JBIMA

Journal of the British Islamic Medical Association

Volume 12, No.4
December 2022

ISSN 2634 8071

JBIMA@britishima.org
www.jbima.com

Journal of the British Islamic Medical Association

Vol 12 - No. 4 | December 2022 | www.jbima.com
ISSN 2634 8071

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JBIMA Editorial

Dr Sharif Kaf Al-Ghazal, Editor in Chief

Assalamo Alaikom

Winter is always a challenging season for healthcare staff; the confluence of flu season, the holidays and colder weather mean that the elderly and more vulnerable are prone to suffering. The short days and long nights affect us all, and with the cost of living crisis showing no signs of abating, this year matters are particularly tough.

NHS staff are still doing an incredible job however, and whilst morale is understandably down, and the media is filled with numerous stories of hospitals being understaffed and patients facing ridiculously long waiting times, you get on with the job admirably. Inequality within the NHS, both as a staff member and as a patient, means that Muslims are likely to face more struggles and poorer access to healthcare as most people from BAME background do. The challenges that BAME staff face in the NHS is steadily getting worse; in 2021 figures were published in the NHS Workforce Race Equality Standard report which stated that it is now 1.77 times more likely for a white staff member to get a role within the NHS compared to a BAME colleague. This is up from 1.46 a few years ago. At BIMA, it is crucial that we keep advocating on behalf of BAME colleagues to address race inequality and protect staff from mistreatment at work. The pressure that colleagues are facing at work is horrendous and we know that it can get overwhelming at times. Ultimately however, working in healthcare is also extremely rewarding; we are working to save peoples' lives.

Muslim patients, who are more likely to be BAME, also suffer disproportionately compared to the rest of the UK population, with 24% of Muslims aged 50 years or over reporting poor or very poor health which is twice that of the national average (as shown in the MCB report published in 2015). This is concerning and this is why public health awareness in our communities is so vital.

The work that BIMA does in mosques, community centres and other places where Muslims meet must be increased and the message that a healthy body leads to a healthy soul must be effectively communicated.

The prophet PBUH once said "Allah loves that when one of you does something, you do it well" and that is a mantra we must stick to whilst we go about our jobs.

With morale understandably so low and people feeling undervalued, this hadith is particularly important to bear in mind. Whilst we work to change the system, we must also keep on doing our utmost for our patients.

Finally, *Alhamdolilah*, it was also a pleasure to see so many of you in person again after the many lockdowns and restrictions that Covid imposed upon us. The recent Conference in November was the first face to face large meeting of BIMA members for a few years and it was energising to see so many new faces, and a brand new senior leadership team elected too at the AGM. For an organisation that has only recently celebrated its 9th anniversary, it is truly a proud moment. Congratulations to the new elected BIMA council and to the new president Dr Salman Waqar.

Very best wishes,

Wassalam.

Dr Sharif Kaf Al-Ghazal
JBIMA, Editor in Chief

Journal of the British Islamic Medical Association

Ethics

Vol 12 - No. 4 | December 2022 | www.jbima.com

ISSN 2634 8071

Evolution of Islamic Medical Ethics - An Overview

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Keywords: *Ethics, Islam, History, Islamic Jurisprudence (sharī`a), Medical jurisprudence (al-fiqh al-ṭibbī), Character ethics, Judicial ethics*

Abstract

The Ethics was not a separate discipline in the early Islamic era because all the moral values were already embedded in Islamic jurisprudence. Nevertheless, the importance of the manners, especially for physicians, prompted Ishāq ibn `Alī al-Ruhāwī to write *Adab al-ṭabīb* (Ethics of the Physician), the earliest extant book that is fully dedicated to medical ethics. This and subsequent writings on the subject were devoted to the character of physicians and their relation to the patients. This can be described as character ethics. In the modern era, medical ethics among Muslims became directed to dealing with the moral questions arising from ever-increasing new medical developments that challenged the old concepts in many ways, especially in the areas of reproduction, beginning and end of life and organ transplantation. While in the West, the resolution of these moral issues is based on secular reasons, Muslims should also consider whether a certain action is Islamically permissible. Muslim scholars are called upon to issue *fatāwā* (opinions), relying on scripture and reason guided by historically developed legal principles, regardingthe permissibility of the actions in question. The study of these issues and their judicial status can be described as judicial ethics. This article discusses the evolution of Islamic medical ethics from its origin in character ethics to its incorporation of judicial ethics. It also discusses the judicial principles that form the bases of these *fatāwā*.

Introduction

Ethics is derived from the Greek word *Ethikos*, which is derived from the root word *ethos*, meaning customs, norms or manners. The closest Arabic word for ethics is *akhlāq*.

Ethics was initially limited to the personal character of the individual. As societies developed and individuals became grouped in professions, the concept of ethics developed to include certain codes of behaviour for the different professions, most notably the medical profession. Healthcare essentially entails direct and personal interaction with other individuals when they need help and are in emotional and physical distress. Physicians deal with human beings, the most honored of God's creation, when they are most vulnerable due to sickness. Thus, they should have higher moral standards. In Islam, these good manners have been embedded in the culture as they were part and parcel of the Islamic teachings. Medical practice rules were simply dictated by the general rules of Islamic morals and conduct. Ethics discourse was thus not treated as a separate discipline. The Qur'an is replete with passages describing the character traits and morals that are pleasing to God and specifying which actions are permissible and which are prohibited.

God commands justice, doing of good and liberality with relatives and forbids all indecent deeds, evil and rebellion: He instructs you that may receive admonition. [Glorious Qur'an, 16:90]

ISSN 2634 8071

When Allah wanted to praise His messenger, He chose to praise his character:

And you (stand) on an exalted standard of character. [Glorious Quran, 68: 4]

In addition, there are many *aḥādīth,* collectively called the Sunnah, that guide Muslims to a virtuous life. In one *hadith*, Prophet Mohammad said "The best among you are those who have the best manners and character" [1]. It is also narrated that Prophet Mohammad said, "I was sent to perfect good character" [2].

Qur'anic teachings and Prophetic sayings constitute the basis for the *sharī`a* (Islamic jurisprudence). Significantly, many of the Prophet's *aḥādīth* discussed health and disease, encouraged seeking cure through spiritual and natural medications available at the time as well as by seeking the help of a qualified *ḥakīm* (physician).

Until the latter part of the twentieth century, ethics continued to be guided by these divine rules and prophetic guidance. With significant advances in medicine, many unprecedented modes of treatment and hitherto unknown techniques and procedures became available. In Islam, every human action can be characterized as *ḥalāl* (permissible) or *ḥarām* (prohibited). Thus, these new procedures and treatments required judgments on which ones were acceptable from the Islamic point of view. These posed challenges to the Islamic scholars who could not find rulings that adequately fit them. Ethics thus had to evolve. In addition to the general moral principles applicable to all Muslims (character ethics), the discipline of ethics required the study of all new issues and deciding on its juristic implication (judicial ethics). Muslim scholars had to rely on *ijtihād* (personal judgment to reach a decision) to decide on matters not explicitly mentioned in either the Quran or Sunnah, the two main sources of Islamic law.

This article reviews the early writings of Muslims regarding ethics and medical ethics and more recently their attempts to make judicial rulings and how they reach these rulings regarding the use of the new modalities. It also compares and contrasts the way they do that with how Western scholars deal with the same.

Historical emphasis on physicians' character and conduct

The importance of good character of physicians has been expressed from antiquity. Hippocrates wrote about the moral character of the physicians, but early Muslim scholars were the first to dedicate complete books on the subject. Al-Rāzī" wrote a companion to *Kitāb al-Mansūrī* dedicated to the 'reformation of the character' and entitled it *al-Tibb al-rūḥānī*(Spiritual Medicine). In this work, he details how one can elevate his character by controlling his passions and casting away vices [3]."Yuhannā ibn Māsaweh wrote a book on the same subject, called *Miḥna al-ṭabīb* ("The Challenge of the Physician"). Both of these early books are lost [3]. The first book that survived is that of Isḥāq ibn `Alī al-Ruhāwī, entitled *Adab al-ṭabīb* ("The Ethics of the Physician") [4]. Al-Ruhāwīwas born in Ruhā (Urfa today) in north western Iraq in 854 A.D. and passed away in 931 A.D. An English translation of a manuscript found in Istanbul by Martin Levey has been published [5]. *Adab al-ṭabīb* is divided into 20 chapters. The significance of al-Ruhāwī's book was also discussed in recent publications [3,6].

A later book that addresses morals was written by Abū `Alī Aḥmad ibn Muḥammad known as ibn Maskaweh (940 - 1030 AD) almost a century after al-Ruhāwī. The book is titled *Tahthīb al-akhlāq wataṭhīr al-a`rāq* ("Refinement of morals and purification of lineage") [7]. Although this book is not specific to physicians, it shows the importance Islamic scholars gave to *akhlāq*. He states that, if the actions of the human being are less than what he is created for by not adopting the morals outlined in the *sharī`a*, he will be undermining his honored status among other creations of God. He then discusses in detail the virtues that one should acquire and the vices and bad characters one must avoid. The moral person does what he does not for worldly benefit but for God's love. He advises each person to investigate himself to detect deficiencies and work hard to correct them.

The following section contains highlights of al-Ruhāwī's *Adab al-ṭabīb*, based on the edition edited by Marīzī Sa`īd Marīzī`Asīrī [4]. Page numbers are italicized in brackets.

Highlights from *Adab al- ab b*

The medical profession is the most noble of professions. The physician who seeks the profession should do so for its sake, not just for earning a living. Such a physician will get lasting satisfaction and joy, in addition to a good living. He will have an excellent reputation, people will respect him, and he would be close to Allah and His Pleasure. [*208*]

Not everyone can be taught to be a physician. Only those who are of good character and ability to endure long studies and continued learning should enter this profession. Physicians are very responsible people. In other professions, if a mistake is done, it can be corrected. However, with physicians' mistakes, the patient's health or even life can be lost, and the damage often cannot be corrected. Physicians must be tested before they are allowed to practice, with emphasis on both the theoretical (basic sciences) and practical aspects (technical skills). [*242-4*]

The physician should be skilled in eliciting symptoms and in looking for signs of diseases. [*184*] He should use a pharmacist that he trusts for making the medications he uses. Yet, he should be familiar with the preparation of the medications whether simple or complex and whether they deteriorate in efficacy or become harmful over time. [*174-6*]

The physician should encourage the patient or his helpers to be frank with him. They need to tell the physician whether mishaps occur, be they errors in the use of the medications, in the preparation of foods or in following his instructions so the physician can try to fix what went wrong in time to avoid complications. Physicians should consult with each other if needed.[*198*]

Al-Ruhāwī stressed the importance of the good moral character of the physician. He should not be envious, hateful, greedy or arrogant. He should be forgiving, kind, humble and thankful. He should take pleasure at well-deserved praise he has earned from grateful patients. Al-Ruhāwī cautions physicians against praise given by evil people. He urges them to ignore criticism as long as they are doing the right thing. [*164-5*]

In addition to his professional skill and good behavior, the physician should take care of his own hygiene and physical appearance. He should always be clean and be sure he has no mouth or body Odor. He must observe his dietary habits. He should be cutting his nails and excessive hair on his head and face. It is not polite of him to expectorate, yawn or stretch himself in public. The physician must take care of his clothes. They must be clean and be garments of beauty, especially, when he is near people of status. The physician must guard his five senses. No foul word should be heard from him. He must guard his sight, not beholding anything vile unless it is necessary. He should not be listening to uneducated people or to statements of the wicked. He should instead frequent assemblies of the virtuous, lettered and learned. [*157-9*]

The physician should follow a strict schedule in his daily activities including a limited amount of sleep. He divides his day between prayer, remembrance and thanking of Allah, studying and visiting the patients both at their homes and in his office. [*159-60*] The physician must be just and merciful to the weak and the poor. As he provides good care and consideration for the rich and powerful, he should do the same for the poor, even if they cannot compensate him financially. [*287*] It is not correct for the physician to earn property by trade since that holds him back from the further pursuit of knowledge. [*240*] It is not in the best interest of the physician to occupy himself with play and playthings which may make him weak-minded and silly. Flattery is not fitting for the physician since it is of the morals of the common people. Envy is not good for the physician since it causes him to fall from his high position. [*277-8*]

The physician must be thankful to God that He bestowed on him these bounties. He should be sincere in his worship of Allah. Similarly, people should honor and give due respect to physicians. It is bad if a patient asks for help from God and from a physician and then, once he is cured, that patient fails to thank God appropriately and treats the physician with disdain. Some patients hate their physicians because they tend to advise against indulgence in vices and other pleasures. [*191-2*]

Physicians have to prepare themselves for getting old, weak or incapacitated by paying attention to proper diet and exercise so that, as they age, they remain capable of taking care of their patients. Al-Ruhāwī advises the physician to be careful with his money so as to save some for old age. [*282-3*]

While many of these recommendations and advice seem quite sensible and obvious to us at present, it is noteworthy they were stated and combined in a detailed way in a book written about eleven hundred years ago.

Adab literature as the vehicle for universal virtues

The genre of writings in the Islamic world dedicated to *akhlāq* has been called *adab* literature. *Adab* literature calls to universal virtues in the medical profession while using Islamic terms and doctrines.[3] Al-Ruhāwī's *Adab al-ṭabīb* is the earliest extant example of this. A more recent example of *adab* literature is a medical code of

behavior from the Islamic perspective that was synthesized byan international conference on Islamic Medicine held in Kuwait in 1981.

This Kuwait Declaration consists of eleven parts. It incorporates these universal ideas but expresses them through Islamic principles and texts. Another, more recent example of *adab* literature is Arafa's "Ethics of the Medical Profession from the Islamic viewpoint." It lists personal qualities: "sincerity, honesty, truthfulness, compassion and sympathy, patience and tolerance, and humility [3]". In this paper, I refer to the aspects of medical ethics *adab* literature addresses as character ethics.

Islamic Medical Ethics

Islamic Medical ethics with its two branches, character ethics and judicial ethics, comprises a set of moral rules and principles which guide a member of the medical profession as to how to discharge his/ her professional responsibilities, and to what procedures he/she can perform. In Western societies, these rules are based only on human thought and intellect with no role for religion. On the other hand, in Islamic societies, these rules and morals draw their legitimacy from divine guidance. Muslim jurists consider actions permissible or impermissible. They further classify the permissible into the subcategories of obligatory, recommended, neutral (*mubāḥ*) and discouraged.

When the judicial status of an action is unclear, Muslim jurists practice individual and collective rational, logical reasoning (*ijtihād*) within the universal *sharī`a*guidelines and in fulfillment of one or more of its *maqāsid* (objectives) to opine on if it is permissible or not, and whether there are some conditions that are necessary to make it permissible, or on the other hand, circumstances which render the impermissible permissible. These opinions are called *fatāwā*. The objectives of the *sharī`a* are preservation of religion, life (and health), intellect, progeny and resources. This *ijtihād* in the context of medicine can be called judicial medical ethics. Kasule called it medical jurisprudence (*al-fiqh al-tibbi*)[8] and described three stages of its evolution. "During the first period (0 to circa 1370 AH[1951 CE]), it was derived directly from the Qur'an and the Sunnah. In the second period (1370-1420 AH[1951-1999 CE]), rulings on the many novel problems arising from the significant changes in medical technology were derived from secondary sources of Islamic law, either transmitted as analogy (*qiyās*), scholarly consensus (*ijmā`)* or reason (*istiḥsān*, *istisḥāb*, or*istslāḥ*)." Reason was formalized into *istiḥsān* (judicial preference between two or more values), *istisḥāb*(presumption of continuity) and *istslāḥ* (consideration of public interest). These tools, specifically *qiyās*, frequently failed to adjudicate in cases with drastic medical advances on which there were no precedents to draw. This led to the modern era (1420 AH / 1999 CE onwards), characterized by use of the theory of *maqāsid al-sharī'a* (purposes of the law) to derive the opinions. Kasule called this method *ijtihad maqāsidi* (independent judgement based on the purposes of the law).[8]. Kasule stated that this theory has to be supplemented by five major principles ofIslamic jurisprudence:

1. Intention: It requires pure and sincere intention in all medical decisions and procedures.
2. Certainty: decisions are to be evidence-based and not based on subjective feelings. Or at least the evidence is preponderant.
3. Injury: requires careful balancing of the benefits of an intervention versus its side effects
4. Hardship: allows medical procedures and therapies that are normally prohibited if there is a necessity such as saving a life.
5. Custom (*`urf*) or precedent: using generally accepted protocols and procedures [8].

The four principles of bioethics and theIslamic judicial ethics

The significant medical and technological advances of today brought us face to face with new challenging ethical and moral issues. In the secular West, ethicists depend on their individual or collective rational to make the moral judgement concerning these challenges. The most accepted principles used in this regard are those developed by Beauchamp and Childress[9].

These are autonomy, beneficence, non-maleficence, and distributive justice. Autonomy means that a person makes his own decisions about treatment, etc. as long as he understands the different options, benefits and risks.

In effect, he must give informed consent for any test, procedure or treatment. Beneficence means that, whatever the health provider does, its intent must be the benefit of the patient. Non-maleficence is the prohibition of doing harm to others. Distributive justice requires a fair distribution of benefits and burdens. This includes allocations of healthcare resources.

These principles are in general agreement with Islamic principles.These four principles are implied in the Qur'an and *aḥādīth*. Allah says:

We have honored Adam's children. [Glorious Qur'an, 17:70]

A person's divinely enshrined honor bestows the right to make his or her own decisions and choices (principle of autonomy).

Prophet Muhammad is reported to have said, "The most loved of people in the sight of Allah are those who are the most beneficial to others" [10]. This is termed beneficence in our lexicon of today.

A *ḥadīth* says: "No harm or reciprocating harm" [11]."Even in the case of being harmed, Islam advises not to reciprocate harm for vengeance [12]."An Islamic principle states that "every action that leads to harm or that prevents a benefit is forbidden". One of the Islamic jurisprudence axioms is: "Avoiding harm takes precedence over bringing good." If one expects an action to result in a similar amount of benefit and harm, one should avoid the action. If, however, the expected benefit outweighs considerably the expected harm, then one could proceed [12]. These instructions represent non-maleficence.

Muslims consider justice to be a foundational principle. Allah says:

If you judge among people, judge with justice. [Glorious Qur'an, 4:58]

In a *ḥadīth*, Prophet Muhammad quotes his Lord:

Verily I have made oppression unlawful for Me and for My servants too, so do not commit oppression [13].

In fact, three of the four principles developed by Beauchamp and Childress [9] are found in one passage of the Qur'an [16:90] cited above. "Commands justice" may be compared to distributive justice. "Liberality with relatives" connotes beneficence, and forbidding "evil" connotes non-maleficence.

Based on the above, it appears that these four principles of Beauchamp and Childress are in general agreement with Islamic principles. In fact, Askoy and Elmali state that these principles "are being applied in Islamic traditional and cultural societies" [14].

However, there are differences in interpretation and application of autonomy in particular. In Islam, it is permissible to override a patient's refusal of critical treatment that could save his life, such as blood transfusion in the face of uncontrollable hemorrhage. Saving a life is a more important goal than respecting autonomy.

On the other hand, it may be possible to abide by the patient's choice even if it is not in his best interest.For example, the patient may choose a treatment that the physician thinks is inferior to the treatment the physician recommended.

