Ethics of Digital Health in Islamic Perspective

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Abstract

Promoting digital health has the potential to significantly enhance healthcare delivery and improve the overall health of the populations. However, it raises ethical concerns such as the breach of personal privacy, risk of misdiagnosis to a larger group of population and potential bias to certain population. Technology should be used in a way to that promotes the well-being of patients and not to be used to exploit or manipulate people. Respect for individual dignity and autonomy, the promotion of social justice, ensuring patient safety and the appropriate use of technology are all ethical values that apply to digital health ethics from an Islamic perspective. These guidelines can direct the creation and application of digital health technologies in a morally righteous manner that enhances the welfare of people and communities.

Keywords: Artificial Intelligence, Bioethics, Digital Healthcare, Ethics, Islam, Medicine

1. Introduction

The COVID-19 epidemic has been affecting nations worldwide since December 2019, and the health care systems in these nations are quickly adjusting to the rising demand. Digital health solutions have been cited as one of the most promising ways to handle this issue in contemporary cultures, as the World Health Organization (WHO) has called for integrated systems to help the response to the outbreak across health sectors.[18]

Campbell & Besselli [9] defined the term "digital healthcare" refers to the use of digital technologies to gather, share, and analyse data on health and wellness, which helps to improve people's health and raise the standard of healthcare.

With the advent of wearables and other Internet of Things (IoT) devices, health care is moving more toward individualised and preventative paradigms by utilising powerful technology that enable real-time self-care or monitoring. These include artificial intelligence and big data, which have greatly influenced digital health.[19]

Digital healthcare advantages through reducing service delivery inefficiencies, increasing accessibility, lowering costs, and improving the calibre of health services. Particularly, the challenges that the global healthcare sector is currently experiencing may have an unavoidable and workable answer in the form of digital healthcare. For instance, the number of people with chronic diseases and the price of current treatments have increased along with the improvement in life expectancy.[35]

With the rapid development of AI, it is now possible to create strong models from aggregated healthcare data that can automate diagnosis and enable a more precise approach to medicine by customising therapies and directing resources with maximum efficiency in a timely and dynamic way.[23]

AI technologies can help optimise daily tasks for healthcare professionals like (1) risk factor analysis, (2) disease prediction, (3) infection prediction, (4) population health monitoring, (5) prediction of adverse effects, (6) prediction of outcome and/or likelihood of survival, and (7) analysis of electronic health records. The potential of AI technologies including AI-Health solutions can benefit several people at once by scaling, diagnosing, or forecasting results.[27]

As digital technologies are swiftly integrating into the healthcare system and expanding the prominence of AI solutions, various challenges relating to safety, explainability, and fairness have evolved into ethical concerns within the digital health domain.[17]

To implement AI technologies into the clinical practice, a strong governance framework is required to safeguard people from harm, including harm resulting from unethical behaviour. [27]

Various literatures have identified several ethical issues surrounding digital health however Islamic perspective regarding digital health or implementing AI in the medical field have not been discussed on. This paper will discuss about the relation of ethics in digital health and Islamic Medical ethics. Islamic medical ethics derives from Shari'ah (Islamic Law), extracted from 2 foundations namely, the Qur'an (the holy book of all Muslims, and the Sunna (Traditions of Prophet Muhammad). Otherwise, Ijtihad (reasoning from experts in Islamic law) or Qiya's (judgement based on analogy) will be sought if there is no clear text from the Qur'an or Sunna. [41]

While implementing digital technologies into medicine, we must revise the principles of Islamic Medical ethics and understand the objectives of the medical field as Al Izz ibn Abdul Salam stated in his book "Qawaeed Al-Ahkam": *"The aim of medicine is to preserve health, restore it when it is lost; remove ailment or reduce its effect. To reach that goal it may be essential to accept the lesser harm, in order to ward off a greater harm, or lose a certain benefit to procure a greater one."*

Objectives:

1. To list the benefits and risks of digital health
2. To discuss ethical issues regarding digital health
3. To understand digital health ethics in Islamic perspective

2. Islamic Medical Ethics

The emergence of advanced medical technologies, such as life support for terminal patients, radiology imaging, and most recently the introduction of smart technologies such as artificial intelligence, has raised some new ethical issues for Muslim doctors and patients. All medical practitioners should be aware of the ethics of digital health in the context of Islamic principles for decent and proper practise, and this knowledge should be incorporated into their programs. [20]

