



Contribution of Unani Physicians in Tashrīḥ al-Raḥīm (Anatomy of the Uterus): A Systematic Review

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ABSTRACT

The Unani System of Medicine was pioneered in Greece and was developed by Arabs into an elaborate medical science based on the framework of the teaching of Buqrāṭ (Hippocrates) and Jālīnūs (Galen). Since that time, Unani Medicine has been known as Grek-o-Arab Medicine. Tashrīḥ-al-badan (Anatomy) is one of the oldest basic sciences. In Alexandria (1st recorded school of anatomy), the renowned anatomical teachers Herophilus and Erasistratus dissected the human body and described many of its structures. Herophilus (335–280 BC) and Aristotle (384–322 BC) were the earliest who emphasized the knowledge of human anatomy and laid the foundation of the subject, Tashrīḥ-al-badan (Anatomy). Galen's description of the "one-sex model" depicted the female and male reproductive organs as homologous anatomical structures, with differences only in location, size, and complexity. Women have been given prime importance in our classics since ancient times as they are the root cause of progeny. This paper highlights the admirable work done by Unani physicians, who compiled their observations and research work about Tashrīḥ al-Raḥīm (anatomy of the uterus) in our ancient Unani literature. To compile the contribution of Unani physicians in the anatomy of the uterus, we search and collect the material from Unani classical reference books Al-Qānūnfi'ITībb, Kāmil al-Ṣanā'a al-Tībbiyya, Al-Manṣūrīfi'ITībb, Modern books, Journal, Research Paper, and Online resources etc.

Keywords: Tashrīḥ al-Raḥīm (Anatomy of Uterus), Al-Raḥīm (Uterus), Unq al-Raḥīm (Cervix), Nizām-i-TawlīdiyyaZananah (Female Reproductive System).

INTRODUCTION

The Unani System of Medicine was pioneered in Greece and was developed by Arabs into an elaborate medical science based on the framework of the teaching of Buqrāṭ (Hippocrates) and Jālīnūs (Galen). Since then, Unani Medicine has been known as Grek-o-Arab Medicine.^[1] In Alexandria (1st recorded school of anatomy), the renowned anatomical teachers Herophilus and Erasistratus dissected the human body and described many of its structures. Herophilus and Aristotle were the earliest who emphasized the knowledge of human anatomy and laid the foundation of the subject, Tashrīḥ-al-badan (Anatomy).^[2] Our early ancestors gained knowledge of anatomy from the slaughtering of animals, from the birth process and from the observation of injuries to the human. The surface anatomy and various body structures were gradually recognized in the Egyptian, Alexandrian, Grecian and Roman eras. Medieval anatomists formalized the knowledge of the female reproductive organs transmitted to them from antiquity, but no new detail was added. This situation remained unchanged until the advent of the Renaissance when artists and anatomists produced high-quality drawings and paintings from anatomical dissections. The Ebers Papyrus (1550 BC) contains the earliest anatomic records. The

Egyptians were aware of surface anatomy and they distinguished between the uterus and vagina.^[3]

Al-Raḥīm (Uterus) is a major hormone-responsive secondary sex organ of the Nizām-i-TawlīdiyyaZananah (Female Reproductive System) that contains glands in its lining that secrete uterine milk for embryonic nourishment. Anatomically, the uterus includes the uterine body, isthmus of the uterus, and cervix.^[4] It is an inverted, pear-shaped, hollow muscular organ. In Germanic, it is called "womb," and in Latin, it is called "Uterus". The uterus is held in position within the pelvis by ligaments and lies immediately behind and almost overlying the bladder and in front of the sigmoid colon and rectum. It provides structural integrity and support to the bladder, bowel, and pelvic bones and also separates the bladder and bowel. Its functions include nurturing the fertilized ovum that develops into the fetus and holding it till the baby is mature enough for birth.^[5] Al-Raḥīm (Uterus) and Unq al-Raḥīm (Cervix) belong to upper genital tract of the Nizām-i-TawlīdiyyaZananah (Female Reproductive System). The uterus is placed inside the pelvis called AndruniTawlīdiyyaZananah (Female internal genitalia).^[6] Herophilus of Alexandrian ancient Greek anatomist, was accused of performing vivisections of living humans. He was the first to give a great

contribution to demonstrating the female genital parts and present a concept that made the base for further research. Galen's description of the "one-sex model" depicted the female and male reproductive organs as homologous anatomical structures, with differences only in location, size, and complexity. Although the knowledge of Unani physicians was incomplete according to modern science, it became a strong base for further research in the field of reproductive systems. However, this does not detract from the fact that Herophilus has made phenomenal anatomical observations of the human body, which have contributed significantly towards understanding reproductive organs (A'dā' al-Tawlīd). Notably, he was the first person to perform systematic dissection of the human body and is widely acknowledged as the father of anatomy.^[7]