Also, respect for autonomy (of the patients) is overruled by a beneficent action in situations where the public safety (health) is jeopardized. One can prefer the beneficial effects of a decision within a community over the autonomy of an individual(s) such as preventing the spread of an infectious disease by imposing restrictions on the individual(s).

Muslim patients like to and should be allowed to consult with their family members or religious leaders regarding their treatment and follow their advice. "In the context of research, women around childbearing age are oftentimes encouraged to consult with and obtain consent from their spouses and family before participating in research as subjects, given the priority of the familial unit over the individual self [15]."

Van Bommel stated that "For a Muslim patient, absolute autonomy is very rare, there will be a feeling of responsibility towards God, and he or she lives in social coherence, in which influences of the relatives play their roles. [16]"

A Muslim physician, out of concern for the patient, will sometimes advise avoiding behavior detrimental to health and well-being [12], in effect negating his autonomy.

In a recent paper, Mustafa wrote "although the underlying essence of an individual's autonomy is something which can be said to be intrinsic to the Islamic faith, the practical outward manifestations with relation to public interest, and the ultimate view of the human being's subservience to God contrast significantly with the Western philosophical model" [17]. Several publications provide a more detailed discussion of the place of autonomy in Islamic discourse [12,14-8].

ISSN 2634 8071

Recent Activity in the Field of Islamic Medical Ethics

Muslims can reach answers relating to the acceptability and utilization of the new medical advances based on Islamic teachings through the methods described above [8]. There have been many attempts to resolve these questions through plural *fatwas*. Conferences of physicians, scientists and religious scholars from different countries and schools of thought have been organized to achieve that goal.Examples of these are meetings organized by al-Azhar University, Cairo, Egypt [19], The Society of the Islamic Medical Sciences, Amman, Jordan[20], and the Islamic Organization of Medical Sciences (IOMS), Kuwait [21,22]. The proceedings of many of these conferences have been published. Similar conferences have been arranged in USA by the Islamic Medical Association of North America (IMANA) [23] and the Initiative on Islam and Medicine [24]. The Federation of Islamic Medical Associations (FIMA) has published yearbooks in a series entitled "Encyclopedia of Islamic Ethics" since 2011 [25].In addition to such conferences, several books have been recently published such as *Islamic Perspectives in Medicine* [26], *Islamic Biomedical Ethics: Principles and Application* by Abdulaziz Sachedina [27],*Islamic Bioethics: Problems and Perspectives* by Dariusch Atighetchi [28],*Medical Ethics: An Islamic Perspective* by Mohammad Iqbal Khan[29] and *Medicine and Shariah: A Dialogue in Islamic Bioethics*, a collection of articles edited by Aasim Padela [30] .Presentations were made, and papers were published [31-6].

Discussion of these modern ethical issues is beyond the scope of this paper, but examples of the issues discussed includebrain death, beginning and end of life, living wills, organ donation and transplantation, euthanasia, termination of pregnancy, assisted reproductive technologies, stem cell research and cloning [31-3,35-6].

Muslim physicians are getting more involved in clinical research. Past experience of abuse of humans included in medical research has prompted many international organizations including Islamic medical organizations to establish ethical guidelines for clinical research. The evolution of this subset of medical ethics has been described elsewhere [37].

Acknowledgements

The author declares that he has no competing interests and there was no funding to support the work.

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Journal of the British Islamic Medical Association

Ethics
Vol 12 - No. 4 | December 2022 | www.jbima.com
ISSN 2634 8071

Organ Transplant in Islam

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Keywords: *Islamic bioethics, organ donation, transplantation*

Preamble

In this paper, we discuss organ transplantation and its benefits as well as its permissibility in the Islamic faith. Due to advances in science, technology, and modern medicine, lives can now be saved by organ donation and transplantation. In this paper, we answer common questions regarding organ donation, the medical benefits of organ transplantation and the Islamic viewpoint on this issue. We have kept this paper as concise as possible while covering the most essential aspects of this issue and have addressed key critical points related to the subject.

What is organ donation?

Organ donation involves giving a healthy organ to a person who is suffering due to advanced organ damage from various diseases. The donor can be a living or a deceased donor for kidney and liver transplants. However, for other organs namely, heart, lung, pancreas, and bowel, the donation happens only after the donor is declared dead as they cannot continue to survive without these vital organs.

What are the medical benefits of organ transplantation?

Organ transplantation is one of the greatest miracles of modern medicine. In the last 50 years, there have been tremendous advances in the field of organ transplantation

with improved life expectancy and quality of life for millions of people around the world. For instance, the kidney is an essential organ which is necessary for removal of excess water and toxins and to maintain electrolyte balance in the body. Patients with end stage kidney disease cannot live without kidney replacement therapy either in the form of dialysis or a renal transplant. Although dialysis is necessary for many patients with ESRD to continue to live, it significantly reduces their quality of life, overall health and life expectancy. Of patients who remain on dialysis, more than 50% will not survive five years. According to data from Canadian Organ Replacement Registry, there were 23,125 dialysis patients in Canada in 2019. A kidney transplant offers freedom from dialysis and significantly improves quality of life and life expectancy. In one study, the projected life expectancy of patients who received a transplant was 17.2 years, compared to 5.8 years in patients who remained on dialysis (1).

The heart is another essential organ necessary for pumping blood to the lungs and to the rest of the body. Patients with end stage heart failure experience shortness of breath, swelling, fatigue and eventually death. A heart transplant is usually the last option for these patients who have failed medical procedures or other therapies. A heart transplant comes from a donor who has recently died. The recipient's own heart is removed and replaced by the healthy donor heart. Worldwide, about 4000-4500 cardiac transplants are performed every year. At 1-year post heart transplant, 91% of patients are still alive, and the average life expectancy is 12 to 13 years post-transplant. Without a heart transplant, the 1-year survival of end stage heart failure patients is only about 64%. A cardiac transplant is truly a lifesaving intervention for these patients and improves both quality and quantity of life (2,3).

The liver is an essential organ as well; with many functions including metabolism, detoxification, protein synthesis, storage of iron, and production of bile responsible for digestion. Patients with end stage liver disease experience jaundice, edema, swelling of their abdomen (ascites) and severe gastrointestinal bleeding. A liver transplant is usually the last option for many of these patients without which they would not survive. According to data from the Organ Procurement Transplant Network (OPTN), patient survival was 87% for patients who received a liver transplant from a deceased donor and 92% for those who received a transplant from a living donor.

The lungs are another essential organ responsible for breathing, thereby providing our bodies with oxygen and removing carbon dioxide. A lung transplant is a lifesaving operation in which either one or both diseased lungs are replaced by a healthy single or dual lung from a deceased donor. Like the other forms of organ transplant, a lung transplant improves recipient quality of life, as recipients can function with less shortness of breath and better activity tolerance. A lung transplant also improves life expectancy for patients who have conditions such as pulmonary fibrosis and cystic fibrosis (4).

Organ transplantation is a lifesaving intervention and provides improved quality of life and life expectancy (5). According to the Canadian Organ Replacement Register (CORR), there were 3,014 organ transplants done in Canada in 2019 and 58% of which were kidney, followed by liver, lung, heart and pancreas transplant. There are over 4,300 patients in Canada waiting for an organ transplant, and about 250 people die each year before they ever receive one. One deceased donor can save the lives of up to 8 people on the waiting list. In summary, there are tremendous medical benefits of organ transplant and organ donation should be promoted and encouraged in our communities.

Is organ donation permissible in Islam?

Muslim scholars have studied the issue of organ donation over the past 5 decades. A number of Fatwas or legal rulings have been issued by a number of organizations (6-10). The majority of the scholars are in agreement that organ donation is permissible in Islam in order to save the life of the recipient under specific conditions.
The Quranic verse, "**Whoever saves a life of one person it would be as if they save the life of all mankind**" Chapter 5, verse 32 emphasizes the great value placed on saving the life of another human being.

Most scholars hold the opinion that organ donation is permissible given the following conditions: [1]

[1]Based on the verdict of the International Islamic Fiqh Academy, Saudi Arabia, February 1988. This opinion is based on the well-established legal principle '*necessities overrule prohibitions*. 'They also point to the Qur'anic verse: "Whoever saves a life of one person it would be as if they saved the life of all mankind." (5:32) The following are some of the local and international institutions which have issued legal opinions (fatwas) for the permissibility of organ donation in Islam:

• The Canadian Council of Imams (Toronto, 2008)

- The recipient requires the organ for survival
- An organ donation from a living person is permissible only if harm to the donor is negligible or relatively minor in that it does not disrupt the life of the donor.
- The donor is fully aware of all consequences of the donation to his/ her health and wellbeing
- The donor is freely and willingly consenting to the donation of the organ without any coercion or force.
- Vital organs are only donated after the death of the donor
- The organs are not being bought or sold
- Deceased organ donation and transplantation of all organs and tissues is permissible except for the gonads (reproductive glands).
- The recipient requires the organ in order to live or in order to perform an essential function.
- The donor's body, whether living or dead, is respected and treated with dignity.

Who makes the decision to donate an organ?

A living person can consent to donating a non-vital organ after fully understanding the risks and benefits of organ donation. Donation of vital organs can only take place after the donor is deceased. In this situation the consent must be given by the appropriate family member or representative of the patient. Hence, it is recommended for everyone to prepare a will with clear instructions and state their consent to donate organs to the executor. This provides an Islamic and a legal obligation for the heirs and relatives to execute the will regardless of differences of opinions among them and eliminates the need to discuss the issue at the time of grief and mourning. In addition, people who are interested in deceased organ donation are encouraged to register as organ donors online. Please visit website: (beadonor.ca).

When can organ donation take place?

Organs such as the kidney and liver can come from a healthy living donor who has made the decision to donate an organ to a family member, friend or even stranger. This decision must be free of coercion, manipulation, or financial incentives. Following completion of all necessary medical testing and clearance by the transplant team, the donor can proceed with the organ donation surgery. With regards to deceased donors, after exhausting all efforts possible to save the life and after the responsible physicians have pronounced the patient dead, the process of organ removal may take place.
Patients who die from severe brain injury after being placed on a ventilator in an intensive care unit constitute the majority ofdeceased organ donors. Once vital centers in the brain are damaged due to brain injury, life becomes impossible. Others who do not die in the hospital can become tissue donors (11).

When can the organs be removed from a deceased donor?

The organs can be removed after irreversible circulatory or irreversible neurologic death has been confirmed. In 1982 the Senior Scholars Council in Saudi Arabia approved brain death as the criteria for withdrawal of life support and for organ donation. This was affirmed in 1988 by the Islamic Fiqh Academy of OIC (7).
The organs can be removed after irreversible neurologic death has been confirmed and the heart has stopped (9).

What is transplant tourism?

Transplant tourism involves travelling to another country to buy an organ for transplant. Transplant tourism is not permitted in Islamic Law and there is consensus that it is not permissible to buy or sell human organs for the following reasons:

1. According to Islamic law, the human body and organs belong to Allah SWT (God Almighty) and it is not permissible to buy or sell that which is not owned.
2. Human beings are to be treated with dignity and respect and buying or selling human organs violates human sanctity and dignity. God Almighty says in the Holy Quran, "**Verily we have honored the children of Adam and we carried them in the land and the sea**

• The International Islamic Fiqh Academy of the Muslim World League, which comprises of scholars from around the world

• The Fiqh Academy of the Organization of Islamic Conference (representing all Muslim countries)

• Al Azhar University, Egypt

• Saudi Arabia's Council of Senior Ulema (Islamic scholars)

• The International Islamic Conference held in Malaysia

• Fatwa Committees in Jordan, Kuwait, Egypt and Algeria. February 1988.

and We provided for them from what is pure and we have favored them over most of what We have created, with definite preference. (Chap. 17, V.70)
3. Organ donation is only permitted out of necessity and it is not permissible to engage in organ procurement for financial gain. This ruling is consistent with the principle of preventing harm (*saddu al-dhara'i'* سد الذرائع) as transplant tourism may lead to vulnerable people selling their organs without consideration of their own health. It may also lead to genocide of an entire nation for the purpose of financial gain.

In Canada it is illegal to pay for an organ or receive payment for it. The organ may have been forcefully removed from a person who was killed, manipulated, or coerced for this vital organ. Transplant tourism is not permissible in Islam.

Not only is transplant tourism unethical and religiously impermissible, there are significant medical risks to both the donor and recipient. One study on transplant tourism from Pakistan showed that paid donors have higher rates of hypertension, declining kidney function and hepatitis, compared to people who donate through legal and ethical means (12). In addition, these donors are usually very impoverished, uneducated and are deceived into donating their organ. The majority of donors do not receive the agreed upon financial compensation. Most donors also report that their health and financial position declined significantly after the organ donation and that they were no longer able to work in labour jobs after donating their organ (13). With regards to patients who receive organs through organ trafficking or transplant tourism, they suffer significantly higher rates of infection, hospitalization and transplant failure (14).

What is Forced Organ Harvesting?

Today we are living in unprecedented evil times. We are witnessing the mass abuse of advanced medical technology in the criminal practice of forced organ harvesting. Forced organ harvesting involves murdering a person in order to forcefully remove their vital organs. This is the most heinous crime against a person. The blood of a human being is sacred in Islam. The Quran states "**He who killed a human being without the person being guilty of killing another or of spreading tyranny in the land should be looked upon as if he has killed all of mankind**." (Chap. 5, verse 32)

Where is forced organ harvesting happening today?

Recently, the China Tribunal chaired by Sir Geoffrey Nice concluded that "In China forced organ harvesting from prisoners of conscience has been practiced for a substantial period of time. Commission of Crimes against Humanity against the Falun Gong and the Uyghurs has been proved beyond reasonable doubt" (15).

Furthermore, a 2022literature review and analysisof 2838 Chinese-language papers on organ transplantation strongly suggests that in the People's Republic of China, physicians have participated in the execution of prisoners by organ removal (16).

What should we do to stop forced organ harvesting?

We must raise awareness about this horrific crime and ensure that people do not travel to receive an organ which may have been taken by murdering an innocent person.

Prophet Muhammad (Blessings & Peace be upon him) said about taking action when witnessing wrongdoing: "whoever amongst you sees an evil action, let him/her change it with his/her hand, if he/she cannot then with his/her tongue and if he/she cannot then with his/her heart- and that is the weakest of faith" (Muslim)

Fiqh Majlis of Canada
المجلس الفقهي الكندي
FiqhMajlis.ca

Statement on Organ donation in Islam

Toronto, June 10, 2021

In the name of Allah, the Most Gracious and the most Merciful

May Allah's Blessings and Peace be showered on His Prophet Muhammad and his family and those who follow his path.

Based on the attached research paper (Organ Transplant in Islam) prepared by members of our Fiqh Majlis and after review and discussion of the many deliberations made by many reputable Islamic jurisprudence bodies and also after consultation with our medical experts, the Majlis determined that:

1. Organ transplantation is permissible in Islam but only for dire necessity as it saves lives of those in desperate situation and threatened by death so long as there is no harm to the donor and the recipient, no coercion to do so and no organ is bought or sold but only donated with consent.
2. Organ transplant alleviates pain, improves quality of life and saves many lives as per the Quranic recommendation
3. Many Islamic legal maxims, rules and principles support organ donation and transplantation such as (Necessities overrule prohibition الضرورات تبيح المحظورات), (Harm must be eliminated الضرر يزال) and more…
4. Organ donation is encouraged based on the above stated guidelines in this research paper and we encourage Muslims to become registered donors and have their consent clearly stated in their wills.

Signed: _____
Dr. Muhammad Iqbal Al-Nadvi
Chairman, Fiqh Majlis of Canada

This meeting was attended by:

Shaikh Abdalla Idris – Dr. Hamid Slimi – Dr. Jamal Taleb – Dr. Muhammad Iqbal Al-Nadvi

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Journal of the British Islamic Medical Association

Ethics

Vol 12 - No. 4 | December 2022 | www.jbima.com

ISSN 2634 8071

When does Ensoulment occur in the Human Foetus ?

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Keywords: *Islamic bioethics, Informed consent, Porcine mesh, Hernia repair, biologic mesh, Muslims*

Abstract

The debate related to legal permissibility of abortion in Islam tends to revolve around three fundamental concerns. The first, related to the staging and what is observed of human form of the foetus, the second, the relationship between this human form and ensoulment, and the third, how we interpret the verses of the Qur'ān which informs us about topics which we identify with 'science'. This article will present important arguments and their responses, sourced mainly from the Islamic legal tradition, and will conclude that it is incorrect to assign ensoulment to just after 40 days (6 weeks) of gestation from conception, rather the 120 days account is to be maintained.

Introduction

Majority Muslim scholars of the earlier formative period associated high moral status to the manifestation of *human form* (*takhlīq*) in the foetus. They identified that the Ādamic human form was what distinguished man from others and was the point at which high moral status was ascribed. They claimed that human form occurs after *muḍghah* stage, i.e. after 120 days from fertilization, having deduced this from the Prophetic tradition based on when human features like head, limbs etc are visible, and hence moral importance is given- as this is the time of ensoulment. [1][2][3][4]

Ensoulment occurs after *muḍghah* stage according to what is interpreted from the Qur'ān. This is explained as being after the bone and flesh stage, after which, this foetus is now another creation- in other words ensoulment.

"And verily we did create man from a quintessence (of clay). Then we made it into a nuṭfah in a place of rest, firmly fixed. Then we made the *nuṭfah* into an *ʿalaqah*. Then of that *ʿalaqah* we made a *muḍghah*. Then of that *mudghah* bone and then, clothed the bones with flesh. Then we developed out of it another creation, *khalqan ākhar* (by breathing life into it). So blessed be Allāh, the Most Marvellous Creator." [Q. 23:12-14]

Muslim Scholars agree that *khalqanākhar* (another creature) refers to a human person due to ensoulment. The foetus develops physical human features only after these stages. So, when physical human features become visible i.e. after clothing of bone with flesh, then we know that the foetus has reached this stage and is ensouled.

More recently, because of advanced ultra-sonographic imaging, it is known that the human form is visible at 6-8 weeks, this approach is now questioned. Does that suggest that ensoulment is therefore after 6 weeks? The response to this question holds a lot of importance because many questions of *fiqh*, substantive Islamic law, that relate to the permissibility of abortion, inheritance, the waiting period for a widower, the funeral and burial rights of an aborted foetus, depend on the time of ensoulment and the witnessing of the foetal human form *(takhlīq)*.

This essay, which is a summary of a much more detailed article written by the author [5], will discuss three main topics. The first, is regarding human form, and how this relates to ensoulment. The second, how classical Muslim jurists related the concept of *takhlīq* (human form) to moral status of the embryo, and how they differed. Third, how we should approach the hermeneutics of the Qur'ān related to embryology, when reconciling with today's science,in order to deduce important ethico-legal questions like abortion. Readers will benefit from the depth of this discussion. In particular, the focus will be on *takhlīq* and ensoulment, and how they tie in with the science of embryology.