Prior to understanding ethics of digital healthcare in Islamic perspective, it is crucial to grasp the broader Islamic worldview to comprehend the fundamentals of Islamic medical ethics. Islam is viewed as a comprehensive way of life by its believers; sickness and health are only one aspect of the believer's journey through life. The Qur'an refers to Abraham, whom is a role model for the Muslims, mentions: "*And when I am ill, it is God who cures me*" (Surah Ash-Shu'ara, Verse 80), which in perspective shows that the role of a physician in the treating patients is consequently mostly one of intermediary. In addition, according to the Islamic worldview, the laws, and principles that Muslims are to follow to govern themselves ultimately arise from a divine source and are solidified in the law. As a result, morality and ethics are absolute principles that cannot be separated from the law and should not be subjected to geographical or chronological variations. Therefore, one must first comprehend the way Muslim jurists strive to accurately interpret the fundamental texts of the Shari'ah in accordance with the divine will, a subject known as the principles of jurisprudence (*usul al fiqh*), to truly appreciate the topic of Islamic medical ethics. [29]

Islamic medical ethics is a system for analysing and resolving ethical problems that occur in healthcare practise or research that is founded on Islamic moral and legal sources (mainly the Quran and Sunna) and attempts to uphold Islamic moral principles. [41]

Islamic medical ethics is an outgrowth of Shari'ah or Islamic law, which the Shari'ah is built on two pillars: the Qur'an, the holy book of all Muslims, and the Sunna (The Prophet Muhammad's tradition, which includes his words, deeds, and approvals) "Ijtihad" or "Qiyas" is considered when the Quran or Sunna do not include a clear guideline. [11]

Given the breadth of ethical precepts in Islam, the Islamic ethical tradition pays special attention to medical practise to ensure that it corresponds to Islamic Shari'ah. The objectives of the Shari'ah include preservation of faith, preservation of Life, preservation of mind

(intellect, reason), preservation of progeny, preservation of honour and preservation of property. [41] The first fundamental premise of Islamic medicine is the Qur'anic emphasis on the importance of human life. "*If anyone saved a life, it would be as if he saved the life of all mankind*" (Surah Al-Ma'idah, verse 32). In this verse, Chamshi-Pasha & Albar [12] explains that a person who saves a life and continues to do so is a characteristic that is essential to survival of mankind.

Along with supporting "the four principles" of biomedical ethics put forward by Beauchamp and Childress, Islamic medical ethics similarly adheres to them. The four guiding principles of biomedical ethics, following this perspective, are (1) respect for autonomy, (2) beneficence, (3) non-maleficence, and (4) justice. However, the emphasis on the individual principles differs from the Western Bioethics' traditional interpretation of them. [41]

Western ethics has evolved into a philosophical science that places a greater emphasis on human experience and reason in determining what is right and wrong. Whereas Islamic ethics embraces diverse intellectual traditions, while retaining a religious worldview and takes its primary resources from religious texts. Islamic bioethics is founded on duties and obligations (such as to protect life and seek treatment) and should align to the rights (of God, the community, and the individual). In contrast, Western bioethics emphasises a rights-based principle that includes individual rights. [11]

The first known framework on ethics in Islamic medicine was described in "Akhlaq Al-Tabib" written by Abu Bakr Al-Razi. He believed that it was crucial for the doctor to serve as a role model in addition to being an expert in his area. He separated his views on medical ethics into three categories: the doctor's responsibility to patients and to self, as well as the patient's responsibility to doctors. [10]

Al-Razi wrote two divisions of medicine that studied two different concepts involving physical and physiological illnesses and the weaknesses of morality, a concept that can be traced back to Plato. In his work, he explained that the self has an upper hand compared to the body as the virtue of the self will determine the nature of the body. He conceptualised this approach in one of his written works, which expanded across society in the years that followed, explaining the flaws of the self, their origins, and ways to address them. In this way, he advanced the practise of balancing morality and medicine and created a new view of medicine that was separate from Plato's. [22]

3.   Ethical Challenges in Digital Health

There is a lack of research in ethics of digital health, and it is understandable given that the application of digital systems and technologies in healthcare is still in its earliest stages of development and that the ethical issues raised by the rise of digital healthcare are complicated and multifaceted. [35]

The public's perception of digital healthcare and how it affects their life can be influenced by understanding the implications of digitalizing healthcare. We can obtain thorough understanding and comprehend the prospective paths that the society may want to take it in the future by posing critical questions about the extensive consequences of digital health. [36]

