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Editorial

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JBIMA Editorial

Dr Sharif Kaf Al-Ghazal, Editor in Chief

I recently had the opportunity to attend an in-person meeting of the Federation of Islamic Medical Associations (FIMA) Ex-Co in Makkah at the beginning of Ramadan where we marked the 40th anniversary of the organisation's founding and reflected on the great strides we have made. But the meeting was far more than an exercise in thinking about the past, and the meeting itself got me thinking about the importance of FIMA for the next 40 years – and beyond. I won't be discussing its history; the President of FIMA Dr Abdul Rashid Abdul Rahman does a great job of this in an article later in the journal.

FIMA is essentially an umbrella group for Muslim medical associations like ourselves and is crucial to the work we do at BIMA. The former brings together more than 50 associations and medical relief organisations across the world in both Muslim and non-Muslim countries, offers an opportunity to share best practice, and ultimately brings us together. FIMA is a fantastic example of the Ummah working as one, and aspiring towards a bigger goal. The geographic diversity of FIMA affiliates is a joy to behold; from Malaysia and Indonesia in the east to Canada and the US in the west and from the UK in the north and South Africa in the south, it is great to see.

Muslim healthcare professionals all face their own unique challenges, but there are of course many issues we face in common too. There is strength in unity and the past two years of the pandemic have shown that. For FIMA to grow however, there are a number of areas we collectively have to work on. And whilst medical associations do a lot of great work on relief and supporting Muslims in need, it is not enough. More should be done by affiliated organisations – including ourselves – on a whole host of issues. Prime amongst them is medical personal development. All doctors undergo rigorous academic study and vocational training, but there is more that can be done in educating medical students and junior doctors on Islamic medical ethics. This is a topic that many young Muslim doctors are not as knowledgeable about.

Moreover, associations need to push for better education of the history of Islamic medicine. If we as Muslims don't properly understand and appreciate our predecessors' contributions, how can we expect others to understand? And how can we strive to repeat their achievements if we don't know what they are?

It must be noted that as great as the geographic diversity of FIMA is, there is still so much work to do in expanding the organisation and including other Muslim associations within it too. Roughly a quarter of the world's countries have a Muslim medical association that is part of FIMA so there is a long way to go yet. A challenge is including associations where English is not widely spoken. Language should not be a barrier to participation and representation and it is up to us to think creatively about a solution for this. It is our mission statement and goals that bring us together, not our method of communication. Western Europe and North Africa for example have many Muslim medical groups that would richly contribute to FIMA and would bring it great benefit.

And as we reflect on the end of holy month of Ramadan, we pray that our good deeds are accepted and we consider our achievements over the past year. And whilst this Ramadan has thankfully been a better experience for us all than the previous two in lockdown, "normality" is still elusive. Covid is still a problem and it's imperative that we take precautions.

I pray that Allah accepts all our good deeds in Ramadan and I wish everyone Eid Mubarak.

Wassalamo Alaikom

Dr Sharif Kaf Al-Ghazal,

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Ethics

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The need for biomedical ethics - in light of the Shariah

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Abstract

In this article, we highlight the demand for Islamic biomedical ethics. We highlight the substantial importance of biomedical ethics by discussing the four well-known ethical principles that guide the current medical practice worldwide. Additionally, we explain that biomedical ethics from an Islamic perspective differs from Western biomedical ethics; this difference being the fact that biomedical ethics from an Islamic perspective is guided by the Holy Qur'an and Islam's prophetic traditions known as the *sunnah*. Moreover, owing to the fact that new advancements and challenges in current scientific and medical practices are ever-increasing, the need is greater for Muslim scholars to apply the principles of Shariah-driven biomedical ethics to such medical issues. We also argue that addressing novel and challenging medical issues would be more effective if Islamic scholars and experts of Islamic biomedical ethics and healthcare specialists collaborated closely.

Introduction: The importance of biomedical ethics in general

Biomedical ethics is an aspect of moral principles, which addresses arising ethical issues in medicine, health care, and science. In relation to health care, biomedical ethics plays an essential role to preserve the practice of medicine and the delivery of care in line with the required commitments to professional and ethical conduct. In the current climate of advancements in the medical field and patient care, new emerging challenges demand the need for an ethical framework to justify and approve the ways to manage patient care.

Ethics provide a basis for balancing benefit and harm. Moreover, ethics-derived rules regulate and guide the way health care providers (HCPs) manage the different medical conditions of their patients – within a framework that considers the individual humanistic constituent, as well as the psychological, and social backgrounds of patients. Ethical practice also impacts the rights and responsibilities of a patient at a personal level. Aside from biomedical ethics playing a role in providing HCPs with a guide to help with their decision-making, it also plays an important role in policy-making and legislation. [1]

The importance of an ethical reference implicates many areas of health care practice such as daily medical care, medical research, medical training as well as managing health-related diseases in health care facilities and in communities. A lack of ethical principles leads to negative outcomes for the individual and society at large. [1]

Common principles of ethics in medical practice

The western or global approach to biomedical ethics rests on four key moral principles:

1. *Autonomy*: Respecting a competent person's right to make their own decisions or choices that are related to their body and/or health. This principle is the cornerstone of the informed consenting process.

2. *Non-maleficence*: The fundamental principle in every duty planned or performed by an HCP is not to cause harm to the patient or inflict harm on people. Though the meaning of the concept of harm is broad, the patient's view on what can be considered as harmful is the most important. Providing a patient with the risks/benefits of any intervention or treatment has to be true and based on evidence without falsifying, manipulating, or hiding information. Truth is the mainstay in the health care-patient relationship.

3. *Beneficence*: HCPs should work for the benefit of others. This concept supports the previously mentioned principles. The medical or generally the HCP is obligated to, always and without exception, favour the well-being and best interest of the patient

4. *Justice*: Refers to the moral duty to treat people equally and provide the same level of access to the health care service or the benefit of an intervention or treatment.

These ethical principles are interacting and combined with four behavioural principles which cover:

1. *Veracity*: honesty and telling the truth, is an obligation and a crucial part of all areas of health care duties.

2. *Health or Medical privacy*: the duty to maintain the confidentiality and security of a patient's records; this includes both the informal decision of HCPs and the security of patients' medical records.

3. *Confidentiality*: this principle mainly focuses on the prevention of sharing private information without the necessity to do so. Sharing information should be on a 'need to know basis ' only.

4. *Fidelity*: this principle relates to building trusting relationships between the HCP and the patient. Fidelity of HCPs means remaining true to the professional agreements and commitments made to provide quality and proficient care to patients.

Islamic and Western medical ethics, are the principles different?

The above-mentioned principles of biomedical ethics are considered Western principles. Although these principles are not discussed in the Islamic health care system in the same terms, Muslim jurists have legitimised these principles because they are in line with Islamic objectives and Shariah law. Furthermore, these principles have been supported by verses of the Holy Qur'an.[2] Moreover, these universal principles find legitimisation not only in the Qur'an and in the teachings of the Prophet Muhammad (Peace be upon him), but throughout history in the teachings and guidance of many other prominent Muslim scholars.[3][4] In current practice, these ethical principles govern the conduct of HCPs' when they engage with their patients. These ethical principles are, therefore, the foundational background underlying the 'Oath of the Muslim Doctor'.[5]

However, although these principles are embraced by Muslim scholars, there is to a degree a difference of opinion concerning 'autonomy' and its applicability from a Shariah perspective. [4] For Muslims, life is believed to be granted by Allah alone. As such, no human has the authority to actively end an innocent life; this includes medical-assisted death wherein a patient chooses to end their life with the assistance of a physician. Suffering and pain are associated with an illness and Muslim patients may hold the belief that patience in such times is worthy of divine reward. The Qur'an highlights that 'Those who are patient shall receive their rewards in full, without reckoning'.[6]

Comparison of the sources and objectives of Islamic and Western ethics

Generally, Western ethics is grounded in philosophical science, which helps to draw principles based on human reason and experience to determine morality. This approach is different to the Islamic approach to medical ethics. Although Islamic ethics incorporates different philosophical concepts, human reason and experience are influenced by a few key sources from which views are

extrapolated to derive Islamic medical ethics [7]. These sources include:

The Holy Qur'an: the sacred text for Muslims which is believed to be the inspired word of Allah to the Prophet Muhammad (PBUH).

The Sunnah: the teachings and traditions of Muhammad either in deeds, words, or tacit approval.

Ijtihad: deductive logic; this source involves examining available legal decisions, precedents from different sources to find solutions to an Islamically-related judicial problem. In the absence of relevant and explicit information in the Qur'an and Sunna, the opinion of religious scholars would be the next preferred source.

Ever since the demise of the prophet (PBUH), the development of Shari'ah law has operated through *Ijmaa,* meaning the consensus of competent scholars or jurists; and *Qiyas* which involves looking at precedents that provide analogous cases. These developed approaches resulted in different schools of Islamic jurisprudence. Additionally, where required and appropriate, *maslaha* meaning public interest and *'urf* meaning local customary practice are also considered [8]. In Muslim culture, qualified jurists of Shariah law provide rulings and decisions on proposed issues as being mandatory, recommended, prohibited, or discouraged, and in some cases, the jurists may remain impartial.[4][9]

There are five main objectives of Shariah law and ethics.[10] Theses are:

1. Preservation and maintenance of life
2. Preservation of faith which includes the protection of an individual's freedom of belief
3. Preservation of mind or intellect
4. Preservation of lineage
5. Preservation of wealth

The way whereby Muslim HCPs regard Islamic ethics differs from the way they view other legal references and ethical backgrounds. Both are equally important and to a degree, even legally binding. However, a Muslim HCP's motivation to adhere to Islamic ethics is likely to be rooted in religious beliefs. Muslims hold the view that Allah has a divine purpose for the world and has set standards of morality to determine right from wrong. The guidelines found in Shariah law, are, therefore, believed to be of benefit to the world, when these guidelines are applied to actions and activities [7]. Consequently, proclivity can be found among Muslims to adhere to Shariah guidelines. Muslim HCPs may be inclined to base their decisions in line with Shariah law and any decision that is made, are likely to be in line with the above mentioned five objectives, especially when an issue is related to the sanctity of the human life.

Modernisation and addressing novel issues

An emphasised principle in Islam is to seek cures. The Prophet Muhammad (PBUH) is reported to have said: 'Seek treatment, for God the Exalted did not create a disease for which He did not create a treatment, except senility'[11]. This report has been a source of encouragement for Muslims to undertake medical research to find a treatment for different diseases [12]. As new technological and medical interventions continue to increase; inventions and new treatments create new ethical issues to determine whether are compliant with Shariah law. This need to evaluate innovations raises the importance of regulating ethical bodies that are well-versed in Islamic biomedical ethics as well as the need for these bodies to be maintained, supported, and developed.

Additionally, new ethical challenges have risen over recent decades because of medical and scientific advancements such as inter alia, fertility treatment, family planning, abortion, euthanasia, genetic research, stem cell research, cloning, organ donation and transplant [13]. Ethics teams that specialise in Islamic biomedical ethics could address these novel and challenging issues in light of Shariah law and its objectives.

Communication is an essential tool in ethical practice and is required between bodies of Shariah law and experts in biomedical ethics [14].

For the best application of Shariah law in a medical environment, conflicts and controversies in biomedical ethics need to be identified promptly and then addressed and resolved through effective communication between HCPs, and Islamic scholars. Cooperation between medical scientists and scholars in Islamic biomedical ethics is, therefore, necessary. Muslim religious scholars also referred to as the *ulama*, are specialists in Islamic religious science. Yet even the efforts of the ulama are also unlikely to cover all aspects of challenging questions in biomedical ethics. Solutions and decisional agreements could be reached, however, when experts in biomedical ethics and the ulama collaborate, as was seen when the two parties collaborated to eradicate polio. [15]

Conclusion

Biomedical ethics plays a crucial role in medicine in helping HCPs work morally within a framework that is appropriate for patients at a personal and social level. Islamic bioethics is distinctive as Shariah law provides a flexible framework that allows Muslim biomedical ethicists to address novel and challenging issues that arise in medicine, which could be effective if the ulama and experts in biomedical ethics collaborate.

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Adult Kidney transplant, Organ donation, COVID-19 and living well with kidney Transplant

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The kidney is the most commonly transplanted organ. A kidney transplant is the best and most optimal treatment for patients with end stage kidney disease. Patient with kidney disease are usually referred to the renal specialists across the United Kingdom (U.K.) when they suffer signs or symptoms related to kidneys or when their primary care physicians think that their patient's kidney functions are worsening, and they ought to seek expert and specialist advice in managing advanced the kidney disease.

The signs and symptoms vary from patients to patients. The process and pathway to prepare patients for renal replacement therapy (including dialysis and renal transplants) could take months to almost a year before getting someone on the national list for a renal transplant or having a live kidney donation transplant from friends and family.

1960 marked the first UK Kidney transplant. There were 3190 adult kidney transplants in the year 2019-2020. There are 24 kidney transplant centres in the U.K.

The benefits of Kidney transplants are immense;

- Functional independence
- Better quality of life including (not coming to hospital 3 times a week for dialysis)
- Better work opportunities,
- No tubes or catheters attached to body (hospital haemodialysis or peritoneal dialysis done at home).

Types of Kidney transplantation:

Donation after circulatory death (DCD)

This is kidney transplantation after circulatory death. It is on the rise and is a valuable source of organ transplantation

Donation after brain death (DBD)

This is kidney transplantation after brain death; there is a need to fulfil brain death criteria.

Live donor

This includes unrelated donor (spouse, friends), related (family member), altruistic (no emotional connection).

In 2016/17 31% of kidney transplants in adults were from live donors.

Kidney transplants could be from a deceased donor or a living donor. There are many advantages to receiving a kidney from a living donor. Kidneys from living donors are more likely to work straight away and remain working for longer. Most kidney transplants come from deceased donors. To receive a kidney from a deceased donor, the recipient will need to go on the national transplant waiting list. The average wait for a deceased donor kidney is 2-3 years. The wait could sometimes be longer if the patient belongs to a black or an ethnic minority group; as in certain circumstances, where the donor pool is smaller, and the incompatibilities are higher; the average waiting time on the national deceased donor list could be at least 3-4 years or even longer. There are many factors which affect the waiting time; it is shorter if the patient's blood group is AB, common

tissue type or fewer antibodies in the blood. Antibodies in the blood develop due to sensitising events such pregnancy, blood transfusion and previous transplantation.

Living donation also increases the overall donor pool in the UK, which means that other patients have a shorter wait for a deceased donor kidney transplant. Saying that; this is somewhat sensitive issue, and it needs careful discussion, involvement of scholars (*Ulema'a)* and clinicians in particular communities, and engagement of wider community members. It is also important for the communities to understand the concept of organ donation, organ donations law in the parts of the United Kingdom, the options of organ donation when it comes to living donors, and the well-being of the recipients of the kidney transplant. The law around organ donation changed in England in May 2020: referred to as the Max and Kiera's law (Deemed Consent) and all adults are now considered as having agreed to donate their own organs when they die, unless they record a decision not to donate, are in one of the excluded groups or have told their family that they don't want to donate. However, relatives will still always be consulted before organ donation goes ahead and each year, opportunities for transplants are missed because families aren't sure what to do. This article will not discuss those in any greater detail here.

As of 31 March 2021, there were around 26.7 million – or 4 in 10 people on the NHS Organ Donor Register. However, people need to tell their family to help ensure their family supports their decision. Figures from the North East and Yorkshire and Humber transplant network reveal that at 31 March, 2021, there were 514 people in the North East and Yorkshire areas on the kidney transplant waiting list.

It is important that patients are provided with enough and relevant information during their consultation and through each and every stage of their journey being kidney patients, for them to discuss it with their loved ones and also to have the opportunities to ask the experts of what suitable options are possible for them. For some patients,a kidney transplant is not a possible or a viable option and this needs to be clearly explained to the patient and families if that is the case. Patients and their loved ones are bound to be anxious and it is only important to support them throughout the process.

Living donors are usually family members or close friends, but NHS Blood and Transplant (NHSBT) also supports altruistic donors who may want to come forward. Once the patients confirm that they wish to proceed, they undergo tests to check compatibility with the recipient. Living donation provides better outcomes for the recipient than a deceased donor kidney. This is because the living donor in a majority of circumstances is more likely to share the same tissue type as the recipient and a living donor transplant is performed as a carefully planned elective procedure rather than an emergency one. Where the intended donor is not compatible, there is also the option of taking part in the UK Living Kidney Sharing Scheme, which pools donor and recipient pairs to help find better and compatible matches.

In certain circumstances where the chances of getting a kidney whilst waiting on the national deceased list is long due to increased antibodies or increased chances of failure, there are occasions where steps and measures are taken to minimise the risks of incompatibility by treating live donors before the transplant surgery and immediately after it. This has to be discussed in the wider multidisciplinary team (MDT) meetings and the risks and benefits of such treatment and complications discussed with patients and documented in their case notes.

We are extremely lucky in Bradford to have a forward thinking and transplant promoting team right from our lead clinicians to practicing nephrologists who look after transplant patients, specialist transplant nurses, pre-dialysis and haemodialysis specialist staff who openly talk about kidney transplant and its implications and only recently Bradford Teaching Hospitals NHS Foundation Trust has appointed a living donor coordinator to lead promotional activity throughout the district and one of the prime responsibilities would be to engage with families and community groups about the benefits of living kidney donation and promoting organ donation and this is a major step forward for living donor transplantation in Bradford and Craven District. We have a cultural and health improvement officer who actively engages with patients and families during the whole process and ensures patients are treated with respect and dignity and is herself a huge transplant first champion.

Transplantation is a great medical success story due to the increase in public support for donation and has been carried out and has saved millions of lives worldwide. It has prolonged lives and has cut cardiovascular events in patients who otherwise would have been on dialysis and had succumbed to its complications. In common with many other services, COVID 19 has had a significant impact on donation and transplantation activity and patients waiting for a transplant. As we begin to recover from the pandemic, Max and Keira's law will play an

important part in the future of donation and transplantation by helping to increase the number of organs for transplantation for patients waiting for a transplant.

We (as in health professionals) need to work together with the British Transplant Society and NHS Blood and Transplant (NHSBT), patients, families, communities and scholars and religious leaders to meet the current challenges and to support colleagues working in this field so that the future of organ donation and transplantation is efficient and sustainable for our patients.

There had been a pause in transplant activities briefly during the first COVID-19 peak between April 2020 to June 2020 due to increasing cases of COVID-19, mortalities associated with COVID-19, uncertainties about the effect of corona virus on immunosuppression in patients and the risk of patients contracting infection whilst in hospital and the fact that energy, resources and manpower were all diverted towards saving lives of patients affected with COVID-19. This data was consistent with the worldwide reduction in transplant activity during the first three months of the pandemic. A recent study in the Lancet Public Health assessed organ transplant (kidney, liver, lung and heart) from 22 countries before and after the start of COVID-19 pandemic where an overall decrease in transplant activity was noticed. Kidney transplant was most affected followed by lung, liver and heart.

The number of Kidney transplants from 1st April 2019 to 31st March 2020 as per the NHSBT publications included **3452 kidney transplants** the highest compared to other solid organ transplants namely **heart (179)**, **lung (160)**, **liver (949)**, **pancreas (217)** and **intestine (20)**, thereby giving the recipients new ray of hope and light.

Leeds Teaching Hospitals NHS Trust is the tertiary centre that provides specialist transplant surgical care for patients across Yorkshire. The numbers in terms of activities during COVID-19 pandemic are as below;

- 2019-2021 – total transplants 180, Live related donors 46

- 2020-2021(so far)– total transplants 152, Live related donors 28

Numbers so far (Jan 1st- July 29th 2021)

- 74 deceased transplants

- 28 live donors/transplants

In Bradford Teaching Hospitals NHS Foundation Trust, we had 27 renal transplants in 2020 and 18 in 2021, this also included 5 live donor kidney transplant operations. The number of referrals from practicing nephrologists to our specialist transplant team; to instigate and initiate transplant work up and assessments for their dialysis and advanced chronic kidney disease patients has gone up from 55 in 2020 to 68 in 2021 and this is very encouraging.

The transplant team reviews all the available information, comorbidities, medical and surgical conditions before deciding on listing patients for kidney transplant. All donated kidneys carry some risk, though in general this is much lower than the risk of long-term dialysis. Generally, kidneys from living donors have lower risks than kidneys from deceased donors

Post-transplant it is important that the patient attends regular transplant follow-up clinics, takes their medications regularly, and attends routine or urgent blood tests including any procedures to determine the cause of worsening transplant functions. The average life span for a functioning kidney is around 10-12 years but we have had some patients who have the gift of a kidney transplant and have looked after it for almost 40 years.

Re: COVID-19 vaccination and renal transplant recipients, it has been widely circulated and advised that patients with transplant and on immunosuppression were categorised as clinically extremely vulnerable and therefore were on the priority list for vaccination.

The UK kidney association (UKKA) has reviewed the joint committee on vaccination and immunisation (JCVI) guideline and has recommended the use of a third COVID-19 vaccine in the renal transplant patients and those who are on the transplant waiting list.

For further information please refer to the NHSBT website on kidney transplantation, UKKA website under patient information section, Kidney care UK and national kidney foundation.

To find out more and register your decision, visit the NHS Organ Donor Register at www.organdonation.nhs.uk and share your decision with your family. Users of the NHS app, can also use this to record, check or amend their details or decision.

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Is the "Concept" of Brain Death Compatible with the "Reality" of Religious Death?

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Keywords:*Islamic bioethics, Brain death, Organ donation, Informed consent, Muslims*

Abstract

The concept of brain death, which was originally designed as a prognostic tool allowing withdrawal of life support, has over the years evolved into a diagnostic tool for declaring death. The concept of "brain death is death" lacked convincing philosophical justification[1] from the time it was first proposed in 1968, and it defies well-established scientific truths. Despite these shortcomings, the brain death concept is accepted as legal death in many countries, it is "well settled yet unresolved"[2] and, "it is too flawed to endure and too ingrained to abandon"[3] . Whether or not brain death equates with religious death has been debated by religious scholars for many years, but it has taken more of a prominent role in the context of deceased organ donation. Leading judicial councils in the Islamic world have reached different conclusions: The International Fiqh Academy (IIFA-OIC), 1986, accepted brain death as Islamic death providing "all functions of brain cease irreversibly and the brain has started to degenerate as witnessed by specialist physicians"[4] which does not equate with brain death as practiced in clinical medicine anywhere in the world. The European Council for Fatwa and Research (ECFR)[5] in 2000 ratified this IIFA-OIC ruling. Both the IIFA-MWL[6] and Islamic Organisation for Medical Sciences[7](IOMS) have rejected brain death as Islamic death but allowed withdrawal of life support. Two recent *fatawa*(legal edicts) in the UK and the USA by contemporary Muslim scholars, notably, Butt[8], a jurisconsult and a hospital chaplain specialising in medical bioethics, in 2019 and the Fiqh Council of North America (FCNA)[9]in 2021, have also rejected equating brain death with Islamic death by comparing the traditional method of determining death with the diagnostic criteria currently used for brain death. Rashid[10], a traditional Islamic scholar and a physician, has studied the opinions of Muslim scholars of the past and concluded that the permanent cessation of consciousness constitutes legal death in Islam, and he opines that the concept of higher brain death andbrainstem death in clinical practice both qualify aslegal death in Islam. These different approaches to the same problem have led to diametrically opposing views on brain death, leaving the Muslim public confused.