Human Form (*Takhlīq*) and its Relationship to Ensoulment

Ensoulment is claimed to occur after 120 days and this is the expressed and agreed upon opinion of all classical Muslim scholars. [6][7][8][9][10][11] More recently, there are those who argue, on the basis of the embryo manifesting physical human features and form just after 40 days, that ensoulment occurs just after 6 weeks gestation. [12]

There are a few early Muslim scholars who argued forty days from conception for completion of *muḍghah* stage, such as the likes of Ibn Zamlakānī, the Syrian Shāfiʿī scholar (d. 727 AH) and some of the later period scholars and commentators who were advocates of the ḥadīth of the companion of the Prophet (ﷺ), Ḥudhayfah bin Asīd that the fashioning (*al-taṣwīr*) and creation of human form (*takhlīq*) are likely to occur at the end of forty days, forty two days or forty five days. Yet, none of them expressed disagreement with ensoulment occurring at the agreed period after 120 days. [8]

The ḥadīth of Ḥudhayfah bin Asīd:

> ʿAbd Allah Ibn Masʿūd reported: Evil one is he who is evil in the womb of his mother and the good one is he who takes lesson from the (fate of) others. The narrator came to a person from amongst the Companion of Allah's Messenger (ﷺ) who was called Hudhayfa b. Usayd al-Ghifārī and said: How can a person be an evil one without (committing an evil) deed? Thereupon the person said to him: You are surprised at this, whereas I have heard God's Messenger (ﷺ) as saving: When forty two nights pass the *nuṭfa,* God sends it the angel and then (*fa*) gives it form and creates his sense of hearing, sense of sight, his skin, his flesh, his bones, and then says: My Lord, would it be male or female? And your Lord decides as He wills and the angel then puts down that also and then says: My Lord, what about his age? And your Lord decides as He wills and the angel puts it down. Then he says: My Lord, what about his livelihood? And then the Lord decides as He wills and the angel writes it down, and then the angel gets out his scroll of destiny in his hand and nothing is added to it and nothing is subtracted from it. (*Ṣaḥīḥ Muslim*)

Muslim jurists saw *takhlīq* to be a somatic observable sign of the time when ensoulment occurs. *Takhlīq* was thought to occur after 120 days and this was because of their understanding and literal interpretation of the ḥadīth of companion of the Prophet (ﷺ), 'Abd Allah Ibn Mas'ūd, which was taken to relate the *muḍghah* stage completion at 120 days, and then ensoulment. The actual purpose of utilizing *takhlīq* as a somatic sign was to provide some source of physical observable means to indicate that ensoulment has occurred, because the human form is complete after *muḍghah* stage and there was no other way of determining this.

The ḥadīth of 'Abd Allah Ibn Mas'ūd:

> ʿAbd Allah [Ibn Masʿūd] said The Messenger of Allah (ﷺ), and he is the truthful, the believed, narrated to us, "Verily the creation of each one of you is brought together in his mother's womb for forty days in the form of a *nuṭfah*, then (*thumma*) he becomes an *ʿalaqa* likewise (for another forty days), then a *muḍgha* likewise (for another forty days), then (*thumma*) there is sent to him the angel who is commanded with four matters: It is said to him, to write down his actions, *rizq* (sustenance), his life span, and whether he will be happy or unhappy (i.e., whether or not he will enter Paradise). Then (*thumma*) [the angel] blows his soul into him. Verily one of you performs the actions [of the people of Paradise] until there is but an arm's length between him and Paradise, and that which has been written overtakes him, and so he acts with the actions of the people of the Hellfire and thus enters it; and verily one of you performs the actions of the people of the Hellfire, until there is but an arm's length between him and Hellfire, and that which has been written overtakes him and so he acts with the actions of the people of Paradise." (*Ṣaḥīḥ al-Bukhārī* and *Muslim*)

ISSN 2634 8071

It was also acknowledged by classical Muslim scholars that manifest physical human characteristics (*takhlīq*) were witnessed before 120 days and hence some Muslim jurists gradually began differentiating the two; *takhlīq*and ensoulment, on the basis that ensoulment was after 120 days even though *takhlīq* was visible some time before. However, *takhlīq* remained the only practical approach to determine that this period had been reached and hence the two were used interchangeably or sometimes confused as being the same.[13][14][15]

Re-interpretation of ad th

There is no need to rush to do *ta'wīl* (re-interpretation) of Ibn Masʿūd'sḥadīth, to satisfy the position of ensoulment just after 40 days, on the basis that this is when we observe human form of the embryo. This apparent conflict between Ibn Masʿūd'sḥadīth and Ḥudayfah'sḥadīth of 120 and 40 days respectively, has already been discussed and settled by Muslim scholars, even after recognising and observing that *takhlīq* can occur before 120 days. We should follow the expert approach of our classical Muslim scholars before we rush to re-interpret the literal meaning of an unanimously agreed understanding of a very reliable and authentic ḥadīth.[16][17] Even though some Muslim scholars acknowledged that the embryo has subtle human features by 40 days after conception, they still maintained the stages of 40 days for *nuṭfah*, *ʿalaqah* and *muḍghah*, totalling 120 days, because this was clear from the consensus, ijma' of Muslim scholars on the basis of ʿAbd Allah ibn Masʿūd'sḥadīth, relating both the apparent (*ẓāhir*) meaning and the transmitted understanding (*maſhūm*) of the ḥadīth, because this is how it was intended to be understood from the Prophet (ﷺ) and passed from generation to generation. Furthermore, there are many reasons why it is problematic to re-interpret Ibn Mas'ūd'sḥadīth as ensoulment at 40-45 days. [5]

1. We would be giving preference to the meaning of a ḥadīth which has no reference to ensoulment (Ḥudayfah'sḥadīth) over that which has explicit reference to ensoulment (Ibn Masʿūd'sḥadīth)
2. We would be giving preference to the meaning of a ḥadīth (Ḥudayfah'sḥadīth) that is uncertain about exactly when there is fashioning of the embryo (40, 42 or 45 days, nights), a sign assumed by some to indicate ensoulment
3. Multiple levels of *ta'wīl*, interpretation, will be required of different sources, if ensoulment just after 40 days is accepted.
4. There are no supporting reliable narrations which are explicit about all stages of embryological development mentioned in the Qur'ān occurring in the 40-45 days
5. We are accepting a re-interpretation of a ḥadīth (Ibn Masʿūd'sḥadīth) which goes against the consensus (ijmāʿ) of classical Muslim scholars, that the time of ensoulment is after 120 days

Ensoulment is a metaphysical issue which is beyond our comprehension. The time the embryo undergoes ensoulment can only be transmitted through revelation with its associated transmitted meaning and not for scholarly debate. To confuse or conflate this with *takhlīq* is incorrect.

Reconciliation as Proposed by Classical Muslim Scholars

The medieval Islamic jurisconsult, theologian, and spiritual writer, belonging to the Hanbali school of orthodox Sunni jurisprudence, Ibn Qayyimal-Jawziyyah(d. 751 AH), reconciles without agreeing to a reconsideration of distortion of words of the two aḥadīth from the literal. He does this by proposing the following stages of embryological development: [11]

- First stage: the fashioning (*al-taṣwīr*) and creation (*al-takhlīq*), which is predetermined (*al-ʿilmī*) and does not extend to an external physical manifestation
- Second stage: the beginning of covert fashioning (*taṣwīrkhafī*), when it cannot be recognised by sensory perception, in other words, not clearly visible to the unaided eye and can be confused with blood or missing parts of the anatomy during miscarriage
- Third stage: The fashioning can be perceived by senses, meaning the unaided eye, but is not complete
- Fourth stage: Complete fashioning (*tamām al-taṣwīr*), after which it is ready for ensoulment

The second stage occurs as early as 40 days and can be visualised on imaging and is consistent with today's understanding.

The Qur'ān can be shown to refer to embryological development in view of this.

1. Primarily, it describes the '*substance*' of the embryo, with gradual and 'concurrent' "transformation of the property of the substance of the embryo". It is transformed from one form or property i.e.*nuṭfah*, to another i.e. *ʿalaqah*, as it matures from its primitive state (*ghayrmukhallaqah*) to be created in to a matured state (*mukhallaqah*),

2. Then we have the external macroscopic appearance described as '*stages*', where each stage of the embryo is 'successive'. These stages are referred to as the 'consequential' "developmental stages" which are the stages of growth of the embryo from *nuṭfah* stage to *muḍghah*stage, flesh and bone. These stages are of 40 days duration each and total 120 days, which is what is conventionally understood. They represent the time when the *nuṭfah*, *ʿalaqah* and *muḍghah* are complete (*mukhallaqah*) in their form, in readiness for ensoulment which is a staging process and occurs consequentially.

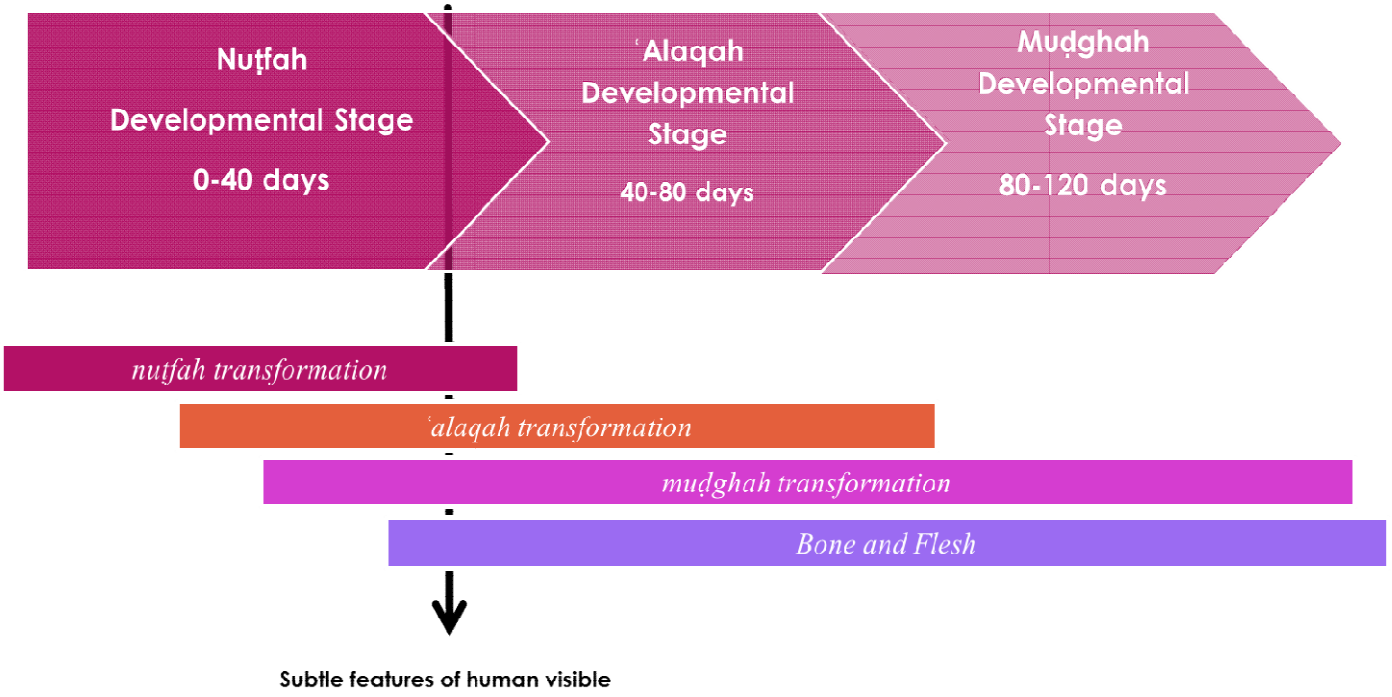

Fig. 1. The developmental stages of the embryo and its substance transformation

Classical Muslim Jurists and Interpretation of *Takhlq*

The process of *takhlīq* evaluation rests on what the exegetes deduced from the meaning of *mukhallaqah wa ghayr mukhallaqah*, literally "formed and unformed." These terms in the verse describe the transformation of the substance of the embryo which matures and then qualifies the threshold for its readiness for ensoulment. The substance of the embryo has to go through the developmental stages of *ghayrmukhallaqah* (unformed) then *mukhallaqah* (formed) to achieve this.

There is a difference of opinion amongst Muslim scholars of what was understood by *mukhallaqah* and *ghayrmukhallaqah*and also when this occurs. There are those, mainly amongst the Ḥanafīs, who describe moral importance at a later stage of development and hence they describe *mukhallaqah* after the *muḍghah* stage having achieved the threshold of *takhlīq* as a normative stage when there is *taṣawwur* (complete fashioning and human manifest form). These two terms (*takhlīq* and *taṣawwur*) were synonymously used to describe the stage during, and after *muḍghah* developmental stage, when there were manifest visible physical human characteristics. By making *mukhallaqah* the state of *taṣawwur* or *taṣwīr* (complete form), they can associate these descriptions to a later stage of foetal development when there is clear manifestation of human form *istibān al-khalq*. The *ghayrmukhallaqah* is the substance which has little moral status, not having qualified this threshold for *takhlīq*. [8][9][18]

Mukhallaqah and *ghayrmukhallaqah* are properties associated with the development of each of the stages of embryological development and describe the level of completeness of each stage. Projections or subtle human features of *muḍghah*, bone and muscle are visible in the *nuṭfah* stage as they are present but not fully formed.

Classical Muslim theologians described a human being as one who has an external and internal complete physical form which is biologically alive with a heart, sensory

organs, a chest cavity, bones, ribs, a liver, and all the organs involved in nutrition. This would then include such a being as a member of the human species. Being a member of the human species accords high moral status and a requisite to FMS (Full Moral Status). The external physical human form may look complete, but the substance of the embryo both externally and internally is yet not fully formed, the flesh and bones being the last. [19] During the incomplete phase, the substance of the embryo, externally, and more importantly internally, is *muḍghah ghayr mukhallaqah*. It is when it has qualified as *muḍghah mukhallaqah*, that it is ready for ensoulment. *Muḍghah ghayr mukhallaqah* does not just relate to the physical substance and hence physical appearance, but it also refers to the nature and property of the substance of the embryo in readiness for ensoulment.

The Approach to Embryology in the Qur' n

Whenever we discuss embryology, we do so in our culture of science. The culture of science encourages individuals to uphold its methods as the main standard upon which we judge and come to know our world. The naturalist scientific modes or method of understanding entails a kind of knowing that moves away from existence and personal experience, something that the Qur'ān appeals to, into a world of concepts. The Qur'ān concerns itself with interpretive hermeneutic understanding, which is rooted in a historical encounter, attaching itself with personal experiences of being here in this world and so relates embryology in a similar way. One that appeals to the people of its time from the time of the Prophet (ﷺ) until the last day. In this hermeneutic interpretation, language is pivotal, because language shapes all situations and experiences that we find ourselves in. Language and understanding are inseparable structural aspects of human-being-in the world. [20] These interpretations move beyond the limitations associated with knowledge constructed purely from the methodologies of the natural sciences- methodologies which rely on a predominantly epistemological and instrumentalist conception of understanding where the *nuṭfah*, *ʿalaqah* and *muḍghah* fit in to a microscopic and reductionistic perspective through the lens of our scientific culture.

It is important to begin to see the way in which our blind attachment to certain classifications and categorizations limit how we may understand and come to know our world from the perspective of those before us and more importantly the limitations of the meanings we take from the language of the Qur'ān. Any interpretation or understanding from a hermeneutic perspective always begins with the interpreter's fore-projections, our fore-projections being a product of our situatedness in the world through a scientific lens. Individuals who possess a limited horizon of natural science have difficulty seeing far enough and may overvalue that which is nearest to them. There is a tendency to do this in our interpretations of the staging of embryology in the Qur'ān, where embryology in the Qur'ān is given a scientific interpretation.

Since man has been able to observe the world through the microscope, science has moved to the position of a methodological reductionism. This is the position that the best scientific strategy is to attempt to reduce explanations to the smallest possible entities. [21] In a biological context, this means attempting to explain all biological phenomena in terms of their underlying biochemical and molecular processes. [22] In this case down to the microscopic level of embryological development.

The dynamic relations among the homogeneous components in the early stages of an embryo that eventually beget a unified whole organism containing heterogeneous parts in appropriate arrangement and connection is a good example of how we have imposed our understanding upon the language of the Qur'ān in light of our reductionist explanation.

The language used in the Qurān allows for different theories of embryological development, accommodating different understandings of knowledge of science throughout time. It is therefore acceptable to translate verses of the Qur'ān in light of our science as long as it doesn't compromise our agreed theological position like the timing of ensoulment.[23]

Nuṭfah, refers to a physical drop of liquid and represents the stage or process of pre-implantation and implantation, as would be seen by the unaided eye, or described to one who does not perceive the world from a naturalist science perspective. It is problematic to limit the meaning of terms, *nuṭfah* or *mā'*. The term *nuṭfah* is therefore used to describe the processes as drops that contain sperm, ovum, zygote and blastocyst. Otherwise, it would make more sense to have used separate terms for each, as they are very distinct from each other - physically, functionally and biologically.[5]
The actual literal meaning of *ʿalaqah* is that of a congealed clot or clot that clings. This would be in line with ancient medics who thought the embryo was a congealed clot of blood which sticks or clings onto human tissues and this description would satisfy that, but

we now know that this is not a clot and what is being described is the miscarried embryo as witnessed with the unaided eye or that which sticks, clings or hangs and hence the early stage of pregnancy when the embryo grows whilst being embedded into the womb lining via the placenta.[5] The important point being that this is how that stage can be described visually.

Conclusion

These stages of embryological development are named as a result of their physical properties, as observed by the naked eye and more in line with how earlier scholars would have described them. Our advancements in embryological knowledge view and perceive embryology at a microscopic level and hence we begin to interpret these words in this sense, which is not always what is intended by the Qur'ān. Important stages which refer to descriptions of the essential properties of that which is visible with the unaided eye is related in the language used in the Qurān allowing for the application of different theories and hence accommodating such understandings throughout generations.

The foetus must pass a number of stages before it is ensouled and that is in relation to conscious thoughts (*idrāk*) that make a 'human being' (related to form) a 'human person' (related to higher brain functioning). Life of personhood only enters the body when the soul enters, and this is after fashioning.

The foetus may show movement before 40 days. However, ensoulment is after 120 days. These movements before 120 days are not associated with the soul and are not voluntary movements (*harakatan zātiyatan ikhtiyāriyatan*) but are involuntary and reflexes (*harakatanʿāriḍatan*).

In conclusion, there is a need to revise our fiqh of abortion and other related legal and normative queries to accommodate the earlier observation of *takhlīq*. There is a need to explore the fiqh literature in much more detail and provide explanations and practical approaches which will support and inform on prospective policy issues related to abortion and its legal permissibility.

The Diagrams below summarises the outcome of the paper in both tabular and visual form [5].

<table>
<tr><th>Times of Takhlīq according to different schools</th><th></th><th>Nutfahsubstance development</th><th>ʿAlaqah substance development</th><th>Muḍghah substance development</th><th>Bone and flesh</th></tr>
<tr><td>Fertilization</td><td rowspan="4">Nutfah
Developmental Stage</td><td rowspan="4">GhayrMukhallaqah

Mukhallaqah</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Implantation</td><td rowspan="3">GhayrMukhallaqah

Mukhallaqah</td><td></td><td></td></tr>
<tr><td>Malikī Position of Embryo now Human Being</td><td rowspan="8">GhayrMukhallaqah

Mukhallaqah</td><td rowspan="8">Unformed bone and flesh</td></tr>
<tr><td>40-45 days Post Fertilization</td><td rowspan="4">ʿAlaqah
Developmental Stage</td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Shāfiʿī/ Ḥanbalī Position of Embryo now Human</td><td></td></tr>
<tr><td>80 days Post Fertilization</td><td rowspan="4">Muḍghah
Developmental Stage</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Ḥanafī Position of Embryo now Human</td><td></td><td></td><td>Mukhallaqah</td><td rowspan="2">Formed bone and flesh</td></tr>
<tr><td>120 days Ensoulment</td><td colspan="4"></td></tr>
</table>

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Journal of the British Islamic Medical Association

Ethics

Vol 12 - No. 4 | December 2022 | www.jbima.com

ISSN 2634 8071

Who is in the picture?