Several opinions on the connection between AI and the implementation of human rights have been released by the Office of the High Commissioner for Human Rights. The Office stated that these technologies could undermine older people's autonomy and independence and offer serious privacy hazards. (World Health Organization, 2021) Numerous academic works have also emphasised the many ethical challenges that must be overcome. Among the most important ones are inadequate information, interference with patient-physician communication, murky and inaccurate reports, the security of electronic personal information, patient safety, undivided responsibility,[3] inequality and bias, and lastly patient autonomy. [35]

All said issues go against the basic tenets of medical ethics: beneficence, non-maleficence, justice, and human autonomy, which are intended to safeguard vulnerable patients in the face of societal hierarchy and uncertainty.[6] To tackle these issues, there are increasingly more proposals and policies addressing the subject of ethical AI. As an example, the United States Food and Drug Administration selectively certify organisations that create and manage AI. The European Commission has put up legislation with standardised artificial intelligence guidelines that outline an organisational accountability principle for privacy and data that is comparable to the European General Data Protection Regulation. [28]

4.   Discussion on Ethical Issues of Digital Health in Islamic Perspective

4.1 Patient Safety

The use of artificial intelligence (AI) as a tool to predict risks, gather a range of data, including both new and prepared data, and to improve patient safety, both within and outside of the hospital. AI, for instance, can improve decision-making by identifying high risk patients while in the hospital and directing early intervention and preventative initiatives. (The potential of artificial intelligence to improve patient safety: a scoping review) In addition to its contributions to the fields of drug discovery, customised medicine, and patient care monitoring, AI offers the potential to help physicians make better diagnoses. In order to recognise, evaluate, and reduce risks to patient safety, AI has also been integrated into electronic health record systems. [16]

As medicine evolves away from traditional clinical-based patient care and toward more digitalized healthcare, rapid technological improvements raise safety issues. There is frequently a lack of high-quality, evidence-based studies showing the linked health advantages of the most recent technologies. Additionally, proving that emerging technologies and approaches are efficient comes with a lot of difficulties. [17]

Patients and society could be impacted by digital health in general if patient safety standards are disregarded at various levels. Misdiagnosis is a serious risk that can occur on an individual basis in several ways. Medical technologies like wearable devices can have bugs or are incorrectly calibrated for their purpose and can present inaccurate results. A healthcare professional who relies on these technologies or software that provides clinical decision support may make an incorrect diagnosis or treatment because they tend to accept the recommendations of automated systems without questioning them. While a physician might diagnose anyone incorrectly and later give a proper diagnosis and treatment to one person only, a flawed algorithm that is based on erroneous or incomplete evidence could diagnose hundreds or thousands of individuals incorrectly at once. [27]

Overreliance on technology can become a major issue within digital healthcare as the simplicity and effectiveness of automated technologies may persuade users to rely too heavily on technology which in the short term can lead to deskilling among healthcare professionals (HCP). This process hinder doctors' capacity to make competent conclusions based on observable signs, symptoms, and available data. Once an event of a technological failure or breakdown happens, disruption of performance or inefficiencies among physicians can be worrying and ultimately affect patient safety. [8]

As the algorithm in this scenario would be considered a diagnostic support tool, just like a blood test, with no decision-making capacity, several laws will imply that the healthcare provider would be at fault, and therefore liable, for an adverse event. It is the HCP's duty to act appropriately based on the information provided. [21]

Even while AI has previously excelled at a number of health-based detection tasks, improving explainability is a very challenging task. This problem occurs because many of these results were obtained by "black-box" methods that are uninterpretable. In other words, data is supplied into the system, which produces a predictive output, but the system makes no mention of how it arrived at the anticipated value or draws any conclusions from it which in turn reduce their trustworthiness. This pose challenges for physicians as it is crucial to grasp at least the fundamental inner workings of the devices they use. This problem is made more obvious by the growing use of deep learning systems in the digital health industry. Deep learning models feature millions of internal connections. [17]

A similar question might be posed regarding the role of commissioners or retailers of the gadget containing the algorithm. Some may suggest that authorities or regulators (for example, MHRA in the UK, the FDA in the US or the CFDA in China) should share some of the blame or responsibility for the product's introduction to the market without thorough evaluation. The source of the problem can be traced further back in the chain, to erroneous coding or poor training data quality. In conclusion, there is a clear lack of distributed accountability, which is a problem that is made worse by a lack of transparency, making it difficult to hold certain individuals or groups responsible for unsatisfactory results, which creates a serious ethical risk. [27]