This paper looks at the history of the evolving concept of brain death over the last fifty years and the underlying criteria justifying brain death as death to try to answer the crucial question:Has medical science reached a sufficient level of understanding of death to create a new standard of legal death in religion, particularly Islam?

Introduction

Historically, death was not so difficult to define. A catastrophic injury to any one of the vital organs - heart, lungs, or brain, would lead to a rapid deterioration of the other two organs culminating in death. However, with the advent and widespread development of intensive care units, artificial airways, and artificial ventilation, it

became possible to disrupt this natural cycle of events leading to death. Patients with severe brain injury and no hope of survival could continue to occupy ICU beds on artificial ventilation, putting a burden on hospitals and families, financially and emotionally. Some felt this problem required redefining death with greater precision. However, there were some other crucial factors at play at that time which led to defining a condition known as irreversible coma as "brain death", a concept which has been a source of controversy since its inception. Studying the competing narratives put forward will help structure the ethical debate on the issue and formulate policy.

The concept of brain death and its evolution

Despite what many people may think, "brain death" is not a uniform concept, but rather one that has evolved over time[11,12]. Clinical brain death in its evolved form is not to be understood as "death of the brain" but death of the individual. The concept does not require all the functions of the brain to have ceased, as enshrined in USA law (UDDA Act, 1981) even though the term "whole brain death" is used. Some experts require that it must be physiologically impossible for the brain to function again[13] while others merely accept that the brain will not actually function again[14]. The brain death theory also puts forwards the idea that actual death can be hidden by technology.

The evolution of the concept of brain death

In the late 1950s, with the advent of intensive care units, artificial airways, and artificial ventilation, it became possible to keep individuals who were in a permanent state of coma with no prospect of recovery alive.

In 1958, at the 23rd International Conference of Neurology, two French neurologists, Pierre Mollaret, and Maurice Goulon, presented a series of 23 patients with severe neurological impairment in a state of irreversible coma for which they proposed the term *coma dépassé*[15].

In 1966, at the CIBA Foundation international symposium on "Ethics in Medical Progress: With Special Reference to Transplantation"[16], one of the main issues was definition of death. Intense discussions took place concerning the issue of equating *le coma dépassé*with death for the purposes of organ procurement. At the meeting was Joseph Murray, a surgeon involved in transplantation and a future member of the Ad Hoc Committee of Harvard medical school. "Those criteria are excellent," he stated, "this is the kind of formulation that we will need before we can approach the legal profession." However, there was strong opposition to Murray's statement, affirming, "if a patient has a heartbeat he cannot be regarded as a cadaver." No agreement was reached at the symposium on whether death should be redefined or not.

In December 1967, Christiaan Bernard of South Africa performed the world's first successful orthotopic human-to-human heart transplant[17]. With the consent of her father, Edward Darvall, and the local coroner present, Bernard took the heart of a 25-year-old young lady, Denise Darvall, who had sustained serious head injuries after being run over by a car[18]. No formal criteria for death had been fixed at that time. Bernard injected Denise's heart with potassium chloride at the urging of his brother, Marius, causing the heart to stop, thereby fulfilling the whole-body standard for death before removing the heart. Bernard transplanted the heart in to a 54-year-old man named Louis Washkansky, whom Bernard had told together with his wife that the chances of success were 80%, for which Bernard has been criticised by ethicists for misleading the patient and his wife.[19] Washkansky died of pneumonia 18 days after his surgery.

In early January1968, the Ad Hoc Committee of Harvard medical school was formed under the chairmanship of Henry Beecher, an anaesthesiologist. Beecher had written to the dean of the Harvard Medical School, Robert Ebert in October 1967, requesting to form a committee: "Both Dr. Murray and I think the time has come for a further consideration of the definition of death. Every major hospital has patients stacked up waiting for suitable donors."[20] Ebert did not reply immediately but approved Beecher's request on 4th January 1968. The Committee, which consisted of ten physicians, a theologian, a law professor, and a historian of science, issued a statement in June 1968 redefining irreversible comaas "brain death", followed by a publication in the Journal of the American Medical Association (JAMA) under the title, "A Definition of Irreversible Coma". The clinical signs put forward by the Harvard Committee to define brain death were identical to those described by Mollaret and Goulon, almost a decade earlier, for *le coma dépassé*. The Committee stated that its primary purpose was to define irreversible coma as a new criterion for death. This first sentence of the report made the assumption that someone in irreversible coma was a dead individual even if the heart and circulation continued to function. This assumption and its subsequent acceptance were done without presenting any philosophical justification which did not materialise until 1981. Giacomini, who has studied the original manuscripts of the Ad Hoc Harvard Committee came to the conclusion that the Committee,

"In constructing its definition had begun with the already familiar characteristic of organ donors….and ended up conveniently but coincidently with features consistent with a good vital organ source."[21]

The conclusion of the first draft of April 11th, 1968, gives an insight into the objectives of the Committee. It read, "The question before this committee cannot be simply to define death. This would not advance the organ transplantation since it would not cope with the essential issue of when the surgical team is authorized - legally, morally, and medically - in removing a vital organ"[21].

In the draft of June 3, 1968, a similar statement can be found: "With increased experience and knowledge and development in the field of transplantation, there is great need for the tissues and organs of the hopelessly comatose in order to restore to health those who are still salvageable"[21].These drafts indicate that organ transplantation was a significant factor in writing the final report but not necessarily the prime goal of the Committee. The former chair of medicine of Massachusetts General Hospital Alexander Leaf said of Beecher, "He would have been the last person to have felt that one was doing this [defining brain death] to go in and get organs[22]." Furthermore, Beecher had a history of blowing the whistle on unethical behaviour.

The Harvard Committee considered cessation of neocortical activity to be an important criterion for brain death and it was believed that a completely flat EEG was necessary for the diagnosis of brain death. Only a year later, this requirement was modified in a subsequent publication[23]. Soon, questions were being raised in scholarly literature about the concept of death.

In 1970 at the American Association for the Advancement of Science (AAAS) meeting in Chicago, Beecher presented a paper entitled "New Definitions of Death: Some Opposing Views." Beecher made the claim that a human dies when there is irreversible loss of "personality, his conscious life, his uniqueness, his capacity for remembering, judging, reasoning, acting, enjoying, and so on."[24] This wasis in-line with the higher-brain criteria for brain death while the original report required loss of all functions of the central nervous system. However, spinal cord requirement was dropped as it soon became apparent that spinal cord function could persist in patients who had death of the brainstem and cerebral hemispheres.

The following year, in 1971, a publication appeared citing two cases showing that an individual could be in an irreversible coma while still retaining some brain functions and respiration[25]. The subsequent Hastings Report contrary to Henry Beecher's paper at the AAAS the previous year, stated that the Harvard criteria goes beyond the mere assessment of higher-brain function to include absent brain-stem reflexes. This forms the basis of whole brain death criteria.

The Hastings group report in 1972[26] stated that the Harvard report did not require the physician to pronounce death when its criteria were met raised the obvious question: Was an individual who fulfilled the Harvard criteria for brain death, dead or alive?

In 1981, President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioural Research put forward the rationale underpinning the brain death concept as "irreversible loss of the capacity of the body to organise and regulate itself, to function as a whole,"[27] and its report included what came to be the Uniform Determination of Death Act (UDDA). This rationale was endorsed by Bernat, an international expert on brain death: "This criterion [whole brain death] is perfectly correlated with the permanent cessation of functioning of the organism as a whole because the brain is necessary for the functioning of the organism as a whole. It integrates, generates, interrelates, and controls complex bodily activities. A patient on a ventilator with a totally destroyed brain is merely a group of artificially maintained subsystems since the organism as a whole has ceased to function"[28].

This concept has been criticised by a number of commentators including Shewmon[29,30], Karakatsanis[31] and Tsanakas[32], Truog[3] and Nair-Collins[33].

The 1981 report stated that death of an individual can be determined in two ways:

(1) irreversible cessation of circulatory and respiratory functions, or
(2) irreversible cessation of all functions of the entire brain, including the brainstem. A determination of death must be made in accordance with accepted medical standards.

In response to growing critics, in 2008 the President's Council on Bioethics decided to re-examine the rationale behind the brain death theory. The Council wrote, "And, perhaps most important, there are critics who have published evidence of ongoing integrated bodily activities in some persons meeting the criteria of "whole brain death" and who have claimed that this evidence

invalidates the rationale for today's consensus position. These challenges invite—indeed, they necessitate—a re-examination of the neurological standard enshrined in law and medical practice. In this report, the President's Council on Bioethics offers such a re-examination."[34]
Meanwhile across the Atlantic in the UK, brainstem death criteria were published in 1976 by the Conference of Medical Royal Colleges as prognostic guidelines "to establish diagnostic criteria of such rigour that on their fulfilment the mechanical ventilator can be switched off, in the secure knowledge that there is no possible chance of recovery"[35].

In 1979, the Conference of Medical Royal Colleges decided that the prognostic guidelines published in 1976 would constitute a diagnosis of brain death meaning that the patient is dead[36]. It was also claimed that the diagnostic criteria established for brain death criteria would suffice for whole brain death.

This claim was withdrawn in 1995 after a review by a Working Group of the Royal College of Physicians. The Conference of Medical Royal Colleges formally adopted the more accurate term "brainstem death" which was stated to be equivalent to death of the individual[37]. Death being defined as "the permanent loss of the capacity for consciousness and spontaneous breathing". The eminent British neurologist, Christopher Pallis explains: "The single matrix in which my definition is embedded is a sociological one, namely Judeo-Christian culture… The "loss of the capacity for consciousness" is much the same as the "departure of the conscious soul from the body," just as "the loss of the capacity to breathe" is much the same as the "loss of the breath of life."[38]

The UK's "brainstem death" criteria was a refinement of the USA's "whole brain death" criteria. These two opposing positions led a to a huge debate on the subject in the media and a six-month heated correspondence in the medical journals[39] following a rather provocative BBC Panorama programme on the subject entitled, "Are the Donors Really Dead," aired on BBC1 on the 13th October 1980. The USA's criticism of the UK's brainstem criteria was voiced by the President's Council for Bioethics in 2008, "The UK standard…. Such a reduction, in addition to being conceptually suspect, is clinically dangerous because it suggests that the confirmatory tests that go beyond the bedside checks for apnoea and brainstem reflexes are simply superfluous."[33]
Roberts and Versnick report two cases in Canada declared brain dead using brainstem criteria both of whom regained spontaneous breathing.[40]

Brainstem criteria or whole brain criteria? The brainstem contains the reticular activating system essential for maintaining a state of wakefulness and transmitting impulses to the cerebral hemispheres responsible for generating consciousness. The brainstem is the most resilient part of the whole brain. The clinical tests for brainstem death do not test the reticular activating system directly. Loss of all brainstem reflexes implies loss of all brainstem functions which precludes discernible functioning of the cerebral hemispheres. So, if brainstem function is lost the brain cannot function. As Pallis puts it, "in the absence of brainstem activation, the cerebral hemispheres remain in a permanent state of coma." However, Shewmon through his thought experiment comes to the logical conclusion that, "we are forced to conclude that a person dies when the cerebral hemispheres are destroyed…,"[41] which he backs up with the German neurosurgeon Hassler's report in successfully arousing patients comatosed from discrete brainstem injury by artificially stimulating the reticular activating system.[42] This is one of the criticisms of the brainstem stem criteria as it gives rise to the absurd possibility of a conscious corpse. In the 1990s, it became clear that certain brain functions such as hypothalamic and pituitary functions remain in brain dead patients, and this was not consistent with the legal definition of brain death which required irreversible cessation of all brain functions (UDDA Act, 1981). "Cessation of all brain functions" in clinical practice became to be interpreted as "cessation of all *critical* brain functions." Singer, despite his utilitarian philosophical outlook, stated, "the brain death criterion for death is nothing other than a convenient fiction"[43], a view corroborated by other scholars.[44,45,46] Such a legal fiction is not designed to deceive but it does have the effect of implanting a false belief in the addressees.

Further analysis reveals more inconsistencies in the brain death concept. What is the underlying criterion for equating brain death with death? The proponents of the brain death concept contend that permanent loss of integrated biological function of an organism as a whole is sufficient basis for declaring an individual dead[28]. However, integrated biological function can continue in brain dead patients without contribution from the brain[30]. These somatically integrated functions include homeostasis, energy balance, wound healing, fighting infection and other functions.

Proponents will argue that these functions are only possible with the aid of artificial ventilation. But what is important is that these functions, normally associated with life, are present; the reason why they are present is

not so important. In some extreme cases of total locked-in syndrome the patient may be conscious and aware but may exhibit no more integrated functioning than brain death patients. Such locked-in syndrome patients are considered alive but require intensive care to keep them alive, similar to the brain dead patient.Proponents will point out that the locked-in syndrome patient is conscious, the brain dead patient is not.

There has been much criticism by experts regarding the definition of death and the presumption of equating brain death with actual death. Veatch has gone so far as to say, "It has now become clear that no reasonable person accepts the Harvard Committee position that "brain death" is a plausible definition of death."[1]

An extension of the brain death concept - The "higher-brain death" concept

Considering all the inconsistencies with the brain death theory some philosophers have put forward the idea that "the person dies" with the "irreversible loss of capacity for consciousness" while the "human organism dies" with the "irreversible cessation of circulatory and respiratory functions".

The "higher-brain" standard for brain death holds that key functions of the brain such as memory, consciousness, and personality, are what make us a person, and since those functions originate in the cerebral hemispheres, it is the death of those portions of the brain that count as death of the person[47]. A number of argumentative strategies have been put forward to support the concept of higher-brain standard for brain death, these include loss of "loss of personal identity", loss of "moral standing" and, loss of "prudential value". The higher-brain theory for death is objectionable because it suggests there are two types of death (personhood and biological). Some death related behaviours come into play after death of personhood, others after biological death. But in reality, there is only one death. An individual is either dead or alive. Although the higher-brain death theory is philosophically defensible as a theory, in practice it would pose considerable problems, as Laureys, an expert in persistent vegetative state (PVS) and brain injury points out: "Clinical testing for absence of consciousness is much more problematic than testing for absence of wakefulness, brainstem reflexes and apnoea in whole brain or brainstem death."[48]The diagnostic criteria we have at the present for determining higher-brain death has a 30-40% false positive misdiagnosis rate for the vegetative state[49].Shewmon and Holmes reported two cases in an abstract, at the International Child Neurology meeting in Tokyo in 1990, of children born without a cerebral cortex who were not only conscious but also had voluntary motor movements and rudimentary vision[50]. One of these cases, Andrew, was reported by the Associated Press in 1989, "Boy born without a brain proves doctors wrong"[51], when he was 5 years old and attending nursery school. Andrew with his brain anatomy should only have had a short vegetative life and considered dead according to the higher brain death criteria. These two cases proved that the cortical doctrine of consciousness was not true in these congenital situations.

Higher brain death is one step removed from "mental death". The concept of the biologically alive human "non-persons" played a key role in the professional acceptance of euthanasia of mentally ill, retarded, and demented individuals in Nazi medical crimes popularised by the book in 1920 entitled, "Permission to Destroy Life Unworthy of Living" by jurist Karl Binding and psychiatrist Alfred Hoche.[52]

Consciousness is not an all or none phenomenon but part of a continuum and there is no universally agreed upon definition of consciousness. If we were to adopt the higher-brain standard, then patients in PVS would be considered dead even though they can breathe spontaneously and have other brainstem functions. They can maintain this status for years in some cases. Similarly, babies born with anencephaly who are unconscious but breathing for themselves would be considered dead under the higher-brain standard. It is unlikely the public would accept dissection in the anatomy room, a post-mortem examination or burial of unconscious individuals breathing for themselves.

If such a criterion of death was to be implemented, it would, theoretically, mean that an individual declared dead based on permanent loss of consciousness, could be subjected to major surgery for vital organ retrieval while breathing spontaneously. Would such an individual need an anaesthetic? "Brain dead patients do not require anaesthesia or sedation…"[53] according to the 1999 guidelines manual of the Intensive Care Society (UK). Brain dead donors are usually given a paralysing agent to prevent any spinal reflex movements during surgery, oxygen and any drugs required to control blood pressure and heart rate[54]. Some authors have stated that nociception (pain) and awareness in donors cannot be excluded during thesurgical procedure of organ retrieval[55].

			Brain death criteria		
	Biological death	**Religious death**	**Whole brain**	**Brainstem**	**Higher-brain**
Underlying criteria	Cessation of all biological functions that sustain life	Desoulment	Loss of integrated biological function		Loss of personhood
Diagnostic criteria	Irreversible loss of capacity for consciousness				
	Irreversible cessation of circulation and respiration		Known cause + Loss of all brainstem reflexes + ancillary tests	Known cause + Loss of all brainstem reflexes	Diagnostic criteria are inaccurate at present

Fig. 1 Comparison of different formulations/ criteria of death

A study by Grigg et al. showed 20% (11/56) of brain dead patients had EEG activity and demonstrated sleep-like cortical EEG in 4% for as long as 7 days[56]. Brainstem auditory evoked potentials can persist and were demonstrated by Machado[57] in 27% (5/30) and by Sasaki[58] in 26% (5/19) of brain dead patients. Wijdicks and Pfeifer reported a study which showed that at autopsy, the brainstem was reported as normal or minimally ischemic in about 60 % of patients who were determined brain dead by clinical examination only[59]. Some anaesthetists in the UK have suggested giving anaesthesia to brain dead patients[60]. Advocating an anaesthetic for brain dead individuals is problematic as it casts doubt in them being actually dead. It is generally accepted amongst the medical profession that brain dead individuals do not feel pain, if there is some sort of sensation still present it is not similar to the pain that a living person feels. Some anaesthetists do administer anaesthesia to brain dead donors during organ retrieval but not because they believe the donors feel pain but for cardiovascular stability.

Fig. 1 shows different formulations of death with their underlying criteria and diagnostic criteria. The underlying principle for all the brain death formulations is the permanent loss of consciousness which is in line with the higher-brain death criteria. Consciousness is a critical function of an organism, permitting it to interact adaptively with its environment and it is crucial to the personhood of an individual.

Rashid[10], by citing the opinions of past Muslim scholars, states that permanent loss of consciousness is legal death in Islam (*al-mawt al-ḥukmī*). Rashid puts forward the following three pertinent points relevant to the discussion:

1. A state of consciousness in the dying process described by past Muslim scholars as *al-ḥayāt ghayr al-mustaqarrah*(unstable life) can be equated with legal death in Islam (*al-mawt al-ḥukmī*). At this point the soul has lost control of the critical rational components of the body resulting in permanent loss of voluntary movements, coherent speech, and eyesight[10].

In 1985, the Islamic Organisation for Medical Sciences (IOMS) equated brain death with unstable life (*al-ḥayāt ghayr al-mustaqarrah*), allowing discontinuation of life-support systems but did not equate brain death with a formal declaration of legal death[61]. The IOMS reviewed its stand on the subject in 1996 and did not make any alterations to its original statement.

The term *al-ḥayāt ghayr al-mustaqarrah* contains the word *"ḥayāt"* meaning life, suggesting there is still life present.

2. Determination of legal death in Islam requires only dominant probability (*ghalabat al-zann*) and not certainty- "but it actually suffices to determine death as a predominant probability (*ghalabat al-ẓann*) from a pragmatic perspective"[10].

In his *fatwa* Butt[9] states the position of the four Sunni Islamic schools of jurisprudence is that where there is doubt regarding death, the declaration of death should be delayed until it can be positively ascertained. It would be reasonable to assume that equating brain death with death is surrounded by doubt and controversy. In practice it

may be impractical to archive absolute certainty, but we can try to achieve moral certainty.

3. Rashid points out that although intentional injury inflicted to an individual in a state of unstable life (*al-ḥayāt ghayr al-mustaqarrah*) is punishable in Islamic law, in the procurement of organs from such an individual who has given consent, because there is no intention to harm, his death is not being hastened as he is already legally dead, the action is for a good cause to benefit the life of another, so the punishment will be excused[10]. This, of course, assumes that unstable life (*al-ḥayāt ghayr al-mustaqarrah*) is accepted as legal death while the term itself suggests that there is life, even though death may be inevitable.

Although Rashid defends his position on the above three points in detail using the views of some past Muslim scholars, the higher-brain death criteria has not been adopted by any jurisdiction anywhere in the world even though it does have considerable support from Western scholarship. Muslims hold the legal rulings of their past scholars in very high regard, but these rulings must be in accordance with reality. The past Muslim scholars held the legal position that the maximum gestation period was 2-7 years or more, based on the knowledge available to them. The intention of these jurists may have been to protect the lineage, but no contemporary Muslim scholar would endorse this view as it defies current scientific knowledge.

If such a legal ruling was to be enacted in this day and age, it could mean a woman who was divorced 2 years ago, could bear a child out of wedlock and then claim child maintenance from her ex-husband with whom she has had no contact for 2 years, by attributing the child to him. Similarly, contemporary scholars have revised the legal rulings of past scholars on issues such as fast invalidators for medical interventions[62] as our understanding of the human anatomy has improved. An individual can be declared legally dead after missing for a period of time, but if he turns up alive, i.e., evidence of being alive, then he is alive despite being labelled legally dead[63].

The Rational of Equating Brain Death with Actual Death

The mainstream prevailing view is that death is a biological phenomenon, not a concept nor a theory. On that premise a logical approach to the problem would be to:

1. Define death based on a philosophical basis,
2. Determine the physiological criteria that satisfy the definition and,
3. Identify diagnostic tests required to determine when the physiological criteria have been fulfilled.

In science, when trying to understand certain difficult phenomena, we put forward a theory or a concept, and then proceed to check the validity of this theory with known observations and predictions to confirm or reject the theory. In 2008 The Academy of the Royal Medical Colleges justified declaring brain death as death because brain death will lead to "organ necrosis within a short period of time" and "cessation of heartbeat within a few days."[64] This obviously does not happen because in the vast majority either the life support is withdrawn, or essential organs are extracted. However, if the brain dead individuals are provided with nutrients and oxygen, they may maintain many functions which require a high level of biological integration. Jahi McMath[65], for instance, continued to grow while she was brain dead, and she underwent puberty. The organs of brain dead individuals, in many cases, do not undergo necrosis within a short period of time nor does the heart cease to function within a few days. These patients can be kept going for years in very rare cases.

