

Islamic Religious Resources may be an Additional Source of Scientific Knowledge

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Abstract

The relationship between religion and science has an important impact on the history of science, and it is presented different views about the relation. In recent years, the discourse of encouraging among scientists to relate science to religion is a new but slowly growing phenomenon. It is observed that most of the information concerning scientific facts mentioned in the Quran is in perfect conformity with modern discoveries in the field of science and does not conflict with them in any way. When the detailed expressions of the Quranic verses regarding the formation stages of the embryo are examined, it is clear that they give a correct definition parallel to the scientific analysis of the embryonic stages. Also, cleanliness is an important part of Islam and, scientific evidence suggests that 'hand washing and hygiene' measures is one of the most important methods in the prevent of the infection spread. Science and religion have common concepts to say to each other, which make it possible to reach consensus in the same context. The aim of this study, which asserts the hypothese that religious sources can be scientific sources, is to shed a bit light on the solution of this controversial issue.

Key words: Religion, Quran, Hand hygiene, Human development, Embryology

Introduction

In 1976, an unusual lecture was given at the French Academy of Medicine. Its title was "Physiological and Embryological data in the Quran". This study, presented by Dr. Bucaille¹, was based on the existence of certain statements concerning physiology and reproduction in the Quran². He emphasized that it was impossible to explain how a text produced in the 7th century could have contained ideas that have only been discovered in modern times. According to him, aside from the

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Quran, it was not exist a human work that includes far beyond the level of knowledge of its time, and these and similar statements in the Quran were compatible with modern scientific information. Although the differences, the sources of information for most societies are known to be science, emotions, intuition, art and narratives. Why should religious sources not be among these sources? The answer to this question has emerged as a subject controversial in recent years. The aim of this study, which asserts the hypothesis that religious sources can be scientific sources, is to shed a bit light on the solution of this controversial issue.

Relationship Between Religion and Science

Scientific information should be based on reliable published sources and should accurately reflect the current state of knowledge. The data sources accepted by the scientific community are shown in Table 1. Historically, scientific knowledge was produced by people of many different beliefs, including Jews, Christians, Muslims, Hindus, and atheists.

Table 1. Commonly accepted scientific data sources

Scientific information sources

- Articles
 - Research / Original
 - Rewiew: systematic literature review / non-systematic (narrative) review
 - Published conference papers
 - Scientific books
 - **Other sources** (they are research results not published by traditional way)
 - PhD theses and master's dissertations
 - Scientific and technical reports
 - Preprints and working papers
 - Unpublished conference papers
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The relationship between religion and science has been discussed throughout history and many books have been written about it^{3,4}. There are variety of views about the relationship between religion and science. Some authors hold that these two fields are in conflict with each other,

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whereas others claim they are in harmony, while others claims they are completely independent, having no connection at all. For example, as highlighted below, some scientists claim that the definitions in the Quran regarding embryological stages of human development coincide remarkably with recent scientific discoveries¹⁻⁵. In fact, religion can have a positive impact on science, such as in the development of modern medical ethics. It is also known that science can enhance the spiritual life of believers. Moreover, it is claimed that Christianity and science do not contradict each other because they seek solutions to different kinds of questions⁶. Actually, many apparent conflicts between science and religion occur because of a lack of understanding of the fundamental differences between the two field. Namely, science and religion are different, but they can not be categorically separated or viewed as mutually exclusive. In this regard, the idea of creating common areas of study and practice between positive science disciplines and religion has been put forward. Years ago, Jones⁷ has proposed how religion can become an active partner with psychology as a practical professional discipline. 20 years after this proposal, historian Ferngren⁸ examined the relationship between medicine and religion in one of his books, and in the other reference book consisted of 30 articles⁹, he explored the relationship between Western religious tradition and science from the beginning of Christianity to the end of the 20th century.

The Quran and Modern Science

As stated in the introduction, the view that the Quran is the source of all knowledge, whether or not known by the public, discovered in the past and in the future, has become popular among some writers such as Bucaille in the 90s¹⁰. The Quran is associated with many sciences such as astronomy, biology, botany, zoology, geography, geology, physics, physiology and medicine. As can be clearly seen in Table 2, it is emphasized that many verses in the Holy Quran coincide or relate to scientific facts¹¹. However, since more scientific publications and meetings have been held about it, it would be appropriate to discuss the subject, especially through the example of embryology.

