whereby venom, which contains a mixture of bioactive proteins and polypeptides could enter the bloodstream. Muslim jurists agree that such venomous bites do not affect the validity of fasting [58].

Conclusion

Based on online discussions regarding vaccines whilst fasting, vaccine uncertainty and postponement of vaccines appear to be a significant concern for some Muslims. The concern is based on the notion that injecting substances into the body could potentially invalidate their fast. A group of Muslim jurists have considered blood transfusion, dialysis, IV fluids, and nutritional injections to render fasting invalid because these treatments provide nutrition to the body. However, this rationale is inapplicable to the three COVID-19 vaccines; the reason being that the three COVID-19 vaccines are not nutritional, the substances used in the vaccines do not pass into the body via the throat, and these substances neither reach the stomach nor the intestines.

These differences between the three vaccines and other forms of medicinal treatment need to be clearly understood by Muslim faith leaders as well as health professionals working with Muslim patients. Imams could explain the efficacy of vaccination against COVID-19 during Friday sermons/ khutbahs adding that although vaccines may not eliminate COVID-19, being vaccinated can reduce health complications if one were to contract the virus. Moreover, mosques and Islamic centres may be used as convenient vaccination hubs. The night-time Ramadan vaccination drive would also be helpful as part of the solution against COVID-19. Continued discussion

between British muftis, Muslim faith leaders, and healthcare professionals is encouraged to understand the decision-making process to inoculate against COVID-19 during Ramadan as well as to unite against the spread of vaccine misinformation. Additionally, as Lancaster University is developing an intranasal COVID-19 vaccine [59], further medical and Islamic juristic discussion around its use whilst fasting is also encouraged.

Acknowledgements

I wish to acknowledge *Dr Salman Waqar* (General Practitioner and Academic Research Fellow, Nuffield Department of Primary Care Health Sciences, University of Oxford) and *Dr Zavid Iqbal Chariwala*, MBChB, DTM&H, MA (General Practitioner, Bolton) for their invaluable feedback.

Notes

ⁱThere is a difference of opinion among Muslim jurists with regard to the distance of travel which allows exemption from fasting.

ⁱⁱ*Fajr* is also referred to as *subhsadiq* that is when the rays of sunlight first begin to spread over the horizon. *Layl* or night, on the other hand, begins after *ghurub* or sunset. The terms *fajr* and *layl* have been defined here to clarify a common misnomer that Muslims fast between sunrise (which occurs a while after *subhsadiq*) to sunset.

ⁱⁱⁱThe Permanent Committee for Scholarly Research and Ifta in its fatwa is general and does not specify to which type of dialysis this fatwa applies.

References

1. Mahase, E. Covid-19: What do we know about the late stage vaccine candidates? *BMJ*. 2020;371:m4576
2. NHS. Overall vaccination activity [pdf]; 2021 April 22 [cited 2021 April 22]. Available from: <https://www.england.nhs.uk/statistics/wp-content/uploads/sites/2/2021/04/COVID-19-weekly-announced-vaccinations-22-April-2021.pdf>
3. Pfizer/ BioNTech COVID-19 Vaccine; Fatwa ID: 00029 [pdf]; 2020 Dec 6 [cited 2020 Dec 6]. Available from: <https://www.wifaqululama.co.uk/wifaq-pfizer>
4. Limbada, A. Is Covid-19 Vaccine Halal? [Internet]; 2020 Dec 6 [cited 2020 Dec 6]. Available from: <https://www.tafseer-raheemi.com/covid-19-vaccine-halal>
5. Shabbir, Y. Is the Pfizer BioNTech Covid-19 Vaccine Halal? [Internet]; 2020 Dec 5 [cited 2020 Dec 5]. Available from: <https://islamicportal.co.uk/is-the-pfzier-biontech-covid-19-vaccine-halal>
6. AMJA Resident Fatwa Committee. The Ruling on Getting the COVID-19 (Coronavirus) Vaccine. Fatwa #: 87763 [Internet]; 2018 Nov 1 [cited 2021 Jan 10]. Available from: <https://www.amjaonline.org/fatwa/en/87763/the-ruling-on-getting-the-covid-19-coronavirus-vaccine>
7. 5 Pillars UK. Fatwa: Pfizer COVID-19 vaccine declared 'halal' [Internet]; 2020 Dec 7 [cited 2020 Dec 7]. Available from: <https://5pillarsuk.com/2020/12/07/fatwa-pfizer-covid-19-vaccine-declared-halal>
8. BIMA. Position Statement on the Pfizer/BioNTech Covid-19 Vaccine [Internet]; 2020 Dec 6 [cited 2020 Dec 6]. Available from: <https://britishima.org/pfizer-biontech-covid19-vaccine>
9. BIMA. Position Statement on the Oxford/AstraZeneca Covid-19 Vaccine [Internet]; 2021 Jan 10 [cited 2021 Jan 10]. Available from: <https://britishima.org/covid19-vaccine-az>
10. BIMA. Position Statement on the Moderna Covid-19 Vaccine Moderna [Internet]; 2021 April 21 [cited 2021 April 21]. Available from: <https://britishima.org/moderna-covid19-vaccine>
11. Maravia, U. Vaccines: Religio-cultural arguments from an Islamic perspective. *JBIMA*. 2020, 6(2), 3-19. Available from: <https://jbima.com/article/vaccines-religio-cultural-arguments-from-an-islamic-perspective>
12. FIMA. Covid-19 is Dangerous, Not Vaccines [pdf]; 2021 Jan [cited 2021 Jan 31]. Available from: https://fimaweb.net/wp-content/uploads/2021/01/STATEMENT_Covid-is-dangerous-not-vaccines.pdf
13. Nazeer, T. In the UK, Muslims find comfort in receiving vaccines at mosques [Internet]; 2021 Feb 8 [cited 2021 Feb 8]. Available