Not quite brain dead...A new protocol for determining death to increase the organ donor pool

In the face of a crisis of organ shortage for transplantation, a new protocol for determining death was introduced to increase the organ donor pool in the early 1990s[66]. This is in effect a modification of the traditional cardio-respiratory criteria, and the criteria used by Bernard for the first human heart transplant. The protocol is referred to as donation after circulatory death (DCD). Controlled circulatory death (Maastricht class IV)[67] is applicable to organ donors who do not quite fulfil the criteria for brain death, or their facial injuries preclude the conducting of clinical tests for diagnosing brain death. If these individuals are not organ donors, then life-support measures would be withdrawn to allow them to die naturally. But because they are organ donors, artificial life support measures are maintained to preserve the organs until the time of organ retrieval. The life support measures are then stopped, allowing the heart and then the circulation to come to a standstill for a period which varies from 2-20 minutes (hands-off or no-touch time) depending on country and location, after

which the individual is declared dead, and the organ removal process commences. This controlled cessation of circulation time is to ensure brain death has indeed taken place by depriving the brain of oxygen, so the underlying criteria for declaration of death in these cases is still brain death even though the diagnostic criteria used to determine death is circulatory. Organ donation babies have been declared dead after as little as 75 seconds of circulatory arrest.[68] The underlying rationale for declaring death in these cases is that 75 seconds of circulatory arrest rules out auto-resuscitation and since no attempt is going to be made to resuscitate such a patient, death can be declared. It is important to point out that even though the heart of the donor was healthy enough to function in the recipient, it would have been impossible to restore the health of the dying donor.

Ethical objections have been raised by some experts in the field and some have cast doubt on whether these donors after circulatory death (DCD) are truly dead or not[69,70], particularly because heart transplantation does take place from donors declared dead using DCD criteria[71]. While other experts have defended the position that DCD patients are indeed dead[72]. Resuscitation research shows that 10–15% of patients recover with normal or only moderately disabled cerebral function when they are successfully resuscitated after more than 5–6 minutes of cardiac arrest[73,74,75].

Some of the strongest proponents of DCD practices, such as Bernat and colleagues, recognise that such issues "remain controversial and that they may change with further research and ethical analysis"[76] .

The Reality of Death in Religion

From a religious perspective, death is not a manufactured concept of the human mind. It is a reality created by the Almighty:

"*He, who created death and life that He may test you [to see] which of you is best in conduct. And He is the All-mighty, the All-forgiving.*" Quran 67:2

All three Abrahamic religions (Judaism, Christianity, and Islam) generally define death as the departure of the soul from the body[77,78]. This definition is fixed. The precise moment at which the soul departs from the body resulting in death is not accompanied by any physical sign that we can ascertain with precision for practical application, it is a metaphysical phenomenon. The diagnostic criteria used to determine the departure of the soul from the body will be dependent on medical advances and the technology available. Using advanced diagnostic methods to determine desoulment of the body is permissible from a religious perspective. The traditional method used to determine this endpoint was the irreversible loss of heartbeat and breathing. These diagnostic criteria are still accepted by contemporary religious scholars as reliable signs of departure of the soul from the body.

Concept of brain death v Reality of religious death

Death is a natural biological phenomenon not a concept nor a theory, this is the mainstream prevailing view. It is a reality created by God Almighty whereas brain death is a concept of the human mind. The reality of death is independent of the limits of the human mind to formulate concepts about it. The reality of death is independent of who declares death or how widely a particular concept or theory about death is accepted.

Scholars from all the three Abrahamic faiths have discussed the feasibility of brain death being equivalent to death with proponents and opponents of brain death in each of the three Faiths. The arguments in each Faith are complex and non-conclusive. The principles involved are shared amongst these three Faiths:

1. Intention of an action is very important in religion as actions are judged by intention. Why do we want to diagnose death at its earliest point?
2. In religion, prevention of harm takes precedence over doing good.

The taking of one life to save another life is not acceptable even if the life to be terminated is likely to be short.
In Islam killing one innocent person is akin to killing the whole of humanity; saving a life is akin to saving the whole of humanity[79].

In the words of Pope John Paul II, "the respect due to human life absolutely prohibits the directand positive sacrifice of that life, even though it maybe for the benefit of another human being who might be felt to be entitled to preference"[80].

In Judaism there is the principle of (one life may not be set aside to ensure another life).

3. Amongst the purposes of religious law is to protect life and resources.

4. The burden of proof that brain death is actual (religious) death is on those who declare brain death as actual death and not on those who do not accept brain death, to prove that the brain dead person is alive.

If brain death is to be accepted as death in religious law (Judaism, Christianity, or Islam) then we must consider two important questions:

1. On what religious basis can brain death be accepted as death?
2. Do the diagnostic criteria currently used in clinical practice to determine brain death fulfil the religious requirements?

It should be stressed that the mere presence of a beating heart of an individual does not imply that the individual is alive since it is possible to remove the heart from a body and keep it beating in a machine such as the Transmedics Organ Care system[81]. Similarly, the heartbeat and other biological functions start before ensoulment of the foetus which occurs at 120 days according to most Muslim scholars. So, the mere presence or absence of a heartbeat is not conclusive proof in itself that the soul is invariably present or absent from the body.

Fig. 2 below shows comparison of different death formulations (criteria) with reference to the presence or absence of generally accepted signs of life. Declaring patients "dead" solely on the basis of "a definition" seems to contradict our common sense of what it is to be alive.[82]

	Actual death	Formulations/ Criteria for death			
		Cardio-respiratory criteria	Whole brain criteria	Brainstem criteria	Higher-brain criteria
Irreversible loss of **all** brain functions	●	●	○	○	○
Irreversible loss of consciousness	●	●	●	●	●
Irreversible cessation of spontaneous breathing	●	●	●	●	○
Irreversible cessation of circulation	●	●	○	○	○
Irreversible loss of ability to maintain homeostasis	●	●	○	○	○
Irreversible decomposition of whole body	●	●	○	○	○
Increase in entropy in all organs	●	●	○	○	○
Irreversible loss of ability to grow	●	●	○	○	○
Irreversible loss of ability to absorb food	●	●	○	○	○
Irreversible loss of ability to excrete waste products	●	●	○	○	○
Irreversible loss of ability to fight infection	●	●	○	○	○
Irreversible loss of ability to heal wounds	●	●	○	○	○
Totally unresponsive to surgical stimuli	●	●	○	○	○

Fig. 2 Comparison of features associated with different formulations/ criteria for death in relation to actual death
● = Present / True ○ = Absent / False

Those scholars who accept brain death as death give different reasons for acceptance. These include:

1. Since brain death is accepted as death by a very large body of professionals then it is permissible to accept on the principle of customary law. We also have to rely on the opinion of the experts. Unfortunately, most professionals have not given much thought to what brain death is. The real experts on the subject disagree amongst themselves about the concept of brain death as death. I personally conducted a survey amongst 41 consultant anaesthetists at our hospitals at Manchester University NHS Trust. The response rate was 40/41. All consultant anaesthetists have had intensive care training and are familiar with the term brain death. 62.5% (25/40) of the respondents did not think that it is possible for a dead person to continue to grow, fight infections nor heal wounds. Yet, all these features are present in brain dead individuals.

   A formal survey, conducted by Joffe, of 192 American neurologists concluded that they do not have a consistent rationale for accepting brain death as death, nor a clear understanding of diagnostic tests for brain death[83].

2. The soul commands the body; with the permanent loss of consciousness, sentience (capacity to feel) and volition (capacity for decision making), it can be deduced that the soul has left the body.

   Rashid[10] while quoting al-Ghazali's work, *Iḥyāʾ ʿulūm al-dīn*, writes "The meaning of the soul parting from the body is the separation (*taṣarraf*) of the control of its actions from the body. The organs are tools of the soul to be used by it such as grasping with hands, listening with ears, seeing with eyes, and knowing the truth of things with the heart. And the heart here refers to the soul and the soul knows the things independent of an instrument. It is for that reason that it feels pain directly from the types of grief, distress and sadness and it enjoys varieties of happiness and pleasure."

   Butt[9] commenting on the same text writes: "Al-Ghazali presents cognitive functions as direct attributes of the soul without the medium of any part of the physical body. However, there is no clear scriptural basis for this, and this is rather pure conjecture which we know today to be untrue. Cognition, perception, volition, and thought are all functions of the cerebral cortex."

   Pallis, who produced the accepted criteria for brainstem death said that in his definition he used "loss of the capacity for consciousness" criteria because it is embedded in Judeo-Christian culture.[37]

   If we confine the definition of death to "the permanent loss of consciousness" in a religious context when we know that consciousness is a function of the cerebral cortex does that imply the seat of the soul is confined to the cerebral cortex?

3. Some religious authorities have put forward their own criteria of what constitutes brain death. So, it seems on the surface they accept brain death as death, but they do not accept the diagnostic criteria used to determine brain death in clinical practice, so in reality, they reject brain death as it is practiced in clinical medicine.

   The IIFA-OIC[4] (Amman, 1986) and ECRF[7] (Dublin, 2000) *fatawa* (legal edicts) accepted brain death as death with the condition that all brain functions have ceased, and the brain has started to degenerate in the case of IIFA-OIC.
   The Pope John Paul II made a similar statement, "the complete and irreversible cessation of all brain activity, if rigorously applied, does not seem to conflict with the essential elements of a sound anthropology[84]."
   The diagnostic criteria used for brainstem death and whole brain death in practice do not test for cessation of all brain functions. In fact, it is well known that in the diagnosis of brain death some brain functions continue to persist.
4. Some scholars who accept the concept of brain death as death but do not consider the current diagnostic tests used to determine brain death as sufficient and stipulate additional tests such as angiographic scanning.
5. Brain death is physiological decapitation. Shewmon has argued, "the 'physiologically decapitated' brain-dead body is just as much a living 'organism as whole' as a body with high spinal cord transection, the difference being the former is comatose and the latter is conscious"[85]. He has also argued that the decapitation analogies, "in the final analysis are irrelevant to understanding clinical brain death, in which no such separation is involved." "Brain-body disconnection, which is the essence of the 'physiological decapitation' analogy, brings to light a number of paradoxes or mental (logical) disconnects between mainstream brain-death theory and mainstream brain-death practice."[85]

6. The brain contains the respiratory centre, so brain death is akin to permanent cessation of capacity for respiration which is considered as death in religion. Permanent loss of capacity for respiration is also present in an individual inflicted with a high cervical cord lesion whom no one would consider dead, they live out their lives on a ventilator as did Christopher Reeve after sustaining a C1-2 injury in 1995, which left him paralysed from neck down with permanent loss of capacity to breathe. He died in 2004 following an allergic reaction to an antibiotic.
7. The Muslim Law Council (UK), in its 1995 *fatwa*, accepted brainstem death as death in Islam in the context of organ transplantation. It stated, "The Council accepts brainstem death as constituting the end of life for the purpose of organ transplant." The Council provided no details of the reasoning behind their decision. It also raises the question: Should the declaration of death of an individual be dependent on whether he or she is an organ donor?

Despite widespread acceptance of brain death as death in modern medicine, a number of prominent Islamic fiqh councils around the world have rejected brain death as religious death, including the Indian fiqh academy[86], IFFA-OIC[4], IFFA-MWL[5], FCNA[9] and ECFR[7] as well as some Christian and Jewish bodies.

Verheijde and Potts concluded that: "It is therefore possible that heart-beating organ procurement from patients with impaired consciousness is de facto a concealed practice of active euthanasia and physician-assisted death, both of which, either concealed or overt, the Catholic Church opposes."[87]. The US Halacha Committee of the Rabbinical Council of America and the UK London Beth Din have rejected the concept of brain death as actual death.[88]

For the proper functioning of a modern civil society, it is necessary to draw a line in the dying process to differentiate between the living and the dead. Where exactly this line is drawn will vary depending on which country you are in, and it is based on local socio-political factors. The position of this line can be changed to better serve and reflect the needs of the local community. It comes down to what the local population will accept as death, and this can change with time. The status of being alive or dead determines the statutory rights of an individual in society. The declaration of legal death is not synonymous with actual death.

Similarly, the legal age of majority has been fixed by different countries from 15 years to 21 years, but this is not necessarily the same as the actual biological transformation from childhood to adulthood, nor the age of majority set by different religions.

The danger of using man-made concepts is that man-made concepts change with time and location whereas reality is constant. An individual declared dead in the UK using brainstem criteria is not considered to be dead in the USA nor Australia nor Europe. Prior to 1979, a brainstem dead person was not considered to be dead in the UK but after 1979 the same person with the same severity of disease became dead.

Implications and strategies used to increase organ donation rates in the Muslim community

Advocates of organ donation in the past have suggested strategies to improve organ donation rates amongst Western Muslims. These strategies include re-interpretation of religious texts associated with organ donation and educating the public about the subject. This has happened to a certain extent. But the religious texts on death cannot be re-interpreted in the same way as for organ donation.

Figures from NHSBT (UK) show that there is a huge need for donated organs especially for ethnic minority patients[89]. This fact, in combination with highlighting that there are so many different scholarly opinions (*fatawa*) on organ donation[90], albeit in various scenarios, allows individuals to pick and choose a *fatwa* which fits the purpose. However, not mentioning brain death at all when promoting organ donation amongst Muslims is a serious omission, because those Muslim scholars who consider deceased organ donation as permissible do require the donors to be Islamically dead as a condition of permissibility before essential organs are removed. The organ donation campaigns and internet sites "provide positive reinforcement and promotional information rather than the transparent disclosure of organ donation process"[91].

The story of Elijah Smith[92,93]demonstrates the importance of the public adequately understanding what the process of organ donation involves. Elijah Smith, a 22-year-old man was declared brain dead following a serious road traffic accident in 2013 in Ohio, USA. He had agreed to be an organ donor when applying for his driving licence the year before his fatal accident. When the local hospital made arrangements to remove his organs the parents of Elijah Smith, who were not against organ donation,

objected because they did not think he was dead yet. According to Mrs Smith, her son did not understand what he was agreeing to when he registered as an organ donor, and that, had he understood that organ removal takes place while on a ventilator and with a beating heart, he would not have registered as a donor. Elijah Smith's organs were removed under a court order against the wishes of his parents. Signing an organ donor card is akin to writing a Will, relatives cannot override the decision of the organ donor.

Fortunately, this would not happen in the UK under the deemed consent law because the NHSBT is committed to supporting the faith and beliefs of individuals throughout the organ and tissue donation process.

Concluding remarks

For the advocates of brain death, the advent of brain death was a great scientific discovery, the story of a lost paradise. For the critics of the brain death concept, the brain death story is one of deception and betrayal, a definition that defies scientific truths, invented to serve the needs, and demands of the transplant community. It was not scientific objectivity but professional interests that governed the implementation of brain death policies[94]. Both narratives these are true to a certain extent.

As the definition of death has evolved over time this may indicate that death cannot be accurately defined, and the only stable definition may be "irreversible cessation of life." Which would imply any signs of life precludes the diagnosis of death.

In its current form, the brain death concept has inconsistencies, leading to allegations of legal fiction by some commentators[44]. There have been calls to revise the legal statutory definition of death in USA[95] or to abandon the dead donor rule[96,97,98]. Some academics have advocated entirely dropping the neurological determination of death[99] and relying on the much simpler cardio-respiratory formulation contained in the first part of the Uniform Determination of Death Act. The cardo-respiratory criteria, of course, is problematic in that both the heart and lungs can be re-animated and should human life be reduced to just two organs? The chief advantage of such an updated traditional approach, according to proponents, is that it most adequately characterizes the difference between life and death.

Even Bernat, perhaps the staunchest defender of brain death acknowledges that the brain death paradigm is flawed[100], as do other prominent commentators such as Seifert[101], Potts, Byrne, and Nilges[102], Joffe[103] and Shewmon[104].

There is no underlying biological rationale for why brain death should be taken as actual death, none of the underpinning criteria put forward by the proponents stand up to scrutiny. The justification that brain death is death because the brain is the central integrator[28]of the body is not valid[30], the body does not disintegrate without a working brain; the rationale that the concept of brain death depended on this close temporal association between brain death and cardiac arrest[64,105] is invalid, brain dead individuals' hearts can keep beating for years; the destruction of the respiratory centre in the brainstem leading to permanent loss of capacity to breathe is not a valid reason; what we are left with is the permanent loss of consciousness as the only defensible rationale philosophically but rejected by medicine. The fact that children born with no cerebral cortex have displayed consciousness with voluntary motor movements[50,51] undermines the core basis of the higher brain death theory. What are we left with? A purely brain based definition of death is neither feasible nor necessary. The brain death concept has been a pragmatic approach with no credible underlying justification. It has solved a problem and served the needs of society in which it operates for over 50 years. From a secular utilitarian approach, whether brain death is actual death or not, is not so important, the important thing is that it is widely accepted by the public, it allows extraction of living organs from individuals declared dead and protects doctors against any charge of homicide. The dead donor rule for organ donation is important to the public even though its application may be questionable. Brain dead (whole brain or brainstem) individuals are as good as dead. They will never recover brain-dependent functions, including the capacity to breathe and the capacity to exhibit even minimal signs of conscious life. In the eyes of the law, they can be seen as dead and dead enough to remove their valuable organs. Making any changes for greater consistency, accuracy, truthfulness, and transparency risks undermining public confidence.

If greater consistency, accuracy, truthfulness, and transparency is a goal, one solution would be to disaggregate death from "death behaviours". So that organs could be removed, life support could be unilaterally withdrawn by doctors when a patient fulfils the criteria of brain death without declaring them dead.

This would mean abandoning the "dead donor rule" for organ retrieval. Such a policy would not be without risks.

And such an approach may not sit well in a religious context in which the sanctity of life is paramount. All brain dead individuals are not all the same, the severity of the medical condition varies. It is unlikely that pure brain dead individuals with all the other organs and systems functioning near normal are truly dead. Whether or not the soul has departed from an individual declared brain dead is impossible to ascertain with certainty. The only statement anyone can make for certain on this issue is that no one knows for sure. Labelling them "legally" dead does not change the reality. Legal death is not synonymous with actual death.

The *fatawa* of contemporary Muslim scholars would indicate that medical science has not yet reached a sufficient level of understanding of death to justify creating a new standard for legal death in Islam. The study of the evolution and analysis of the criteria underpinning the brain death theory supports this position. The brain death theory is not a medical fact but a value judgment, a conclusion looking for a justification. It may be that the true definition of death cannot be reduced to the isolated failure of one or two organs but the failure of multiple bodily systems to the "point of no return," meaning no amount of medical effort can prevent the body from losing its integrity to maintain homeostasis, and resist entropy and disintegration[33,106]. The real integrator of the whole body is not the brain but the soul. To identify the "point of no return" with precision is elusive and may be impossible.
Rashid's approach to the problem has been to resort to the opinion of some Muslim scholars of the past in trying to define death, because "it is important to understand that Muslims accept a legal definition of death not a scientific one,"[10], and to put forward the idea of two deaths (*hukmī* and *haqīqī*).Rashid states, "The permanent loss of consciousness" is legal death in Islam[10]. Such a philosophical approach requires no reference to the brain. It is based on the notion that the soul is the administrator of the body responsible for higher cognitive function, sentience (capacity to feel) and volition (capacity for decision making). Such a position is analogous to the higher brain death put forward by some western philosophers and from an Islamic perspective it seems to limit the seat of the soul to the higher brain. No jurisdiction has ever accepted higher brain death as legal death.

Brain death or the determination of death by neurological criteria remains controversial scientifically, culturally, and legally, worldwide[107].Most commentators agree that death should not be treated merely as a legal construct nor as a matter of social agreement but instead, the standard used for determining death must be defensible on biological as well as philosophical grounds. If an individual is declared dead based on a particular criterion of death but continues to display obvious signs of live, then the criterion should be reviewed.

It would be helpful for the UK Muslims if a national body of UK Islamic scholars together with appropriate expertise from other specialists could issue a unified ruling on the issue of brain death in the context of Islamic death as the Fiqh Council of North America has done for the Muslims in the USA.

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Bone Fractures in ibn-Sina Medicine

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Abstract

Ibn Sina, or Avicenna as he is known in the west, was a well-known Islamic philosopher and physician. He composed 276 works, the most famous of which is "al-Qanun fit-Tibb." This paper highlights the bone fractures that may occur, described in ibn Sina's book "al-Qanun," and reveals his accomplishments and contributions to this field of medicine, especially in what is called now the Theory of Delayed Splintage.

Introduction:

Ibn-Sina, or Avicenna as known in the west, was born in the year 980 A. D. in Afshana near Bukhara in Turkistan, which is now called Uzbekistan. He left Bukhara when he was 21 years of age and spent the rest of his life in various towns in Persia.

When he died in the year 1037, he was known as one of the greatest philosophers in Islam, and in Medicine he was so highly regarded that he was compared to Galen, so he was known as the Galen of Islam. Because of his great celebrity, many nations disputed and competed to celebrate his anniversary.

The Turks were the first who revived his anniversary in 1937, when they held a great meeting for the occasion of nine hundred years after his death. Then Arabs and Iranians followed them by holding two festivals in Baghdad in 1952, then in Tehran in 1954. To appreciate his contribution in developing the philosophical and medical sciences, in 1978 UNESCO invited all its members to celebrate the anniversary of one thousand years since his birth. All the members participated in the celebration, which was held in 1980.

Ibn-Sina composed 276 works: all of them written in Arabic except very few small books written in his mother tongue Persian. Unfortunately, most of these works were lost, but there are still 68 books or treatises available in the eastern and western libraries.
He composed in all branches of science, but he was more interested in philosophy and medicine. Some recent historians consider him more a philosopher than a physician, but others consider him to be a prince of the physicians during the Middle Ages.

The classification of ibn-Sina's works according to their content is as follows:
43 works in medicine, 24 in philosophy, 26 in physics, 31 in theology, 23 in psychology, 15 in mathematics, 22 in logic and 5 in the interpretation of the Holy Koran. In addition, he published many treatises in asceticism, love, music, and some stories too.

Al-Qanun fit-Tibb

Al-Qanun fit Tibb (or Code of Laws in Medicine) represents the most important work of Ibn-Sina, which is written in Arabic, and as William Osler described it, the most famous medical textbook ever written [(1)]. This book is considered a unique reference or document containing all medical knowledge, as it accumulated through many civilizations until the time of Ibn-Sina himself.

In his way of explanation, ibn-Sina was very close to the

way which modern medical textbooks follow regarding classification, causes of diseases, epidemiology, symptoms and signs, treatment, and prognosis. In this respect we can say that the excellence in its arrangement and comprehensiveness made al-Qanun book the most widespread in the Islamic and European countries.