Diversity, representation, and clinical photography

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Keywords: *awra, clinical photography, medical textbooks, non-white, Fitzpatrick skin types IV-VI*

Abstract

Growing evidence suggests that images in medical teaching materials could potentially be providing a representation of illness that is narrow and incomplete. Accordingly, this opinion piece will explore implications for under-represented demographic groups. The resulting gulf in health care outcomes, delayed diagnosis, and missed diagnosis are likely to have multiple contributing factors, including poorer access to medical intervention and 'multiple disadvantage'. The lack of diversity depicted in medical textbooks is also a possible contributing factor that could shape the expectation of physicians. As such, this article explores the range of medical illustrations used in popular medical textbooks. The topic of medical illustration and under-representation is of specific relevance to the JBIMA readership. Both cultural and religious reasons are probable for the hesitancy in consenting to photography for educational purposes - due to the concept of *awra* in Islamic tradition. Furthermore, we explore if the lack of volunteers from ethnic groups to be the subject of medical photographs in textbooks could also play a role. Finally, to encourage participation, ethical concerns related to clinical photography are discussed from an Islamic viewpoint.

Background

Unconscious assumptions can play an important role in many aspects of medicine, including the recruitment of future physicians and their journey to qualified status. Accumulating evidence shows that the stereotype of medical doctors is predominantly one of white-males. For example, Freedom of Information requests gathered by the British Medical Journal revealed that white candidates working in London were six times more likely to be offered a job in medicine than black applicants [1]. Such representations are not only unjust, but appear to make medicine less accessible not only for patients of diverse backgrounds but even for students interested in pursuing a career in medicine. Moreover, authors of medical textbooks are becoming increasingly aware that different skin tones are poorly represented leading to inaccurate, in addition to, delayed diagnoses. The editor of the Journal of Visual Communication in Medicine, Erolin, noted that '… an area of growing concern for many students is the apparent gender and race bias still visible in many contemporary anatomical textbooks' [2].

Furthermore, in the 2021 edition of the popular textbook, *First Aid*, the editors reported an internal audit of previous editions. They noted that the illustrations had scarce representation of females, as well as a limited range of skin tones [3]. Additionally, in the 2021

foreword, the authors concluded that the 2020 edition contained 70 illustrations in total - all described as 'male-appearing' and depicting skin tones that were 'pink' or 'light beige' [3]. *First Aid* has consequently committed to including medical illustrators that would show greater gender representation and a wider range of the Fitzpatrick skin typesI-VI [3].

Despite many clinicians and academics being determined to implement significant change, the current lack of diversity is problematic for multiple reasons. First, let us consider the way change is actively hindered. Many industries appear to portray a certain perception about who leads the profession and shapes the future; such leaders are given an image, a so-called *face* – creating a stereotype. Despite demographic facts contradicting expectations, challenging such stereotypes and the existing hegemony can be a slow and difficult process [4].

In the 2008 text *The Changing Face of Medicine*, Boulis and Jacobs observed that since the 1960s the medical profession in the US has attracted significantly more women. The authors argue that this evolution reflects social changes in everyday American society and is multi-directional, in that increased participation changed the industry and adjusted the status and roles of women beyond medicine [5]. The Association of American Medical Colleges (AAMC) revealed that there are now more female medical school applicants than males. However, Michael Dill, AAMC's director of workforce studies, comments: 'If the majority of female physicians are still concentrated in a handful of specialities, then we haven't gotten where we need to be' [6]. Despite these demographic shifts within the medical profession, the so-called face is still male and still white.

In the UK, application data compared over the last 50 years has revealed a trend towards increasing diversity [7]. Moreover, researchers observe that in comparison to other undergraduate disciplines, medicine has greater diversity [8]. However, rising numbers of non-white graduates alone will not lead to meaningful change. A greater problem appears to be the organisational culture, which is fraught with hidden obstacles that hinder progression for non-white clinicians and lead to disciplinary hearings that are disproportionate. In the UK, the General Medical Council has been recently criticised by the British Medical Association for their inadequate support of non-white doctors [9]. Accordingly, to achieve the aim of a medical workforce that represents the population it treats, the NHS has yet to make sufficient progress.

Furthermore, the lack of representation has clinical implications. Within medicine, a lack of visible diversity in healthcare providers has serious and significant consequences for patient outcomes and staff welfare [10][11][12]. Accurately diagnosing diseases for patients of certain ethnic groups, for instance, remains a known problem. This concerning phenomenon is apparent in many disciplines, including psychiatry. In the interpretation of affective disorder symptoms, researchers have observed that in relation to schizophrenia, the diagnosis was applied significantly more frequently to African American men [13][14].

In recent years, academic journals have been examined to reveal the degree of inclusion therein of patients from a more ethnically diverse sample. For example, over 25,000 colour photographs and colour illustrations in leading plastic surgery journals were categorised according to the Fitzpatrick scale and then entered into regression analysis [15]. The analysts reported that only 22% of all images sampled between 1992 and 2017 were from Fitzpatrick skin types IV-VI as opposed to I-III i.e. the vast majority of images depicted white skin tones. Moreover, when the proportion of images used in each academic article was considered, the categories were disproportionate, with non-white skin featuring a mean of 1.6 times per article and white skin 5.4 times [15].

Other areas of medicine in which researchers have established a pattern of increased risk and delayed diagnosis along ethnic lines include dermatology [16], oncology [17], and obstetrics and gynaecology [18]. For example, the occurrence of cancer is generally lower in the UK for non-white individuals [19]. However, outcomes are disproportionally poorer. In the UK, diagnoses for breast cancer appear to be made in later stages for women from ethnic minorities [17]. Moreover, there is evidence that symptoms can be misinterpreted, underplayed, or even ignored leading to deadly consequences. Similarly, the high rates of maternal mortality in women of colour in the UK and USA have been the focus of books, documentaries, and extensive articles and have been termed national scandals [20] [21] [22] .

On the note of significant underrepresentation, scrutiny of medical journals related to breast surgery revealed a paucity of non-white patient images [23]. Likewise, *The Lancet* published a systematic review of publicly available skin cancer images revealing that fewer skin samples were taken from Fitzpatrick skin types IV-VI [24]. This pattern has also been observed in dermatology journals [25]. However, within academia and wider

society, there has been increasing focus on health inequalities and the poor representation of non-white patients has gained attention. Policies have been implemented to improve representation.

Changing the stereotype of a medical doctor from that of someone white and male and representing doctors from a range of diverse backgrounds could make medicine more inviting; especially to other races. The set of assumptions about the race of doctors and patients is pervasive and problematic on multiple levels. Researchers have also observed a recruitment 'snowball effect' in which greater representation leads to increased diversity in the pool of applicants [26]. Consequently, a diverse representation of medical doctors would also increase trust in patients of diverse backgrounds. An increase in patient trust could cultivate greater trust in clinical photography and the use of photographs for medical research and medical textbooks.

Applications of medical illustration and clinical photography

On both sides of the Atlantic, creating medical artwork requires significant training and the professional practice is regulated. In the USA, for instance, the Association of Medical Illustrators (AMI) oversees the accreditation of individual professionals. Training courses in medical illustration, on the other hand, are accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). Similarly, in the UK, medical illustration (drawings and photography) is regulated and professional clinical photographers are provided with extensive guidance. Guidance on inclusion, accessibility, and sensitive working practices, for instance, is provided by IMI, the Institute of Medical Illustration.

The journey towards full inclusivity is acknowledged as an ongoing endeavour and the IMI is open to recommendations from both clinicians and patients. The IMI website states:
We welcome your comments or suggestions for improvements to these guidelines. If you have any suggestions for existing guidelines, or wish to be involved in a working group for any new guidelines, please contact the National Guideline Coordinator, Larissa Lee [27].

Before we move on to solutions, let's take a brief look at the history of medical images. Before the invention of the camera obscura, the main tool available to teachers and trainee physicians was anatomical sketches. Notably, the Association of Medical Illustrators [28] observed that medical illustrations have existed for over 2000 years. In Hellenic Alexandria, Egypt between the 3rd and 4th Century BC, evidence from sheets of papyrus suggests that medical illustrations for teaching purposes were sketched [28].
From the 20th Century onwards medical images took the form of either photographs or drawings. The uses of these images range across various purposes including patient information, medical and anatomical education, scientific communication, professional exhibits, and even for advertising pharmaceutical and medical equipment. Consequently, a vital medium for doctor-patient communication, scientific innovation and disease management has been medical images. Table 1 below summarises some of the purposes for illustrating various anatomical regions in medical teaching materials.

Region	Selected examples of possible reasons
Face	Depicting symptoms of a stroke, illustrating Bell's Palsy, illustrating cleft-lip/ cleft-palate, examples of emotional expressions
Eyes	Illustrating exophthalmos, thyroid eye disease, proptosis, ptosis, orbital tumours, orbital fractures, Marcus Gunn Syndrome, trauma, cosmetic procedures
Upper and lower limbs	Classification of injuries such as lower limb injury from an improvised explosive device, and illnesses such as poliomyelitis
Breasts	Illustrating symptoms of illness and surgical procedures such as: Breast reduction/ reconstruction/augmentation/implant mastopexy/mastectomy/asymmetry/capsulotomy repair • TRAM Flap (Transverse Rectus Abdominus Muscle Flap) • DIEP Flap (Deep Inferior Epigastric Artery Perforator Flap) • Latissimus Dorsi Flap • Gynaecomastia • Breast Radiotherapy Trials
Genitalia	Images of circumcision, potential carcinoma, FGM, Tanner Stages
Thoracic, lumbar and sacral	Illustrating skeletal conditions impacting the spine, especially scoliosis
Abdominal field	Examples of hiatus hernia, commonly occurring sports injuries, illustrations of pregnancy, and images of sites of rare abdominal pain.
All	Surgical photography, images created during theatre to illustrate new techniques, rare conditions, or to assist with teaching
All	Providing visual examples of non-accidental injuries, especially sentinel injuries that clinicians should recognise and possibly document if abuse is suspected

Table 1: A summary of medical illustration

ISSN 2634 8071

A cursory glance at the content that is illustrated in medical textbooks raises ethical questions about the sensitive nature of the images. Although the table is not intended to be exhaustive, it does convey the wide range of medical illustrations students would be expected to encounter during their medical education. From an Islamic medical viewpoint, the use of such images requires addressing some ethical concerns.

Medical Textbooks

A brief review of the literature revealed that general medical textbooks are also experiencing a lack of non-white illustrations. Academic journals are typically published more frequently than textbooks and we would assume that they would be quicker to implement new policies on inclusion. Louie and Wilks [29] appraised images from four popular medical textbooks for students: 1) *Atlas of Human Anatomy, 2) Bates' Guide to Physical Examination & History Taking*, 3) *Clinically Oriented Anatomy*, and 4) *Gray's Anatomy for Students*. In total, 4146 images were classified according to race and skin tone. The study concluded that images in these textbooks followed the approximate racial distribution of the USA: 62.5% White, 20.4% Black, and 17.0% person of colour. Nevertheless, with regard representation of skin tone, these influential medical textbooks showed an overrepresentation of lighter skin tone. The data showed that lighter skin tones were featured in 74.5% of the images, with 21% featuring medium tones and only 4.5% of the medical images featuring skin categorised as dark. Alarmingly, of the six types of cancers commonly occurring in people of colour, the textbooks provided no related images [29].

Moreover, despite observations that many regions around the world are becoming more ethnically diverse, dermatology textbooks rarely feature non-white skin [30]. Such lack of inclusion is deeply concerning because popular medical textbooks are not illustrating the way common skin conditions could present in darker skin. Consequently, in relation to their non-white patients, students may fail to identify acne vulgaris and pityriasis rosea. Furthermore, images of conditions such as erythema dyschromicum perstans which has a disposition associated with race were also rarely featured within the four sampled textbooks. Perhaps more concerningly, another observation found that certain infectious diseases were not represented in all skin tones. Such depiction could potentially create bias in future physicians to associate illnesses, such as syphilis, with patients with darker skin types [30].

Similarly, gynaecology textbooks are more likely to include images of Fitzpatrick skin types I-III, or skin classified as light [31]. An analysis of vulvar conditions (VCs) depicted in major gynaecology textbooks aimed at the medical student market revealed that the images were significantly less likely to include darker skin tones [31]. The alarming trend of bias was apparent yet again with fewer images of VCs but a significantly higher number of images showing infectious conditions in darker skin tones [31].

In summary, there is growing awareness and intention to address the poor representation of clinical images in textbooks and journals. However, the current picture does not represent our UK patients. Such trends are concerning because the images to which medical students are exposed could unknowingly shape their expectations. As a result, later on in their careers, physicians might misdiagnose patients of colour or unconsciously associate them with stigmatising conditions.

Shariah-compliant clinical photography

We now move on to summarise the main ethico-medical issues when it comes to *satr* al-*awra*. As JBIMA largely serves a UK readership, we will provide principals according to the Sunni Hanafi school of thought, as this philosophy has the largest following in the UK. Understanding the Islamic viewpoint on photography is important for HCPs if health care is to improve. Cho et al. [23] highlight the importance of cultural competence for HCPs, 'As surgeons, we have a responsibility to ensure that our trainees are not only technically but also culturally competent and that all our patients feel welcome and well represented by our specialities' [23]. In this section, we will briefly recap and explore the implications of Shariah law regarding medical images. In a nutshell, Muslims who choose to adhere to rules of modesty and rules pertaining to mixed-gender interactions, commonly observe the practice of *'satr* al-*awra'*. Linguistically, *satr* means to cover and *awra* means a secret or a hidden place, in this context meaning parts of the body that require to be concealed.

The main reason for Muslims to observe *satr* al-*awra* is to have the right to cover areas of the body to maintain dignity. Other reasons could include preventing potential embarrassment or preventing covetousness as a result of exposure; which according to Shariah law, are considered to be harmful to a person's spiritual health [32]. The aim of *satr* al-*awra* is also to minimise vanity, and rather than emphasise appearances, the emphasis is placed on people's actions. For simplicity, Shariah law permits

exposing parts of the body for convenience, especially where no harm is expected. Adult Muslim males consider the area of their bodies from the navel to the knees to be the *awra*. By contrast, bearing in mind the difference of opinions, adult Muslim females may consider their entire bodies as *awra* except for the face, hands, and feet. This understanding of the *awra* is a simplification for practical purposes of which clinical photographers need to be aware. The details of the topic of the *awra* can be found in manuals of Islamic Jurisprudence; also refer to Ibn Adam [33].

For clinical photography to be permitted in Shariah law, several factors need to be considered during the decision-making process [34]. Intriguingly, the same concerns are considered during NHS guidance and ethical rules for clinical photography [27]. The key questions related to medical photography from an Islamic viewpoint are:

- Is photography the only effective option?
- What areas of the body are being photographed?
- Will the patient be identifiable?
- Is the photography session, the manner of obtaining consent, storage, and the use of the photographs all Shariah-compliant?

Moreover, the doctor-patient relationship is generally that of a *non-mahram* nature, meaning that the patient and doctor are not blood relatives, nor are they immediate family. The question that arises from such a scenario, therefore, is how much of the body can a Muslim patient expose to non-family members? In this case, to the clinical photographer and to the HCPs who will have access to the photographs. The answer depends on the degree of need to expose particular areas of the body as well as the gender and sexual orientation of anyone looking at the patient. However, the anonymous nature of who will have access to the photographs makes the ethical status somewhat blurred.

Firstly, participating in photographs for a clinical need is acceptable when that is the only option for effective treatment. The permissibility is based on the idea that Shariah law encourages monitoring and maintaining health [35]. Likewise, photography for necessary matters such as passports and other forms of identification is also permitted for the sake of public safety, as well as for forensics to tackle crime [36].

The permissibility of digital photography was questioned by Muslim jurists only in the 19th century after advancements in camera technology [37]. Before that time, since the 7th century, concerns were raised mostly with regard to the permissibility of making sculptures and paintings of humans.

In any case, pornographic art in any shape or form has always been prohibited in Shariah law. Furthermore, describing a person's body to a third party in a manner that sexually objectifies the subject or creates embarrassment for them is also prohibited. Such behaviour includes body shaming, which comes under the general prohibition of mockery and shaming (Qur'an, 49:11). For Muslim patients, therefore, clinical photography needs to follow particular rules and regulations for the patients to be assured that the process is Shariah-compliant.

The ethical rules provided by the NHS and the IMI [27] are strikingly similar to the rules mandated by Sharia law. Accordingly, clinicians can help to ensure that certain measures are in place to minimise the misuse of images as well as minimise any risk or harm to patients. Bearing safeguarding measures in mind, the photographer needs to be reputable and preferably one that meets the requirements of the patient. Moreover, patients are likely to prioritise their dignity, safety, and well-being. As such, Muslim patients may wish to be accompanied by a trusted chaperone. Such measures could also prevent allegations of any inappropriate conduct.

Furthermore, photos should be used for purposes only to which the patient or their legal representatives consented in writing. If a photo contains the *awra,* then the patient should not be identifiable, i.e. the face should not be included in the photo, nor should any other identifiable features. If on the hand, a photo is taken of the *awra* of an unidentifiable patient, then Hanafi jurists have excluded such images from prohibited art [38].

The precedent for such a ruling exists, for instance in the case of an amputated limb of an unidentifiable person. Likewise, Muslim jurists do not consider the reflection of an image to bear the same sanctity as the actual object it represents. Bearing these principles in mind, a clinical photograph is a) not the same as the patient themselves and b) the patient is to remain unidentifiable. The patient must be informed of the purpose of having their photos taken as well as the way their photos and their identity will be protected against any breach of confidentiality. The patient must also have the right to withdraw consent at any time.

ISSN 2634 8071

Conclusion

The stereotype of medical doctors appears to be of white males. Such excluding representations are likely to impact different group members from diverse backgrounds; students seeking a career in medicine may feel less welcome whereas patients may be affected by an inaccurate or delayed diagnosis. Moreover, medical textbooks are currently not representative of darker skin tones leading to poor diagnoses of patients. Although this article is not a meta-analysis nor an exhaustive appraisal, we have used a hypothetical link to help understand a real social problem. Moreover, to improve representation, we encourage more patients to participate in clinical photography. As such, medical textbooks require improvement. Medical illustrations need to be more representative to make medical imaging more accessible for previously and currently less represented demographic groups. New more inclusive and encouraging policies associated with long-term and sustainable improvements could also be considered to allow a representation of a wider range of ethnicities in medical teaching materials.

Underrepresentation of skin tones as well as the misrepresentation of conditions found in darker skin tones affect not only ethnic minorities but clinicians in their practice. Improvements in representation in medical images could begin with doctors making patients aware of ways to participate in and contribute to clinical photography. A key message for the Muslim population needs to be that Shariah law provides scope to have clinical images taken especially when the strictest of ethical protections are applied. Current clinical photography practice appears to be Shariah-compliant. Should more ethnicities consent for their images to be included in education materials, greater representation of ethnicities would be possible, which in turn makes medicine more inviting to all ethnicities as well as allow better opportunities for trainees to treat a diverse range of patients.