- from: <https://www.aljazeera.com/news/2021/2/8/in-the-uk-muslims-feel-comforted-receiving-vaccines-at-mosques>
14. Sherwood, H. Hundreds get Covid vaccine at East London mosque's pop-up clinic [Internet]; 2021 Feb 7 [cited 2021 Feb 7]. Available from: <https://www.theguardian.com/society/2021/feb/07/hundreds-covid-vaccine-east-london-mosque-pop-up-clinic>
 15. WFIA. Pop NHS Covid Vaccination Centre at Lea Bridge Road Mosque [Internet]; 2021 Feb 12 [cited 2021 Feb 12]. Available from: <https://www.wfia.org.uk/covid-vaccination>
 16. Macnamara, F. Bradford Central Mosque to become a Covid-19 vaccination centre [Internet]; 2021 Feb 17 [cited 2021 Feb 17]. Available from: <https://www.thetelegraphandargus.co.uk/news/19096518.bradford-central-mosque-become-covid-19-vaccination-centre>
 17. Riley-Smith, B. Night-time jabs planned for Muslims during Ramadan amid fears of poor vaccine uptake in communities [Internet]; 2021 Feb 26 (cited 2021 Feb 26). Available from: <https://www.telegraph.co.uk/news/2021/02/26/night-time-jabs-planned-muslims-ramadan-amid-fears-poor-vaccine>
 18. Shimabukuro, T. COVID-19 vaccine safety update: Advisory Committee on Immunization Practices (ACIP) January 27, 2021 [pdf]. 2021 Jan 27 [cited 2021 April 12]. Available from: <https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-01/06-COVID-Shimabukuro.pdf>
 19. Kumar, N. and Jivan, S. Ramadan and Eyedrops: The Muslim Perspective. *Ophthalmology*. 2007, 114(12), 2356-2360.
 20. Waqar, S. and Ghouri, N. Managing Ramadan queries in COVID-19. *BJGP*. 2020, 4(2), bjgpopen20X101097.
 21. Ilkilic, I. Bioethical Conflicts Between Muslim Patients and German Physicians and the Principles of Biomedical Ethics. *Medicine and Law: World Association for Medical Law*. 2002, 21(2): 243-256.
 22. Maravia U, Bekzhanova Z, Ali M, Alibri R. British Muslims Caught Amidst FOGs—A Discourse Analysis of Religious Advice and Authority. *Religions*, 2021, 12(2),140.
 23. Al-Bukhari, M. I. *Sahih al-Bukhari; Kitab al-emaan; Bab al-emaan*. Beirut, Lebanon: Dar Tauq al-Naja; 2001.
 24. NHS. NHS thanks Muslim staff working through Ramadan and urges care over Eid [Internet]; 2020 May 21 [cited 2021 Feb 14]. Available from: <https://www.england.nhs.uk/2020/05/nhs-thanks-muslim-staff-working-through-ramadan-and-urges-care-over-eid>
 25. Hussain, M. *The Majestic Qur'an: A plain English translation; Sura al-Baqara; 2:185*. Nottingham: Invitation Publishing; 2018.
 26. Al-Tirmidhi, M. I. *Sunan al-Tirmidhi; Abwaab as-saum an Rasul Allah; Babmajaa'a fir rukhsafi'l iftar li'lhublawal'murdhi'a*. Beirut, Lebanon: Dar al-Gharb al-Islami; 1998.
 27. Hussain, M. *The Majestic Qur'an: A plain English translation; Sura al-Baqara; 5:32*. Nottingham: Invitation Publishing; 2018.
 28. Hussain, M. *The Majestic Qur'an: A plain English translation; Sura al-Baqara; 2:195*. Nottingham: Invitation Publishing; 2018.
 29. Al-Ju'ayyit, M. A. *Al-a'dhaar al-mubeehali'lfitr fi Ramadan: Fatwa #20* [Internet]; 1960 Feb 14 [cited 2021 Jan 10]. Available from: <http://raissouni.net/2019/09/03/الحدائثونومقاصد-الشرعية>
 30. Hussain, M. *The Majestic Qur'an: A plain English translation; Sura al-Hujurat; 49:6*. Nottingham: Invitation Publishing; 2018.
 31. Al-Tabarani, S. A. *Al-Mu'jam al-Awsat*. Cairo, Egypt: Dar al-Haramain; 1994.
 32. Ilkilic, I. & Erten, H. Ethical conflicts in the treatment of fasting Muslim patients with diabetes during Ramadan. *Medicine, Health Care and Philosophy*. 2017, 20, 561-570.
 33. Salti, I., Bénard, E., Detournay, B., Bianchi-Biscay, M., Le Brigand, C., Voinet, C., Abdul Jabbar and on behalf of the EPIDIAR Study Group. A population-based study of diabetes and its characteristics during