Discoveries and Contributions of Unani Physicians in Tashrīḥ al-Raḥīm (Anatomy of the Uterus)

Hippocrates (Buqrātī 460–377 BC)

He was the father of medicine, described the uterus, ligaments of the uterus, and external os of the cervix (Fam-e-Raḥīm) and he assumed that the vulva is part of the uterus.^[8]

Aristotle (Arastu 384–322 BC)

Arastu described the uterus in various animals and is recognized as the founder of comparative anatomy. He imagined that the human uterus comprised seven cells: three to the left, three to the right, and one between and on top. He developed many theories related to menstruation, conception, pregnancy and infertility.^[3]

Herophilus (300 BC)

Herophilus was the originator of gross dissection. He described the cervix as a definite region of muscular and cartilaginous character 'like the head of a cuttle-fish', and also reported his observations on the uterine body.^[3] He has been credited with giving the best description of the Female Reproductive System upto the time of the middle ages. He showed that the uterus is a hollow organ.^[9]

Soranus of Ephesus (98-138 AD)

Soranus studied in Alexandria and described the size and shape of uterus and named its various parts by dissection of cadavers. He reported the relationships of the bladder and rectum to the uterus, found that the os uteri was about 4 inches from the labia, and noted that the uterus contained arteries, veins, and flesh. He documented the presence of uterine ligaments and described that they could become shorter when inflamed. He also discovered that the uterus was made up of two coats, which differed in their arrangement. The outer was fibrous, smooth, firm and white and the inner was more fleshy, villous, soft and red, inter-twined throughout with vessels. He theorized that the cervix elongated during intercourse in a fashion similar to the penis.^[3]

Claudius Galen (Jālīnūs 129-200 AD)

He considered that the uterus corresponded to the scrotum, the cervix to the penis and the vagina to the prepuce. By turning a woman's reproductive organ outward, he considered that the male and female organs were identical. Galen described uterus as bicornuate

and considered that the uterus had two cavities. The right uterine cavity received warm pure blood from the aorta and vena cava; consequently, the male developed on that side. The left side of the uterus received impure blood from vessels passing to the kidneys, giving rise to the female.^[3] He described the cervix, vagina and their accompanying arteries and veins and noted that the cervix became soft in early pregnancy. The uterus' round ligaments were described as homologous to the cremaster muscle.^[10]

Abū Bakr Muḥammad ibn Zakariyyā Rāzī (854-925 AD)

The Al-Raḥīm (Uterus) is placed in the body between Al-Mathāna (urinary bladder) and Al-Ma'y al-Mustaqīm (rectum) but superiorly it is away from the bladder.^[9,10] The uterus is small in virgin and before pregnancy, but it enlarges in pregnant women. The uterus binds with many nervous ligaments, which stretch and become broad during childbirth because support and stretching are needed, while shrinks and become smaller when support is unnecessary. The uterus has two cavities that end at the opening of the uterus. In virgin girls, the uterine opening is closed and look like tuft of branches, in between these branches, a large number of blood vessels are present, which disappear with Pard-e-Bakarat (Hymen) and dilatation occurs in branches. During pregnancy, the uterus is closed in such a way that not even a single needle enters into it and when the time of delivery approaches or any harm or disease to Jannen (fetus) appear which disturbs the temperament of the fetus then the uterine opening dilates and expel out the fetus from the uterus.^[11]

'Alī ibn' Abbās Majūsī (Haly Abbas, 930-994 AD)

Hewas a Persian physician. In his book, Kāmil al-Ṣanā'a al-Ṭibbiyya mentioned that the Al-Raḥīm (uterus) and the Al-Mathāna (bladder) are similar in structure because both has the same central cavity. The uterus has two appendages on either side, resembling two horns called Fallopian tubes and in the bladder two ureters present. He was the first to prove that the child does not automatically come out from the mother's womb at the time of birth but the contraction of uterine muscles causes the expulsion of child from the womb. He opposed the theory of Hippocrates, which is the spontaneous expulsion of the child. He says that the neck of the uterus reaches the vulva. Majūsī named Al-Raḥīm (Uterus) as 'Arham' because the uterus has two cavities and on removing the covering, it looks like the uterus has two cavities and both are dissimilar.^[12]

Ibn Rushd (Averroes 1126-1198 AD)

Al-Raḥīm (Uterus) is present between the bladder and rectum but slightly above the bladder. It is attached to the lumbar vertebrae by soft ligaments. The uterus is a nervous organ that is capable of contraction and expansion. It has two cavities that end at a single opening with some depressions in each cavity called Nuqr. The uterus has only one layer with two fibers: longitudinal (less in number) and horizontal.^[13]

Abū Sahl Masīḥī (10th century AD)