Digital health doesn't necessarily affect within hospitals but play a major role in public health. Policy decisions based on data and evidence direct the deployment of health resources and policies based on poor-quality data can result in depletion of public resources (e.g., promoting vaccination campaigns where regions don't require vaccination), disrupt local economies (e.g., scaring away tourists), which would reduce the amount of money available for public spending and result in lower-quality public healthcare delivery and, ultimately, worse health outcomes for society as a whole. [15]

The next generation of AI technologies must be visible, intelligible, explicable, and fair in order to be deployed into health - care settings. Clinicians and patients will gain more

confidence from transparency in AI systems, but the enhanced system should also be more accurate overall and more generalizable when we have better knowledge and understanding of internal processes and decisions. [17] There are certain scenarios where AI-Health solutions might not be in line with existing standard practices but necessary to handle cases of large uncertainty and can only be completely handled by physicians. Therefore, physicians should participate in the decision-making process with AI-health technologies. [27]

Prophet Muhammad instructed that "There should be neither harming nor reciprocating harm". Islam forbids us from being destructive or malevolent to others. Islam advocates against taking revenge on those who have hurt you, even if they have done you harm. (Chamsi-Pasha & Albar, 2013) Inflicting harm against another human being is being looked down as Prophet Muhammad said: *"By Allah, he does not believe – thrice – the one whose neighbor is not secure from his harm."* (Sahih al-Bukhâri) In this hadith, the Prophet repeated thrice that he is not a believer if one harms his neighbour and therefore should not enter Jannah (paradise) [37]

Non-maleficence is one of the four principles of medical ethics (autonomy, justice, beneficence, and non-maleficence) and is a fundamental principle of morality and bioethics. It is desirable to avoid causing harm if an action has both positive and undesirable outcomes. Additionally, if a situation's benefits outweigh its drawbacks, the action can be permitted and performed. [41]

Al Izz ibn Abdul Salam stated in his book "Qawa'id Al Ahkam" that the purpose of medicine is to maintain health and, when necessary, to give a cure. In order to achieve this aim, the lesser harm occasionally needs to be tolerated in order to avert larger harm. The ultimate objective of the treatment is for the patient to gain from it. As a result, when deemed necessary and when there are no other options, restricted treatment may be allowed.

Islam places such a high value on preventing harm that, as was already established, there is a specific legal maxim to that effect. According to the al-darar-yuzal principle, injury must be avoided at all costs and has precedence over actions that might produce an equivalent benefit. According to another Islamic belief, "no damage shall be inflicted or reciprocated." This is one of the most significant traditions in Islamic social ethics that is directly attributed to the Prophet and is accepted by scholars from essentially every branch of Islamic jurisprudence. [29] AI should be created to be harmless; it should, first and foremost, do no harm. We

should consider what results it ought to produce. "Should the emphasis when applying machine learning to healthcare be on maximising saving lives over profit, and who does it save?" The saying was derived from a hadith in which the prophet advised the companions to prevent any harm that might come to them. As Healthcare professionals, they should perform their duties as Allah's servants by carrying out a preventive strategy to safeguard lives. [40]

4.2 Justice and Equal Rights among Patients

Equal access to digital technology in health care, equity in treatment access, non-discrimination and non-stigmatization in treatment, equity in data ownership, and empowerment are the characteristics of justice. [35]

The adage "Rubbish in, garbage out" describes how poor input data or instructions may result in undesirable outputs. This is particularly true for machine learning, as the data sets used to train and evaluate machine learning models are crucial for assuring the moral application of prediction algorithms. Machine learning-trained algorithms may become skewed if the training data sets are not sufficiently representative. An algorithm that was developed using a data set that have a demographic that is underrepresented in the population especially when algorithm is trained mostly on data from older male and such algorithm would produce subpar recommendations for younger Black women. Health disparities may be made worse if algorithms developed on data sets with these features are used in healthcare. [39]

Unintentional injustice to people has grown in importance as a problem for AI. The choice of training datasets is a significant source of bias because AI techniques are data-driven. [6] The accuracy, completeness, and diversity of AI data should be maintained by AI developers, especially for training purposes. If a certain racial or ethnic minority group is underrepresented in a dataset, oversampling that group relative to its population size may be required to ensure that an AI technology obtains the same quality of findings in that population as in better represented groups.