Table 2. Examples of knowledge related to scientific truth and advancement in the Qur'an verses.

<ul style="list-style-type: none"> • The ‘Big Bang Theory’ – <i>Historic Preamble</i> • The expanding universe • Early universe in state of ‘Smoke’ • The orbital movement of the Sun and the Moon • The spherical shape of the Earth • The lowest point on Earth • The Qur’an verses and mountains • The origin of life in water • Barrier between sweet and salt waters • Wind motions, clouds, and water cycle 	<ul style="list-style-type: none"> • Chlorophyll – <i>The green pigment</i> • The duality in the creation • Light and levels of darkness in the oceans • The uniqueness of fingertips • The skin – <i>Sensation of pain</i> • Frontal lobe of the brain • Behavioural patterns of species are like human • Hand hygiene & Quarantine* • The embryonic development of human* <p style="text-align: center;">(*) <i>These two topics are discussed in detail in the text.</i></p>
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Although critics claim that there is a scientific error in the verses and that they were influenced by the current Greek theories, after Bucaille, the subject caught the attention of Keith L. Moore, professor of embryology. In the early 1980s, when Moore first read what the Quran said about the development of the human embryo, he was amazed by the accuracy of the statements recorded in the 7th century, when the science of embryology was not yet known⁵. There are many verses in the Quran regarding embryological development and reproduction. In the first verses of the Quran (Al-Alak, 1-5); the first verse begins with the command ‘read!’, more interestingly, the second and third verses speaks of human 'miraculous' creation. Interestingly, islamic sources such as the Qur'an and Hadith also include the topic of ‘combating epidemics’. Due to the last Corona virus pandemic, it will be appropriate to discuss briefly this issue, which has come to the agenda again.

Hand hygiene and quarantine

Once again 'hand hygiene' became one of the most important subject of the scientific world due to the disease 'COVID-19' which started in China in 2019 and turned into a global pandemic¹². The

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Hungarian doctor, Ignaz Semmelweiss, was the first person to realize that keeping hands clean can really help prevent the passage of diseases¹³. In 2003, Curtis and Cairncross¹⁴ reported that washing hands with soap can reduce the risk of diarrhoeal diseases by 47% and, suggested that it would be one of the most cost-effective ways to prevent many diseases. In the over time, hand hygiene has become an important global issue especially in places without access to clean sanitation and toilets. Islam has always placed a strong emphasis on hygiene; There are a large number of other hygiene-related rules governing the lives of Muslims¹⁵. Although the Quran is not a medical and health science book, it contains many verses and tips for human health on personal hygiene issues such as cleaning, clean dressing and clean nutrition² (*An-Nisa 43; Al-Muddaththir 4-5; Al-Bakara 168*).

Many parts of the body, including the hands, feet, face, mouth, ears, and nostrils, are cleaned with ablution (wudu). Moreover, ablution has many benefits to protect and maintain health. For example; Thanks to ablution washing hands five times a day before prayer is an effective way to keep germs away. Also, gargling during wudu, contribute to the health and hygiene by removing germs, allergens, dust particles and, food residues on the teeth. This procedure, which is repeated five times a day, is known to play an important role in keeping of health by preventing the spread of germs¹⁶. The first national hand hygiene guideline were published in the 1980s, then due to its importance, guidelines on hand hygiene in health care were updated by CDC and WHO in 2002 and 2009 respectively^{17,18}. With the pandemic of COVID-19, it can be said that the basic teachings of the Prophet Muhammad about hygiene and health were rediscovered by the scientific world. It is extremely remarkable that the prophet Muhammad, who lacks education, describes what to do during an epidemic, that is, in a sense, describes the practice of quarantine? The concept of quarantine has been known since biblical times, and is understood to have also been practised through in modern history such as the bubonic plague outbreak in 1665 and the 1918 flu pandemic¹⁹. Indeed, before vaccines and antibiotics were developed, isolation and quarantine were the most current methods used to prevent both the transmission between humans and the geographical spread of infectious diseases²⁰. Especially after the tenth century, it is seen that Islamic rules lead to advances in many fields of medicine and that Islamic medicine has created an exemplary discipline in the quarantine, hospital and systematic clinical training²¹. Quarantine was recommended by Ibn Sina especially for those with infectious disease such as tuberculosis²².