Al-Raḥīm (Uterus) is situated between the bladder and rectum but it separates above the bladder. Its entire body is nervous, which are capable of expanding when needed. When the uterus is empty, it consists of two cavities with one opening. The neck of the uterus reaches to the vagina and the vagina is homologous to the urethra of males. Masīḥī researched that the women's role in the establishment

of pregnancy is not only to accept the sperm but women equally participate in zygote formation (NutfaSazi).^[14,15]

Masīhī Ibn al-Quff (1233-1286 AD)

Al-Raḥim (Uterus) is a nervous tissue and organ of normal consistency. It has only one layer with different type of fibers; some are longitudinal (less in number) and, some are horizontal (more in number) and some oblique fibers also present (numerous in number). In the inner cavity of the uterus, two openings are actually the branches of arteries and veins that enter it. These are called as Nuqr. The inner surface of uterus is hard. According to Ibn al-Quff, there is a canal in uterus which ends upto Furj (Vulva) called as Unq al-Raḥim (Cervix). The tissue of the cervix is mostly muscular from outer side and it is almost nervine from inner side. This canal constricts at the time of pregnancy and it dilates at the time of delivery by the decree of Allah.^[16]

Ibn hubal baghdādī (1121-1213 AD)

Uterus is produced by the nervous body, which expands during pregnancy and constrict after pregnancy. It is made up of two layers, the inner rough vascular layer which has jazib (absorbent), masik (adhesive) and dafe (excretory) fibers. These layers are not nervous but resemble as nerve essence. If the entire layer were nervous, its involvement with the brain would be intense and cause it to suffer more. Very few nerves are coming from the brain, with which its sense is maintained. In this, those blood vessels open, which brings menstrual blood. These layers are divided into two neighboring cavities that are not connected. It seems that there are two uteruses in humans with a single cervix. Other animals have more than two cavities of uterus. Some say that the number of uterus cavities is equal to the number of mammary glands, as in animals.^[17]

Ibn Sīnā (Avicenna 980-1037 AD)

Ibn Sīnā was the most influential Persian physician. In his famous book, Al-Qānūnī'l'Ṭibb, the female organs were regarded as less complex and viewed as an inverted form of male reproductive organs. He subscribed to the Galenic dogma of the inverted female genitalia. He described the uterus as an inverted penis, whereby the scrotum represents the body of the uterus, the shaft of the penis making the neck (cervix) and the foreskin (prepuce) forming the vagina. He mentioned that the uterine wall is capable of stretching and contraction. In addition, he stated that the uterus is smaller in girls than in married women and that during pregnancy, the uterus and the breasts grow continuously until the fetus reaches maturity. He stated, "Why is the uterus made from nerves, and why are so many nerves collected in it? It is to prepare the uterus for stretching, contracting and squeezing. When the uterus covers the fetus, it needs to stretch a great deal to provide a wide space for the fetus. When the baby is born, it comes together and becomes very small. That is why the uterus of girls is smaller than the uterus of married women". He described a two-layered uterine wall consisting of the thick inner lining and the outer covering layer, contradicting the modern anatomical descriptions of the three-layered uterus including the perimetrium (fibrous), myometrium (smooth muscle) and endometrium (mucosa). He however correctly described the mensural cycle by pointing out that the uterine wall thickens during the menstrual cycle and the

menstrual blood comes from the inner lining of the uterus. He also described the uterine position and relations as lying behind and on top (postero-superior) of the urinary bladder with its body resting on the superior surface of the bladder. He also mentioned that the rectum lies behind (posterior) to the uterus. He described the "uterosacral ligaments" as ligamentous attachments of the uterus to the sacrum. He described the innervation and blood vessels to the uterus and suggested that blood vessels can be seen during the examination of the uterus in pregnant females and described the cervix by confirming that its folds increase during pregnancy. He stated, "The uterus is attached to the posterior area with strong and elastic tendons, and it tends towards the umbilicus, the bladder, the flat bone and the area above the flat bone. The uterus is elastic, white in color, does not have blood and it is nerve sensory and there are a few nerves from the brain to the uterus. If there were more sensory nerves, there would be more connections with the brain. The neck of the uterus has folds. It looks like there is fold upon fold. There are more folds and greater stiffness of the uterus in fat women. The folds are also more numerous during pregnancy."^[18]