Al-Qanun book was known to the Europeans through the Latin translations of Gerard of Cremona, in the 15th century, and remained in use in medical schools at Louvain and Montpellier until the 17th century. According to the Journal of UNESCO, October issue, 1980, Al-Qanun remained in use in Brussels University until 1909.

By the 12th century, awareness set in that these compendia were too large to be really useful for ready reference. Consequently, epitomes of al-Qanun were produced to make the ideas more quickly accessible, and commentaries were written to clarify the contents. The most popular of all the epitome of al-Qanun was that called Kitab al-Mujaz fil Tibb or the Concise Book in Medicine. It was written in Syria by ibn-al-Nafis, who died in 1288.

Ibn-Sina begins his book al-Qanun by defining medicine and saying: Medicine is a science, from which one learns the states of the human body, with respect to what is healthy and what is not, in order to preserve good health when it exists, and restore it when it is lacking.

The Al-Qanun book consists of five books, the first concerned with general medical principles. The second with materiamedica.The third with diseases occurring in a particular part of the body. The fourth on diseases not specific to one bodily part (such as fevers), in addition, to traumatic injuries such as fractures and dislocations of bones and joints.With the final book containing a formula giving recipes for compound remedies.

Ibn-Sina devoted two treatises in the fourth book of al-Qanun, to fractures. The first treatise is entitled: “Fractures as a Whole”, and the second is “Fractures of Every Bone Separately”.

In the first treatise, he described the causes, types, forms, methods of treatment, and complications of fractures. While in the second treatise, he determined the special characteristics of fractures of each bone. Ibn Sina, by this way of explanations, was very close to following the format of modern medical textbooks.

The first treatise: Fractures as a Whole

Ibn Sina defined a fracture as a loss of continuation in the bone [2]. Then, he determined the types of fractures such as transverse, longitudinal, or comminuted. When he talked about symptoms and signs of a fracture, he considered the pain, swelling, and deformity of the limb to be of great importance to the diagnosis.

In this chapter, Ibn-Sina distinguishes the fractures that reach the joint line. He says: “If the fracture was at the joint line and healed, the movement of the joint could be difficult as the rigidity of the callus needs more time to become soft,” [3]. It is well known now that fractures that occupy the joint line, cause stiffness of that joint after they heal, unless convenient physiotherapy is applied to the limb.

Factors that stimulate and inhibit bone healing

Ibn Sina mentions that fractures of children heal more rapidly than those of adults. He determined the time span necessary for bone to heal.

He said, for example, a nose bone fracture needs 10 days to heal, a rib needs 20 days, a forearm needs 30 to 40 days, and a femur needs 50 to 120 days. It is clear that these figures are similar to those written in modern medical textbooks.

At the end of the chapter, he pointed out the factors that negatively affecr bone healing, such as the lack of a splint at the site of the fracture, quickness in moving the affected limb, loss of blood (anemia), and the existence of a disease in the body [4]. These factors, and others, are now considered to have a considerable role in delaying bone healing.

Principles of splinting the bone

In this chapter, Ibn Sina talked about treating a bone fracture by splinting it. He warned the physician against over-tightening the affected limb, which could cause gangrene.

In respect to what is now called an open fracture, he pointed out the importance of taking care of the wound more than the fracture. If the fracture was complicated by hematoma formation, Ibn Sina advises the bone setter to make an incision at the site of swelling to allow the blood to get out.

In this chapter, Ibn Sina also focuses on a very important issue in the treatment of comminuted fractures. He said if the fracture is associated with a sequestrum, and is painful, it has to be mended and reduced into its position. If this is impossible, the sequestrum has to be excised using a thin saw or by drilling many holes at the base. Whatever the method, the physician has to be very careful not to injure an important structure. Sometimes the sequestrum is not visible; remarking the discharge from the wound can identify its position. In such cases, the wound must be enlarged to allow the removal of sequestrum [5].

Recommendations to the bone setter

Before treating any fracture, Ibn Sina advised that the physician should inspect and examine the fracture accurately and splint it quickly, because fracture reduction will be more difficult, and complications may develop if there is a delay.

At the same time, Ibn Sina drew attention to the necessity of not splinting the fracture immediately. He advised postponing it beyond the fifth day or more, until the swelling disappears. This is now called the Theory of Delayed Splintage, and Professor George Perkins is considered the pioneer of this theory today [6].

Fractures associated with a wound (open fractures)

In this chapter, Ibn Sina talked about treating fractures associated with a wound. He stressed the necessity of not applying a splint to the wound; ointment should be put on first, then the wound may be covered by a special dressing that would let out the wound discharges and allow the physician to apply medicine.

This method of treating open fractures as described by ibn-Sina is similar, in many aspects, to that used today, except the use of antiseptic procedures during the course of treatment.

Mal-union fractures

What ibn-Sina meant by mal-union fracture was a fracture that is joined in a non-suitable position, allowing the limb to become deformed. To treat this case, he suggested breaking the bone again at the site of old fracture and splinting it properly. If the callus is hard, this method should be avoided, otherwise a fracture may occur elsewhere. In such cases, ibn-Sina advised the bone setter to apply a material that softens the callus until the limb can be splinted in the correct position.

Today, all types of mal-union are treated surgically.

The second treatise: Fractures of every bone separately

Skull fractures

Ibn Sina clarified that a skull fracture may happen even if the skin above it is still intact. In such cases, a hematoma may develop under the skin. The physician should not omit fracture treatment because this may lead to bone decay. The patient may complain of tremors and mind loss. In such cases, ibn Sina advised the operator to make an incision at the site of fracture to treat it. Next, he described the signs of skull fracture such as unconsciousness, dizziness, and speech loss.

At the end of this chapter, ibn Sina said: “If the fracture is severely comminuted it should be completely excised, but if is linear and distended you should not widen the incision, as no damage could result from the fracture.” [7]

Mandible fractures

The method Ibn Sina described for treating these fractures resembles what is used today, except in some modern special surgical techniques. In this respect, he said that if the fracture is in the right side and displaced internally, the physician must insert his left index and middle fingers into the patient’s mouth to elevate the fracture edge outward. The complete reduction could be identified by a good occlusion of teeth.

If the fracture is comminuted or associated with a wound, ibn Sina said to make an incision at the fracture site and remove any sequestrum that may be present.

He advises the physician to suture the teeth using a gold wire in order to stabilize the correct position of the mandible. The patient is asked to remain at rest and avoid speaking. His diet should be liquids. The mandibular bone needs three weeks to heal; it is filled with bone marrow.

Nose-bone fractures

Ibn Sina stated that a delay in treating a nose-bone fracture may lead to tilting of this bone, and anosmia may develop. So, he insisted on treating this fracture during the first 10 days. If the fracture is comminuted, and the reduction is impossible, the bone setter should incise the skin and remove all the comminuted bone.

Clavicle fracture

Ibn Sina's treatment of clavicle fractures is extremely different from those known today. He considered clavicle fractures difficult to splint. He described a long method to achieve a complete reduction. Today, this fracture is considered easy to treat, and complete reduction is not required to achieve healing.

Shoulder fractures (fracture of scapula)

Ibn Sina said: "The shoulder is rarely fractured in its broadest part, but its borders and sides are commonly affected. The most common signs are pain and crepitation on palpation, and the patient may complain of anesthesia in the hand. This fracture is treated by pushing the shoulder from the anterior aspect as a trial to reduce it; otherwise, the physician has to use cupping glasses in order to tract the fractured part posteriorly. In cases of existence of some painful bone fragments, they should be excised. After the treatment, the patient is asked to sleep on the intact side." [8]

Now all types of scapular fractures need no more treatment than rest until the pain subsides.

Fractures of the sternum

Ibn Sina classified this fracture into types:

1. An isolated splitting fracture, which is diagnosed by the existence of crepitation on palpation.
2. A fracture that is displaced anteriorly and may cause bad symptoms such as difficulty in breathing, dry cough, and, sometimes, hemoptysis

The treatment of this fracture is similar to that of the shoulder.

Rib fractures

In this chapter, Ibn Sina stated that the seven true ribs are fractured at their lateral sides, while the false ribs are fractured at their medial sides. The diagnosis of a rib fracture is very easy to determine by palpation, which allows the physician to feel abnormal movement at the fracture site. The patient may complain of pleurisy and hemoptysis.

The treatment is accomplished by using cupping glassing to tract fractured rib. If the bone is compressing the diaphragm, the skin must be incised to excise carefully that bone.

Vertebral fractures

Ibn Sina talked about vertebral fractures very briefly, perhaps because of the rarity of information about these fractures at that time. He attributed all this information to Paulus Egine (who is famous surgeon from the Alexandria school who lived in the 7th century and wrote a medical book containing seven treatises on surgery and obstetrics, translated into Arabic by Hunin ibn Ishaq). [9]

Ibn Sina drew the physician's attention to the danger of this type of fracture that could cause death if the cervical vertebrae were involved.

Finally, he described the method for reducing coccygeal fractures by inserting the left index finger into the patient's rectum.

Humeral fractures

Ibn Sina elucidated that this fracture often tilts outside, so the physician must reduce it according to this tilting. It should be stabilized by using three bandages; the first one is ascending while the second is descending and the third is ascending. The upper limb must be stabilized in an angular shape with a sling. It is better to stabilize it to the chest to prevent movement.

After seven to 10 days, the bandages should be released and replaced by applying suitable splints for another 40 days.

Forearm fractures

Ibn Sina said: "Both ulnas or one of them may be fractured. The fracture of the inferior one is more bad, while the fracture of the superior one is more easy to treat." [10] At that time, the bones of the forearm were called the superior ulna (radius) and the inferior ulna (ulna).

Ibn Sina explained the methods for stabilizing the fractured forearm. He said not to tighten the bandage too much, otherwise severe swelling of the fingers may develop, and not to loosen it, so no swelling at all may appear. After that, he explained a very important item that still occupies a considerable role in the field of treatment of forearm fractures: the necessity of not applying the splints so they extend beyond the base of the fingers, which may cause these fingers to become stiff.

After accurate reduction and complete stabilization are achieved, ibn Sina advised the physician to sling the

affected forearm to the neck in an angular shape by using a wide rag so that it covers the whole length of the forearm. Forearm fractures heal quickly (within 28 days).

Wrist fractures

Ibn Sina said: "These bones rarely fracture, as they are very hard. And if they severely injured, dislocation may result, which could be treated as we had said in the dislocation section." [11]

It is well known today that wrist fractures are extremely rare, except for scaphoid fractures, which cannot be diagnosed without performing an X-ray on the wrist joint.

Finger bone fractures

In this chapter, ibn Sina said that finger bones are affected more by dislocation than by fractures. To treat finger fractures, the patient is seated on a high chair and is told to put his hand on a flat chair, an assistant should extend the fracture bones, and the physician reduce them with his thumb and index fingers.

Ibn Sina pointed to what is called "Bennet's fracture 1982" when he said, "If the fracture was in the thumb and was displaced inferiorly, then you have to use the broad bandage from above to prevent the occurrence of the hot tumor." [13]

Ibn Sina said if the fracture is in the thumb, it should be bound to the hand; If it is in the index or small finger, it should be bound to the nearest finger.

Broad bones and hip fractures

This chapter represents the cases of central hip fracture-dislocation and fracture of the sacrum, which was called the broad bone at that time.

Ibn Sina said a central hip fracture-dislocation rarely occurs. The injured patient may complain of severe pain and anesthesia in his leg and thigh, resembling that of an arm or shoulder fracture.

In order to achieve a good reduction in broad bone fractures, he said the physician should put the patient in a prone position, and two strong people should tract the patient's two thighs while two other people use splints to try to reduce the fracture and put on the bandages.

Femur fractures

Ibn Sina said: "If the femur fracture needs severe traction to reduce it to the normal position, which is convex in its lateral side and concave in its medial side, the traction should be upward to be more effective." [14]

He said that when this fracture occurs, the distal fragments displace anteriorly and outside because the femur is broader at that side.

After the reduction is achieved by applying severe traction, a bandage should be applied above the fracture and another one below it if the fracture is in the middle of the femur.

Femur fractures heal within 50 days. The most common complication is deviation at the fracture site.

Patella fractures

Ibn Sina said: "The patella is rarely fractured, but it is sprained frequently. The fracture is diagnosed by the presence of crepitation, which can be palpated or heard. In respect to treatment, the leg should be extended, then the patella be reduced. But if the fracture was comminuted, the fragments should be gathered first then reduced." [15]

Al-Razi (who lived before ibn Sina) is considered the first who pointed to excision of patella before Brook (1903). [16]

Leg fractures

Ibn Sina stated that fractures of the small bone of a leg (which is now called the fibula) are better than fractures of the big bone (tibia). If the fracture is in the upper part of the tibia, the deformity is outside and anterior, and walking is possible. If the fracture is in the lower part of the tibia, the deformity is posterior and outside. If the fracture is in both bones, the situation is bad, and the deformity may be at any direction.

He said the physician should apply traction to reduce the fracture in the same method used for forearm fractures.

Talus fractures

In this chapter, Ibn Sina said the talus is protected against fracture because it is solid and surrounded by structures that guard it. This bone may be dislocated.

Today, this fracture may happen rarely; its diagnosis is difficult unless an X-ray is performed.

Calcaneus fractures

Ibn Sina said: "Calcaneus fracture is a bad case as its treatment is difficult. It occurs when a person falls down on his feet from a high place. It may cause severe signs like fever, confusion, tremor, and spasm. After Calcaneus fracture unites walking becomes difficult." [17]

This fracture is now called a parachutist's fracture. The most important complication of this fracture is the difficulty it causes in walking, due to the development of osteoarthritis in the talo-calcaneal joint after the union of this fracture.

Toe fractures

This is the last chapter on fractures. In this chapter, ibn Sina pointed out that the treatment of toe fractures is like that of the fingers.

Conclusion

A survey was conducted to find out the most important points related to fractures as described by ibn Sina in his medical book, al-Qanun-fit-Tibb.

From this survey we can conclude:

1. Ibn Sina played an important role in keeping the medical heritage that developed over thousands of years. His medical book, al-Qanun-fit-Tibb. represents a unique reference document containing medical knowledge in general and traumatology in particular as it accumulated through many civilizations until the age of ibn Sina.
2. In his way of explanation, ibn Sina was very close to the way which modern medical textbooks follow. At the beginning, he talked about fractures in general. He described their cause, types, forms, methods of treatment, and complications. Then he described the fractures that occur in every bone.
   In this respect, one can say that the excellence in its arrangement and comprehensiveness made al-Qanun the most widely used medical textbook in Islamic and European countries until the 17th century.
3. Ibn Sina drew attention to the necessity of not splinting the fracture immediately, advising postponing it beyond the fifth day. Today, this is called the Theory of Delayed Splintage; now Professor George Perkins is considered the pioneer of this theory.
4. Ibn Sina talked about what is now called "Bennet's fracture 1882." We know that neither al-Razi before him, nor ibn al-Quf after him, had described this type of fracture, this means that ibn-Sina is considered the first who described this fracture nearly one thousand years before Bennet.

In the west, it had been said: "Anyone who wants to be a good doctor must be an Avicennist." A word of truth was written by the European Physician De Poure who declared: Medicine was absent until Hippocrates created it, dead until Galen revived it, dispersed until Rhazes (al-Razi) collected it, and deficient until Avicenna (ibn-Sina) completed it.

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Ibn Al-Nafis - The First who described the Pulmonary Blood Circulation

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Abstract

The history of the discovery of pulmonary circulation is a complex one. Although this discovery is attributed to Servetus, Vesalius, Colombo and Harvey, the pioneering role of Ibn Al-Nafis al Quraishi, a 13th century physician and scholar deserves more attention. This article examines his contributions to the discovery of pulmonary circulation and the progress that was made a few centuries before Harvey. It also shows his contribution to description of the coronary arteries for the first time. Europe was lagging behind the Muslim world in scientific discoveries during the Medieval era and this article demonstrates that the work of scholars in post Renaissance Europe would have been impossible were it not for the discoveries of Ibn Al-Nafis.

Introduction

Ala-al-Din Abu al-Hasan Ali Ibn Abi al-Hazm al-Qarshi al-Dimashqi (known as Ibn Al Nafis, and by his nisbah, al Qurashi) was born in 1213 CE in Damascus. He was educated at Bimaristan Al-Noori, the medical college hospital founded by Noor al-Din Al-Zingi. At the Bimaristan he was taught by the renowned physician Al Dakhwar. As well as medicine, Ibn al-Nafis studied Islamic sciences, literature and theology. He thus became an expert on hadith, the Shafi'i school of Islamic jurisprudence and as well as a reputed physician. [1]

In 1236, Ibn Al Nafis moved to Egypt where he worked first in Al-Nassri Hospital and then in Al-Mansouri Hospital where he became Chief Physician. He also held the role of personal physician to the sultan. When he died in 1288 CE, he left his house, library and clinic to the Mansuriya Hospital [1]. He was a contemporary of the polymath Ibn Abi Usaibia with whom he worked at the Mansuriya. [1, 2]

Usaibia was a poet, biographer and physician. His work 'Uyoon al-Anbaa fi Tabaqat al-Atibbaa' was a thorough biographical account of physicians from the early Greco-Roman period to his contemporaries. Interestingly, he did not mention Ibn al Nafis in his book. [3]

Ibn Al Nafis lived at an interesting time in Muslim history. Referred to as the 'Islamic Golden Age', this was a time of great development in thought, particularly scientific throught, across the Muslim world. While little

is known about Western medical advancement in the period intervening the 'fathers' of medicine such as Hippocrates and Galen and renaissance physicians, advancements in the Islamic world were flourishing. In the Western world, Galen's ideas were still being propagated at Cambridge University until at least the 16th century. Damascus and Cairo, where Ibn Nafis spent much of his life, as well as Baghdad were the centres of the Golden Age. Another point of interest is that Ibn al Nafis lived during Ayyubid and Mamluk rule in Egypt, a fascinating time in Muslim history. [4]

Ibn al Nafis was a prolific writer and the most ambitious of his works is *Al-Shamil fi al-Tibb*. This was an ambitious project intended to be an encyclopedia of 300 volumes. Ibn Al Nafis only completed 80 before his death, of which three remain today. The manuscript is currently in Damascus. While this is his ambitious work, perhaps his most important is the commentary on Ibn Sina'sQanun fi Tibb. He called his commentary on The Canon 'SharhMujaz al Qanun'. He wrote another commentary on the anatomy in the Canon and this was named 'SharhTashrih al Qanun'. It is in the Tashrih that his description of the pulmonary circulation is found.[4]

He wrote extensively on both Islamic law and medicine. 'The Autodidact Theologian', a work described as a philosophical science fiction, was written in response to Ibn Tufail's 'Hayy ibn Yaqzhan'.[4]

As well as commenting on Ibn Sina, Ibn Nafis also wrote commentary on Hippocrates, epidemiological work 'Of the Epidemics', 'SharhKitab al Epidemia'. He could access this in Arabic, as a translation by Ibn Ishaq was available. A copy dated from the 19th century is at the Egyptian National Library and Archives. Ibn Nafis attempted to expand on Hippocrates' idea, attempting biological explanations for the causes of disease due to 'imbalances'. In terms of epidemiology, he described the exposure-outcome relationship and provided comparisons between Hippocrates examples, and cases and outbreaks Ibn Al Nafis experienced in the Damascene context. He further commented on another of Hippocrates works on epidemiology, 'Aphorisms'. Here, he again attempted to offer biological mechanisms by which external factors mentioned by Hippocrates, such as climate, could exert a role in disrupting health. [5]

Among his original works, two of note are Al Muhadhab fi al-Kohl, a work on ophthalmology and Kitab Al-Mukhtar Min al-Aghdiyah, on nutrition. His authorship extended into Islamic sciences. He wrote a book on principles of hadith entitled 'Al Mukhtasar fi IlmUsul al Hadith'. [6]

Perhaps Ibn Al Nafis' most significant contribution to medical science was his original discovery of the pulmonary circulation.

This was re-discovered by western scientists after a lapse of three centuries. He was the first to correctly describe the constitution of the lungs and gave a description of the bronchi and the interaction between the human body's vessels for air and blood. He also elaborated on the function of the coronary arteries as suppliers of blood to the cardiac musculature.

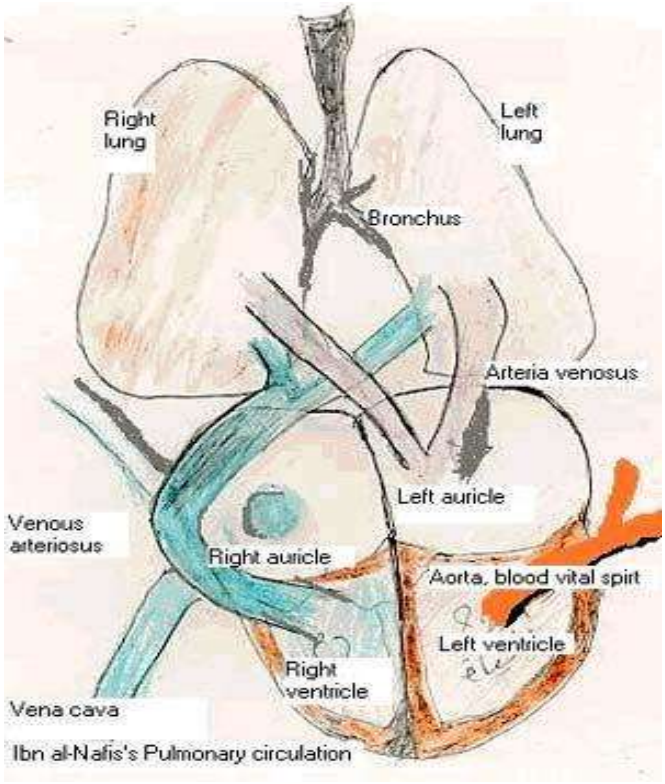

Figure 1: Ibn Nafis's Concept of Pulmonary Circulation. (7)

Discovery of the Pulmonary Circulation

The discovery of pulmonary circulation has a complex history. It is commonly believed that this discovery was made in Europe in the sixteenth century by Servetus. It is reported he was burned at the stake as a result of this discovery, as it was in opposition to the prevailing biblical beliefs of the time. Vesalius, Colombo, and finally Harvey are all credited to various degrees with discovering the pulmonary circulation. However, subsequent to the study of ancient manuscripts, it is

proposed that the real credit for the discovery of the pulmonary circulation belongs to an eminent physician of the thirteenth century: Ibn Al Nafis.[4]

In 1924 an Egyptian physician, Dr. Muhyo Al-Deen Altatawi, discovered a manuscript entitled, "Commentary on the Anatomy of Canon of Avicenna" in the Prussian state library in Berlin while studying the history of Arab medicine at the medical faculty of Albert Ludwig's University in Germany [4, 8, 9]. In this work, Ibn AnNafis shows his aptitude as he expounds on anatomy, pathology and physiology in detail. The discovery of this manuscript revealed an incredible historic finding - this was the earliest known description of the pulmonary circulation. Max Meyrhof, an orientalist in Cairo came to know of Dr Tatawi's and took it upon himself to make translations in English, French and German. [4]

Prior to Ibn Nafis' discovery, the accepted contemporary understanding was that of Galen. He had theorised that the blood reaching the right side of the heart passed through invisible pores in the cardiac septum to the left side of the heart where it mixed with air to create 'spirit' and was then consequently distributed to the body. According to Galen's view, the venous system was quite separate from the arterial system, except when they came in contact through the unseen pores [4, 10].