Moreover, interviews could also be conducted with Muslim patients to understand their views on allowing photography for medical research and textbooks. Female Muslim HCPs/patients, as well as those from different ethnicities, can make an informed decision about having their photos taken for clinical purposes whilst taking into account Shariah guidelines.

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Journal of the British Islamic Medical Association

History
Vol 12 - No. 4 | December 2022 | www.jbima.com
ISSN 2634 8071

Original Pioneering Medical Islamic Discoveries and/or Inventions (Plagiarized by The West)

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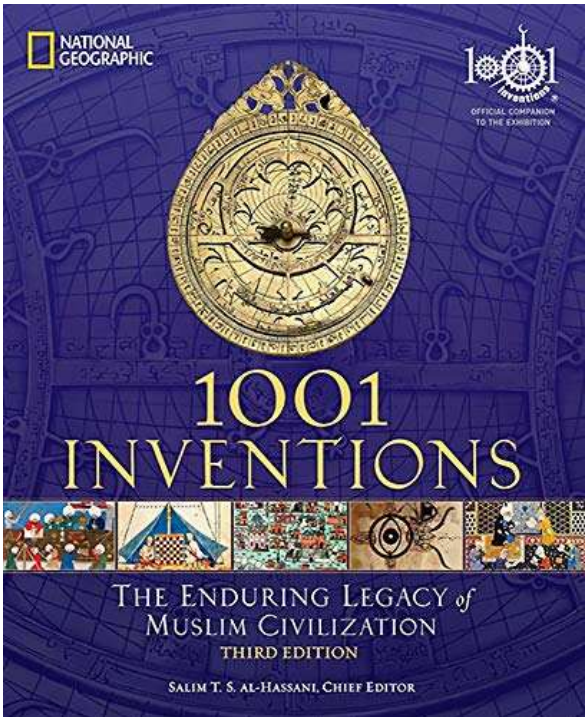
General Introduction

Comprehensive sources for Arabs and Muslim contributions to the Western civilization in science are generally scanty. However, a few excellent general books were written addressing this subject, *alas* incomplete. Examples include:

- **La Civilization des Arabes(the Civilization of the Arabs,** written in French and translated into Arabic, but without English translation) by Gustave Le Bon. 1884.[(1)]
- Gustave le Bon (1841-1931) a French psychologist and anthropologist states in page 126 (as adapted from the Arabic translation): (***Because it is the methodology of Allâh: "Islam, from among all religions, best suits the science discoveries and is the most ready to edify souls and force them to abide by justice, kindness and toleration."***)
- **Influence of Islam on Medieval Europe,** by W. Montgomery Watt (The New Edinburgh Islamic Surveys. 1972) [(2)]
- **The Genius Of Arab Civilization: Source Of Renaissance**, by John S Badeau, Majid Fakhry, Oleg Grabar, *et al*. (New York University Press, 1975) [(3)]

Recently however, and within the last 25 years, an awareness of Western indebtedness to Arab/ Muslim Civilization in science was made publicly, mainly due to the three (3) contemporary sources illustrating the enduring legacy of Muslim Civilization in science:

1. Salim T. S. Al-Hassani an Emeritus Professor of Mechanical Engineering at the University of Manchester. He is President of the Foundation of Science, Technology and Civilisation (FSTC), founder of www.MuslimHeritage.com ; and Chief Editor of **the 1001 Inventions,** touring exhibition, who built as a global education initiative which includes a book, award winning film and teacher's pack.



Edited by professor Salim Al-Hassani
(Now undertaken by National Geography) [(4)]

2. Jameel Sadik "Jim" Al-Khalili CBE FRS (جميل صادق الخليلي; born 1962) is professor of theoretical physics and chair in the public engagement in science at

the University of Surrey. He is a regular broadcaster, commentator, and presenter of science programmes on BBC radio and television. Jim Al-Khalili presented: ***Science and Islam*** (2009) a three-part BBC documentary about the history of science in medieval Islamic civilization, **for which he** travels through Syria, Iran, Tunisia, and Spain to tell the story of the great leap in scientific knowledge that took place in the Islamic World between 8th and 14th centuries (the so-called the **Golden Age of Islamic science**). The series is accompanied by the book '***Science and Islam: A History'*** written in 2017 by **Hassan Ehsan Masood** (born 1967) a British science writer, journalist and broadcaster [(5)].

The 3 Episodes

- "The Language of Science"
- "The Empire of Reason"
- "The Power of Doubt"

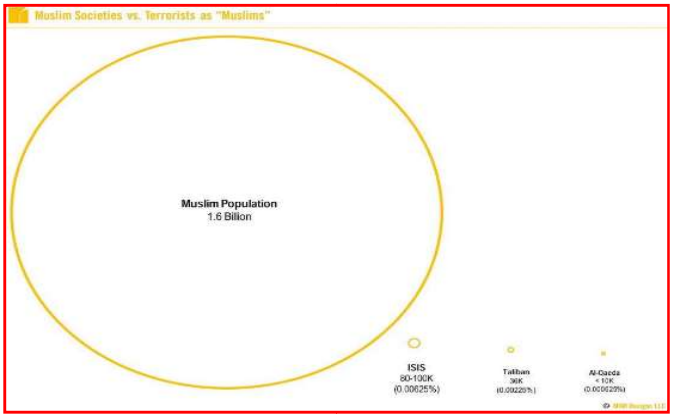
J Al-Khalili also wrote an excellent book (**Pathfinders The Golden Age of Arabic Science** - published by Penguin, 2012) [(6)]

3. Fuat Sezgin (1924 –2018) was renowned worldwide for reviving the works of forgotten Islamic-era scientists. He was a Turkish orientalist, and a ***professor emeritus*** **of the History of Natural Science at Johann Goethe University in Frankfurt (Germany).**Sezgin obtained a PhD from Istanbul University under the German Orientalist **Hellmut Ritter** in 1950. He moved to Germany in 1961 and got married to Ursula (German orientalist) and started working as a **visiting professor at University of Frankfurt**, and was appointed professor at the university in 1965. His research in Frankfurt focused on Islam's Golden Age of Science. In 1982, Sezgin established the **Institute of the History of the Arab Islamic Sciences (IHAIS)** there (He was the founder and honorary director).

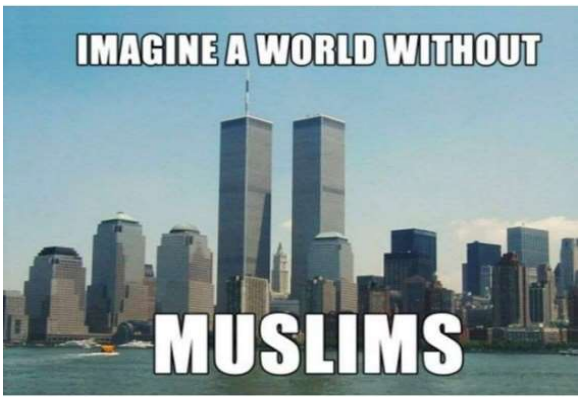
Sezgin also founded a unique museum within the IHAIS at Frankfurt (1983) and in Istanbul (2008), with **more than 800 replicas of historical *Arabic-Islamic* scientific instruments, tools and maps (of the Golden Age of Islamic science).** His best-known publication is the 17-volume work ***Geschichte des Arabischen Schrifttums*** (1967-2000) is the cornerstone and standard reference on the history of science and technology in the Islamic world. Sezgin had argued that Muslim seafarers had reached the Americas by 1420, citing as evidence the inscription on a map and the fact that the high longitudinal precision of early maps of the Americas would not have been attainable using Western navigational technology. When I (the author) visited **Institute of the History of the Arab Islamic Sciences (IHAIS)** at Gulhana Park (Istanbul) [(7)]; I found a beautiful replica of the **first *Earth Globe*** as presented by Muslim scholars to the Abbasid Caliph ***Al-Ma'moon*** on his specific order; together with professor Fuat Sezgin burial site (died 2018, May Allah have mercy upon his soul).

In the wake of World Trade Centre explosion (Sept. 2001), and Paris Attack (Nov. 2015), President Trump comments ostracising Muslims as threat, and brandishing them as terrorists (!) was followed by unprecedented Islamophobia that swept the world, alienating Muslims and shunning any research in Islamic medical history.

However, ***Political Scientist and a University professor*** **Ian Bremmer** of New York has debunked that fallacy [8]; *he highlighted that radical ISIS only account for a negligible 0.00625% of 1.6 billion Muslim population.* To hold a whole population responsible for the actions of a few is ignorant and racist. No one would ever expect Christians or White people to be held responsible for the acts of Timothy James McVeigh (Oklahoma bombing, killing 168 people – 1995), or Anti-Islamic Anders Breivik (Island of Utoya, Norway mass killing of 77 people - July 2011), or Brenton Tarrant (Mass shooting of 51 Muslims during Friday prayer in 2 mosques at Christchurch, New Zealandon - 15 March 2019). Similarly, the rest of the 1.6 billion Muslims have nothing to do with these terrorist incidents (figure).



Furthermore, he wrote a provocative meme or article: (**Imagine the World without Muslims**), the post went viral in no time (figure)



Professor Ian Bremmer, *highlighted many inventions made by Muslims, right from toothbrushes to hospitals.* **Without Muslims you wouldn't have:**

- Coffee
- *Cameras*
- *Experimental Physics*

- *Chess*
- *Soap*
- *Shampoo*
- *Perfume/spirits*
- *Irrigation*
- *Crank-shaft, internal combustion*
- Engines*, valves, pistons*
- *Combination locks*
- *Architectural innovation (pointed arch -European Gothic cathedrals adopted this technique as it made the building much stronger, rose windows, dome buildings, round towers, etc.)*
- *Surgical instruments*
- *Anaesthesia*
- *Windmills*
- *Treatment of Cowpox*
- *Fountain pens*
- *Numbering system*
- *Algebra/Trigonometry*
- *Modern Cryptology*
- *3 course meal (soup, meat/fish, fruit/nuts)*
- *Crystal glasses*
- *Carpets*
- *Checks*
- *Gardens used for beauty and meditation instead of for herbs and kitchen.*
- *Universities*
- *Optics*
- *Music*
- *Toothbrushes*
- *Hospitals*
- *Bathing*
- *Quilting*
- *Mariner's Compass*
- *Soft drinks*
- *Pendulum*
- *Braille*
- *Cosmetics*
- *Plastic surgery*
- *Calligraphy*
- *Manufacturing of paper and cloth*
- ***Indeed:***
- *It was a **Muslim** who realized that light **ENTERS our eyes**, unlike the **Greeks** who thought we **EMITTED rays**, and so Muslims invented a camera based on this discovery.*
- *It was a **Muslim** who first tried to **FLY in 852**, yet it is the **Wright Brothers** who took the credit.*
- *It was the **Muslim: Jabir ibn Hayyan** who is known as the **founder of modern Chemistry**. He transformed alchemy into chemistry. He invented: distillation, purification, oxidation, evaporation, and filtration. He also discovered **sulfuric** and **nitric acid**.*
- *It was a **Muslim**: **Al-Jazari** who is known as the **father of robotics**.*
- *It was a **Muslim** who was the architect for **Henry V's castle**.*
- *It was a **Muslim: Ammar Al-Mawsilli** who invented **hollow needles** to suck cataracts from eyes, a technique still used today.*
- *It was **Muslims** who actually **discovered inoculation**, not Jenner and Pasteur to treat cowpox. The West just brought it over from Turkey.*
- *It was a **Muslim** who contributed to **Mathematics**, invented **Algebra and Trignometry**, which was imported over to Europe **300 years later to Fibonacci** and the rest.*
- *It was **Muslims** who discovered that the Earth was round **500 years before** Galileo did.*
- The American historian 'Olivia Goldhill' in her article: ***(An Arab thinker invented economic theory 400 years before Adam Smith did)*** stated that **Ibn Khaldun** is the one who invented the science of Economics preceding Adam Smith by 400 years [8].
- **In short, we would be nothing without Muslims.**

A Critique:

However, all above writers are in the field of engineering, physics, mechanics, politics, or in the history of science and physics. The medical discoveries and/or inventions mentioned by them (if any) are totally marginalised or rudimentary, because none of them are medical practitioners nor are they specialized in medical history; such medical history is purely based on biographies without the clear inter-connected picture. While the remarkable contributions of Muslims to the evolution of science is now unblemished and well-established in History, there remains a major hiatus or lacuna (gap) in our knowledge and understanding of the history of Arab/Islamic pioneering achievements in Medicine.

Islamic medical history is a fertile field for research which remains unexplored fully. This original article therefore, is in-depth research written with the aim of closing and bridging this serious gap in our knowledge of Arab/Islamic Medical history. This illustrated and detailed account is a fruitful outcome of my life-time research in the history of Medicine and a cumulative wealth of information, travels, lectures to various bodies,

societies, and museums and of many years of publishing of Medical historical articles (nine of my papers were already listed in '***Wellcome Institute of History of Medicine'***). It is probably, the first thorough and comprehensive review (though non-exhaustive) in the field of Medical Islamic history; this **review puts things into perspective**. It sets the scene clearly, acting as a springboard for future expansion in this fascinating field of research.

This account of Muslim achievements and pioneering works in Medicine reveals clearly, that many of their original Muslim discoveries/inventions were later attributed wittingly or unwittingly, to the Western physicians. In legal terms: these Muslim achievements were borrowed, covered-up and subsequently **plagiarized** and owned fraudulently, by the West (legally called: **Theft of intellectual property**).

Arab-Islamic influence on Western civilization in Medicine is a fascinating aspect of history of Medicine. In-depth research (over a 24 year-period: from 1986 to 2012) revealed the extent and magnitude of such colossal influence and its reflection on medical terminology and its ramifications in European vocabulary. This research was crowned by publication of 1500 pages **'Paradise Dictionary'** (in 2 volumes), the first dictionary in the world for English words of Arabic origin [9].

Phases of Evolution of Islamic Medical History:[10,11,12,13,14]

There are myriad routes for Arabic influences on Europe: via the Crusaders, Andalusia, Sicily, Istanbul, commerce and trades, as well as colonial British presence in Middle East and Indian subcontinent. Cultural influence however, can be studied according to 3 phases of evolution of Arabic Medicine:

I. PHASE OF TRANSLATION (directly from Greek into Arabic, Or indirectly from Greekinto Syriac and then from Syriac into Arabic)

Abbasid Caliphs acquired Greek books from Romans and offered the equivalent weight of the translated book in gold to the translator (Naqqal). The famous Doctors of the time: Jurjis Ibn Jibrail, Yuhannah Ibn Masawayh and Hunayn Ibn Is'haq Al-Ibadi, at special request of successive Caliphs in Baghdad: Abu Ja'afar Al-Mansoor (754-775 AD), Haroun Al-Rashid (786-809 AD) and Al-Mamoon (813-833 AD) respectively, undertook the arduous task of translating all Greek books into Arabic on unprecedented scale. **Caliph Al-Mamoon** ordered School of Translation to be attached to the Academy of Baghdad 'BaytulHikma' (House of Wisdom). He appointed **Hunayn Ibn Is'haq Al-Ibadi (808 -73 AD)** as its head. Hunayn translated Galen's books: 'On Anatomical Procedures' of which original Greek **books IX to XV (inclusive)** were totally lost.Arabic Translation was therefore, the **preserving medium**, through which Arabic version preserved the Greek medical knowledge. Furthermore, the **GOLD** changed the fabric of society, so that the **paper bookmakers (*warraqeen*), the writers (calligraphists or *Khatt'ateen*), and the translators (*Naqqaleen*)** became a very rich echelon in the society, coming in status, after **the princes (military leaders), ministers and scholars.**

II. PHASE OF ARAB ORIGINAL CONTRIBUTIONSAND CREATIVE ACHIEVEMENTS

Abbasid Caliphate of the Islamic World with its capital in Baghdad became the centre of Gravity at the time and the centre of scientific radiation of the world. Thus, **'Old World Order' was created circa 700-1500 AD (for 8 centuries) with Arabic being the language of Islam becoming the *lingua franca* of the World.** This **Golden Era of Science** reached its zenith in Abbasid Golden time (for 5 centuries: AD 754 – 1258, also known as the **Golden Age of Islam**) and dominated Europe which was sinking in its Dark Medieval Ages.

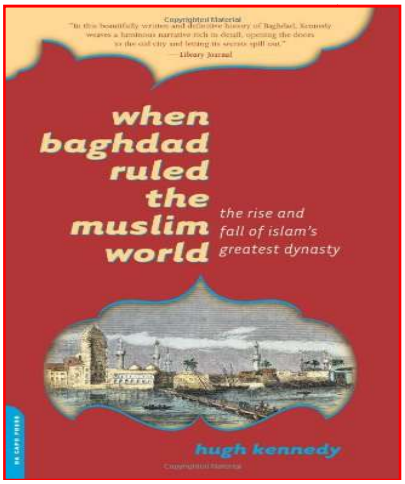
For instance, in Anatomy, the assertion that Islam forbids dissection is untenable; Qur'an states: **"And in yourselves, Can ye then not see? "** Al-Thari'at, verse 21. Monkeys were dissected by Yuhannah Ibn Masawayh in 830; deers by Ibn Tufail in 1185; dead pregnant mothers and dead foeti were dissected by Rhazes and Albucasis. Dead human bodies were dissected by Avicenna (circa 1020) and by Ibn Al-Nafis (1288). Arabs left indelible imprints in many Anatomical terms. In Physiology, Systemic blood movement was described by Haly Abbas Al-Majusi (circa 994) 6.5 centuries before Harvey's description in 1628. Capillaries discovery by Haly and Ibn Al-Quff (1233-1286) 4 centuries prior to M. Malpighi's discovery in 1661. Pulmonary circulation was described by Ibn Al-Nafis (1211-1288) 3 centuries before Michael Servetus report in 1553.

Muslims also pioneered many advances in chemistry, pharmacology, microbiology, and in Food, Nutrition, and Health leaving their legacy behind.
Muslims mastered Medicine and Surgery and manufactured many instruments and invented

'anaesthetic sponge'. Command of anatomy, anaesthesia, antisepsis and instruments made abdominal surgery and Caesarean section feasible events. Furthermore, the Black gown of graduation from the Medical colleges was derived from black Abbasid Aba' as symbol of nobility.

Baghdad being the Capital of Islamic World (**Old World Order**) had become the Centre of international attraction for all scholars from different corners of the world irrespective of their nationality, ethnic background, creed, or religion; they all flourish in Baghdad (the Centre of the World at that time). Progress of Medical Sciences and Excellence of Clinical Practice were not related to Greatness of Muslim Pioneers (Rhazes, Avicenna, Alhazen and others) as much as they are related to **congenial environment in Baghdad**, the capital of Islamic World. Baghdad was simply the magnet and the incubator for **'seeds and soil'** for all Medical and Scientific progress.

Professor Hugh Kennedy in 2006 wrote an excellent book to document Baghdad's leadership of the World [15]



This can explain the term ***Baghdadah*** البغـــدادة as synonym for grandiosity, beauty, and excellence; it also explains the Worldwide Spread of 'Baghdad' name among many cities in the World:

There are about 19 places named Bagdad (without H) or Baghdad in the World:
Eleven (11) cities named 'Bagdad' in USA alone:

Bagdad, Arizona USA
Bagdad, Florida USA
Bagdad, Kentucky USA
Bagdad, Louisiana USA
Bagdad, Pennsylvania USA, 2 cities
Bagdad, California USA,2 cities
Bagdad, New York, USA
Bagdad, Virginia, USA
Bagdad, Washington, USA
There is also, one in each of: Uzbekistan, Somalia, Romania, Mexico, French Guiana, Tasmania (Australia), Afghanistan, and one Baghdad in Iraq.