The implications of AI technology use must be monitored and examined, particularly unequal effects on specific groups of people that affected by existing forms of bias and discrimination. Special measurements must be taken in place to ensure the rights and well-being of the vulnerable population are protected once discrimination and bias emerges in machine learning models. [42]

Excluding specific characteristics, like age or gender, from the training of AI models is one method for preventing biases that have already been identified. It is important to note excluding certain parameters will introduce new biases and may come at a cost, such as a significant decline in model performance and, consequently, its usability. Conflicts between the many levels of justice could eventually trample on the respect for the autonomy of patients [6]

The goal of the concept of justice is to uphold all parties' legal rights in any given situation, acting to ensure fairness and equity. Gillon has outlined three main applications of this principle in the field of healthcare ethics: distributive justice (where limited resources are divided fairly), rights-based justice (ensuring individual rights are respected), and legal justice. In Islam, Justice is a central principle that should be applied in all aspects of life including spiritually, legally, politically, or financially.[29] The Holy Qur'an emphasise justice very strongly, as it is mentioned at least in 16 verses and these verses stated that one of the main purposes of the prophets in this is to establish justice.[41] In the Qur'an, it is said that: "*Indeed We have sent Our Messengers with clear proofs and revealed with them the Scripture and the Balance (justice) that mankind may keep up justice*." (Surah Al-Hadid, verse 25)

During Prophet Muhammad's last sermon, he gave a strong emphasis on the importance of justice as every person from all backgrounds of life should be respected as he had said: "*All mankind is from Adam and Eve, an Arab has no superiority over a non-Arab nor a non-Arab has any superiority over an Arab; also a White has no superiority over a Black nor a Black has any superiority over a White except by piety and good action*". [41]

Historically, Al-Razi ensures his duty as a physician to practice medical justice by treating all his patients equally regardless of their background. He believes that physicians should be more eager to treat people who are disadvantaged and should not focus on having monetary gain after the treatment.[10] According to Athar [4], the principle of medical justice is to fairly distribute the benefits and burden by ensuring people receive what they deserve and entitled. These principles include deciding where to allocate the health resources and so as technology advances, Muslim physicians should implement medical justice into the sphere of digital health. The goal of digital health should focus on reshaping the healthcare system by broadening the coverage of healthcare access and the spread of health information and literacy. [7] As it is known by now, Justice is one of the main 4 principles of medical ethics

and as being said in the Qur'an: "*God commands justice (principle of Justice), doing of good (principle of beneficence), and giving to kith and kin, and forbids all indecent deeds, and evil (principle of non-maleficence) and rebellion: He instructs you that may receive admonition*" (Surah An-Nahl, verse 90).

4.3 Data Privacy and Security

Healthcare organisations will require big data will to be stored, managed, and utilised to ensure an efficient healthcare system. As big data are stored and processed online, there is an increased risks for data breaches occur that can lead to patient's privacies being breached. [1] In digital healthcare, the privacy of patient medical data is most probably one of the most important markers of ethical concerns and every patient has the right to privacy and only non-personal information be disclosed to certain parties subjected to permission being given. [35]

Since ensuring the patient's private and sensitive information has become more challenging, data security will require more attention especially when most personal information can be viewed in healthcare data and large volumes of patient data are shared between departments, increasing the risk of unauthorised to the data at any point. [35]

Protected Health Information disclosed that there had been increasing number of cyber-attacks in healthcare organizations and the number had risen 320% in 2016 recording at least a total of 16,612,985 individual patient records being compromised. This displays that there is an urgent need for healthcare providers to take a far more proactive and comprehensive strategy to ensure information assets are protected and to counter the growing threat of future cyber-attacks. [1]

Private data of users are also continuously generated outside the healthcare organisations and these data are harvested through various forms such as social media and through wearable technologies. There had been various studies raising ethical issues regarding regularizing such technologies and this issue cannot be keep up as it is exacerbated with rapid technological advancements of healthcare solutions. A report from the Federal Trade Commission reported that some companies had not complied with regulations in collecting private data from individuals and some of these data had been sold for commercial profits. Sharing data without the permission of the customers goes against the customers' privacy and their human rights. Strict regulations must be enforced to prevent any similar incidents in the future. [14]