However, Ibn Al-Nafis, based his understanding of pulmonary circulation on scientific reasoning and his knowledge of anatomy. Haddad and Khairullah translate from his writings as follows:

"...The blood from the right chamber of the heart must arrive at the left chamber but there is no direct pathway between them. The thick septum of the heart is not perforated and does not have visible pores as some people thought or invisible pores as Galen thought. The blood from the right chamber must flow through the vena arteriosa (pulmonary artery) to the lungs, spread through its substances, be mingled there with air, pass through the arteria venosa (pulmonary vein) to reach the left chamber of the heart and there form the vital spirit..." [1]

Elsewhere, he states:
"The heart has only two ventricles ...and between these two there is absolutely no opening. Also dissection gives this lie to what they said, as the septum between these two cavities is much thicker than elsewhere. The benefit of this blood (that is in the right cavity) is to go up to the lungs, mix with what is in the lungs of air, then pass through the arteria venosa to the left cavity of the two cavities of the heart..." [1]

Ibn Nafis also describes the anatomy of the lungs:

"The lungs are composed of parts, one of which is the bronchi, the second the branches of the arteria venosaand the third the branches of the vena arteriosa, all of them connected by loose porous flesh." [1]

He then adds:
"... The need of the lungs for the vena arteriosa is to transport to it the blood that has been thinned and warmed in the heart, so that what seeps through the pores (manafidh) of the branches of this vessel into the alveoli of the lungs may mix with what there is of air therein and combine with it, the resultant composite becoming fit to be spirit when this mixing takes place in the left cavity of the heart. The mixture is carried to the left cavity by the arteria venosa." [1]

Ibn Nafis corrected the statements of his predecessors. A lesser known opinion of his is that he postulated that the 'nutrition' of the heart is extracted from coronary arteries:

"... Again his (Avicenna's) statement that the blood that is in the right side is to nourish the heart is not true at all, for the nourishment to the heart is from the blood that goes through the vessels that permeate the body of the heart..." [1]
Ibn Al-Nafis can thus be regarded as the earliest to propose the concept of coronary circulation.

Europe's Late Awakening

These important observations were not known in Europe until 300 years later when Andrea Alpago of Belluno translated some of Ibn Al-Nafis' writings into Latin in 1547 [11].

Later, Michael Servetus, a Spanish theologian and anatomist, described the pulmonary circulation in his book, "ChristianismiRestitutio". He wrote, "...air mixed with blood is sent from the lungs to the heart through the arterial vein; therefore, the mixture is made in the lungs. The bright colour is given to the sanguine spirit by the lungs, not by the heart." [12]. Both Calvinists and Catholics considered his work a heresy and so he was consequently burnt, along with his book, at the stake in Geneva. [4]

Andreas Vesalius described the pulmonary circulation in his book "De Fabrica", in a manner similar to Ibn Nafis' description. An interesting observation is that in the first edition of the book (1543), Vesalius agreed with Galen

that the blood "... soaks plentifully through the septum from the right ventricle into the left..." Then in the second edition (1555), post Alpago's translation, he omitted the above statement and wrote instead..."I still do not see how even the smallest quantity of blood can be transfused through the substance of the septum from the right ventricle to the left..." [11]. Another similar description was given by Realdus Colombo in 1559 in his book "De re Anatomica" [12].

Then in 1628, William Harvey, demonstrated by direct anatomic observation in laboratory animals the movement of blood from the right ventricle to the lung. He then observed the blood returning to the left side of the heart via the pulmonary vein and again he stated that he could not find any pores in the interventricular septum. He wrote in his monograph, 'Exercitatioanatomica de motu cordis et sanguinis in animalibus'

"I began to think there was a sort of motion as in a circle. I afterwards found true, that the blood is pushed by the beat of the left ventricle and distributed through the arteries to the whole body and back through the veins to the vena cava and then returned to the right auricle, just as it is sent to the lungs through the pulmonary artery from the right ventricle and returned from the lungs through the pulmonary vein to the left ventricle, as previously described." [12]

However, he did not understand the physiology of the pulmonary circulation (dissipation of carbon dioxide and replacement with oxygen), which was fully elucidated by Lavoisier in the 18th century [10].

There are some remarkable coincidences among the characters within the story of the discovery of pulmonary circulation. Servetus and Vesalius were both well versed in Arabic. In Servetus' *ChristianismiRestituto,* there is a section quoted directly, but not cited, from Alpagus' translation of Ibn Nafis. Alpagus himself was a keen translator, having translated Arabic books into Latin over three decades in Syria. He taught at Padua University, the same institution where Harvey studied, and later published the famous *Exercitatioanatomica de motu cordid et sanguinis in animalibus*. [13]

Views of Some Modern Historians

It may be useful to mention the views of a few modern historians who reviewed the works of Ibn Nafis.

Mieli said: "We believe that henceforth it is fair to attribute the discovery of the pulmonary circulation to Ibn Nafis who was a distant precursor of the physicians of the sixteenth century Italian School and of William Harvey who, four centuries later, described the whole of the pulmonary circulation in an accurate, clear and definitive manner." [14]

Max Meyrholf, a distinguished scholar of Arabic historical medicine, states: "... We have seen that Ibn Nafis, three centuries before Colombo, had already noticed visible passages between the two types of pulmonary vessels." [15]

In the William Osler Medal Essay on the discovery of the pulmonary circulation, Edward Coppola said:
"...The theory of pulmonary circulation propounded by Ibn Nafis in the 13th century was not forgotten and that centuries after his death it may have influenced the direction of the anatomical investigations of Colombo and Valverde, who finally announced it to the Western world as a physiological fact susceptible to experimental proof." [11]

Responses to sharing the discovery of Ibn Al Nafis are not free of criticism. There is contention as to what credit Ibn Al Nafis deserves for his discovery. Some consider his discovery 'a lucky guess' and others argue that his theory is not so developed as to be eligible to take the title of the first description of the pulmonary circuit. In a letter to the editor from 1978, a John Forrester from Edinburgh Medical School posits:
"Dr Al-Daggagh (May 27, p. 1148) seeks to secure for Ibn Al-Nafis credit for the discovery of the pulmonary circulation. But it is difficult to establish the case...A serious claimant to a share of the discovery must have discerned some new feature of the story, or have provided some experimental evidence. On these criteria, where does Ibn Al-Nafis stand?" [16]

However, there are several responses to the criticism. One is that the precedence of Ibn Al Nafis' ideas by 300 years compared to those of Harvey is clearly significant. Another is the field of medical science a good three centuries later allowed for the detail provided by Harvey, conditions for which were not present in Ibn Nafis' time. [17]

Nahyan Fancy, in his book *Science and Religion in Mamluk Egypt: Ibn al-Nafis, Pulmonary Transit and Bodily Resurrection,* considers positioning Ibn al Nafis' understanding of pulmonary transit beyond its context as simply a development of Galen and Ibn Sina's ideas, but

as a product of Ibn Nafis's social and religious context. Fancy cautions against over-interpreting his discovery from a scientific context.

He mentions the religious discussions and debates between rationalists like Ibn Sina, mystics like Ibn Tufail and traditionalists like himself in terms of reason vs revelation.

Fancy argues that Ibn Al Nafis developed his medical ideas through his understanding of the body-soul connection which led to his understanding of a 'hylomorphic psychology' in which the soul and body are as if wired together as one unit, reducing the concept of 'chief organs' such as proposed by Galen. Instead his conception was a soul-centred one. He considered the brain as 'tempering the spirit in order to govern and issue the remaining psychic faculties.' The heart was the container of the spirit's emanated faculties and so had a crucial role in its distribution. Thus the idea of pulmonary transit was developed 'from a need to ensure the purity and fineness of the spirit and that the blood would be very fine and thoroughly mixed with air.'[18, 19, 20]

Fancy also dissuades those hisotrians who regard the contributions of the commentary genre as meaningful developments in historical Muslim medical thought. He explains that the purpose of commentaries was not merely the copying and disseminating of existing ideas but served to correct inaccuracies, clarify meanings, compare the views of the authors to other prevalent opinions and further critically engage with the original text. [20]

Conclusion

In conclusion, Ibn al Nafis made a remarkable contribution to the discovery of the pulmonary circulation. His clear description of the pulmonary circulation, 300 years before any known Western scholar, is a product of the rich intellectual context in which he lived. Modern historians have regarded with high esteem the contributions of Ibn al Nafis and some have dedicated works to his study.

Study of key discoveries in the history of Islamic medicine is important as it leads to a greater appreciation of the contribution of the Islamic world to medical developments, and a fuller appreciation of the history of these discoveries, as their relative obscurity means they may be misattributed in mainstream literature.

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Some of the Achievements of Al-Zahrawi as a Biomedical Engineer

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Keywords: Al-Zahrawi, biomedical engineering history, surgical instruments.

Abstract

Biomedical engineers are considered the personnel who provide tools that could be used in diagnosis and treatment of an illness or a disease. Biomedical engineers apply a variety of concepts (such as mechanical, chemical, optical, and electrical concepts) to solve medical and biological problems. Studying the history of biomedical engineering is beneficial as it frees the mind of the biomedical engineers from the narrow static image of the new modern concerns. Al-Zahrawi is considered one of the ancient pioneers in the biomedical engineering field.

Introduction

Al-Zahrawi (936–1013 A.D.) was named after Al-Zahraa, a city near Córdoba, Andalucía, Spain; it was where he was born and died. He is a Muslim surgeon (Figure 1) who had a wide reputation in Europe during the Middle Ages. He was a true inventor, creating many surgical instruments that were not known in the Greco-Roman era. The illustrations of such instruments in his encyclopedic work, *Al-Tasrif*, reflect his willingness to teach (1).

The weight of a positive doctor-patient relationship on the psychological state of the patient was promoted by him. He showed the importance of bedside clinical medicine (2). His ethical concept in research was shown by mentioning above sixty references in his work (3).

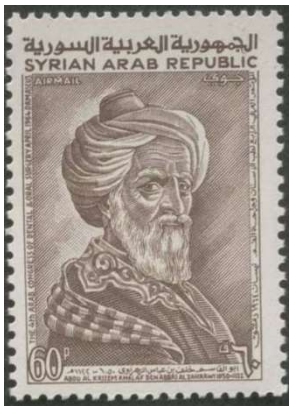

Fig. 1. A Syrian stamp issued on the fourth Arab congress of dental and oral surgery in 1964 and bears a drawing for Al-Zahrawi.

Achievements in Dentistry

Al-Zahrawi used several types of tongs for taking off teeth and the removal of tooth fragments, as shown in Figure 2. He used tweezers to extract the roots of teeth and jawbone fragments, as shown in Figure3 (4).

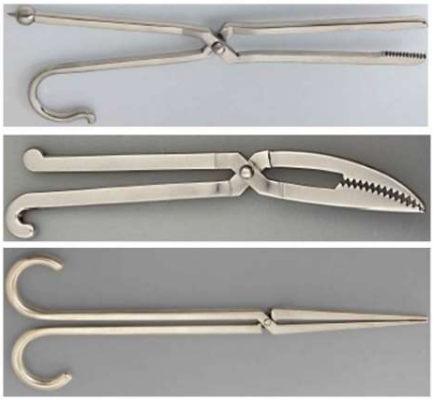

Fig. 2. Three different types of tongs for extraction of teeth and removal of tooth fragments (4).

Fig. 3. Tweezers for extraction of teeth roots and jawbone fragments (4).

He suggested the replacement of teeth displaced from their sockets because of trauma. He proposed the use of prosthetic dentures made of animal bones for replacing the missing teeth (5, 6, 7).

He also used minerals in oral and dental diseases. Alkali was used in the treatment of pyorrhoea. Alkyonion stone would be helpful for teeth whitening, gum strengthening, and pyorrhoea and putrefaction treatment. Alum was employed as a haemostatic, toothpaste, mouthwash, and for the treatment of gingivitis, pyorrhoea, and thrush. Moreover, Alum was used for consolidating loose teeth, preventing halitosis and putrefaction, strengthening gums, and healing mouth chancre. In fact, Alum is still often included in preparations for mouthwash and gargle for treating pharyngitis and cough.

Armenian bole was used for strengthening gums, polishing teeth, cleansing the mouth, and preventing halitosis, tooth decay, pyorrhea, and mouth cankers. Arsenic was used for mouth chankers and as a caustic. Lapis lazuli was applied in case of mouth cankers, buboes (swollen lymph nodes), and ulcers. Depending on its caustic activity, lime was used for loose teeth, gum decay, and chancre. Marcasite was mainly used as a dental painkiller. Strengthening the gums was the main function of orpiment (8, 9).

Achievements in Ear, Nose & Throat

Al-Zahrawi used a curved scalpel in the procedures of removing the swollen tonsils. The scalpel's concave side is sharp, and the convex side is blunt, as shown in Figure 4. The curved scalpel could be used to cut off a pale and elongated uvula or to excise throat tumors (10, 11, 12).

Fig. 4. Curved scalpel for removing swollen tonsils (4).

He used a pointed cautery to treat otalgia, as shown in Figure 5. Several points on the auricle were cauterized (13). He used a fine scalpel (Arabic: *Mibdaa Raqiq*) to crash a foreign body that had entered the ear and swollen up inside the ear due to moisture, as shown in Figure 6 (4).

Fig. 5. Pointed cautery for treatment of otalgia (4).

Fig. 6. Fine scalpel for splitting foreign bodies that have fallen into the ear (4).

Achievements in Ophthalmology

He used scalpels to remove adhesions in the inner corner of the eye and to cut off pterygium, as shown in Figure 7 (4,14). He described a crescent-shaped cautery used in case of the eyelashes grew turned into the eye, as shown in Figure 8. The roots of the hair on the eyelid were

cauterized to stop cornea irritation (4, 15). The same cautery was applied for the relaxation of the upper eyelid. The required length of cauterization was the length of the eyelid. The required thickness of cauterization was one-third the thickness of the skin. He noted that the physician should use tremendous delicacy to prevent burning the temples (14, 15, 16).

Fig. 7. Scalpel for cutting off pterygium and removing adhesions in the inner corner of the eye (4).

Fig. 8. Crescent-shaped cautery for cauterizing the roots of the hair on the eyelid when eyelashes grow into the eye (4).

Aneurysm Treatment

In case of migraine headaches, he used a tip of a hook to twist and cut the superficial temporal artery. The hook could have one, two, or three prongs, as shown in Figure 9 (17, 18, 19, 20).

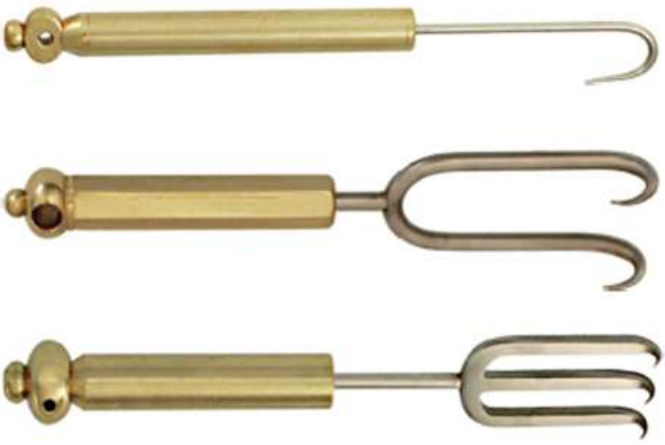

Fig. 9. Single, double, and triple hooks for lifting vessels (4).

When the enlargement of an artery at the mouth occurred, he suggested the usage of a knife to make a longitudinal incision at the affected area. He used hooks to widen the field of view to simply canvass the artery. Then, he used an aneurysm needle and a double thread to tie the artery in two places. A scalpel was used to open an aperture between the two ligatures to let the infected blood out, as shown in Figure 10 (4, 21).

Fig. 10. Scalpel for making an opening in infected artery (4).

Bleeding Control & Wound Healing

In case of entropion, he used cotton wool dipped in egg white or mucilage of psyllium seeds under the eyelid before cauterization (13). In case of harelip, he was the first to use a wax plaster after cauterization for safe healing of wounds and the reconnection of the two sides of the cleft (22). Wax insulates the wound from the surrounding air which could cause the putrefaction of the wound (23).

In cases of the opening up of swellings occurring in the womb, a wool dressing soaked in an infusion of mallows (Malvaceae family) was placed on the pubes. A perfusion of honey, water, and decoction of liquorice (roots of glycyrrhizae) oraristolochia was used to wash the wound and the uterus. Then, ointments were applied (24). Green oil, also known as Egyptian oil or vitriol, was used as a hemorrhage stopper and swelling cleaner after its extirpation. Mallows were used to cool down the womb, relieve its swelling, and heal the wound (23).

In cases of nasal polyps, he inserted a lead tube into the nostrils as a postoperative treatment. The lead tube was loaded with Egyptian oil or drying medicaments by instillation for the complete healing of the wounds. During the surgery, he recommended the use of vitriol in case of bleeding. As a sterilization procedure, the patient was asked to rinse his mouse out with salt and vinegar (7, 22).

Achievements in Cosmetology

He classified his manufactured perfumes according to their beautifying properties. Hence, hand creams, nasal sprays, and mouthwashes were included. He was careful to address the cost of his recipes, giving both expensive and cheap alternatives for many of them (25, 26, 27). He modified Paul of Aegina's technique for surgical management of moderate and severe gynecomastia in men to remove the excess breast tissues and maintain firm breasts (28, 29).

Achievements in Fractures & Dislocations

He favored stabilization in case of spinal injury. In case of the presence of bone fragments in the spinal canal, they should be cut down and removed using spars and winches. Then, the edges of the opening should be sutured (30, 31, 32). He preferred a delay of one or more days in applying bandages over splints to guard against swellings (33).

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FIMA – 40 years of existence

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Introduction

The Federation of Islamic Medical Associations (FIMA) was founded in a meeting on the 31st of December in 1981 (1) in Orlando, Florida, the United States of America. Thirteen doctors from ten countries (Canada, India, Indonesia, Jordan, Nigeria, the United States, Pakistan, Saudi Arabia, Sudan, and the United Kingdom) were at the inaugural meeting. During the inaugural meeting Dr. Syed Mubin Akhtar from Pakistan was elected as the first President of FIMA. Subsequently, FIMA was incorporated in the State of Indiana as a not-for- profit corporation on the 31st of January 1982. FIMA has been awarded Tax Exemption Status under section 501 (C)(3) from the US Federal Income Tax by the Internal Revenue Service. At the end of this article we will see a few pictures of previous FIMA meetings that have taken place over the last 40 years.

FIMA (2) was founded on the following objectives:

i. To foster the unity of Muslim medical and healthcare professionals
ii. To promote healthcare services, education, and research through the application of Islamic principles
iii. To mobilize professional and economic resources for medical and humanitarian relief
iv. To collaborate with partners for the 'mercy and healing of all mankind"

Membership

Starting with healthcare professionals from 10 member countries, FIMA now spans 43 countries globally with 53 associations as its full and associate members with more than 100,000 members and volunteers.

The catalyst towards the formation of FIMA was the Islamic Medical Association of North America (IMANA) (3) which was established in 1967 in Newark New Jersey. The pioneering founder of IMANA who spearheaded the formation of FIMA was the late Dr. Ahmad El Kadi (4) who passed away in 2009. Besides IMANA, other pioneering Islamic Medical Association (IMA) which joined FIMA in the embryonic years were IMA Pakistan (5) (PIMA established in 1979) South Africa (6) (IMASA established in 1981), Islamic Doctors Forum of Indonesia (FOKI, established in 1981), Islamic Hospital Jordan (7) (established in 1982), IMA Sudan (SIMA established in 1983). In the first 10 years of its formation the following IMAs became members of FIMA; IMA Malaysia (8) (IMAM established in 1990, joined FIMA in 1991), IMA Yemen (9) (registered as Yemen Medical Charitable Society or YMCS (established 1991 and joined FIMA the same year). In the second decade of its formation, FIMA showed a steady growth in its membership coming from Europe (Arab Doctors in Europe or Arabmed joined in 1994) (10), IMA Uganda (11) (IMAU established 1988 joined in 1994), Turkey (Hayat Foundation established in 1988 joined in 1996, IMA Saudi Arabia (IMAKSA established in 1996 joined in 1996), IMA Lebanon (IMALB established in 1982 joined in 1996), IMA Algeria (joined in 2000), IMA Bangladesh (National Doctors Forum established in 1989 joined in 2000)

The third decade of its formation showed an influx in new members to FIMA namely IMA Cambodia (IMAC established in 2001 joined in 2004), IMA Indonesia (12) (IMANI joined in 2004), IMA Iraq (Al Razi Medical Society joined in 2006), IMA Somalia (IMA Som established in 2006 joined in 2007), Young Doctors of Somalia (SOYDA established in 2007 joined in 2009), IMA Kenya (KAMMP established in 1998 joined in 2010), IMA Zimbabwe (IMAZ established in 2006 joined in 2010), IMA Queensland (IMAQ established in 2020 joined in 2020), IMA Nigeria (IMAN established in 1989 joined in 2011), IMA Palestine (Emergency and Welfare Society established in 1992 joined in 2011),

IMA Thailand (TIMA established in 2003 in joined 2011).