Because of the establishment of another late Fatimid Caliphate in Egypt and because of the excessive travel of Egyptians all-over the World, and migration of many Iraqi scholars to Egypt (e.g. Ibn Al-Haytham, Ammar Al-Mawsili), Cairo became a popular name too. There are 25 places named Cairo in the world: **19 places named Cairo in America; 2 places named Cairo in Colombia; one place named Cairo in Peru; one place in Italy; one place in Costa Rica, and one Cairo in Egypt.**

Similarly, the Umayyad Caliphate capital Damascus together with excessive travels of Syrians throughout the world, made the name Damascus popular too. **There are 15 places in the World named Damascus**, 13 of which are in America, one in South Africa, and one Damascus in Syria. [16]

III. PHASE OF REVERSED TRANSLATION (from Arabic into Latin, followed by eradication of all Arabic texts, and then removing all Arabic terms by the Humanists. Then Renaissance emerged as European phase in the New World Order).

Most Arabic texts were translated into Latin by famous translators such as:

- **Constantinus Africanus (1020-87) at Monte Cassino,**
- **Gerard of Cremona (1114-87) at Toledo,**
- **Moses Farachi. The latter was a Sicilian Jew who at the order of King Charles of Anjou in 1279,**

undertook the arduous assignment of translating: Rhazes' "*Liber Continens*" (23 volumes) during his lifetime.

In 1085, Toledo fell to Spanish and, Toledo School of Translators and for 4 centuries running, continued to bring vast stores of knowledge to Europe by rendering great academic and philosophical works of Arabic into Latin. Religious intolerance took place after the so-called Spanish Reconquest, which resulted in Inquisition Tribunals (in 1492), with pre-planned programmed deliberate eradication of Islamic/Arabic culture starting with burning of thousands of Arabic books, and ending with expulsions of all Muslims even after their conversion to Catholicism (Moriscos) as well as many *Conversos* and *Marranos* (Jews publicly recanted Jewish faith and adopted Catholicism under the pressure of Spanish Inquisition pressure).

Against this tyranny and religious intolerance, *Conversos* and *Moriscos* exploded in the 1520–1521 ***Revolt of the Comuneros***, a popular uprising in Castile against the rule of King Charles V.

This was followed by the Humanists movement aiming at purifying Medicine and Science by casting out all Arabic terms. In fact, the progress in Western civilisation had begun in 11th/12thcenturies, and was the result of the ***transfer of Arabic civilisation to Europe***.

The 16th century **Renaissance** (meaning Re-birth of Arabic texts, but fraudulently owned by the Europeans) was rather the construction of an exclusive Christian European identity within the world of literature and science. For instance, during this Renaissance period, most medical knowledge was available only in Arabic texts. Andreas Vesalius (1514-1564), the so-called father of modernanatomy dissected human cadavers. Fluent in Arabic, he wrote "***A Commentary on the fourth Fen of Avicenna***", followed by his baccalaureate thesis, "***Paraphraseon the Ninth Book of Rhazes***" in 1537 long before his masterpiece, ***'De Humani Corporis Fabrica Libri Septem***' (Seven Books on Human Body Structure) in 1543.

Latin humanists created a movement imitating the Arab tradition in its key values, but distinguishing itself by classical Latin as its *lingua franca* and the classical authors as its founding fathers. After a period in which classical culture was vigorously celebrated and Arab influences were deliberately removed from the scientific canon, the image of a Greek source of European culture had settled itself firmly in the European mind. Scholars hardly dared cite an Arab in support of their revolutionary developments. [17]

By losing the original Arabic texts, many translated books in Latin were then plagiarised and the authorship were owned fraudulently, by Western scholars. However, many Arabic words escape detection and remained within the infrastructure of medical terminology; **'Paradise Dictionary'** by the author documented that legacy. [9]

This phase in Europe, starts with Columbus' supposed discovery of America in 1492 AD, and is ushered in what is called (**New World Order**) and extends from 1492 AD till now; the Western world (Europe and America) considered **English**, as the ***lingua franca*** of the New World order, followed by French, and Spanish, according to which they classified World nations into: ***Anglophone, Francophone***, and ***Hispanophone*** or ***Hispanic***countries. Currently, however, and after prolonged pressure from Arab countries (especially Saudi Arabia), the six official languages of the United Nations (UN) have now become in this order: **Arabic (Arabophone), Chinese (Sinophone), English, French, Russian and Spanish.**

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Giant Muslim and Arab Doctors with their famous Books in Medicine and/or Surgery[10,11,12,13,14,18]

إسحاق بن حُنين العبادي (مفقود) كتاب صنعة العلاج بالحديد (830-910) Ishac Ibn Hunain San'at Al-IlajBilHadeed (craft of treatment with iron)
الحاوي في الطب Liber Continens (23 Volumes) أبو بكر الرازي (864-935) Abu Bakr Rhazes
جالينوس العرب Galen of Arabs
Kamil Al-Sina'at or Al-Kitab Al-Malaki علي بن عباس (died 994) Hali Abbas
الكتاب الملكي Liber Regius (20 Articles)
كتاب التصريف لمن عجز عن التأليف (كتاب واحد من أصل 30 جزء) أبو القاسم الزهراوي (936-1013) Albucasis أبو الجراحة الحديثة وجراح العرب Father of modern surgery and Surgeon of Arabs
(Al-Tasreef Liman Ajaza An Al-Ta'leef)(30 Vol. encyclopedia)or 'The Clearance of Medical Science For Those Who Can Not Compile It'
Book of Optics (7 Volumes) ابن الهيثم (Alhazen, 965–1040) Ibn Al-Haytham
كتاب المناظر
(The book of choice in ophthalmology) عمار الموصلي (996-1020) Ammar al-Mawsili
كتاب المنتخب في علاج أمراض العين
Al-Qanon Fil Tibb (Canon in Medicine 3 Volumes) ابن سينا (980-1037) Avicenna
أمير الأطباء القانون في الطب Prince of Physicians

Avenzoar (1094-1062) ابن زهر	Al-Taisir Fil Mudawat Wal Tadbir (2 Volumes)
	التيسير في المداواة والتدبير
Averros (1126- 1198) ابن رشد	Kitab Al-Kulleyyat Fil Tibb (1 Volume)
Philosopher of Arabs فيلسوف العرب	كتاب الكليات في الطب
Ibn Al-Nasfis (1288 -1213) ابن النفيس	Shar'hTashreeh Al-Qanon (1 Volume)
	شرح تشريح القانون مكتشف الدورة المويةالصغرى (الرئوية)
Ibn Al-Quff (1286-1233) ابن القف	Al-Omda Fi Sina'at Al-Jiraha (2 Volumes)
	العمدة في صناعة الجراحة
Ibn Abi Usaybia (1269-1303) ابن أبي أصيبعة	Uyun Al-Anba' Fi Tabaqat Al-Atibba' (1 Volume)
	عيون الأنباء في طبقات الأطباء

Journal of the British Islamic Medical Association

Advocacy
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Barriers to mammography amongst Muslim Women in the UK

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Keywords:Muslim women, UK, barriers, mammography, breast cancer screening

Presented as a poster in the BIMA National Conference on 5.11.2022

Abstract

BACKGROUND: The most recent ONS data on Covid-19 showed Muslims to have the highest mortality risk of all groups in the UK, validating religion as an important, but frequently overlooked health determinant. Amongst the Muslim population, gender inequalities result in Muslim women in particular being one of the most vulnerable population groups, with several studies drawing attention to the substantially poor uptake and barriers of breast screening mammography amongst ethnic minority Muslim women. Importantly, more than 90% of Pakistanis and Bangladeshis in the UK are Muslim. Covid-19 has further amplified the barriers for these populations and need addressing to reduce inequalities nationally.
AIM: This narrative review subsequently aims to summarize the barriers to mammography screening in Muslim women in the UK.
METHODOLOGY:A literature search was conducted on Medline and PubMed to identify relevant studies. A strict inclusion and exclusion criteria resulted in exclusion of any studies on mammography that did not have Muslim women in the population group. A thematic analysis of studies that met the final inclusion criteria was conducted and collated into a narrative review, organised by common barriers to mammography amongst Muslim women.
RESULTS:10 main themes were extracted, as follows: access to healthcare, fatalism, a preference for gender concordant healthcare, perceived importance of mammography, lack of English language proficiency, modesty, family caring patterns, reliance on traditional healing practices, low income and finally a lack of trust in doctors.
CONCLUSION: This review provides critical insight into Muslim women's intersectional experiences and the unique role that religious belief systems and cultures may play in women's engagement with breast cancer screening. As well as highlighting deficits in the current breast screening programme in engaging and making the programme accessible to Muslim women. The review signposts a need to develop evidence based targeted interventions, that are culturally and religiously appropriate to overcome the perceived barriers for minority groups like Muslim women in the UK, with a view to reduce health disparities in the UK.

Background

Breast cancer is the most prevalent cancer amongst women in the UK, with an incidence rate of 55,500 cases a year and a mortality rate of 11,500 deaths per annum(1). Women living in more deprived areas in the UK have an even higher risk of mortality(1).

These health inequalities are exacerbated by ethnic minority groups and shared religious beliefs collectively influencing their health beliefs and behaviours (2).

Muslims represent an ethnically diverse group with over 3 million in the UK, and close to half of them living in the most deprived areas(2).

The uptake of breast cancer screening services amongst groups living in deprived areas is poor and correlates with the rising rate of cancer among Muslims and ethnic minorities (2). Since more than 90% of Pakistanis and Bangladeshis in the UK are Muslim, this makes Muslims an especially high risk group, with recent ONS data on Covid-19 showing Muslims to have the highest mortality risk of all groups in the UK, demonstrating religion to be an important, but frequently overlooked health determinant (3). Amongst the Muslim population, gender inequalities result in Muslim women being one of the most vulnerable population groups, with several studies drawing attention to the substantially poor uptake and barriers of breast screening mammography amongst ethnic minority Muslim women. Few studies however have examined mammography barriers facing Muslim women in the UK, especially with Covid-19 having amplified these barriers(3). This narrative review subsequently aims to summarize the present day barriers to mammography screening in Muslim women in the UK.

Methods

Search Methods

A literature search of free text English-Language, papers was conducted from January 2002 – September 2022. PubMed and MEDLINE databases were searched. Search terms included: 'Muslim women', 'UK', 'barriers', 'mammography OR breast cancer screening' as keywords (Figure 1). Initial database searches yielded 51,127 results on PUBMED and an additional seven on MedLine. Only review articles, systematic reviews, meta-analysis, clinical trials and randomised controlled trials were included, all other study designs were excluded narrowing the search to 8020 results. Titles were screened for relevance and duplicates removed and 20 selected papers' abstracts were reviewed. Four articles met the inclusion criteria with an additional three identified through a manual google scholar search. Seven papers were subsequently included in the review. This process is summarised in the Preferred Reporting Items for Systematic Reviews and Meta-Analysis diagram (PRSIMA) (Figure 1)(4).

Study Design, Data extraction and Analysis

Selected studies were reviewed and data relevant to the aim of the study was extracted into an Excel Chart. Extracted data was analysed thematically and collated into a narrative review.

Results

Thematic analysis of studies identified 10 key themes.

Access to Healthcare

Socioeconomic constraints due to patriarchal family systems can hinder Muslim women's access to mammography as they lack the autonomy and rely on male counterparts to make their medical decisions and to fund associated finances for example transport to facilitate these meetings, perpetuating delays in diagnosis(5).

Fatalism

The notion of events being predestined and by the will of God represents a generally accepted belief by Muslims, placing emphasis on prayers to endure their illness(5). While this can serve as a protective factor in some, the health belief that events are 'out of one's own control' can also result in a corresponding reduction in some individuals' motive to seek healthcare treatment and attend screening(5, 6).

Preference for gender concordant healthcare

A clear preference for female nurses and doctors among Muslim women in the UK is compounded across studies(2, 5-7). This is likely due to the intimate nature of the breast assessment which forms part of the breast screening programme, since exposure of intimate body parts to the opposite gender is not permitted in Islam. Muslim women's preference of healthcare providers is described as a hierarchy in the bioethics of Islam as follows: 1) Muslim woman, 2) non-muslim woman, 3) muslim Man, 4) non-muslim man(6). However, one study highlighted preferences for female physicians prevailed more in routine appointments such as breast cancer screening, compared with life-threatening situations where preservation of life became the key concern(7).

Perceived importance of mammography

Amongst British-South Asian Muslim women there is a perception that breast cancer screening is a symptom treating service, rather than a cancer detecting service for both asymptomatic and symptomatic women(7). Mammography is therefore viewed by some muslim

women as unimportant(7, 8). This is maybe due to the conservative culture that prevails in south Asians and muslim groups, whereby certain topics like women's health and cancer are not openly discussed, limiting the spread of knowledge within the community groups(5).
A large sub-group of muslim women in the UK are immigrants that have come from developing countries, and therefore lack knowledge and awareness about the UK breast screening system that British women born and brought up in the UK may otherwise have been exposed to(5). Whilst amongst some muslim women religious beliefs pertaining to God controlling disease, can alter their health beliefs and behaviours and reduce their perception of self-risk from breast cancer(9).

Lack of English language proficiency

Poor English literacy among many muslim women, in particular among British Pakistani women constitutes a barrier to mammography(7).As communications regarding mammography appointments via post or email in English, containing medical terminology, may not be understood, or may require other family members to translate, and may delay attendance or result in important information being missed, as the communications are ignored or thrown away(7). Similarly, during mammography women not proficient in English may not comprehend information relayed to them by the radiographer or radiologist and may rely on taking family members as translators, resulting in additional obstacles to attendance(7). This is especially the case if there is a lack of understanding or perceived importance of breast cancer screening amongst other family members(7).

Modesty

Maintaining modest dress is fundamental in Islam and believing men and women are told to guard their private parts. This can pose a moral and religious dilemma when asked to expose their breasts for assessment, compounded by the fear and embarrassment that the examining physicians or technicians may be male(6, 9, 10). Islamic modesty not only shapes the way Muslim women dress but also their speech, such that female body parts and related topics including breast cancer may not be subsequently spoken about openly, contributing to poor health literacy (5, 9).

Family caring patterns

Strong family caring patterns in muslim families can have both positive and negative outcomes on muslim women's healthcare, and can result in some women putting the needs of their family, including household and care commitments, above their own, at the detriment of their health(2, 5, 6, 9). Meanwhile, efforts to attend mammography may be hampered by patriarchal family dynamics which prevail in some muslim families, in instances where the male head of the household may not permit the woman to attend the screening(5).

Reliance on traditional healing practices

Meetings with religious healers, fasting, prayer practices and consumption of foods like dates and black seeds constitute some of the traditional healing practices adopted by muslim women in the UK (2, 5, 6). Whilst these activities may be beneficial, they can diminish any motive to attend breast screening and seek help from healthcare professionals.

Low income

Muslim women from low socio-economic groups, immigrants and refugee women living in deprived areas may by limited in their time due to the need to prioritise work and provide family income or may be reliant on family members for financial support to fund travel costs to attend the breast screening services (6). This can result in some muslim women wanting to attend mammography but not being able to due to circumstances(6).

Lack of trust in doctors

Experiences of religious and racial bias or discrimination faced by Muslim women, especially immigrant or refugee women that may have language barriers can negatively impact health seeking behaviours and perspective on doctors and hospitals in the UK(6). Meanwhile, unfamiliarity with the UK healthcare system can impede trust in doctors, with muslim women occasionally only seeking medical care as a final resort(2).

Conclusion and recommendations

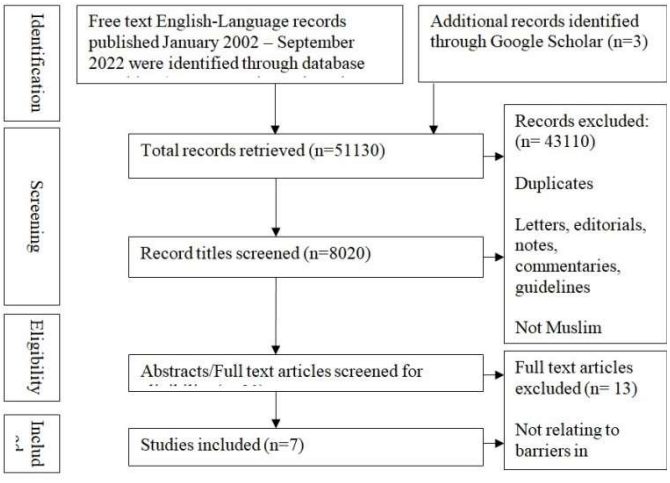
This review provides critical insight into Muslim women's intersectional experiences and the unique role that religious belief systems and cultures play in women's engagement with breast cancer screening. It highlights deficits in the current UK breast screening programme and signposts a need to develop evidence based targeted interventions, that are culturally and religiously appropriate to overcome the perceived barriers for minority groups like Muslim women in the UK, with a view to reduce health disparities in the UK.

Tables and Figures

Table 1: Containing the Keywords and associated MESH terms used on PUBMED.

MESH Terms
muslim: "islam"[MeSH Terms] OR "islam"[All Fields] OR "muslim"[All Fields] OR "muslims"[All Fields]
women: "womans"[All Fields] OR "women"[MeSH Terms] OR "women"[All Fields] OR "woman"[All Fields] OR "women's"[All Fields] OR "womens"[All Fields]
barriers: "barrier"[All Fields] OR "barrier's"[All Fields] OR "barriers"[All Fields]
mammography: "mammography"[MeSH Terms] OR "mammography"[All Fields] OR "mammographies"[All Fields] OR "mammography's"[All Fields]
breast cancer: "breast neoplasms"[MeSH Terms] OR ("breast"[All Fields] AND "neoplasms"[All Fields]) OR "breast neoplasms"[All Fields] OR ("breast"[All Fields] AND "cancer"[All Fields]) OR "breast cancer"[All Fields]
screening: "diagnosis"[Subheading] OR "diagnosis"[All Fields] OR "screening"[All Fields] OR "mass screening"[MeSH Terms] OR ("mass"[All Fields] AND "screening"[All Fields]) OR "mass screening"[All Fields] OR "early detection of cancer"[MeSH Terms] OR ("early"[All Fields] AND "detection"[All Fields] AND "cancer"[All Fields]) OR "early detection of cancer"[All Fields] OR "screen"[All Fields] OR "screenings"[All Fields] OR "screened"[All Fields] OR "screens"[All Fields]*Figure 1: PRSIMA Flowchart displaying search strategy*

Figure 1: PRISMA Flowchart displaying search strategy(4)



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Vol 12 - No. 4 | December 2022 | www.jbima.com
ISSN 2634 8071

Challenges of bowel cancer screening uptake in ethnically diverse communities in the GL1 area of Gloucestershire

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Presented as a poster in the BIMA National Conference on 5.11.2022

Background

Bowel cancer is the fourth most common cancer in the UK and the second most common cause of death from cancer (1). Screening can identify cancers earlier and reduce the incidence of bowel cancer by endoscopic removal of pre-malignant lesions at colonoscopy. Regular bowel cancer screening has been shown to reduce the risk of dying from bowel cancer by over 16% (2). Despite this, there is evidence that participation in all three of the cancer screening programmes is lower in more ethnically diverse communities, people from more deprived groups, people in vulnerable groups, and people with severe mental illness (3). GL1 is an area of Gloucestershire which represents a high proportion of these groups relative to surrounding areas.