It is thought that the first institutional practices related to isolation and quarantine were carried out during the plague epidemic between 1347 and 1352.²³

Although, personal hygiene is an important component of human well-being regardless of, religion, culture or origin, 'hand hygiene' and cleanliness is paramount to worship in the Islamic tradition and teaching^{18,24}. Muslims must perform in order ablutions before praying, and it is recommended them to wash hands frequently, especially after some clearly defined tasks. Prophet Muhammad as saying, "Cleanliness is half the faith" (*Sahih Muslim 2; Hadith 432*). Also, "Blessing in food lies in washing the hand before and after eating" (*Sunan Tirmidhi, Hadith: 1846*), and "Whoever wakes up from sleep, should wash his hands before putting water for ablution, because nobody knows where their hands have moved during sleep" (*Sahih al-Bukhari 1/4; Hadith 163*) are two hadith examples on hand hygiene. Meanwhile, Prophet Muhammad had said; "If you hear of an outbreak of plague in a land, do not enter it; but if the plague outbreaks out in a place while you are in it, do not leave that place" (*Sahih al-Bukhari 7/71; Hadith 624*). Thanks to this hadith, it was realized that quarantine was one of the oldest application examples for infection control in those years.

Advances in Embryology and Verses from the Quran

The Quran, which was revealed fourteen centuries ago, mention also facts only recently discovered or proven by scientists. Although many scientific facts found in it, it is important to note that the Quran is not a book of science, but that it is consistent with science. The embryological references in the Quran have attracted the attention of authors and scholars, who have attempted to interpret the related verses according to modern embryologic findings before and after in the years of 80s^{1,5}. Basic medical sciences; in particular, with the invention of the science of biology and microscopy, and thanks to embryological advances, these Quran statements could be understood in depth by humans. As can be seen from many references on the subject, it is clear that God, in the Quran, gives a detailed account of the development of the human embryo^{2,25-27}. In the Quran, creation of the human, and gradual embryonic development are expressed in correct terms in accordance with modern rules of science. Although the definitions attributed to embryonic development are simple, it is observed that the explanations are absolutely correct and correspond exactly to the basic stages of growth (Table 3)^{2,11,28}. The growth in the foetal stage is silent and unseen. The fertilized ovum,

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which is attached to the mother's womb and tightly fixed, is protected like a castle. In the words of the Quran, the uterus is a very safe settlement for the growth and protection of the embryo (qararen makeen)². Implantation of the human embryo into the uterus occurs at the blastocyst stage of development and comprises several sequential events. Notably, these observations at the microscopic level showed that the development inside the mother's womb takes place in just the way it is mentioned in the verses²⁹.

Table 3. Words related to the embryological development of man, in the verses of the Qur'an.

Arabic word or expression	Sura; verse(s)	Valid or potential scientific term
Many, yumna, defiq	75:37, 86:6	A drop of sperm emitted
Mai-mehin	77:20, 32:8	A fluid (held) despiced; semen
Qararen makeen	23:13, 77:21, 39:6	In place of rest; firmly fixed in the whomb (uterus)
Nutfah	80:19, 23:13-14, 22:5, 16:4, 18:37, 35:11, 40:67, 53:46, 75:37, 36: 77	A sperm drop
<i>Nutfah amshaj</i>	76:2	Mingled liquids; A drop of mingled sperm
<i>Sulalah</i>	32:8	Quintessence of liquid
Alaqah	23:14, 22:5, 75:38; 40:67	A clinging clot; leech-like clot, foetus (lump)
Mudghah	23:14, 22:5, 75:38	Cheewed-like flesh
Izam	23:14	Bones
Lahm	23:14	Clothed the bones with flesh
Kaderin malum	77:22	Gestation period

Surahs: 16; An-Nahl, 18; Al-Kahf, 22; Al-Hajj 23; Al-Mu'ninun, 32; As-Sajdah, 35; Al-Fatir, 36; Ya Sin, 39; Az-Zumar, 40; Al-Mu'min, 53; An-Najm, 75; Al-Qiyamah, 76; Al-Insan, 77; Al-Mursalat, 80; Abasa, 86; At-Tariq.