This last decade showed more IMAs joining the FIMA fraternity namely IMA Afghanistan (AIMA established in 2008 joined in 2012), IMA India (IMAI established in 2010 joined in 2012), IMA Gaza (Palestinian Medical Forum joined in 2012), IMA Sri Lanka (Serendib Doctors Forum joined in 2012), IMA Tunisia (Association of United Doctors for Tunisia established in 2012 joined in 2013), IMA Britain (13) (BIMA UK established in 2013 joined in 2015), IMA Singapore (Muslim Professional Health Association established in 2004 joined in 2015), IMA Philippines (Bangsamoro Medical Society established in 2009 joined in 2015), IMA Morocco (joined in 2015), IMA Niger (AMIN joined in 2016), IMA Ghana (Muslim Health Workers Association established in 2015 joined in 2017), Medical Relief Agency of Malaysia (MRA established in 2010 joined in 2017), Al Khidmat Pakistan (14) (established in 1990 joined in 2017), IMA Somaliland (established in 2004 joined in 2017), IMA Tanzania (Sunshine Medical Volunteers established in 2010 joined in 2017), IMA Malawi (IHAM established in 2015 joined in 2019), Medics World Wide (established in 2016 joined in 2019), Union of Egyptian Medical Professional (UEMP established in 2017 joined in 2019), Kibuli Hospital Uganda (joined 2019) and last year (2021) two more IMAs were admitted to FIMA namely IMA Australia (AIMA established 2016) and IMA Canada (Muslim Medical Association of Canada established 2021)

FIMA now has members from 43 countries covering 5 continents. Besides IMAs of these countries (full members), there are also members from relief organizations (3) and hospitals (425 in total), and universities (38) admitted as associate members. FIMA now has among its membership more than 100,000 health care professionals and volunteers, the largest membership being from SIMA with 16,743 members followed by IMAN with 15,000 members and IMANA with 7,000 members. As regards Relief organization, Al Khidmat of Pakistan has 25,000 volunteers in its rank

Organisational Structure

The affairs of FIMA are guided by its constitution and bye laws.

The FIMA Council is the highest policy making body of FIMA. The Council consists of one representative from each member organization who attends the yearly FIMA Council Meeting. The day to day running of FIMA is managed by an Executive Committee which comprises of 9 members. Seven members are elected bi-annually during alternate Council meetings, namely the President, Vice President, Secretary, Treasurer and three committee members. These 7 elected members are joined by the immediate Past President, and an Executive Director making up for a nine member Executive Committee or in brief EXCO. The EXCO meets physically at least 3 times a year. Since 1981, thirteen Presidents have been elected from 8 different countries (Pakistan, South Africa, Egypt, Sudan, the United States of America, Jordan, Malaysia, and Turkey).

Besides the EXCO, FIMA is also guided by a 12 member Advisory Council which comprises of Past Presidents, recipients of FIMA Lifetime Achievement Awards and senior members who have made major contributions towards FIMA. The Advisory Council plays an advisory role with no voting rights. The 12 member Council is chaired by a chairman from among them who are invited to attend FIMA EXCO meeting.

Since its inception in 1981, the Council has met 38 times. Beginning from 1987, the Council meets every year and so far, 17 countries have hosted the Council Meeting (USA, South Africa, Tanzania, Sudan, Nigeria, Morocco, Uganda, France, Egypt, Bosnia, Turkey, Lebanon, Jordan, Yemen, Pakistan, Malaysia, Indonesia). Indonesia has hosted 5 FIMA Council meetings, followed by Malaysia and Jordan who have hosted 4 meetings each. Each yearly Council meeting is followed by 2 to 3 days of a Scientific Conference organized in conjunction with the host country. Even during the challenging years of the COVID 19 Pandemic FIMA yearly Council and Scientific Conference were held, virtually

FIMA Projects

The heartbeat of FIMA is the activism of its IMAs. Besides national level program organized by the various IMAs, the objectives of FIMA listed above are externalized through the various projects which the Council approved over the last 3 decades. The various projects and year of implementation are as follows

i.	FIMA Relief	1994
ii.	ii.FIMA Students Activities	1999
iii.	Consortium of Islamic Medical Colleges (CIMCO)	2000
iv.	Islamic Hospital Consortium (IHC)	2000
v.	FIMA Yearbook	2002
vi.	FIMA HIV/AIDS Resource Centre	2004

vii.	FIMA Save Vision	2005
viii.	FIMA Save Smile	2008
ix.	FIMA Save Dignity	2009
x.	FIMA Encyclopedia	2010
xi.	FIMA Addiction Group	2013
xii.	FIMA Life Saver	2017
xiii.	FIMA Journal	2017
xiv.	FIMA Save Water	2017
xv.	FIMA Surgical Training	2019
xvi.	FIMA Save Earth	2021

The various projects approved by the Council have made significant contributions in tandem with FIMA's objective "for the mercy and healing of all mankind". These FIMA projects also directly and indirectly contribute to the United Nation Sustainable Develop Goals Particularly Goal 3 (Good Health and Well Being), Goal 4 (Quality Education), Goal 6 (Clean Water and Sanitation), Goal 10 (Reduce inequalities), Goal 12 (Responsible Consumption and Production) and Goal 13 (Climate Action). Each of the FIMA projects is headed by a chairman who coordinates activities with other IMAs. Every six months, a chair of each project will present their activities to the EXCO and to the annual Council meeting. Major achievements of some of the projects are summarized below

FIMA Relief

Humanitarian relief has been the flagship FIMA activity since its inception. It is the first project from the Council, first mooted in 1991 and approved in 1994 in the 11th Council Meeting in Paris. FIMA has since then declared itself as a medical manpower provider. The objectives of FIMA Relief include:

- to coordinate relief activities of different IMA's
- to invite like-minded NGOs to participate in different relief activities organized by FIMA
- to seek cooperation with International Relief Organizations
- to prepare a database of international volunteers

Among the activities of FIMA SAC is the organisation of student camps held yearly since 1999. These camps are held in several member countries including Jordan (1999, 2013), Saudi Arabia (2000 and 2001), Lebanon (2004), Malaysia (2005, 2009), Egypt (2006, 2010), Indonesia (2007, 2008, 2011, 2015), Turkey (2012, 2017) and Uganda (2019). Besides the yearly camps, yearly Umrah programmes were also organised with the following objectives:

- To foster brotherhood among Muslim students from various IMAs.
- To enhance mutual understanding and cooperation.
- To exchange information and experiences.
- To provide leadership training and organizational skills.
- To strengthen the involvement of students in IMA activities.
- To promote communication and networking among the student chapters of IMAs and other countries.

FIMA Model of Humanitarian Relief

Prompt and effective communication forms the backbone of the FIMA relief model. Following the recognition of a disaster, a local relief coordinator is appointed to coordinate and facilitate humanitarian aid and medical relief missions in that region.

The local team is commissioned to conduct a rapid needs assessment based on local conditions and needs. The local coordinator in collaboration with the FIMA Relief coordinator establishes and formulates a holistic multi-disciplinary response involving the broader network of relief coordinators and their partnerships with humanitarian relief organizations.

The progress and development of the disaster is monitored with regular updates and communication between all partners. At every stage in the life-cycle of the disaster and audit/evaluation of the impact of our intervention is assessed. This ultimately results in a final report with accountability and acknowledgement of aid received.
Regular training in disaster mitigation, preparedness and response is conducted with every council meeting.

Over the last 2 decades FIMA Relief has been involved in the following relief activities in disaster areas

- Afghanistan war (7 October 2001: war on terror)
- Bam earthquake, Iran (Silk Road, Iran, 23 December 2003)
- Aceh Earthquake and Tsunami (26 December 2004, Aceh Indonesia)
- Darfur, Sudan (medical missions established)
- Pakistan Earthquake (8 October 2005, Azad Khashmir)
- Jogyakarta Earthquake (27 May 2006)
- Japanese Earthquake (11 March 2011)
- Libya revolt (February 2011)
- Egyptian Revolt

- Somalia civil unrest (SOYDA
- Pakistani Floods (Quetta, Pakistan: Mother and child mobile)
- Lebanon (Palestinian refugee camps, September 2010)
- Philippines Typhoon Haiyan and Floods (8 November 2013)
- Gaza (7 July 2014, Operation Protective Edge)
- Lebanon Blast (4 August 2020)
- Yemen relief (ongoing)
- Gaza (ongoing)
- Rohingya Refugee Camp (ongoing)

This project is headed by IMA South Africa (IMASA)

FIMA Student Activities

Launched in 1999, FIMA Student Activities was established with following objectives

- To foster brotherhood among Muslim students of various IMAs
- To enhance mutual understanding and cooperation.
- To exchange information and experiences.
- To provide leadership training and organizational skills.
- To strengthen the involvement of students in IMA activities.
- To promote communication and networking among the student chapters of IMAs and other countries.

Among the activities of FIMA SAC is the organisation of students' camps held yearly since 1999.These camps are held in several member countries including Jordan (1999, 2013), Saudi Arabia (2000 and 2001), Lebanon (2004), Malaysia (2005, 2009), Egypt (2006, 2010), Indonesia (2007, 2008, 2011, 2015), Turkey (2012, 2017) and Uganda (2019). Besides the yearly camps, yearly Umrah programmes were also organised with the following outline

- Directed and guided Umrah and visit to the Holy mosques in Makkah and Al_madinah.
- Visits to Islamic historic and famous relic places
- Lectures, roundtable discussions, workshops & Seminars
- Project presentation
- Meetings and visits
- Spiritual sessions
- Cultural show
- Outdoor activities and sports
- Educational tours

The success of these students' activities is closely attributed to the coordination by IMA Kingdom of Saudi Arabia and the World Assembly of Muslim Youth (WAMY)

FIMA IHC

The Islamic Hospital Consortium was a project approved by the Council in 2000. It was created for the following objectives

- Islamisation of Health services
- Sharing the concept of hospital as a platform of Dakwah
- Understanding and application of *Maqasid Shariyyah* (The Purpose of Islamic Shariah) and the *Qawaid al Fiqhiyah* (Principles of Islamic Jurisprudence) in medicines
- Application and Implementation of Concept of Shariah Compliant Hospital
- Sharing and Application of the concept of Ibadah Friendly Hospital
- Establishment of Spiritual Support Care Program in hospital

Activities from this consortium have been escalated following publications of Guidebooks and Manual on the practical implementation of both the Shariah Compliant and Ibadah Friendly Hospitals from Pakistan, Malaysia, and Indonesia. Workshops and seminars continued to be organized and interest has come from both Muslim majority and Muslim minority countries (the Philippines and United Kingdom)

This project is headed by IMA Malaysia (IMAM)

FIMA Yearbook

Since 2002, FIMA has produced a repository of Islamic oriented publications called the FIMA Yearbook. This is in tandem with one of the FIMA objectives "to promote healthcare services, education and research through the application of Islamic principles". This project was spearheaded by the late Dr. Aly Mishal of Jordan and now under the Dr. Musa Mohammad Nordin. The first publication was in 2002 with the theme Contemporary Bio Medical Issues in the Light of Islam (2002). Since 2012, the publication became a yearly affair with the following themes; Health in The Muslim World; Meeting the Millennium Development Goal (2012), Encyclopedia of Islamic Medical Ethics Part I (2013) Addiction:

Medical, Psychosocial and Islamic Perspectives (2014), Encyclopedia of Islamic Medical Ethics Part II (2015), Encyclopedia of Islamic Medical Ethics Part III (2016), Encyclopedia of Islamic Medical Ethics IV (2017), Encyclopedia of Islamic Medical Ethics Part V (2018), Encyclopedia of Islamic Medical Ethics Part VI (2019), Encyclopedia of Islamic Medical Ethics Part VII (2020).

The FIMA Yearbook has been instrumental in providing high quality resources. Soft copies of the Yearbook can be accesses at the following site

https://fimaweb.net/category/publications/yearbook/. Limited hard copies have been distributed to member countries and distributed to libraries of various universities

This project is headed by IMA Malaysia (IMAM)

FIMA Save Vison (FSV)

This project is sometimes referred to as the 'Jewel in the Crown 'of FIMA activism. Approved by the Council in 2005 FSV had a vison which states *A world in which no one is needlessly blind and where those with avoidable blindness can achieve the full potential and the Mission to work for the elimination of the avoidable causes of blindness regardless of religion, ethnicity, gender, and nationality.* Since its establishment FSV has performed 145,700 cataract surgeries in 20 countries mainly in Sub Saharan Africa. It was fitting that FSV was awarded the Prestigious American College of Physician Hilda and Rosenthal Award for 2008. In the award plaque, FSV contribution is stated as *whose recent original approach in the delivery of health care or in the design of facilities for its delivery will increase its clinical and /or economic effectiveness*

This unique project not only served patients' unmet needs, it also equally if not more importantly contributed to human resource development. FSV in collaboration with Hergesia University of Somaliland, Peshawar Medical College of Pakistan and Riphah International University of Pakistan and Manhal Charitable Hospital of Hergesiahas trained 17 doctors to the level of Clinical Diploma of Ophthalmology. The training program has moved on with the establishment of a Master of Science in Ophthalmology with two having completed their training and two more being trained. FSV also endeavour to establish sustainable facilities called FIMA Eye Centres in at least 3 countries, Sudan, Sri Lanka, and Pakistan

This project is headed by IMA Pakistan (PIMA)

The International Journal of Human and Health Sciences (IJHHS)

This is a more recent FIMA project approved at the Council meeting in 2017. The impetus for the journal is triggered by the success of FIMA Yearbooks and the need for more academic and scientific exchanges between FIMA members and institutions they represent. It is also the natural progression following the established of the Consortium of Islamic Colleges (CIMCO). Following its approval by the Council it started as a semi-annual journal but in the year 2018 it became a quarterly journal. With the grace of Allah 20 issues including 3 supplementary issues containing 259 articles from various FIMA member countries have been published. Despite being a new initiative, IJHHS is already included and indexed in the Cross Ref, Index Copernicus, Euro-Pub, DOAJ., HINARI (WHO), EBSCO Library (USA). Alhamdulillah IJHHS is in active consideration for listing under the 'Web of Science' (WOS) with Harzing's Citation index showing increasing Citation number.

Thus, the project is headed by IMA Bangladesh (National Doctors Forum) and IMA Indonesia (IIMA)

International Collaboration

FIMA is involved with many international bodies including the United Nations, World Health Organisation, Organisation of Islamic Cooperation. At the United Nation General Assembly FIMA contributes directly to the Economic and Social Council (ECOSOC) by submitting 5 yearly reports on its activities.

FIMA has been working with WHO-EMRO (Eastern Mediterranean Regional Office) in the Polio Eradication Initiative (PEI- Polio) since 2013. FIMA is a standing member of the International Islamic advisory group on eradication of Polio and communicable disease. FIMA also has a advisory status with the Science and Technology wing of Organization of Islamic cooperation and its subsidiary SESRIC (Social and economic and statistical research institute.)

The future

As a unique federation, FIMA has the potential to leverage its current and previous achievements. The current COVID 19 pandemic though challenging to

FIMA has brought the best out of FIMA in terms of its advocacy role to the Muslim population in particular. FIMA in collaboration with its member IMA's developed ways and means to help fight the menace of the pandemic. Standard Operating Procedures (SOP's) were developed to address challenging issues like praying in the mosques, religious holidays assemblies, burials of the dead within Muslim traditions, provision of medical services, supplying Personal Protective Equipment's (PPEs) to medical facilities and establishment of laboratories for diagnostic purposes. The world in general and FIMA in particular will be better prepare in sha Allah in future should such a global health challenge occurs

Within FIMA, there is a disparity among IMAs with some well ahead and others in the infancy needing assistance to realise their full potentials. The world when FIMA was born is different from that of this millennium, it is important that FIMA moves with the times and identifies new stakeholders, benchmarks itself with any similar organisation, reappraise its strengths and weaknesses, opportunities, and threats and identifies tangible and doable performance indicators, and embraces modern technology

As FIMA fast approaches its 50th Anniversary, what it has achieved within the constraints it has faced will act as an impetus and encouragement for it to move forward in the future

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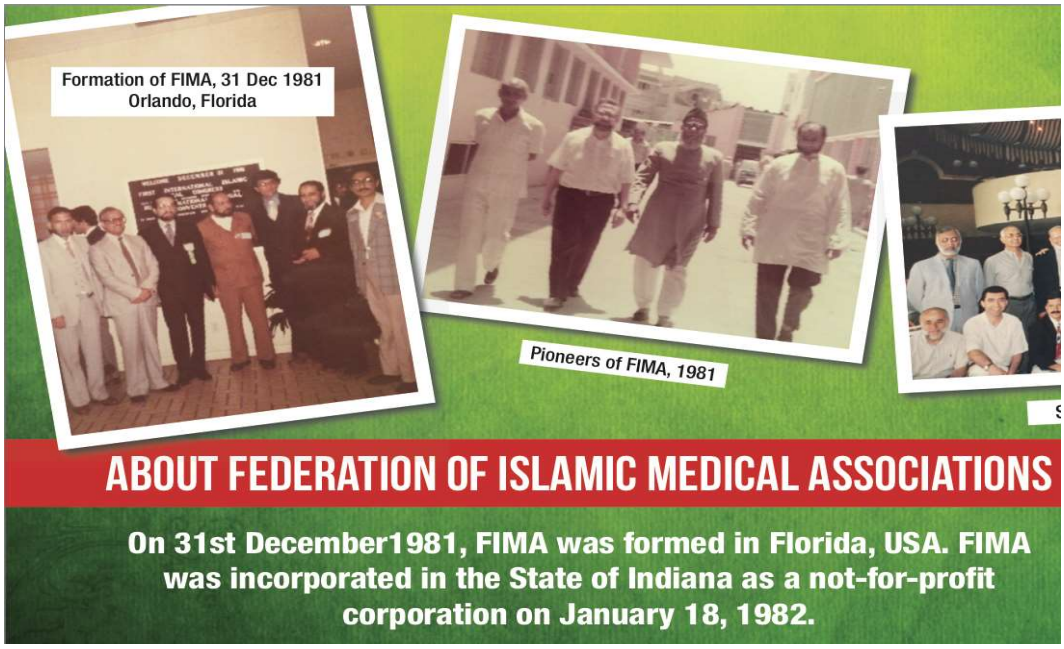
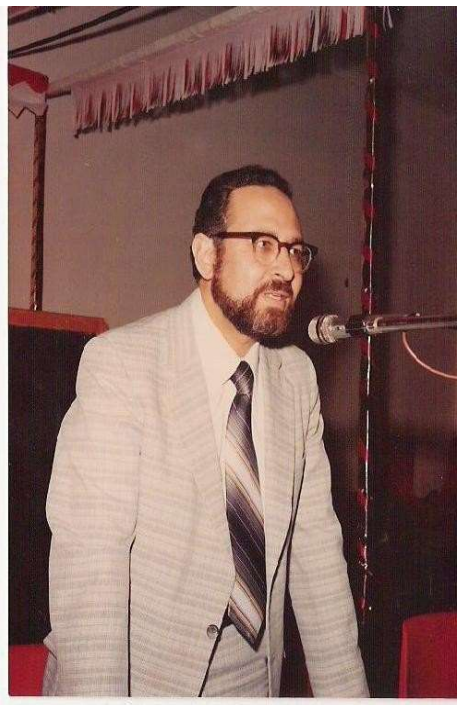
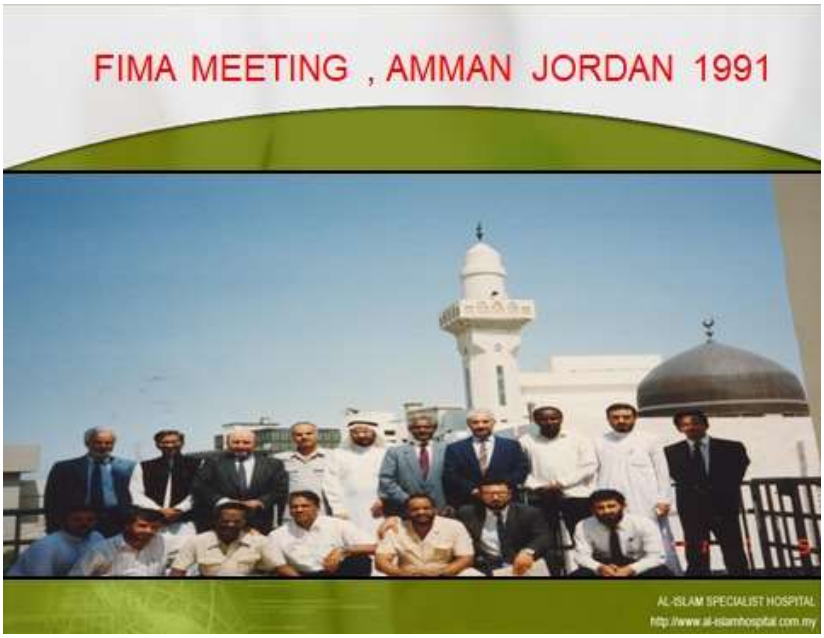
Appendix

Pictures of some previous meetings of FIMA over the last 40 years:



The late Dr. Ahmad El Kadi (one of the founders of FIMA)





FIMA meeting in Pakistan - 2000

FIMA/IMAM Scientific Convention
Kuala Lumpur 2012

30th FIMA Scientific Meeting

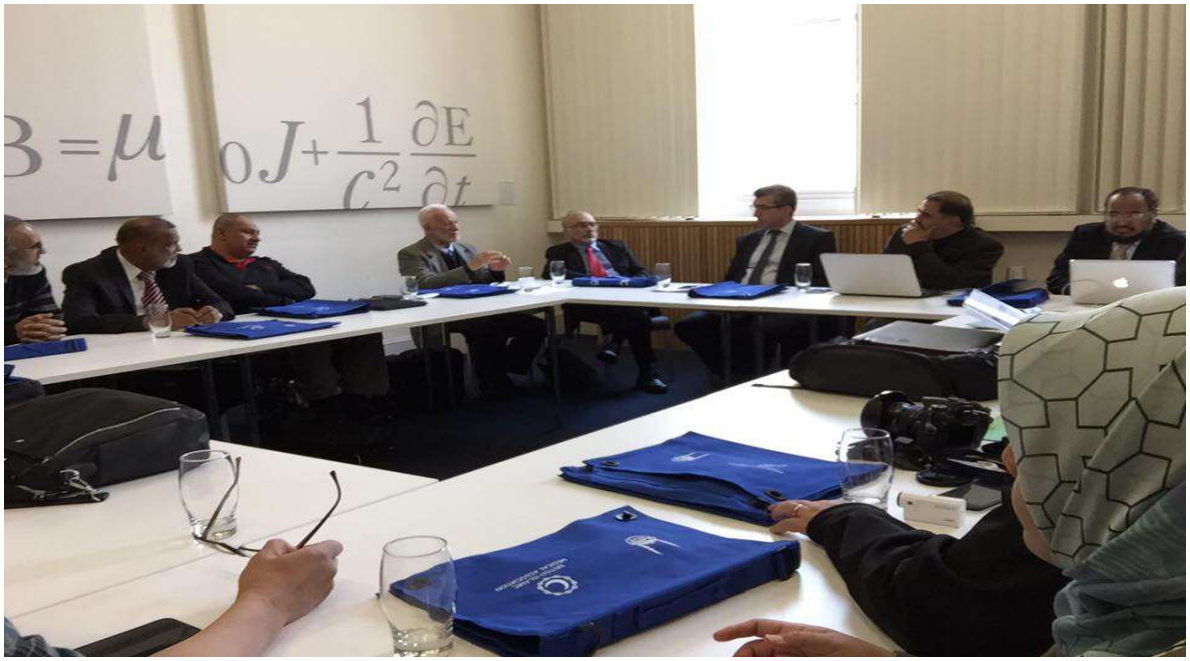
Cape Town, South Africa,2013

35th FIMA Council & Scientific Meeting 2015 (Indonesia)

36th FIMA/IMAN Council Meeting

Abuja, Nigeria,2016

FIMA Exco meeting in London – March 2017



35th FIMA Council and Scientific Meeting
Amman, Jordan, 2018

FIMA Semi-Annual Exco Meeting (Jakarta, Indonesia - 2019)

36th FIMA Council Meeting , Kampala , 2019

FIMA Exco Meeting (Makkah, Saudi – April 2022)

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An Overview of Health Inequalities – Kidney Care for All in Support of World Kidney Day (2022)

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Keywords: *Healthcare, Inequalities, Education, Screening, Long-Term Conditions*

Abstract

Introduction: In the UK, unfortunately, one of the main issues surrounding healthcare is that patients with chronic illnesses like Chronic Kidney Disease (CKD) are restricted to NHS healthcare services and approaching healthcare provider. Further complications can arise especially for those who have healthcare challenges and where misinformation can lead to fragility and health inequalities. Patient and Public Involvement (PPI) can help bridge issues surrounding health inequalities.
Aims: To identify 1) whether patients with CKD would like to approach health professionals and patients through online consultations and educational support, thus prompting collaborative efforts and 2) understand if/ whether CKD patients would welcome more integrative support from healthcare professionals through social media, wherein patients and professionals can bridge gaps across health inequalities.
Methodology: In support of World Kidney Day (2022), this article seeks to highlight how health inequality can be bridged through online spaces and integrative practices between patients and health professionals.
Discussion: Patients are the intermediaries between primary and secondary healthcare services. CKD patients now have more opportunities to share lived experiences owing to the nature and implementation of social media platforms, like the Renal Patient Support Group (RPSG) and the Kidney Disease and Renal Support Group (KDARs) for Kids.
Conclusion: In addition to sharing experiences, this prompts patients to be more than mere recipients of healthcare; CKD patients become more empowered so that more informed decisions can be made.
Summary: Educational intercessions are required generally to offset issues where there are inequalities but also to ensure excellence in health practice.