According to the divine principles of Islam, it is forbidden to enter another person's property without that person's consent, and it is also forbidden to pry into and reveal another person's privacy.[32] Allah S.W.T. disapproves this unethical conduct, and He warned *"O believers! Avoid immoderate suspicion, for in some cases suspicion is a sin, Do not spy on one another"* (Al-Hujurat, verse 12) Looking at another verse in the Qur'an, Allah stresses great importance to every individual's right privacy as He has protected the heavens from Jinn or Satan eavesdropping of any information being shared. [33] Allah stated in the Qur'an *"Indeed, We have adorned the nearest heaven with an adornment of stars; and as protection against every rebellious devil. (So) they may not listen to the exalted assembly (of angels) and are pelted from every side. Repelled; and for them is a constant punishment. Except one who snatches (some words) by theft, but they are pursued by a burning flame, piercing (in brightness)"* (Surah As-Saffat, verse 6–10).

Prophet Muhammad had also stressed the importance of privacy among each other as had said *"O people, who have professed belief verbally, but faith has not yet entered your hearts: Do not pry into the affairs of the Muslims, for he who will pry into the affairs of the Muslims, Allah will pry into his affairs, and he whom Allah follows inquisitively, is disgraced by Him in his own house"* [32]

With advancements of technology in healthcare, such as telemedicine, and electronic medical records, there are increasing chances of breaches of data privacy.[38] This illustrates the priceless sanctity associated to information confidentiality, which could only be kept when people's privacy is respected, particularly in this era of widespread ICTs. Shari'ah places strict measures against any forms spying including eavesdropping and with the current technology, accessing and sharing personal data without consent goes against one's rights to privacy. [33]

Autonomy is one of the four Islamic Medical ethics, and this is maintained by keeping the information of the patient secret, to respect the privacy of the patient and to ensure only the truth are explained to the patient without any forms of deception.[38] Failure to comply betrays the patient's rights to autonomy and this can deteriorate the patient's trust towards their physician leading to lack of effective communication and treatment. [2]

4.4 Maintaining Proper Doctor-Patient Relationship

The healthcare professionals are overworked, and physician burnout is becoming a universal dilemma. There is a significantly increasing demand for healthcare services and doctors will have to see a large group of patients leading to longer waiting hours. [34] Given these constraints, finding efficient strategies to provide the best healthcare for all patients should be a priority. Latest technologies such as telemedicine implemented in hospitals and clinics can help reduce waiting hours and prevents patient unnecessary travel to the hospitals

Telemedicine is one the most important tools in digital health along with the use of medical data and medical technology, it has the potential to revolutionise patient-centred care remote clinical care. We may now communicate with patients through various new technological platforms, such as messaging text, email, and mobile device applications. Telemedicine enables disadvantaged communities where there is a lack or absence of competent clinical care, such as in distant areas to obtain medical care from healthcare specialists as well as support from all disciplines, such as medical, nursing, or psychological. [25]

Telemedicine can help optimise care and management of patients with the use of remote monitoring including automated interactions and reminders to continuously engage with patients with the ease from their homes.[25] According to Luz [24] some studies showed telemedicine help to improve quality of life and improve medical conditions such as diabetes mellitus, increased blood pressure and hyperlipidaemia. Telemedicine improves the effectiveness of the healthcare system and is useful in reassessing and monitoring known patients, adjusting medications, responding to straightforward inquiries, gauging adherence, or sharing information on additional tests, particularly when they are normal. The patient does not need to visit the doctor, to confirm that everything is normal. However, it is important to note that the first consultation with the doctor must be in person as the doctor will have to perform physical examination to confirm the diagnosis of the patient. Menage [26] highlights that physical examination plays an important role in diagnosing a patient and she emphasises that technology like telemedicine undermines human dignity by treating individuals as an impersonal object. Empathic touch creates a clinical relationship of intersubjectivity and affirms the ethically significant differences between individuals and objects, such as value and dignity.