It is seen that developmental biology subjects related to human reproduction and embriyologic development are frequently repeated in the Quran. In particular, the verses of the Al-Mu'minun and Al-Qiyamah suras contain more detailed definitions than the verses in other surahs. Firstly, the Quran accurately describes the main stages of embriyonic development. Each word describes the characteristic of a specific stage and its morphological and physiological identity. Secondly, it describes the sequence of these events in the same chronological order as discovered by the electron microscope³⁰. As can be seen more clearly in Table 4, in the Quran, God mentions that human embryonic development passes through a number of distinct stages. Remarkably, these expressions, Nutfah, Alaqah, and Mudghah, which are preferred in expressing early human development, are stated in numerous Quran suras (more than ten) and in some hadiths.

Table 4. It is stated in the Quran that embryonic development goes through a number of different stages. These verses in the two surahs are understandable and constitute a union of meaning that verifies other verses.

Stages	Al-Qiyamah (Verses 37-39)	Al-Mu'minun (Verses 13-14)
1- The Nutfah	'Had he not been a sperm from semen emitted'	'Then We placed him as a sperm-drop [nutfah] in a firm lodging'
2- The Alaqah	'Then he was a clinging clot'	'Then We made the sperm-drop into a clinging clot [alaqah]
3- The Mudghah	'and (God) created (his form)'	'and We made the clot [alaqah] into a lump (of flesh)'
4- Bone formation (Izam)	'and proportioned (him)'	'and We made (from) the lump bones'
5- Clothing the bones with flesh (Lahm)		'and We covered the bones with flesh'
6- Creation, construction	'and made of him two mates the male and the female'	'then We developed him into another creation'

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The first term, 'Nutfah', meaning 'a small amount of fluid', 'a drop', it's singular noun. Nutfah also means gamete and zygote, however the latter by expressed in a special term 'nutfah amshaj' in the context of genetic uniqueness, and this expression is plural. It is meant herein combination of two fluid, so a male and a female gamete (sperm and ovum). Another word sulalah means quintessence or the best part of a whole^{2,31}. The second term, 'Alaqah', refers to zygote and its subsequent developmental stages required for implantation. Alaqah is a leech that thrives on the blood of animals to which it attaches. Additionally, alaqah is 'the red blood in general' or 'the thick clotted blood'. Alaqah also denotes 'the wet blood'³². The third term, 'Mudghah', refers to piece of flesh. One of the meanings of the word mudghah is 'something that is chewed by teeth' (like chewed gum). In fact, the transformation from stage of alaqah to stage of mudghah is very rapid. The appearance of the somites gives this stage a distinctive feature. This is because of the somites at the back of the embryo that 'somewhat resemble teeth-marks in a chewed substance'¹¹. Indeed, the silent growth in the mother's womb is itself a wonder of creation. Although his physical aspect is at the forefront, in fact, in this stage it has a higher degree than an animal. After the fertilisation of the ovum by the sperm, an individual life comes into existence, and it is gradually fashioned into shape; its limbs are formed and the higher faculties (hearing and seeing) come into play. The fourth stage mentioned here is the 'unique' human stage where the spirit is breathed by Allah to that body².

The next two stages, namely in the formation of bones and flesh, first, the cartilage tissue of the embryo ossifies (Izam). Then muscular cells that are selected from amongst the tissue around the bones come together and wrap around the bones (Lahm). Although the process consists of five stages, some authors mention another (the last) stage in which the human body is constructed with all organs (Table 4)^{2,11,25}. On the other hand, foetus protected by three veils of darkness. In the Az-Zumar surah Allah says; 'He creates you in the wombs of your mothers in stages, one after another, in three veils of darkness', thus indicating the continuation of the embryonic development and the change from one stage into another, as explained previously. According to embryologist Prof. Moore, these three veils of darkness in the Quran, consist of (i) anterior abdominal wall of the mother, (ii) the uterine wall, and (iii) the amnio-chorionic membrane³⁰.