Introduction

It has been reported that patients with Long-Term Conditions (LTCs) account for around 50 % of GP appointments, 64 % of outpatient appointments and 70 % of hospital bed days (1). Around 70 % of total health and care expenditure in England is attributed to people with LTCs (1). Education and consultations through online spaces where patients have access to peer support and Allied Health Professional (AHP) involvement would help prompt smarter care (2-4). Providing CKD patients education that is centred surrounding clinical and non-clinical scenarios is important owing to changes in health and disease over time (5; 6). Health Professionals are

prompted to keep up to date with aspects that surround 'at risk patients' and consult nephrology guidance where most applicable (7; 8). A stance is now required where healthcare educational interventions constitute service equality and improvement.

Healthcare is best when there is a position to deliver the NHS Long Term Plan's aim for 'triple integration' of primary and specialist care, physical and mental health services, and especially if connectivity is 'unified' via the Health and Social Care Network (HSCN) (9) this can allow interconnectivity in healthcare that meets compliance (10; 9). HSCN should allow *'untapped'* areas focusing on education provision surrounding disease trends through e-health (11; 12). HSCN provides the underlying network arrangements to help integrate and transform health and social care services by enabling care organisations to access and share information more reliably, flexibly, and efficiently (9).

Patients may also increasingly find themselves taking on roles, particularly where involvement is dependent on bridging educational gaps (13; 14) through technology and 'online spaces' (15; 16). Quality of education should also empower and support self-care (17). Patient and Public Involvement (PPI) can help bridge issues surrounding health inequalities. (18; 2).

Aims

Toidentify 1) whether patients with CKD would like to approach health professionals and patients through online consultations and educational support, thus prompting collaborative efforts and 2) understand if/ whether CKD patients would welcome more integrative support from healthcare professionals through social media, wherein patients and professionals can bridge gaps across health inequalities.

Healthcare Complexity

An estimated 15 million people in England have at least one Long-Term Condition (LTC) with the prevalence of cancers, chronic kidney disease (CKD) and diabetes rising most quickly (19). It is predicted that the number of people with LTCs will remain relatively stable over the next six years, although the number of people with multiple LTCs (known as multi-morbidity) is set to rise from 1.9 million in 2008 to 2.9 million in 2018 (19). This consequently has an impact on health and lives (20). Already the 30% of the population with LTCs account for 70% of NHS spending (21).

Reducing people's dependence on health professionals and increasing their sense of control and wellbeing is a more intelligent and effective way of working (22). Despite overwhelming evidence, people with an LTC or a disability face several challenges regarding discrimination and/ or ignorance; people may feel disenfranchised; have perceptions of helplessness and feelings of powerlessness against a backdrop of diminished health (23-25).

Healthcare and the National Health Service (NHS)

First announced in 2003, the term *population health* was used to describe health outcomes surrounding disease trajectories across health conditions (19). Population health has now progressed to include identifying people at risk of LTCs, according to severity of illness, demographics, and broader bioinformatic parameters to identify risks in leveraging resources to improve healthcare and outcomes (19).

Healthcare education has diversified for patients with LTCs over the past two decades (19; 21). Patients with LTCs use the internet to access peer support groups via social media (21), and whilst this can be helpful, peer support alone does not over-ride the necessity for educational support (26; 27). It is in this context, patients either become more informed as decision-makers or misinformed around disease trajectory, leading to compromised quality of care (26; 27).

Technology has allowed patients with LTCs to access supplementary information relating to health and disease, including National Health Service (NHS) websites and portals, Patient-based organisations, and various other sources (28). The current concern is that despite technology advances, integration between information searching vs. knowledge implementation differs between age groups and across LTCs (29). Information available over the internet is vast and much of it can be daunting and lead to educational barriers.

Transparency is required to define the remit against which progress can be measured (30). The role of Clinical Commissioning Groups (CCGs) and NHS Commissioning Boards should relate healthcare back to patients and the public (31; 32). Evidence has underscored the importance of effective self-management and delivery of healthcare to LTCs (33; 34). Patients who are 'activated' (that is, who recognize that they have an

important role in self-managing, have skills confidence) experience better health outcomes (35; 36). The government has a wide role in preventing ill-health, prompting the nation to live healthier lives, not just longer ones (37-41; 19). The problems, which appear in healthcare have risen from a lack of understanding about the multidimensional nature of patient and public involvement (17).

Information and Communications Technology (ICT) and Shared Decision Making

Reducing people's dependence on health professionals and increasing sense of control and wellbeing is a more intelligent and effective way of developing joined up thinking between patients and all health professionals (18). There are a wide range of initiatives to support self-management including information leaflets, online peer support, one to one counselling, group education sessions, use of social media with technology, and self-management interventions. Initiatives can be categorised along a continuum, with passive information provision about people's condition and 'technical skills' at one end of the scale and initiatives that more actively seek to support self-management and increase self-efficacy at the other end of the continuum (18).

The use of Information and Communications Technology (ICT) and shared decision making is important for most patients because many want to be more involved than are in making decisions about their health care (19). There is also compelling evidence that patients who are active participants in managing their health and health care have better outcomes than patients who are passive recipients of care (19). The use of user-friendly ICT services is also important for knowledge and resource acquisition and for integrated care. User friendly ICT services allow the delivery of better understanding, enhancing care quality efficiencies across care providers, to enable better patient outcomes (20).

All types of support are important components of the shared decision-making jigsaw needed to encourage empowerment, but information provision alone is unlikely to be sufficient to motivate or improve healthcare outcomes (18).

Challenging Inequality

The involvement of citizens in decision about health policy, planning and service provision have been introduced in several countries, including the UK, Canada, Holland, and Australia (17). The public involvement and support are needed to promote innovation and research, the research needs to reflect public interest and values. In line with research and challenging aspects that encourage inequality, Patient and Public involvement (PPI) has become a key component healthcare and research in the United Kingdom (38). PPI gives healthcare service users the opportunity to be part of the solution to establish beneficial healthcare and tackling inequity through research and involvement. PPI is also an important mechanism for inducing necessary healthcare though research (31) and allows to improve the quality of health care (39). The essential changes are the belief that involving patients in healthcare leads to improving quality of healthcare through participation.

Several studies suggest that users of public healthcare with a history of chronic disorders can be involved in health services, and this can depend on adequate support (33). The study of Brett and collaborators reports evidence of the beneficial and challenging impacts of PPI on researchers and communities engaged in the research. PPI has positive impact on healthcare users, they feel empowered, valued, listened to and more positive about their experiences. The most important impact is that it has an increasing influence on users to possess more knowledge around their condition and develop life skills (30). The PPI is also beneficial for researchers, as it has positive impacts about gaining new insight into their work and gaining better understanding of the area under study (30). The involvement and engagement of patients and researchers need to be preceded by the development of guidelines for users integrated into a project, and the permission on transferring the expertise and skills between the academic, practice and service user communities (34).

PPI helps in the bridging gaps between healthcare professionals, scientists, and patients (31). The involving of patients in healthcare is an ethical requirement since patients pay for services so they should have an influence on healthcare together with health professionals and across sciences (35).

The Renal Patient Support Group (RPSG)

Patients and carers often have various questions relating to kidney care following routine clinical outpatient appointments. Owing to a lack of opportunities to share real-life experiences with fellow peers via face-to-face communication, the intention of the RPSG founders was to provide an online support group as part of kidney care

received at the North Bristol NHS Trust in Bristol, South-West England UK. The RPSG was formally founded in (2009) to help raise CKD awareness on a broader scale, for the adult renal population and provides support from ages 18 plus. The group has grown exponentially and now has over 9000 members internationally. The RPSG has been a support group for ALL who live with this long-term condition. Patients and carers are using the RPSG all around the world because involvement and engagement activities through the social media platform provide a wider opportunity for discussions about how patients, professionals and researchers could be working in partnership to find answers and improve disease and lives of patients with this long-term condition. Being involved also provides potential to become an innovative model for shared decision-making. The RPSG membership has proved that those using the group now have an increasing understanding of CKD, care plans and related disease-processes. The RPSG is highly research active, building on evidence-based treatment to better the care and lives of patients. Whilst the RPSG does not provide formal medical advice, it is a support group for patients, siblings, carers, guardians, and families to share real-life experiences and everyday challenges. Over a decade, the RPSG has an international administration and research team, and this helps keep group live and proactive, 7-days a week, 24 hours a day. The RPSG welcomes everyone to join.

The Kidney Disease and Renal Support (KDARs) for Kids

The Kidney Disease and Renal Support (or KDARs) for Kids is a group founded in Lincolnshire, North East UK, (2014) and was initiated for patients, parents, guardians and carers of babies, toddlers and young people who are living with CKD and renal disease. The social media platform supports paediatrics and young people from ages 0-18 years. KDARs was inspired by the founder's own personal experiences when daughter suffered with AKI, secondary to antepartum haemorrhage during new-born period; the daughter of founder was later diagnosed with CKD stage 3B. The KDARs team offers 'online space' for families to communicate, share experiences and stories, offer supportive advice, especially when areas of health become challenging and where face to face communication is not always possible. The group has grown exponentially and now has over 2000 members internationally. Confidentiality is paramount in KDARs, and what is raised, shared, and discussed remains within the closed platform. Paediatrics and young people, families, siblings, parents, and guardians require a safe and secure place to share understanding without the anxiety of potentially feeling comprised elsewhere. The lack of support for paediatric renal patients and families is overwhelmingly obvious. The KDARs team is bridging a gap that requires more established educational and support pathways built into paediatrics and young people's kidney care, especially in a minority renal health population. Safeguarding, confidentiality, and the security of KDARs members and families is extremely pertinent to objectives and mission of the group. Anyone who now wishes to join KDARs have a set of questions to answer before being accepted. The KDARs membership encompasses a strong administration team who have offered time to support and keep the platform running smoothly on a 24-hour basis. Over 7 years, KDARs have admin involved from UK and USA, and this helps keep the group live and active, 7-days a week, 24 hours a day.

Discussion

Initiatives such as 'integrated care pathways', 'patient-centred care' and 'shared decision-making' are examples of attempts to align clinical, managerial, and service user interests, and to improve coordination of care for patients with LTCs (42). Concern about fragmentation typically focuses on a lack of service coordination for individual patients and, particularly, the structural and cultural isolation of generalist from specialist medicine, or adult social care from health care, which often results in patients experiencing discontinuity of care when they are transferred from home to hospital, or vice versa (42). The UK healthcare system should not ignore the evidence (22).

'Integrated care' is a term that reflects a concern to improve patient experience and achieve greater efficiency and value from health delivery. The aim is to address fragmentation in patient services, and enable better coordinated and more continuous care, frequently for an ageing population which has increasing incidence of chronic disease (42).

Conclusion

Patients are the intermediaries between primary and secondary healthcare services. CKD patients now have more opportunities to share lived experiences owing to the nature and implementation of social media platforms, like the Renal Patient Support Group (RPSG). In addition to sharing experiences, this prompts patients to be more than mere recipients of healthcare; CKD patients become

more empowered so that more informed decisions can be made.

Patients should be armed with appropriate education, so they are able to have 'level-up' communication and discussions with service providers (43-45). Health professionals associate younger people wanting access to technology. There is scope for service development and initiatives relating patient care through advice, education, and peer support, but there needs to be coordinated effort. Service providers should focus attention to how online spaces and technology can improve CKD education provision. Healthcare challenges have led CKD patients to explore new and more effective ways of approaching medical practice with integrated educational support.

Summary

Educational intercessions are required generally to offset issues where there are inequalities but also to ensure excellence in health practice. Patients would welcome health professional involvement through online platforms. The above notwithstanding, future research should look to encourage development of a novel framework to help streamline educational support and highlight what CKD education in healthcare could look like with healthcare professional involvement to bridge health inequalities through the RPSG and KDARs.

Any health education provided will also require documenting and transfer of information, connectivity of any future technologies or links between Electronic Patient Records (EPRs). Knowledge provision would need to be fast, reliable and General Data Protection Regulation (GDPR) compliant.

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Shahid N. Muhammad is an Author, Specialist Biomedical scientist, HCPC Scientist, Chartered Scientist, writer, presenter, co-founder, lecturer, supervisor, researcher, blogger, contributor. And Advancing Healthcare Awards (2018) and (2022) Finalist. Shahid is a Specialist Biomedical Scientist and member of the Healthcare Professions Council (HCPC). Shahid is a Fellow for the Institute of Biomedical Sciences (FIBMS) and a Chartered Scientist with the Science Council (CSci). Shahid has built experience in laboratory and health practice surrounding pathology. Shahid has been involved in the development of key practices through several working groups/ panels and was a member for the NHSBT Paediatric Kidney Advisory Group (PKAG-sub-committee 2009-2011). It was in (2009), Shahid co-founded the Renal Patient Support Group (RPSG). Shahid was a member of the British Association of Paediatric Nephrology (BAPN) (2011-2014). Shahid was involved in the development of the BAPN; Nephrology Networks Guide (2012) and was also a member of the Kidney Research Education Initiative (KREI) (2010-2013), and has supported development of frameworks, and healthcare initiatives. Shahid developed research between (2010-2013) with the University of the West of Scotland (UWS) surrounding Paediatric Nephrology and between (2017-2021) developed research Adult Nephrology under the University of the West of England (UWE). Shahid is currently an Academic and Scientist at Coventry University, England UK. Shahid has formed several key publications, and presented work locally, regionally, in various European countries, virtually and internationally.

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Is *Ijarah ala al-ashkhas* applicable to therapeutic services supplied by clinicians and traditional healers and what are the potential consequences if they are defective?

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Abstract

This review considers the nature of the contract between physicians, traditional healers and their patients and whether it is consistent with concepts embodied within *Ijarah ala al-ashkhas.*This includes the four pillars of employer/employee, offer and acceptance, wages and service as defined by Hanafis. The review deals with the differences in training and qualifications between these two groups of therapists and its impact on clinical outcomes and how this related to contractual obligations. The nature of the contract between patient and practitioner is reviewed in terms of an employer/employee relationship. As an employee, a clinician may work as an agent for a state body, such as the National Health Service (NHS), a member of a partnership (*Sharikat al-a'mal*) or independently. The concept of offer and acceptance is paralleled by consent processes and their documentation. The wages paid for such services are considered in view of the two extremes of the lowly status of a cupper and the significant income received by physicians working under royal patronage. The adverse impact of additional payments or bribery on the quality of services is also considered. The service offered brings with it accountability on the part of the practitioner and breaches are dealt with in terms of severity and the intent behind it. The nature of compensation for patients who have suffered harm is discussed in terms of retributive justice or the payment of *diyyah* and the spreading of this to include the wider family or clan of the practitioner. Parallels between criminal negligence and the civil consequences of breaches of duty of care and consequent harm are considered, together with role of mutual defence societies in the payment of compensation.

Introduction

In this review the status of physicians and traditional healers within Islamic societies will be considered from both an historical and contemporary perspective. Such an approach will allow an understanding of their position within society and how they were remunerated for their services. It will include an understanding of those qualities and qualifications which were necessary to distinguish true practitioners from charlatans and, therefore, of the standards by which they should be judged. This will lead directly into an awareness of the consequences of any failures to achieve those standards by individual practitioners. Arising from these criteria, it will be possible to assess whether clinicians and traditional healers should be paid and assessed in the same ways.

Historical Background:

Various ahadith point towards issues related to standards of practice, payment and compensation from the time of the Prophet (PBUH). The expertise of both clinicians and traditional healers is derived firstly from knowledge and

then developed through practice. Based on ahadith reported by al-Mundhiri, knowledge should be disclosed and shared without restriction (1). The question, therefore, arose as to whether practitioners should be paid for such services. In response to this issue ahadith provide a range of comments in relation to traditional healers, such as cuppers. For example, Haram bin Muhayyisah reported in a Sahih graded Hadith that his father was told by the Prophet (P.B.U.H.) that the earnings of a cupper were forbidden (2). In contrast, ibn 'Abbas reported that the Prophet (PUH) was cupped and "he paid wages to the one who had cupped him". (3)

The issue of payment for healthcare services is important for a variety of reasons. Historically, in *The Spiritual Physick,* the distinguished Persian physician, Rhazes, recognised that:

"Men take wealth as a mark and a stamp whereby it is mutually recognised how much each deserves for his labour and the toil that he performs that is profitable for all." (4)

The linkage between status and wealth is commonly recognised, even if fallacious. Support for this view was seen during the Medieval period the status of ordinary physicians in bimaristans or hospitals was generally secondary to that of administrators and their salaries were generally modest, at best. Their income was comparable to dyers and shop keepers (5). There is evidence that salaries were fixed by the state (6). As a result, many followed other professions, in addition to medicine. In contrast, those who wanted to have care from the most competent physicians often established waqfs so as to be able to meet their fees (7). This distinction between state provided and private care emerged in Baghdad with the building of bimaristans and the provision of travelling dispensaries to rural areas, which were driven by the head of state (8). Such a view was confirmed in 2005 in an *Islamic Code of Medical and Health Ethics,* which considered it the responsibility of the state to supply care to those in need (9). However, clearly Muslim physicians should treat all patients equally, regardless of wealth or status, and whether seen as state funded or privately so as to be consistent with Islamic principles (10).

Current Employment of Physicians and Traditional Healers:

These days most physicians in the West combine state employment with private practice, although private practice alone is commonplace elsewhere. For traditional healers generally work is in the private sector. Traditional healers have been included in this review because of the growth of Tibb and hijama practice in the UK in recent decades (11). In this review the nature of the financial and contractual relationship between health care provider and patient will only be considered mainly within the private sector, although attention will be paid to the dual nature of many practitioners' work.

*Ijarah*is a contractual term which refers to the sale of usufruct or a service in return for compensation (12,13). It is a form of gainful occupation because the customer or *as Mu'ajiir* pays an employee or contractor, the *as Musta'jiir*and both derive benefit from the transaction (14,15). Central to this relationship the Prophet (PBUH) insisted the foremost condition for validity of such an employment contract is specification of the wage before commencement and immediate payment, in full, on completion (15,16). The payment of this wage is specified in the Qur'an 95 v 6:

"Those who believe and perform honourable deeds (good work) ... their earnings will never be withheld from them"

Such a contract also brings with it responsibility and issues of liability for the employee (15,17). As a consequence, Hanafi jurists have defined ijarah contracts as having 4 pillars:

1. The employer and the employee
2. Offer and acceptance
3. Wages
4. Service (12)

Clearly, such contracts would cover the work carried out by doctors and traditional healers. *Ijarah* contracts of employment are essentially of two types:

1. *Ala al-ashkhas*– where an employee works for one employer for a specific wage for a known period for a well-defined service. During this period, he cannot work for another employer and is subject to the control of the employer as to what he does and how he does it (12). The contractor benefits temporarily from another person's work and expertise, amongst other aspects (18). An important issue, from the viewpoint of clinicians, who are governed by codes of ethics requiring them to assist the sick, the service should not be obligatory. In addition, a question arises as to doctors who deliver a publicly funded service, as within the NHS, and also have a private practice. There is an argument that under an *ala al-*

ashkhas contract a doctor should not be able to charge for a service, which would be available within the state funded service, although at a significantly later date. Such a service facilitates queue jumping and could be considered to be an example of bribery or corruption. For many jurists, the contract concerns the nature of the work or expertise. However, for Shafis it is about the worker as the usufruct did not exist at the time of the contract and so such concerns are particularly valid.

2. *Ala al-'alam*is a general employee or independent contractor, who works for himself and so can have more than one employer (14). Such a contractor can determine his own method of performance as the terms of his contract permits. Traditionally, by national and international guidelines doctors and other healers have been considered to hold such contracts. However, the method of performance of clinical contracts is constrained and cannot be solely determined by the contractor. The income generated from work under such a contract raises problems. Hanafis hold that if wages are paid from the income of the work the employee performed the *ijarah* contract is voidable. However, most clinicians who conduct private work do so through a wholly owned company, which then pays them a wage. The rationale is to minimise taxation. In contrast, Malikis and Hanbalis consider such a wage permissible (12).

In practical terms, for clinicians and traditional healers, the important aspects are the expertise and temporary nature of the contract. However, for many clinicians their work will lie somewhere between these two forms of *ijarah* contract.

It is important to recognise the existence of a different relationship between doctors or between traditional healers and that is of partnerships, where a group of therapists of the same professional background come together to offer a service. Known variously as *Sharikat al-a'mal*, *Sharikat al-abdan* or *Sharikat al Sanai*' two or more professionals contribute labour to a joint enterprise and share the earnings (12). Shafi jurists contend that such a contract between professionals is not valid as there is uncertainty (gharar) as to exact percentage of work contributed by each member of the partnership and so division of the profits would be potentially unjust. Hanafis, Malikis and Hanbalis do not hold this view, contending that each member acts as an agent for the others and the purpose of the partnership is to collect profit. They also hold that the skills of Each partner may not be identical and can compliment each other so offering a service, which none could offer alone (12). With the nature of healthcare work, the partnership will be an *Inan*, where each is liable only for the obligation incurred by himself (13).