Methodology

1934 eligible patients in the GL1 area were identified as registered to a single GP practice and not having completed bowel cancer screening in the last two years. 30 of these patients aged between 61-65 were consented for a structured interview with a GP using five questions. These covered three key areas: awareness, reasoning for declining and willingness to participate following GP endorsement.

Results

Approximately 47.5% of the total number of patients who have not engaged with the bowel cancer screening programme in the GL1 area were registered as British or Mixed British ethnicity. The remaining cohort was made up of ethnic minority groups including Indian or Mixed Indian, Pakistani or Mixed Pakistani and African. 72.4% of interviewees were aware of the screening programme. The most common reasons for not partaking in the screening were "invite lost or not received" (46.7%), "unsure why needed" (36.7%) and "unwilling to provide stool sample" (30%). 63.4% of the interviewees would be "more likely" to participate following GP endorsement.

Conclusions

While awareness in this population group remains good, there are issues of this translating to placing importance on bowel cancer screening. Patient education is key to tackling this. GP endorsement has a clear role to play and this may include opportunistic discussions in vulnerable patient groups within consultations. More research is needed to see if health education in community or faith-based settings may also improve informed awareness in these groups.

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ISSN 2634 8071

Awareness and uptake of the pork-free, injectable flu vaccine in the Muslim community

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Presented as a poster in the BIMA National Conference on 5.11.2022

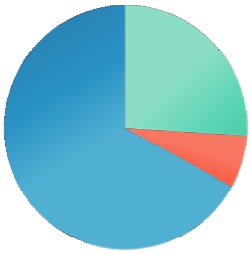
Background:
The childhood nasal flu vaccine programme acts to minimise flu transmission amongst the vulnerable population; however, the British Muslim community have consistently reported lower rates of uptake. A Public Health England study in Luton concluded that the main reason for hesitancy within Muslims was because the nasal vaccine contained pork gelatine. In an effort to increase its uptake, last year the government offered an injectable, pork-free alternative to those unwilling to take the nasal vaccine due to pork. However, little follow up has been done to assess the awareness and uptake of this alternative, pork-free flu vaccine in the Muslim community.

Objectives:
The aims are (1) to explore the awareness and views surrounding pork-free, injectable flu vaccine in the Muslim community; (2) to assess uptake of the yearly childhood flu vaccination in the Muslim community.

Methods:
A survey was designed using Google forms and distributed amongst the Muslim community through social media. Data collection lasted between February-May 2022. A total of 60 responses were received, of which 27 were from Muslim-identifying parents with children eligible for the vaccine. Such respondents completed further questions regarding flu vaccine uptake amongst their children.

Results:
95% of survey respondents believed that offering the pork-free alternative would increase vaccination rates in Muslim children. 78% of respondents were not aware of the injectable, pork-free alternative to the nasal flu vaccine. 67% of Muslim-identifying parents did not consent for their children to take the flu vaccine; the most common reason (44%) being that the vaccine contains pork. 75% of parents who refused due to pork, were not offered the pork-free alternative.

Conclusions:
Despite strong consensus that offering the injectable, pork-free alternative will increase childhood flu immunisation rates, a lack of awareness may have limited the extent to which this option has increased uptake in practise. The findings of this small-scale, retrospective study should highlight the need for improved information sharing through public health initiatives. Given the national importance of increasing childhood flu vaccine uptake, it would be a disservice to leave the Muslim community behind in these efforts at the final hurdle.



2i. UPTAKE OF THE FLU VACCINE IN THE 2020/21 FLU SEASON
(75% of parents who refused the nasal vaccine due to pork, were not offered the pork-free alternative)

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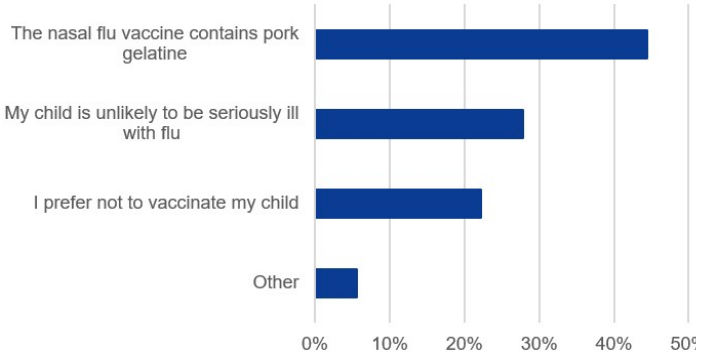

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Journal of the British Islamic Medical Association

Advocacy
Vol 12 - No. 4 | December 2022 | www.jbima.com
ISSN 2634 8071

Think Pink: An exploration of barriers faced by Muslim women in accessing breast cancer care and a pilot programme to address them

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Presented as a poster in the BIMA National Conference on 5.11.2022

Introduction

In the UK, screening programmes are crucial for early detection of breast and cervical cancer. Muslim women's attendance to these programmes falls below the national average (1), increasing the risk of delayed diagnosis, and thus exacerbating health inequalities. This study explores the barriers that Muslim women face in accessing screening programmes, in order to develop initiatives to increase engagement within this population and consequently tackle morbidity and mortality.

Methods

A preliminary online survey was conducted for Muslim women to explore their understanding of women's cancers. Following this, an in-person breast cancer awareness workshop, Think Pink, was completed at a mosque in London. This was advertised in local mosques, through community groups, and on social media. Bilingual presenters conducted the workshop, with resources provided in numerous languages. Verbal feedback was compiled before and after the workshop to ascertain the understanding of attendees.

Results

69 Muslim women aged 25-70, of varying ethnicities, completed the survey. One-third of participants did not know how to examine their breasts and two-thirds had not undergone a cervical smear. The notable barriers to accessing care included: the negative attitudes of doctors; interaction with male doctors; family responsibilities; waiting times; lack of awareness of the need for screening; and language barriers. 15 individuals attended the workshop, all of whom confirmed that the session improved their knowledge of breast cancer.

Discussion

Our research showed that Muslim women experience inequalities in their access to cancer screening. Think Pink aimed to overcome these barriers by providing a faith-based, culturally cognizant intervention directly engaging the community. The limitations of our research were a lack of participant data pre and post-workshop. Furthermore, the Google Form survey had minimal language options which may not have covered the full spectrum of languages spoken by this population.

We recommend that Think Pink be replicated in other locations, accompanied by stringent data collection for continual improvement and targeting of more barriers. At the macro level, there needs to be greater dialogue and education between policymakers, healthcare professionals and Muslim women, to enable better engagement for stigmatised health issues, and to empower patients with greater autonomy.

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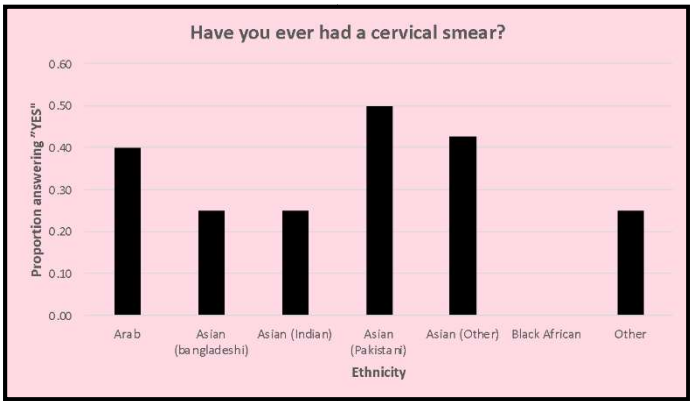
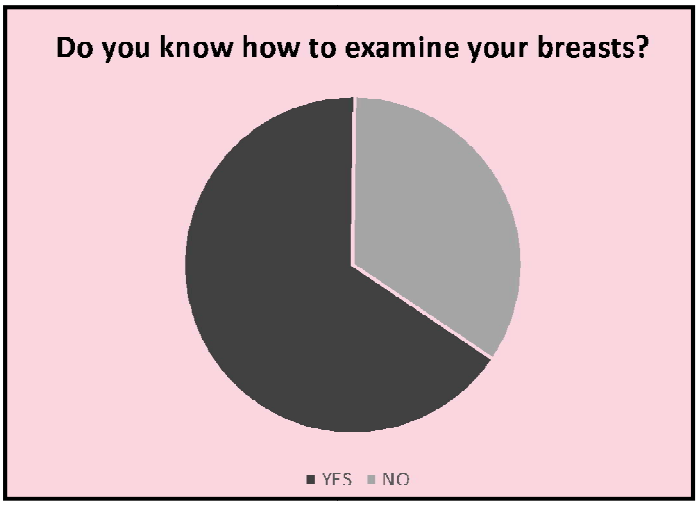
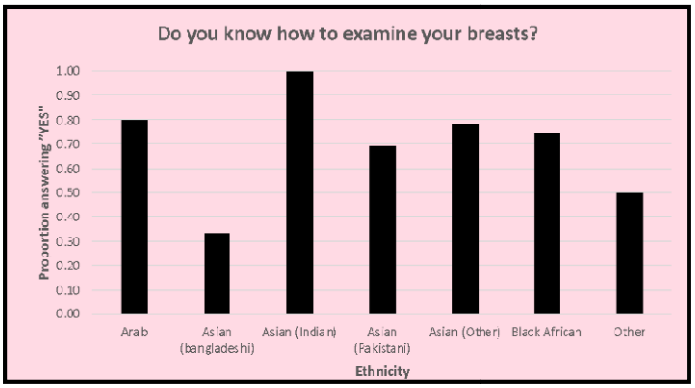
Figures:

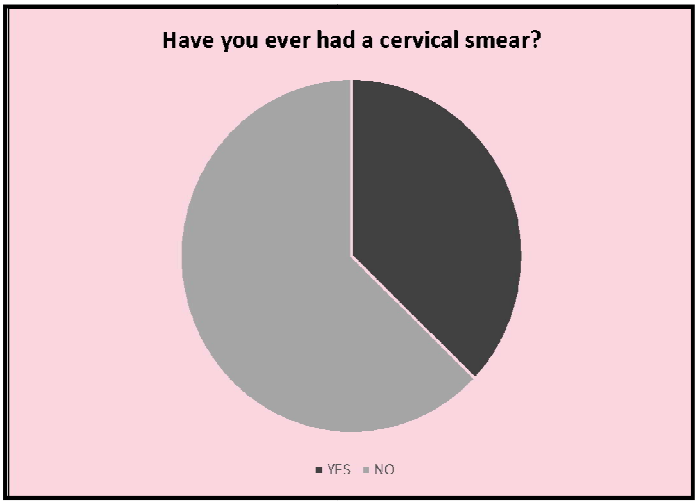
Sample Characteristics

Age	N
<20	6
20-29	31
30-39	4
40-49	12
50-59	16
60+	1
Ethnicity	
Arab	5
Asian (Bangladeshi)	12
Asian (Indian)	4
Asian (Pakistani)	26
Asian (Other)	14
Black African	4
Other	4
Language	
Arabic	7
Bengali	11
French	5
Punjabi	8
Tamil	5
Urdu	36
Other	17









Barriers

Structural Barriers	N
Sex of doctor	4
Appointment availability	9
Distrust in doctor	6
Socio-cultural Barriers	
Language barrier	3
Embarrassment	4
Stigma/ Taboo	2
Individual Attitudes and Perceptions	
Unaware of symptoms	3
Fear of procedure	2
Conflicting responsibilities	3

Journal of the British Islamic Medical Association

Advocacy

Vol 12 - No. 4 | December 2022 | www.jbima.com

ISSN 2634 8071

A scoping review of UK-faith-based organisations' role in addressing Covid-19 vaccine hesitancy

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Background:

Faith-based organisations are considered part of an area's voluntary and community sector (VCS). There is a developing role for these organisations to improve access to healthcare services, understand the wider social determinants of health and advocate for minority communities. With higher proportions of COVID-19 cases and mortality seen within BAME communities, the pandemic highlighted the need to leverage the potential role of faith organisations. We sought to investigate their role in addressing COVID-19 vaccine hesitancy and identify how lessons can be applied to future health promotion activities.

Study Design:

Scoping review of grey and peer-reviewed literature of faith-based organisation's role in addressing Covid-19 vaccine hesitancy in the UK.

Objectives:

This scoping review aims to identify the methods used by faith-based organisations in addressing vaccine hesitancy

- To assess the extent and breadth of faith-based organisations' interventions in the community
- To advance knowledge and awareness of initiatives led by faith-based organisations to address Covid-19 vaccine hesitancy

Methodology:

PRISMA Extension for Scoping Reviews (PRISMA-ScR) guidelines were followed to conduct a scoping review of literature on COVID-19 vaccine hesitancy. Peer-reviewed literature databases such as MEDLINE, EMBASE, HMIC, Scopus and Web Of Science were utilised to find relevant articles. A four pronged approach was used to search grey literature: grey literature databases (Ethos, SlideShare), customised google search, targeted websites and consultations with experts. The keywords were generated from the research question and an iterative search strategy was used.

An exclusion and inclusion criteria were developed post hoc. Independent reviewers were used throughout the screening process and resolution of conflicts. The extracted data were synthesized following the narrative approach and results were mapped graphically and tabulated.

Results

A summary of studies/data abstraction table was created to capture the following variables: title, authors, date of publication, organisations involved, target faith group and description of intervention. The extracted data was synthesised following the narrative approach, post-hoc an additional variable was added as it became apparent that organisations had a variety of interventions which could be broadly categorised into 3 areas: **Online engagement & Resource development, Advocacy & Research, and Operational support.**

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ISSN 2634 8071

Fig.1 Venn diagram of interventions by 3 areas

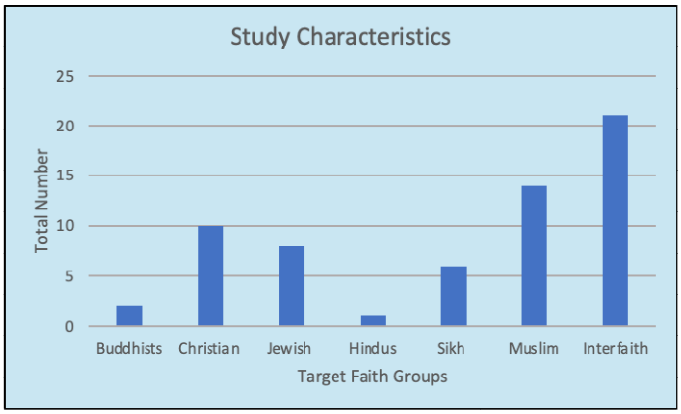

Fig.2 Study Characteristics

Discussion and conclusion

Medical faith organisations showed particular independent strength in online engagement & resource development to address misinformation, run workshops and webinars, translate information, campaigns on social media to advertise vaccinations and engaging with the media.

Operational support was most commonly seen in setting up vaccination clinics at places of worship. This included setting up safe and specialised vaccine clinics in significant community areas, becoming public role models to advertise vaccinations and integrating work with other organisations.

Our research identified that there was limited peer-reviewed and evaluative documentation of organisations work in advocating for their community. This was in contrast to organisation's own sites, local news outlets and social media that had more thorough documentation and audit of interventions. However, limitations in methodology included a short time frame for data collection (2 weeks) and consultation with experts' approach was not fully maximised in the search.

This scoping review has highlighted that further research must be funded to evaluate the impact of organisation efforts and further evidence the role of VSCE organisation integration in health promotion activities.

Journal of the British Islamic Medical Association

Advocacy
Vol 12 - No. 4 | December 2022 | www.jbima.com
ISSN 2634 8071

Understanding and addressing barriers to accessing mental health services for Muslims in the UK - a scoping review

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Presented as a poster in the BIMA National Conference on 5.11.2022

Inherent reference is given to focusing on and maintaining good mental health in Islam however, Muslim communities appear to continue to underutilise mental health services. Muslims have been reported to experience a range of barriers preventing them from accessing these services with Muslims at a significant disadvantage when using these mental health services in the UK[1]. When accessing mental health services, Muslims experience a lower recovery rate (40%) compared to Christians and Jews (55% and 50% respectively)[2].

We conducted a scoping review consisting of a review of contemporary literature and reflected on our own experiences in healthcare to gain a better understanding about these barriers and consider why they may exist, their repercussions on the Islamic community and methods to improve this.

Barriers that exist for the Muslim population include socio-economic status, mental health stigma, poor mental health literacy, racism and Islamophobia. There is also a belief of mental health difficulties associated with the 'evil eye', black magic or even as a punishment from God. Many Muslims also find it difficult to seek help from those they feel would not understand their faith or culture.

Solutions lie in increasing mental health literacy, raising awareness of mental health issues in the Muslim community, breaking down the associated stigma and inspiring communities to access support with their mental wellbeing. A multitude of organisations have recognised these barriers and work towards providing a faith and culturally sensitive support system to Muslims that is confidential and non-judgemental. These include Muslim Youth Helpline, Inspirited Minds, the Lantern Initiative and Muslim Community Helpline. Mind have also worked with local Muslim groups to build their capacity of mental health services including Bradford, East London, Suffolk and Rochdale[3]. Further work needs to be done to achieve more in relation to accessing mental health services for Muslims.

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Journal of the British Islamic Medical Association

Advocacy
Vol 12 - No. 4 | December 2022 | www.jbima.com
ISSN 2634 8071

In-person community cardio-pulmonary resuscitation (CPR) teaching using mannequins versus 'pillow partners' - a comparative study

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Presented as a poster in the BIMA National Conference on 5.11.2022

Studies have shown that community initiatives such as Restart a Heart and British Islamic Medical Association's (BIMA) Lifesavers program help teach effective CPR to the public. CPR mannequins and simulation models are traditionally used however incur a significant expense and may not be available in low resource settings. In the context of an increasing demand for training; difficulty in resource procurement, lack of models and logistical dissemination have been highlighted as obstacles to matching this demand.

Yorkshire Ambulance NHS Service, in conjunction with the Resus Council UK have developed a 'pillow partner' apparatus. 'Pillow Partners' are a standard-sized pillowcase with markings of the surface anatomy of the human thorax, accompanied by simplified instructions on providing chest compressions. BIMA procured this apparatus for trial in their annual Lifesavers project, which aims to teach Basic Life Support skills (cardiopulmonary resuscitation, choking management and the recovery position) to the public through faith institutions.

We appraised whether the pillow partner was found to be useful to volunteers in community delivery of CPR. An online feedback form was devised and shared with a section on the pillow partners. The form consisted of a rating scale to determine usefulness of the apparatus, from 1-10 (1 = not useful to 10 = very useful) and an option for free text comments.

The feedback from over 300 attendees was largely positive with 93.5% of individuals rating it 6 or more. They suggested that pillow partners provided a visual mechanism to aid delivery and the learning experience. It increased accessibility for younger and smaller bodied individuals compared to mannequins. Additionally, the use of pillow partners is more cost effective than mannequins due to a reduced price and lower associated costs (maintenance and storage) which has significant implications for equity of access in low-resource settings.

Overall, analysis of responses and discussion suffices pillow partners have been useful in community BLS-teaching initiatives. However, hesitation of volunteers in using the apparatus, lack of depth perception and lack of recoil has also been identified.