Discussion

At the beginning of the 7th century, it was impossible to express these ideas correctly, and there was nothing to show that people in the Middle- East and Arabia knew more than people living elsewhere. Today, there are scientists (from most Islamic geographies) who have an in-depth knowledge of the natural sciences or other modern knowledge such as the Quran and reproduction, and recognize the surprising similarity between them and the verses of the Quran. The words of Islamic geography stem from the need to ‘emphasize’ that this situation is attractive to them. It is a fact that the number of scientific studies and publications in this geography is much less than the developed Western countries. The comparison results between the beliefs present at the time of the Quran’s revelation and modern scientific data have surprised and amazed other scientists as well as researchers interested in embryology. In this regard, the importance of Dr. Moore's scientific conferences and frequently updated books is particularly noteworthy^{5,30}. On the other hand, in a recent article, the role of the mother in the development of the fetus and its importance in the future of the newborn life are discussed in the light of some Quranic verses and Hadiths and recent medical research results³³. In this regard, the author argues that the Quran and Hadith can be concluded to be consistent with modern science. As far as it is known from the history of embryology, little was known about the staging and classification of human embryos until the 21th century. For this reason, the descriptions of the human embryo in the Quran cannot be based on scientific knowledge in the 7th century. According to Al-Mehri¹¹, the only plausible explanation is that these statements were revealed to Muhammad as revelations. Because it was impossible for the prophet, who was absolutely unlettered and had no scientific education, to know these details. Ordinarily way religious resources and modern science interact in the discovery of unknowns about nature, human and other beings. This interaction, and scientific development have enabled us to understand certain verses of the Quran, which hitherto have been impossible to interpret. The Quran, however, is not a book of Science but a book of ‘Signs’. These signs invite human to realize the purpose of his existence on earth, and to live in harmony with Nature³⁴. In particular, according to today's modern societies, everything must be proved by empirical evidence; This means that it has to be measurable and quantifiable. Research, especially quantitative research, then, is the criterion by which everything, including religion, is either accepted or rejected³⁵. Of course, science is the search for exact truth. As stated in an article, it is rooted in established, systematic,

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unbiased, theoretical and empirical approaches involving the scientific method. However, it requires the participation of many societies, and all elements within these societies, without discrimination, in a global attempt to understand nature and our universe³⁶.

In the era of renaissance and enlightenment that began after the Middle Ages; the debate that religion does not match the language of science and that it should be separated from science has spread rapidly and unfortunately is still being discussed. Since they couldn't be measured by scientific criteria, it can be said that religions and religious thought are largely marginalized. However, in recent years, it has been suggested that 'religion and its effectiveness' can be scientific evidence for integration in daily life and for increasing health and well-being³⁵. As in recent studies by psychiatrist Harold Koenig et al.^{37,38}, it has been observed some growing body of evidence on the positive effects of religion and spirituality on recovery from cancer and the ability to cope with it as well mental health. Also, results of another study suggest that the verses of Quran could serve as an influential medium to culturally competent public health practitioners in diverse populations, particularly in Muslim communities, for improving and maintaining healthy lifestyle and behaviour³⁹. It is necessary to emphasize that the principles of Islamic medicine and modern medicine or science are not irreconcilable but can help each other's theoretical scope⁴⁰. On the other hand, in the past, the society of Iberian Peninsula has been witnessed numerous interactions and collaboration of religion and science at the time of Islamic culture and civilization (about eight centuries)⁴¹. Interestingly, the vision of the relationship between religion and science varies from country to country in terms of religiosity as well as trust in scientific authority⁴². The Quran, which is an important religious reference for centuries, mention also facts only recently discovered or proven by scientists. Notably, as highlighted by Dr Moore⁴³, most of the information concerning embryology mentioned in the Quran is in perfect conformity with modern discoveries in the field of embryology and does not conflict with them in any way.

Conclusion

It is known that thanks to scientific progress taking place in the last century and modern times, the hidden meanings of some Quranic verses have become more comprehensible to humanity. Actually, it would seem that these scientific facts discussed made in understanding the complexity of embryology and human development provides stronger arguments in favor of the other theory

and opinions. The scientific themes and facts in the Quran not only create a magnetic attraction for today's scientists, but in a sense encourage them to do scientific research. Hand hygiene is essential for the maintenance of personal health, also is an integral part of both preventive medicine and Islamic teachings. Interestingly, it is observed that medical measures such as hand washing, personal hygiene and isolation, whose importance has been understood due to COVID-19 pandemic, appear to have been in Islamic culture for centuries. Finally, information on embryological human development should not be ignored in the scriptures sources such as the Quran and Hadith. These and similar subjects in the holy books or sources; it should be discussed extensively by objective and courageous scientists in the light of current scientific research. In other words, Holy books and resources may be appropriate sources for achieving scientific truth and, this never does not contradict scientific and social development.

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