- the fasting month of Ramadan in 13 countries: Results of the epidemiology of diabetes and Ramadan 1422/2001 (EPIDIAR) study. *Diabetes Care*. 2004(27), 2306-11.
34. Abolaban, H. and Al-Moujahed, A. Muslim patients in Ramadan: A review for primary care physicians. *Avicenna J Med*, 7(3), [81-87](#).
 35. Randhawa, G. and Griffin, S. Covid-19 must be a tipping point for tackling inequalities [Internet]; 2021 February 12 [cited 2021 February 12]. Available from: <https://blogs.bmj.com/bmj/2021/02/12/covid-19-must-be-a-tipping-point-for-tackling-inequalities>
 36. bin Othaimen, S. Majmou' fatawaawarasa'ilash-sheikh Muhammad bin Salih al-Othaimen; idhasaafar al-insaanilabilaad al-kuffaarfakaifayasoum ... (vol. 19). Al-Riyadh, Saudi Arabia: Dar AlWatan - Daralthuraya; 1992.
 37. Al-Tirmidhi, A. E. Sunan at-Tirmidhi. Abwab as-saum an Rasul Allah; Bab ma jaa'afikarahiyyat as-saumfissafar. Beirut, Lebanon: Dar al-Gharb al-Islami; 1998.
 38. Al-Naysapuri, M. H. SahihMuslim. Kitabas-siyam; bab saum ba'dhRamdanfissafarwaiftaarba'dh. Beirut, Lebanon: Dar al-Kutub al-'Ilmiyah; 1998.
 39. Al-Sarakhsi, A. M. Al-Mabsut. Kitab as-saum (vol. 3). Beirut, Lebanon: Dar al-Kutub al-'Ilmiyyah; 1997.
 40. NAFD. Update: frontline funeral workers prioritised for the COVID vaccine – next steps [Internet]; 2021 Jan 8 [cited 2021 Jan 8]. Available from: <https://nafd.org.uk/2021/01/08/update-frontline-funeral-workers-prioritised-for-the-covid-vaccine-next-steps>
 41. Maravia, U. Rationale for Suspending Friday Prayers, Funerary Rites, and Fasting Ramadan during COVID-19: An analysis of the fatawa related to the Coronavirus. 2020, 4(2), 10-15.
 42. Islam Quest. What is the ruling regarding taking injections during Ramadhan? [pdf]; 2009 Sep 7 [cited 2021 Jan 31]. Available from: <https://www.islamquest.net/en/archive/question/fa6824>
 43. Rashid, R. Part 1-What invalidates fasting related to the throat in light of modern medicine [pdf]; 2020 May [cited 2021 Jan 10]. Available from: https://www.academia.edu/43086999/part_1_what_invalidates_fasting_related_to_the_throat_in_light_of_modern_medicine
 44. Rashid, R. Part 2-What invalidates fasting related to body cavities [pdf]; 2020 May [cited 2021 Jan 10]. Available from: https://www.academia.edu/43158103/part_2_what_invalidates_fasting_related_to_body_cavities
 45. International Fiqh Academy (IFA). Qaraar bi-sha'n al-muftiraat fi majaan at-tadwaawi: Resolution 2019 (3/23) [pdf]; 2018 Nov 1 [cited 2021 Jan 10]. Available from: <https://www.iifa-aifi.org/ar/4934.html>
 46. IMANA. The position of Islamic Medical Association of North America on issues of Medical Ethics [Internet]; 2005 Apr 14 [cited 2021 Jan 10]. Available from: <https://hhlf.org/the-position-of-islamic-medical-association-of-north-america-on-issues-of-medical-ethics>
 47. Limbada, A. Masaail of Ramadhan: Differences between the Hanafi fiqh and Salafi fiqh [Internet]; 2012 July 17 [cited 2021 Jan 10]. Available from: <https://www.tafseer-raheemi.com/masaail-of-ramadhan-differences-between-the-hanafi-fiqh-and-salafi-fiqh>
 48. bin Baz, A. Al-ibr al-mughdhiyatufir [Internet]; 1998 [cited 2021 Jan 10]. Available from: <https://binbaz.org.sa/fatwas/11361/-الابر-المغذية-قطر>
 49. bin Abd al-Maqsud, A. Fataawa Ramadan fi'ssiyaamwa'lqiyaamwa'litikaafwa zakat al-fitr (vol 1). Riyadh: Maktabatadwa' al-salaf; 1998.
 50. Malik, S., Bhanji, A., Abuleiss, H., Hamer, R., Shah, S.H., Rashad, R., Junglee, N., Waqar, S. and Ghouri, N. Effects of fasting on patients with chronic kidney disease during Ramadan and practical guidance for healthcare professionals. *Clinical Kidney Journal*. 2021. sfab032.
 51. Uthmani, M. S. Imdaadulmuftiyeen; Kitab al-saum; Fasl fi ma yufsid al-saumwa ma yukrahlulis-sa'im (vol 1). Karachi, Pakistan: DarulIshaat; 2001.