There are several legal and ethical issues that can arise in telemedicine. Some patients may have difficulty in getting used to new devices and software therefore some might prefer to consult with their doctors in their offices. Different demographics and socioeconomic groups

might also not have the access to such technologies and may lead to unequal healthcare access. Telemedicine can be said to be effective for certain users or scenarios. [25] Doctors should maintain proper manners as when seeing the patient in the office to maintain proper doctor-patient relationship as both diagnosis and treatment are effective when the patient and doctor has a good relationship and trust.[12] As legal statutory clauses regarding telemedicine are not standardised, responsibility over caring patients in telemedicine might be taken for granted and the risk of misdiagnosis is greater therefore, standardising laws for telemedicine will increase acceptance of telemedicine globally.[31]

Every management outlined by the physicians should have some degree of explainability however most machine learning models have so called "black-box algorithms" which are noninterpretable even for the developers of the machine learning model and these can raise ethical and legal issues as disclosing medical treatment to the patients in detail is one of the important principles of medical ethics. Patient will only have trust and acceptance of machine learning models if they are explained regarding the implementation of machine learning in their care. [39]

The practise of medicine is firmly dependent on the relationship between the doctor and his or her patient and medical technology should not be permitted to further dehumanise medicine. A doctor who consults patient over telemedicine should be as compassionate in the office and do not over-test or over-treat their patients. When physicians treat patients with decency and respect, the doctor-patient relationship is successful. [12]

Doctors are expected by the patients to be treated with high level of care and compassion as they see doctors should possess good khuluq (Manners) such as mercy, patience, tolerance, kindness, and honesty while avoiding anger, prejudice and selfishness as taught by the Qur'an and Sunna.[13] As good Muslim doctors, they must look further into patient's interest and avoid taking any form of advantages nor mislead the patients as the Prophet said: "*Those who have a perfect faith are those who have the best character*". The Quran describes the ideal character of a Muslim saying: "*Indeed, Allah orders justice and good conduct" ... and "forbids immorality and bad conduct and oppression'.* (Surah An-Nahl, verse 90) The two primary sources of Islamic law help guide Muslim physicians to have the essential manners as a good physician which is an important component towards having a good doctor-patient relationship. [12]

To establish a healthy relationship, Islam listed 3 important points that is to have justice among the patients, Ihsan which could roughly translate as to be sympathetic, forgiving, and cooperative and lastly is to give proper treatment for the patient's relatives. Akhlaq Al-Tabib is one of the first books written on medical ethics written by Al-Razi over a thousand year ago. Al-Razi explained in his book that doctors should be soft-spoken, communicate with compassion and kindly and be modest with patients. Even those patients who have lost all hope of recovery should be encouraged by the doctor to be more positive. [22]

Medical technologies are advancing and there are increasing means to obtaining investigation results to help our understanding of the patient's condition and as digital health also involves using telemedicine, doctors can be reached through the means of computers and phones and the communication between the doctor and patient is lessened. The doctor-patient relationship will then become distanced and there is a loss of empathy as physicians will see patients as disease to be treated rather than as a human. Empathy enables doctors to understand the patient more subjectively and can be the key to cover the religion and spiritual aspect of health for the patients. [13]

To maintain trust between doctors and patients Al-Razi stresses the importance of patient privacy and ensure information obtained during consultation should be kept private. Trust plays an important component in an effective communication and relationship between doctor and patient. [22]

5. Conclusion

Islam asserts that in general, has supported the application of science, medicine, and technology as remedies for human suffering. The Qur'anic verses regularly refer to the pursuit of knowledge, particularly in the sphere of science, and urge us to investigate and seek the truth. As stated in the Al-Qur'an: "*Allah will raise in rank those of you who have faith and those who have been given knowledge" (*Sūrat al-Mujādilah, verse 11). According to this verse, having a real faith in Allah SWT is one of a believer's core characteristics, and possessing knowledge is one of their most admirable qualities.

Digital health is the implementation of technology into healthcare system and the complexity of digital health has led to improvements in the healthcare system even as the digital health revolution draws closer to individualised and preventative approaches, which at the same time, the lack of legislative constraints or uniform standards in the health ecosystem

integrating with new and quickly developing technology leads to a rise of new stakeholders, large amounts of data, unique computational and analytical approaches, and these factors together, create ethical difficulties especially in the Muslim communities. [30]

Before introducing new digital health tools into clinical practise, it is critical to consider their ethical consequences. Within Muslim nations, 'fatwas' (authoritative Islamic opinions) that are issued by Islamic religious authorities can encourage the use of new medical technologies while restricting certain aspects of the technology that can be deemed to be seen as unethical especially for the Muslim communities. [11]

With the availability of new medical technologies, Muslim doctors should be permitted to use them under the direction of Islamic law-derived ethics. Muslim nations should support the integration of digital healthcare because it advances knowledge and expands the role of the doctor in the digital healthcare with the goal of achieving a more efficient and better care for the patients.

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