The nature of the contract:

The Employer and the employee:

For doctors, the employer will either be a healthcare organisation, a patient or his or her relatives. In the case of traditional healers, the employer will usually be the patient or relatives. There is an obligation on the employer to seek out a competent practitioner. Imam Malik narrated in his *Muwatta* that Zayd bin Aslam reported that when the prophet (PBUH) called two doctors to a person with a worsening wound, He asked:

"Which one of you is a good doctor?" (19)

This view is reiterated in a further hadith which states:

"Anyone who practices medicine though he does not have enough knowledge will pay for the damage he causes" (20)

ibn Al-Jauziyah emphasised the importance of the selection of a competent and knowledgeable practitioner when he wrote:

"If the sick person had knowledge beforehand that his doctor is ignorant and yet allows him to treat him, then there is no compensation required in this case". (19)

This is a view reflected in English case law. For example, in *Shakoor v Situ (t/a Eternal Health Co)* [2000] the judge disagreed that complementary practitioners should be held to the standards of orthodox doctors, partly on the grounds that:

"The patient has usually had the choice of going to an orthodox practitioner but has rejected him in favour of the alternative practitioner for reasons personal and best known to himself." (21)

The doctor or traditional healer has a personal responsibility to be appropriately trained. A well-known hadith states:

"Seeking knowledge is a duty upon every Muslim, and he who passes knowledge to those who do not deserve it, is like one who puts a necklace of jewels, pearls and gold around the neck of swines." (22)

He or she:

"should do one's job well, and with sincerity to Allah" (23)

For physicians, there are systems for validated formal on-going assessment, based on examinations, annual appraisal and revalidation. For traditional healers, there are no comparable systems. For example, in the case of *hijama*, there has been a dramatic growth in the number of short courses allowing people from non-healthcare backgrounds to set-up numerous unregulated practices (11). As a result, the selection of a knowledgeable and trained practitioner can be problematic. Linked with these issues the nature of contracts and payments must be viewed in the context that few traditional healers in Western clinical practice have followed any recognised formal training program (11) and so responsibilities and remuneration cannot be directly comparable to that of allopathic physicians. However, despite the views of ibn Al-Jauziyah that a patient who puts himself in the care of an ignorant person is not entitled to compensation for any negligent care which he receives (20), someone who holds himself out as performing a "lost sunnah" and promotes the concept that this form of medicine is superior to allopathic practice should not, in my opinion, be exempt of responsibility for their actions.

Offer and Acceptance:

Offer and acceptance show consent (12). They can be expressed orally or in writing. In the clinical setting, who is making the offer and who is accepting it, does not readily fit easily into a market setting. According to the Hanafi school the party who first expresses a willingness to make a contract is making an offer or *ijab* (12). In private clinical settings it is the doctor who is making a general offer to treat the sick and it is the patient who accepts. However, it could be considered that it is the patient who has approached the doctor for treatment and the clinician accepts that offer. For other schools, the situation is moreclear as it is the doctor who has the product – an ability to diagnose and treat and will always be considered the offeror (12). In the case of health organisations, doctors could be considered to act through a general agency (*al-Wakalah al-Khaassah*) on its behalf (23). Of course, the health organisation could not of itself perform the service, which some would consider an essential attribute of the principal.

Traditionally, both offer and acceptance have been by the spoken word. It is their meaning rather than the words or forms that have mattered (23). Qur'an 2 v 282 – 283 outlines the requirements for a debt contract. It should be written and witnessed, although when the transaction is immediate it can be an oral agreement (24). Such requirements have distinct parallels in clinical practice, where histories and physical examinations are based on oral agreements between the parties, but significant interventions such as invasive investigations or surgical procedures require signed documents, namely "Consent Forms", although these are seldom witnessed. Within a consent form the details of the service to be provided are specified together with limits on what can and cannot be done. Such an approach is consistent with the requirements for an *ijarah ala al-ashkhas* contract.

Wages:

This has been touched on earlier in the review. The concept of a public service emerged early in Islam with the *ashab e Suffah*(The People of the Bench). Members acted for the Prophet (PBUH) as scribes and emissaries (25). The Centre for Labour Research in Pakistan has produced an Islamic Labour Code (26) in an attempt to encapsulate principles for payment of wages, especially for those working in a public service. These include:

1. Wages are a right.
2. Wages should be sufficient to provide the basic necessities of life.
3. Wages should be fixed in the light of inflation, regional price differences and need.
4. Punctual and timely payment.
5. Payment should be in full.
6. Equal pay for equal work.

However, Qur'an 4 v 32 would support pay diversity based on competence and justify incentive pay systems (26, 27). Of course, Pakistan has an Islamic constitution and the application of an Islamic Labour Coded in non-Islamic countries is unlikely to be adopted by government bodies, such as the National Health Service (NHS).

The contract should specify the amount of compensation in the form of wages, time of work, payment intervals and the quality and quantity of work to be done (26). There should be no doubt in such contracts according to Qur'an 2 v 279. Indeed, it has been suggested that an employer should consider employees ''as members of their own family." (28) However, although a salary is a continuous way to reimburse health workers and professionals, it may affect the quality of service offered as it divorces outcomes from the clinician's input (29). Some support for this view comes from a study in Iran

where targeted payments were considered by some clinicians to lack transparency and lead to dissatisfaction (29). In a number of countries, inadequate government salaries or limited clinical facilities have led to a system of informal payments to clinicians, in other words, bribes. In *rashwah,*a person has private gain from his public office or through seeking recompense for duties ordinarily considered as non-compensatory (30).Such payments are common in Pakistan (31), Turkmenistan and Tajikistan (32). Nodeh et al have drawn attention to the difficulties in eradicating this problem once it becomes an ingrained habit (33).

The consequences of such bribery and the associated corruption are social and economic injustice and damage societal organisations, such as a state funded health service. Although the definition as to what is bribery varies between various Muslim jurists (34), the overarching theme is that the briber is expecting to receive some benefit from the bribee, to which he is not legally entitled. Hanafi and Shafi jurists have emphasised the need to ensure that such bribes are not hidden under the rubric of being a salary (35).

Service:

Associated with any service, Islam requires there to be accountability or *hisbah* (35). Al-Mawardi considered *hisbah* as a system for enjoining what is just and right if it is neglected and forbidding what is unjust and indecent if it is found to be practiced (36,37). It should operate at both the personal and institutional level (38). Responsibility for poor or adverse outcomes within medical practice comes under two headings:

1. Contractual – where the physician strayed outside the terms of the contract.
2. Derelictual – where the harm arose because of a physician's wrong actions (39).

In practice there is often an overlap between the two and, indeed, and dereliction arises because the physician strayed outside the terms of the contract. Wrong actions are increasingly being seen as criminal in nature. The extent of liability has been linked to the doctor's intent or *maqasid.* Criminal intent is distinguished by the presence of wilfulness, knowledge and disobedience (40). When all three are present then the doctor faces the consequence of full criminal liability and retributive justice or *qisas.* Shafi jurists have clarified the interpretation of these conditions as being when the error committed by the physician is gross and not to be expected of one in his position (41). In such a case the severity of the punishment would be proportionate to the crime. However, Hanafis consider that payment of *diyyah*as monetary compensation is an acceptable alternative (42). This view is based on Qur'an 2 v178. In addition, for Hanafis, liability is removed when the patient approves of the action and the intent was to achieve the patient's interest and preserve life (40). Maliki also require the approval of the ruler (40), in other words, state regulation of the profession. This has immediate relevance to the practice of hijama and other traditional therapies in the UK, which are totally unregulated professions (11).

Simple mistakes have generally been interpreted by jurists as unintentional in nature (40). They may take one of two forms:

1. Error in performance, which is common to all professions. Failures could be due to negligence, recklessness or lack of caution.
2. Error in estimation in which the doctor makes the wrong diagnosis or recommends the wrong type of treatment. His performance will be compared with that of a body of responsible doctors to assess whether such an action would have fallen within their range of practice (40).

In order to prove liability, the requirements within Islamic law are that the following need to be established:

1. *Al-Taadi* (Breach of Duty)
2. *Al-Darar* (Harm)
3. *Al-Ifdhai* (Causation)

These criteria parallel those required in western clinical negligence cases. Similarly, proof comes through:

1. *Al-Iqrar* (Admission)
2. *Al-Shahadah* (Witnesses)
3. *Ra'yu al-Khabir* (Specialist opinion)
4. *Al-Kitabah* (Documents) (43)

The traditional outcome for proven breaches of duty resulting in harm was summarised by Ibn Rushd, who wrote:

If the medical practitioner is competent yet he commits a mistake, then he is only liable for what is less than a third of the value of *diyyah*. More than one third of the full *diyyah*, should be met by his relatives. But if he is not knowledgeable, then he is lashed and imprisoned." (44)

In contrast Malik wrote that:

"A qualified and competent medical practitioner is absolved of all liability, even if he errs. Whereas an impostor is fully and personally liable." (45)

Interestingly, the role of the family can be directly compared to that of many medical defence societies, which act as mutual organisations with a common fund, somewhat similar to *takaful*, as distinct from western insurance companies.

Conclusions:

The question raised in this essay is whether *Ijarah ala al-ashkhas* is applicable to the therapeutic services supplied by clinicians and traditional healers. Hanafi jurists consider such contracts to have four pillars, namely: employer and employee, offer and acceptance, wages and service (12). Although some clinicians are employed by organisations and act as its agents in providing a service, most therapeutic relationships are directly between a patient, who is the employer, and the therapist, who is the employee. The service is offered by the clinician and accepted by the patient, and this is often embodied in a signed document, the "Informed Consent." This document outlines what is being offered, as well as the risks and benefits associated with the service. For this service the employee receives a payment either directly from the patient or from the state organisation, for whom he acts as agent. Clearly *Ijarah* is an appropriate term to apply to the work of clinicians and traditional healers.

In the West, allopathic practice is the main form of therapy offered to patients. It is provided both through state-based institutions, such as the NHS, and private practice. Although *ijrarah*contracts are not utilised in either setting, they are relevant to Muslim practitioners and should form the moral basis for their practice. However, the absence of externally validated qualifications and the nature of training received by many traditional practitioners in the West raises serious questions as to their fitness to offer therapies to would-be patients. The impact that this would have on any contracts depends upon the patients and the information given to them.ibn Al-Jauziyahwas of the view that if a sick person knows that his therapist is ignorant and yet allows him to treat him, then no compensation is required.

The second issue to be raised is the potential consequences of a defective service. Adverse outcomes may be due to dereliction or contractual breaches. When there is wilfulness, knowledge and disobedience the dereliction can have criminal intent and lead to retributive justice. Shafi jurists consider that the error must be gross and not expected from someone of his professional status. For contractual breaches the remedy generally lies in payment of compensation or *diyyah*, although, contrary to present-day practice, Malikis consider that a competent and knowledgeable practitioner should be absolved of liability. Such views leave the poorly trained traditional therapist exposed to the full consequences of taking on a role for which they were not appropriately prepared.

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Relief

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Medical relief during the time of war - The Syrian catastrophe – a case study

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Medical relief during the time of war and disaster is considered amongst the most difficult and complex tasks, and it's fundamentally intertwined with so many factors, including the lack of security and safety, the displacement of the population, and the lack of public health and food security.

The humanitarian crisis started in Syria in 2011, and the United Nations considers it to be amongst the worst crises of this kind since the Second World War (*United Nations report 9 June 2020)* and the Syrian people are still suffering from the interruptions of their education, health, and food security.

The aim of this article is not to analyse the reasons for this crisis (catastrophe) and to delve into the geo-political intricacies of it. It is instead to shed light on the humanitarian situation generally, and on the suffering of children in particular.

1. The Syrian catastrophe in numbers

- The Syrian Network for Human Rights has stated that from March 2011 to June 2021, 227,781 civilians amongst them 29,250 children and 28,526 women have been killed in Syria.
- The number of disappeared is 101,678 and a further 14,537 were casualties in Syria's prison system.
- 13 million Syrians have been displaced, 6.6 million externally (2) and 6.4 million internally, essentially half of Syria's pre-crisis population.
- 2.5 million children have had their education interrupted.

2. Consequences of the Syrian crisis

The Syrian crisis is unique in that:

- The repeated and long-term shelling of hospitals.
- The continuous upheaval and expulsion of inhabitants from the areas they live in, and the spread of psychological diseases and the interruption of learning amongst children as a consequence. This has been confirmed by the Secretary General of the UN (3).

2.1 On children

Children have been subjected to the worst consequences of the crisis, and the indiscriminate nature of shelling has been devastating. Children have been affected by the torture within prisons too, and schools and play facilities have been hit by shelling as well due to the haphazard airstrikes of the Syrian government *(it is proven that more than 3,800 schools have been destroyed)* (5).

The size of the problem for children has increased greatly over the last decade; a generation has been born that suffers from a lack of education, be it traditionally within schools, or health education and no real focus on child wellbeing. The danger of illiteracy is worrying and is unprecedented in scale in the history of modern Syria.

Approximately 1.25 million children live in refugee camps within Syria; they suffer from the worst circumstances with a lack of cleanliness, proper place to live, medical care, and even Islamic education as refugees have been forcibly displaced. So many children

are now the breadwinners for their families and are now working instead of continuing with their education.
The Information Management Unit (IMU) within the Union of Medical Care and Relief Organisations (UOSSM), produced a report (6) on the situation of schools within the camps in Northern Syria. And to carry out this study, researchers visited 1,302 and camps within the Idlib and Aleppo governorates.

It transpired that only 175 camps had schools, and the number of schools was 189, most of which lacked teachers and essential educational resources.
And with regards to children who have special educational needs, their situation is even more difficult with little care being shown toward these children and their families. UOSSM is one of the few organisations that work with them and ensure their needs are met.

Figure 1 - UOSSM centre for supporting children with special educational needs

2.2 Mental Health

The number of children in North Western Syria who have attempted suicide, and have successfully gone ahead with it has increased sharply over the last year, as the organisation Save The Children states. The report stated that 1 in 5 suicide attempts were made by teens. The increase in the number of suicides was sharp; it had increased by 86% compared to the first 3 months of 2020.

According to the report, no less than 42 people attempted suicide, and they were no older than 15. The report also stated that 18% of the casualties of suicide were teens and young people who were between 16 and 20 years old.

2.3 Consequences of the crisis from the medical angle

The systematic destruction of hospitals and medical facilities has been catastrophic. According to videos located in the Syrian Archive, there have been 410 separate airstrikes and 270 of these have been against medical facilities from 2011 until 2020. And the organisation has released a set of statements that indicate that 90% of airstrikes on hospitals are not just random and haphazard, but are part of a calculated strategy on behalf of the regime.

Figure 2 - This photo is from a website for doctors supporting human rights

The targeting of doctors and healthcare workers (9):

The killing of 930 healthcare workers from March 2011 – March 2021.

dentist, doctor, public health student, technician, nurse, paramedic, pharmacist, veterinarian

More than 10,000 doctors have left Syria according to official statistics provided by the Syrian Medical Union.

The medical response and future challenges

Syrian medical organisations have worked with international medical organisations from the start of the crisis, and despite the difficulties they have faced, the following has been achieved:

- The creation and support of public and specialist hospitals.

- The creation of new health centres.
- Psychological support.
- Recruiting and training healthcare staff despite the difficulties they are facing.
- Physiotherapy.
- The protection of medical staff.

The following are amongst the challenges that medical staff face:

- Geopolitical complications and their effect on humanitarian work.
- The continuing of the crisis for more than 10 years.
- The Covid-19 pandemic and it's negative effect on the healthcare situation in general.
- Lack of support and resources.
- The continuous pressure on medical organisations that are self-founded (out of necessity) and are filling gaps in the absence of formal medical organisations.
- The weakness in the number of specialist doctors.

There is no doubt that the health crisis that the Syrian people are facing is amongst the most difficult since the Second World War. All the work that medical organisations do is greatly appreciated.

The extent of the crisis has been affected the mental health of Syrians, especially women and children which will go on for more than a generation. The international community is still paralysed and can't protect civilians and can't provide them with the medical, psychological, and educational support they desperately need.

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Book Review

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'Akhlaq-Al-Tabib' (Physician's manners)

By Al-Razi

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The book 'Akhlaq-Al-Tabib' (literal translation: Physician's manners) or 'Medical ethics' is predominantly a treatise, copied from an original letter written in Arabic by Al Razi (also known as Rhazes, Ar-Razi or Rasis) 854–925 CE to one of his students. The valuable 16th century copy was unearthed by the book's editor during his PhD's research who decided to publish the manuscript with his own commentary, making the document more accessible to the modern-day readers and reconnect it to Al Razi's more known works.

The book starts with a prologue, introducing the readers to Al Razi's upbringing and what was recorded of his genius and personality. The editor carefully paints an image of the pious philosopher widely known as 'Galen of Arabs', who has developed an interest in medical sciences later in his thirties. This unique classical education endowed him with an unparalleled humanistic outlook on medicine, making him a pioneer in medical ethics of his era and centuries to come.

The book divides the treatise into 25 sections according to their order in the original script covering a myriad of situations any physician may come across in their practice; 17 of these are clear do's and don'ts for the physician to follow. Although the script is aimed toward medical practitioners, it must have made a useful read for legislators, patients and even normal citizens on what to expect from their medical carers.

The personal letter explains the responsibility of physicians toward themselves /patients alike and provides advice on how to approach ailments, patients and practice medicine as ethically as possible. The experienced physician shares his practice ethos in a pragmatic and engaging style laced with personal anecdotes and experiences of his own.

What attracts the reader's attention is the simple language used by Al Razi throughout the treatise, except for a few terms -which the editor does a great job explaining in the footnotes- scattered across, it could easily pass as a document written in the 21st century. The editor's commentary adds another dimension to the script that aids readers understanding, sometimes it's anecdotal from Al Razi's life or his other publications and at others it provides cultural references to the era he lived in.

Al Razi starts with endearing praise and prayers for his student as he embarks on a new position to work for an unnamed prince. Al Razi doesn't shy away from laying the facts as they are, the task that awaits his student is very difficult and demanding but as any good instructor, he aims to prepare the student to the real world and equip him with the devices needed to be an independent ethical practitioner.

As medicine is a very challenging unpredictable profession, the student is advised to control the thing he definitely can, himself. Al Razi highlights the importance of self-discipline multiple times throughout the letter, this includes anything that can hinder the physician's ability to fulfil his duties or affect his ethical and scientific credibility. Various sections were dedicated to warn from egoism, alcohol dependency and using experimental treatments on patients.

Discipline for Al Razi manifests itself in various forms, for instance, the commitment of continuous study and development of the physician's skills. In his opinion, practitioners should always keep up-to-date with new advancements in the field and be prepared to apply their knowledge in any emergency that may arise.

After a brief description of disease types and how to approach treatment courses, he moves to set the

foundations of the physician-patient relationship. Al Razi strongly stresses on morality of the physicians, where they should always demonstrate honesty, kindness, humility and respect to a patient's privacy regardless of their gender or age.

Although the letter was aimed at a newly appointed court doctor, Al Razi reminds the student of his moral responsibility to treat all patients with no exceptions, independently of their class or status, especially the poor. This responsibility does not expire after diagnosing and administering the treatment but extends to attending the patients until stability, giving examples of emetics and laxatives dangers if given unmonitored.

Similar to his contemporary physicians of the Arabo-Islamic era, Al Razi demonstrated support for the prophylactic and preventative methods before illness take place, which are accomplished by regular check-ups in the absence of any disease. This stretches to include a dedicated section on the importance of a patient's diet, then he provides examples of food combinations that were believed to be incompatible and should be avoided.

Meticulous examination is essential prior to diagnosing any patient. Al Razi speaks of refusing to perform 'blood release' a common practice in his day without checking the patient's history, pulse and urine. He mentions two occasions where he saved patients using less drastic treatments.

The majority of the letter focuses on physicians' duties; however, Al Razi emphasises the critical role these individuals play in society in multiple sections. Two sections were aimed to regulate the patient's relationship with their physicians, where patients must always show respect and disclose their medical history since it will assist treatment.

Al Razi warns from dealing with charlatans and crooks who lack the knowledge and the moral background to be entrusted with people's money or lives. These fake healers were described as illusionists, who take advantage of people ignorance to make a quick gain.

Although 'Akhlaq-Al-Tabib' might be considered dated, it offers a useful insight of the medical ethics evolution over time. Throughout the book, readers will notice that Al Razi, has built on the codes of practice by his antiquity predecessors (Hippocrates and Galen) and formulated updated guidelines of the 'ideal' physician's qualities, which are very similar to the ones followed by the modern day medical practitioners, making him and his colleagues from the same era the forbearers of medical ethics before the term was coined for the first time in the 1800s by Percival. The field would hugely benefit from a translation of this important historical document, as many of Al Razi's untranslated publications.

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Letters to the Editor & Short Communications

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Why we need to understand and study medical history

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Although healthcare sciences often have some of the longest degrees and postgraduate components, there is often very little medical history taught.

This can give the impression that the history of healthcare isn't important. After all, if you can't find time to fit in one lecture on the subject in 5 years then surely it must be less useful than the Krebs cycle?

But nothing could be further from the truth. Medical history isn't just useful, it is vital to our development as individuals and as a field of study.

Firstly, as the old adage goes, those who do not learn from history are condemned to repeat it. Medical science and ethics are replete with circular discussions and stunted conversations that have been going on for generations. However, there can be no greater example that the current pandemic. Had we studied and analysed the Spanish Influenza pandemic of 1918, we would have been in a much better position to be prepared for Covid 19. Instead, we kept repeating the patently false mantra that this pandemic was "unprecedented."

Then, there's the humility and context that comes from learning about our history. It places you within a timeline and in relationship to those that came before you. Can we see far, if we don't even know that there are giants whose shoulders we could be perching ourselves on? Learning about history quickly disabuses someone of the notion that they know everything. It instils humility. If Galen and Ibn Sina could be wrong, so could we.

Finally, learning from history is immensely motivational. You realise that Medicine isn't a dry subject where we must memorise as many facts or figures as possible. It's the pursuit of uplifting peoples lives through a combination of study, observation and constant incremental improvement punctuated by periods of sheer brilliance. Learning about the struggles of previous generations and how they overcame them is fuel for those long hard years toiling away in a university or clinic. You are not merely a cog in an unfeeling and unthinking machine. You are the heir to a beautiful tradition that works to improve the lives of our fellow human beings.