52. Shabbir, Y. What nullifies the fast and what does not? [Internet]; 2015 June 3 [cited 2021 Jan 10]. Available from: <https://islamicportal.co.uk/what-nullifies-the-fast-and-what-does-not>
53. Al-Harmasi, A. Al-Mujtama' wa'l Islam wa'nnakhb al-Islahiyya fi Tunis wa'lJaza'ir: Dirasamuqarana min mandhurilm al-ijtima at-tarikhi. Doha, Qatar: Arab Center for Research and Policy Studies; 2018.
54. Al-Munajjid, S. Hal yuftirubi' akdh al-banj li-ijraa 'amaliyya fi Ramadan? Fatwa #65632 [Internet]; 2008 Aug 31 [cited 2021 Jan 10]. Available from: <https://islamqa.info/ar/answers/65632/-هل-يفطر-ياخذ-حقنة-البنج-لاجراء-عملية-في-رمضان>
55. Saleem, A. M. At-tat'eem fi athna' as-saum; Fatwa #2194 [Internet]; 1945 July 18 [cited 2021 Jan 10]. Available from: <https://www.dar-alifta.org/ar/ViewFatwa.aspx?sec=fatwa&ID=13120>
56. BIMA. Q&A for Muslim communities: Fasting & COVID vaccinations [Poster]; 2021 Jan 28 [cited 2021 Jan 28]. Available from: <https://britishima.org/wp-content/uploads/2021/01/WhatsApp-Image-2021-01-30-at-11.27.56.jpeg>
57. bin Ibraheem, M. Fataawawarasaa' ilsamahatash-Sheikh Muhammad bin Ibraheem bin Abd al-Lateef Aalash-Sheikh (vol 4); **Fatwa #1129**: at-tawteen fil adhudhwa' libratufi' ladhhlwa' lwareed. Mecca, Saudi Arabia: Matba'at al-hukouma; 1977.
58. Al-Munajjid, S. Hal ladghat an-nahl aw al-aqrabmin al-muftiraat?! Fatwa #67168 [Internet]; 2005 Oct 14 [cited 2021 Jan 10]. Available from: <https://islamqa.info/ar/answers/67168/-هل-لدغة-النحلة-او-العقرب-من-المفطرات>
59. Park, J. G., Oladunni, F. S., Rohaim, M. A., Whittingham-Dowd, J., Tollitt, J., Assas, B. M., ... & Munir, M. Immunogenicity and Protective Efficacy of an Intranasal Live-attenuated Vaccine Against SARS-CoV-2 in Preclinical Animal Models. bioRxiv. 2021 [Internet]; 2021 Jan 11 (cited 2021 Mar 2). Available from: <https://www.biorxiv.org/content/10.1101/2021.01.08.425974v1>