Journal of the British Islamic Medical Association

Islam & Science
Vol 12 - No. 4 | December 2022 | www.jbima.com
ISSN 2634 8071

Inspiration from the past to embrace the potential future of Artificial Intelligence (AI) in Radiology: An Islamic Perspective

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Abstract

BACKGROUND: Technological advancements in healthcare have resulted in improvements in hospital workflow, more accurate disease prediction and shaped patient engagement, personalising patient experiences. At the forefront of these advances is Artificial intelligence use in radiology (a field which has frequently led the way for digital healthcare evolution), which uses algorithms to efficiently analyse large data sets. However, the Muslim world has been slow to embrace technological developments and in particular AI, sparking the debate between "modern liberalism and Islam". This review subsequently explores the benefits to society from studies looking at AI in radiology from an Islamic perspective and studies examples of renowned past Muslim scientists and pioneers with developments that shaped the medical field.
METHODOLOGY: Literature on past Islamic medical pioneers was examined and compared to the present day uptake of AI in radiology, by Muslim populations. The literature review was analysed from an Islamic perspective using usul al-fiqh, Hadith and tafsir.
RESULTS: Studies examining the use of AI in radiology show AI can assist radiologists via reliable automated recognition of complex imaging patterns, providing second opinions - minimising rate of diagnostic errors, time-saving and reduction in workload burden. This is increasingly important post-pandemic where radiologists are met with a backlog of cases, but few added resources. Inspiration for Muslims to embrace AI is taken from multiple medical pioneers surfacing in the Islamic golden era, including AlKhwārizmī whose name yielded the words "algorithm" and "algebra".
CONCLUSION: This review highlights key Islamic principles which are satisfied by AI including the benefits to society of AI in radiology, which align with the Islamic duty of helping people. Meanwhile, the Islamic principle of acquiring knowledge also supports AI advances and these are reflected in examples of notable past Muslim scientists and pioneers with developments that shaped the medical field. Subsequently, there is a strong incentive for Muslim populations to consider case studies of scientific pioneers in Islamic history as stimuli on a micro-level to embrace AI advances in fields like Radiology.

Background

Technological advancements in healthcare have resulted in improvements in hospital workflow, more accurate disease prediction and shaped patient engagement, personalising patient experiences(1). At the forefront of these advances is Artificial Intelligence (AI) use in Radiology (a field which has frequently led the way for

digital healthcare evolution), which uses algorithms to efficiently analyse large data sets(1, 2). However, the Muslim world has been slow to embrace technological developments and in particular AI, sparking the debate between "modern liberalism and Islam"(1).

This review explores the benefits to society from studies looking at AI in radiology from an Islamic perspective and studies examples of renowned past Muslim scientists and pioneers with developments that shaped the medical field.

Methodology

Literature on past Islamic medical pioneers was examined and compared to the present day uptake of AI in radiology, by Muslim populations. The literature review was analysed from an Islamic perspective using usul al-fiqh, Hadith and tafsir.

Results

Inspiration from Islamic Pioneers in Science, Medicine and Technology

The Islamic Golden Age between the period of 6th-13th century was a time of Islamic excellence, where numerous muslim physicians, scholars and scientists amongst other muslim pioneers made significant discoveries and advancements in the fields of science, medicine and technology and established the groundwork for present day robotics and artificial intelligence(3).

Al Jazari frequently termed 'the father of robotics' was an example of a highly influential 12th century Islamic Golden Age pioneer and Turkish muslim mechanical engineer who contributed greatly to AI and robotics. He achieved this through the construction of a programmed humanoid robot, the invention of the first mechanical clock, creation of the famous weight-driven elephant water clock and an automated hand washing apparatus, along with several other inventions during his lifetime(3-5). Al Jazari is therefore considered one of the most important Islamic engineers of the Middle Ages.

Another eminent innovator from the Islamic medieval period was Al-Razi. A 9th century physician, chemist, and philosopher in Baghdad who wrote on a wide array of topics, which included medicine and pharmacology and developed theories on the use of drugs to treat various illnesses(6). Al Razi made noteworthy advancements on our understanding of Measles and Small-Pox through his written piece "A Treatise on the Small-Pox and Measles," where he distinguished the two as separate diseases(7).

Abu al-Qasim al-Zahrawi was an Arab muslim surgeon practicing between the 10th and 11th century, occasionally labelled the "Father of Operative Surgery" was renowned by his expert surgical knowledge and contributions to the field of surgery through his development of various surgical instruments which included scalpels, cauterization and forceps which are still used today(8, 9).

One of the most famous Islamic pioneers was Ibn Sina (Avicenna). He was a physician, Islamic intellectual and a scientist and wrote on Medicine extensively, his writing including the book "*al-Qanun, fi al-Tibb*or" translated as "The Canon of Medicine", frequently referred to as one of the most famous medical textbooks ever written(10). The book was regarded as the standard medical textbook for centuries(10).

The Banu Musa brothers (Muhammad ibn Musa al-Khawarizmi, Ahmad ibn Musa, and al-Hasan ibn Musa), were 9th century scholars of the 9th century from Bagdad who between them made important contributions to mathematics including algebra, trigonometry and bringing the decimal point and arithmetic to the west, with Muhammad ibn Musa al-Khawarizmi being termed 'the father of algebra', and his name yielding the words "algorithm" and "algebra".They also made contributions to astronomy introducing concepts like astrolabe, and to automata where they wrote a book titled "*Kitab al-hiyal*" translated to "The Book of Ingenious Devices" and shaped the development of mechanical sciences in Islam(11, 12).

In this way emergence of multiple pioneering health technology innovations in the Islamic medieval times lead to advancements that have paved the way for modern medical practices, that are still in use today.

Embracing Artificial Intelligence in Radiology from an Islamic perspective

The innovative stream in medicine, science and technology from the Islamic world has slowed over recent years for a number of deliberated reasons (3). However, taking inspiration from the pioneers of Islam's golden age can prompt muslims to once again take an active role in scientific innovations like AI to advance healthcare and promote Islamic values.

From an Islamic perspective, the potential of AI in the field of radiology is immense. AI has the potential to

bridge the supply-demand gap of radiologists allowing radiologists to interpret scans more quickly(13).This is increasingly important post-pandemic where radiologists are met with a backlog of cases, but few added resources.As well as assisting radiologists in providing more accurate and complete diagnoses for patients, minimising the risk of misdiagnosis enabling better patient outcomes(14).

The use of AI in radiology could also improve patient safety and reduce the risk of medical errors(15). AI can detect subtle changes in a patient's medical images and alert medical professionals to potential medical issues that may otherwise be missed(16).

AI also has the potential to reduce the workload of radiologists, allowing them to focus on more complex cases(17). This could lead to more efficient patient care and better outcomes for patients.

The most important aspect of the use of AI in radiology, however, is its potential to save lives. AI could be used to detect early signs of cancer, reduce the risk of adverse events caused by radiation exposure, and improve the accuracy of diagnosis(16).

Subsequently, the use of AI in a medical field like radiology reflects core values of Islamic belief which include seeking new knowledge and using this positively to help improve the lives of others. By leveraging AI technology to improve the accuracy and speed of diagnosis, we can reduce suffering and improve the quality of life of patients. This is a value that is at the core of Islamic teaching and should be embraced by all medical practitioners.

Conclusion

The golden age of Muslim pioneers in health technology was a period of great innovation and progress in the Islamic world. These great scientific scholars made significant contributions to the advancement of medical sciences and their work has had a lasting impact on the world of medicine. Subsequently there is a strong incentive for Muslim populations today to consider case studies of scientific pioneers in Islamic history as stimuli on a micro-level to embrace AI advances in fields like Radiology, which has the ability to significantly improve quality of care for patients, upholding the Islamic duties of acquiring knowledge and helping people.

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Journal of the British Islamic Medical Association

Islam & Science

Vol 12 - No. 4 | December 2022 | www.jbima.com

ISSN 2634 8071

Honey - The Food of Heaven; Healing in this world and the Hereafter

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INTRODUCTION

Nutrition has an integral role in preserving health, and the importance of diet has consistently assumed a notable standing in traditional Islamic medicine.

As gathered in the Hadith, the Prophet Muhammad once stated that *"Allah did not create a disease for which he did not also create a cure."* Muslims are therefore motivated to study the Medicine of the Prophet as an alternative to current treatments, or as an addendum to modern medical therapies.

Honey is represented as a basis of healing in the Quran:

There comes forth from their [bees'] bellies, a drink of varying colour wherein is healing for men. (Quran 16:69).

It is also mentioned as one of the foods of Jannah (heaven). [1]

The description of Paradise which the pious have been promised is that in it are rivers of clarified honey, clear and pure... (Quran 47:15).

Honey, an inherently sweet and sticky substance, is primarily produced by honeybees *(Apismellifera)* from flower nectar. Honey wields a superfluity of pharmacological activities, namely: antioxidant, antimicrobial and anti-inflammatory action, because of the presence of a vast assortment of bioactive compounds. Such use of honey for biomedical applications has earned remarkable focus over the years, with the evolution of novel applications taking benefit of its outstanding chemical characteristics. [2]

As a result, besides honey's widespread utilisation as a typical food and flavouring agent, honey is an attractive natural antimicrobial agent.

ANTIBACTERIAL

The antibacterial activity is one of the most reported biological properties, with many studies demonstrating that honey is active against clinically important pathogens.

The status of antimicrobial activity ranges from honey to honey and is firmly linked to its floral basis, geographical source and processing methods. It is specified in the publications that an interplay of distinct parameters, i.e. low water content, high sugar content, acidity, and hydrogen peroxide compounds, influence the empirical antimicrobial action of honey.

A 2019 study by the Institute of Molecular Biology, Slovak Academy of Sciences assessed the antibacterial activity of 57 Slovak blossom honey against *Staphylococcus aureus* and *Pseudomonas aeruginosa* and examined the role of several bioactive substances in the antibacterial action of honey.

Inhibitory and bactericidal activities were analysed to demarcate the minimum inhibitory and bactericidal engagements. The ranges of hydrogen peroxide (H2O2), and total polyphenols (TP) were specified. Samples displayed different antibacterial efficacy against the tested bacteria as follows: wildflower honey > acacia honey > rapeseed honey.

Across the board, the antibacterial activity of the honey was statistically significantly correlated with the contents of H2O2 and TP in them. The antibacterial activity of the

12 selected honeys was markedly decreased by treatment with catalase, while it remained fairly constant after the inactivation of the glucose oxidase enzyme with proteinase-K digestion. [2] Acquired results suggest that the antibacterial activity of blossom honey is largely moderated by H2O2 levels present which is impacted principally by polyphenolic substances.

WOUND HEALING

Stingless bee honey has a unique flavour and tart taste compared to *Apismellifera* honey. Presently, the appeal of farming stingless bees is increasing among rural citizens to satisfy the elevated need for natural honey-based products.

Several investigations on stingless bee honey have shown diverse medicinal properties for wound healing applications. These include antioxidant, antibacterial, anti-inflammatory, and moisturising attributes related to wound healing. The effect of such applications, such as incorporation into hydrogels, has enticed researchers worldwide.

As a result, the significance of stingless bee honey against wound infections can be enhanced in the future to optimise recovery rates.

Some of the benefits of the use of honey for wound-healing solutions are the acceleration of dermal restoration and epithelialization, angiogenesis advancement, immune response rise and the decline in healing-related infections with pathogenic microorganisms.

This is due to stingless bee honey's therapeutic properties, including antioxidant, antibacterial, anti-inflammatory, and moisturising capabilities. Consequently, it can be deduced that stingless bee honey-based hydrogel has an increased possibility to be a useful wound dressing. Clinical investigations of stingless bee honey should be persisted to deliver exceptional wound dressing and improve current wound dressings. [3]

As revisited, honey offers a favourable prospect for use in wound-healing strategies, either by immediate application, contained in fibrous membranes, or in hydrogels, with extremely promising outcomes in *in vitro* and *in vivo* trials.

However, additional research is required to overcome the main challenges of employing honey for biomedical applications.

ANTI-CANCER

It is well known that dark honeys are distinguished by their increased content of polyphenols and flavonoids, which may be the reason of their antioxidant and anticancer capabilities.

Prior analysis has revealed that bee honey has varying *in vitro* effects on cancer cell lines relying on the plant source.

For example, some types of honey have anti-proliferative effects against human cancer cell lines, such as thyme honey, while others e.g. fir honey) have been shown to stimulate the viability of human cancer cell lines, such as MCF7. [4]

In one study, acacia honey from both high and low altitudes were led to exhibit cytotoxic consequences against three human cancer cell lines.

High altitude honey indicated raised cytotoxicity against HCT116 and MCF7 cells, and also possessed heightened levels of flavonoids, versus the low altitude honey.

However, these conclusions are limited due to the small number of honey samples acquired from solely two areas. Thus, it is not yet feasible to generalise such outcomes, and further research is required to validate the results.

ANTI-INFLAMMATORY

Inflammation is a key role in developing chronic diseases including cancer, cardiovascular diseases, diabetes & arthritis which possess a huge challenge for treatment. With convincing proof of the role played by nutritive modulation in averting inflammation-related conditions, there is a growing curiosity in the quest for innately functional foods with restorative and prophylactic actions.

Honey maintains specific phenolic and flavonoid compounds, of which there is a potent interest in their biological and clinical actions against inflammation-mediated chronic diseases.

Targeted tissues benefit from the honey's pharmacological and preventive actions which modulate the inflammatory cytokines processes and eventually facilitate the rigour of chronic inflammatory diseases. [5]

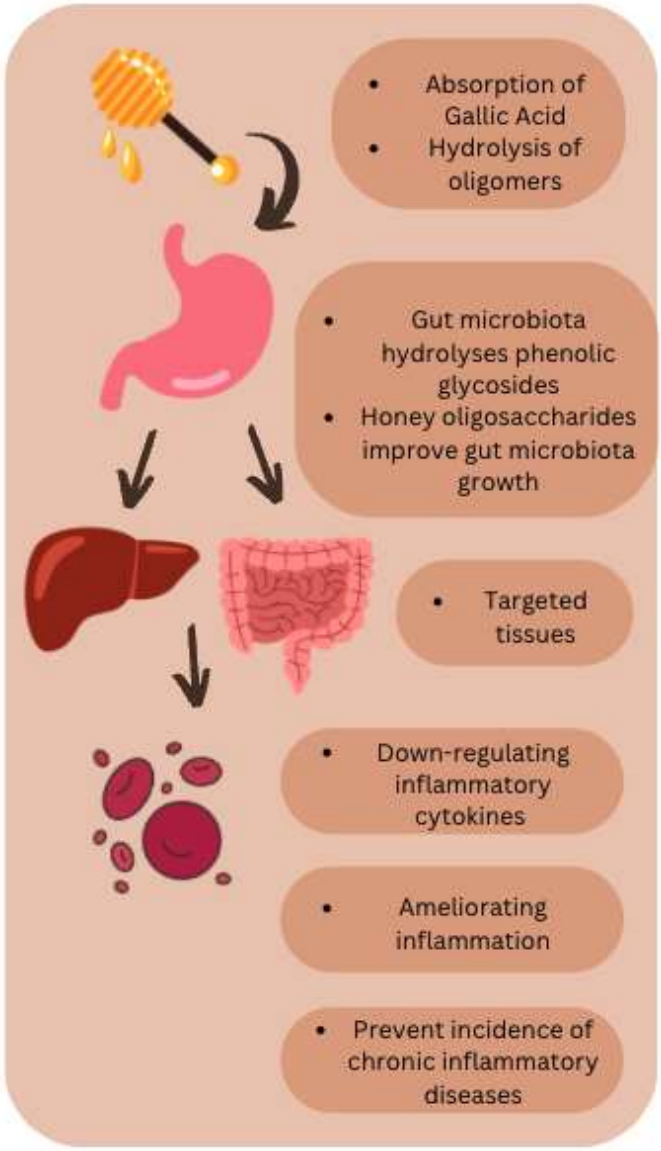

Diagram displaying the effects of honey downregulating inflammation. [5]

Nevertheless, the molecular mechanisms of polyphenols in honey are not totally defined. Additional studies are required in the nutrigenomics analysis to thoroughly explain the genome-wide effects of honey and practices of global gene expression, protein expression, intracellular signalling pathways, and metabolite production in reaction to certain compounds. Ultimately, dissect the outcomes of honey on gene expression profiling with particular focus on human intervention trials, ideally with large-scale randomised placebo-controlled studies, to deliver understanding into their preventive and restorative uses, as well as formulate efficacious procedures for relieving chronic inflammatory diseases.

CHALLENGES

The usage of neat honey for healing intent poses some issues, for example, its stickiness may hinder its appeal to clients and healthcare professionals, and the supervision of an acceptable medicinal concentration over a satisfactory timeframe may be contesting due to honey liquidity and leakage. [6]

This motivates researchers to interweave honey into multifarious formulations. Due to its low pH, honey bears enzymatic and biochemical stability, which can be lost if not appropriately processed for secure usage. Thus, the arrangement of suitable honey processing techniques is of foremost significance for its engaged use.

CONCLUSION

Honey is remarkable when likened to additional natural products with respect to its biochemical effects and health advantages. Such research has inspired scientists to incorporate honey into various formulations, for example, hydrogels, dressings, ointments, pastes and lozenges. [7]

This article expressed the central compounds of honey that sway said healing abilities, also demonstrating promising outcomes in in vitro and in vivo trials. With compelling evidence of the role recreated by nutritional modulation in inhibiting disease, there is accelerated appeal in the search of naturally functional foods with both preventative and therapeutic actions.

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Journal of the British Islamic Medical Association

Islam & Science
Vol 12 - No. 4 | December 2022 | www.jbima.com
ISSN 2634 8071

The Believer is a Mirror of their Brother: Prophetic Lessons to Elevate the Management of Mental Health with Reference to American and British Guidelines

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Presented as a poster in the BIMA National Conference on 5.11.2022

Background:
Medical ethics has a rich history of derivation from theological sources, such as from the Hippocratic Oath and religions such as Judaism, Christianity and Islam. In history religion and theology have been used in the development of medical regulatory guidance.

Aim:
To explore how a prophetic saying (Ḥadīth) can be used by clinicians of all faiths and none, to enhance the management of mental health.

Design and setting:
Psychological exploration of the Ḥadīth "The believer is a mirror of their brother" and its utility in management of mental health within healthcare settings worldwide.

Method:
The Ḥadīth was analysed within the context of the UK and American medical regulatory guidelines set out by the General Medical Council and the American Medical Association to develop a framework for its practical application within mental health consultations.

Results:
A framework which can facilitate clinicians of all faiths and none during mental health consultations, the MIRROR framework. Memory, a mirror has no memory and is confidential, just as a clinician is when they leave their work. Impartiality, a mirror shows what is present without any judgement, in the same way clinicians are completely transparent in their consultations. Relationship, a mirror should be held neither too close. nor too far, similarly clinicians must maintain professional boundaries. Rounded, the viewer is at the focal point of the mirror, the mirror is viewer-centred in the same way that clinicians are patient-centred. Openness, a mirror does not change according to the viewer, likewise, clinicians must not allow unconscious biases to affect their practice. Revitalize, a mirror is cleaned before reflecting the viewer, in the same manner clinicians must look after their own mental health before managing their patient's mental health. The framework provides solutions to challenges faced within mental health consultations including clinician burnout, transparency of mental health services, harmful therapy, the social determinants of mental health, cultural safety and clinician self-care.

Conclusion:
This paper provides greater understanding of how faith-based medical regulatory guidance in conjunction with secular medical regulatory guidance can guide clinicians when faced with challenges in the workplace to improve the management of mental health.