DISCUSSION

Herophilus contributed significantly to reproductive anatomy by demonstrating the uterus, even though he was the first to identify the uterine tube's broad ligaments. He used an illustration to show that the uterus was a hollow organ that was securely fixed in place by the wide ligaments. In contrast, Soranus reported the relationships of the bladder and rectum to the uterus and found that the os uteri was about 4 inches from the labia. He noted that the uterus contained arteries, veins and flesh in his description. He documented the presence of uterine ligaments and described that they could become shorter when inflamed. He also described the size and shape of the uterus and discovered that it was made up of two coats, which differed in their arrangement. The outer was fibrous and smooth, firm and white and the inner fleshier and more villous, soft and red, inter-twined throughout with vessels. According to Jālīnūs, Al-Raḥim (Uterus) had two cavities. The right uterine cavity received warm pure blood from the aorta and vena cava; consequently, the male developed on that side. The left side of the uterus received impure blood from vessels passing to the kidneys, giving rise to the female. He noted that the cervix became soft in early pregnancy. As per Muḥammad ibn Zakariyyā Rāzī, the lie and position of Al-Raḥim (Uterus), which was also followed by Masīhī, Ibn-Rushd, H Baghdādī and Masīhī Ibn al-Quff described its anatomical position as being situated b/w Al-Mathāna (urinary bladder) and Al-Ma'y al-Mustaqīm (rectum) but at the superior surface, it gets away from the bladder in some extent. This is true according to today's knowledge. Rāzī correctly commented that the uterus is comparatively small before pregnancy but becomes bulky after delivery of the newborn. He further elaborated on the special characteristic of the uterus, having the capacity to carry fetus. He believed that the uterus is A'sabi in nature (it has sympathetic and parasympathetic nerve supply), it attaches many ligaments to maintain its position and it can even expand as in pregnancy. The uterus has the capacity to expand and constrict, which are essential events for parturition. When a woman gets pregnant, her fam-e-Raḥim (external os of the cervix) closed as a single crochet

can't be entered. At the time of birth or any trouble or disease with the newborn, the temperament of the fetus alters, which expands female-Raḥim to open, leading to the delivery of a newborn. According to Ibn al-Quff, the Al-Raḥim (uterus) is a nervous tissue and organ of normal consistency. It has only one layer with different types of fibers, longitudinal(less), horizontal(more) and some oblique fibers, which are numerous in number. These oblique fibers resemble to the shape of a bladder. In the inner cavity of the uterus, two openings are actually the branches of arteries and veins that enter it. These are called as Nuqr. Ibn al-Quff also said a canal in the uterus ends up in the furj (vulva). This is called as Unq al-Raḥim (cervix). The tissue of the cervix is mostly muscular from the outer side and from the inner side, which is almost nervine. This canal constricts at the time of pregnancy and dilates at the time of delivery according to the decree of Allah. Majūsī further explained that the cervix of the uterus gets continued with a vagina, which is a tubular structure lying between the pubic bone and on the anal part. It has two big cavities on both sides, right and left. If the outer membrane is peeled out, it shows two cavities that stick to it. Both cavities separate as there are two Al-Raḥim (uterus), due to which he named Arham, this information was mainly based on animal dissection. Most of the time, a single male fetus at right side and the female fetus at left side of the cavity. The virgin female has wrinkles in the mouth of uterus. Minute vessels are present in between them. The uterus has one layer in which two types of fibers lie; one has longitudinal fibers (some) and another has horizontal fibers followed by ibn Rushd, ibn al-Quff. Rāzī and Majūsī both describe there are two cavities in the uterus, although there is a single cavity in the uterus according to modern science but when we open the uterus, it seems to have two cavities; maybe they misunderstood. Besides, they gave the correct anatomy of the uterus. Ibn Rushd said that soft ligaments attach the uterus to the lumbar vertebrae. The uterus is a nervous organ that is capable of contraction and expansion.

As per Abū Sahl Masīḥī, Al-Raḥim (Uterus) entire body is nervous which are capable of expanding when needed. Neck of the uterus reaches to vagina and the vagina is homologous to the urethra of males. Baghdādī narrated that the uterus binds with the spinal cord through strong ligaments, which follow and support the action of uterus relaxation and contraction. Two layers form it. The inner one is vascular and rough and has jazib (absorbent), masik (adhesive) and dafē (excretory) fibers spread everywhere. Some vessels open in it, carrying the blood of Ḥayḍ (menses). Its external layer is neuro layer. Unq-al-Raḥim (cervix) is formed by cartilage and muscles. According to Ibn Sīnā (Avicenna), the uterus is positioned so that its body rests on the bladder's superior surface, behind and above the urinary bladder (postero-superior). Additionally, he mentioned that the rectum is located posterior (behind) the uterus. The uterus is connected to the sacrum by ligaments, which he called the "uterosacral ligaments." Avicenna described the cervix by stating that it expands in folds during pregnancy. Additionally, he discussed the vagina and its roles as a birth canal, a conduit for menstrual blood flow, and a source of semen. Contrary to present anatomical descriptions of the three-layered uterus, which include the perimetrium (fibrous), myometrium (smooth muscle), and endometrium, Ibn Sīnā described a two-layered uterine wall consisting of the thick inner lining and

the outside covering layer (mucosa). However, he accurately defined the menstrual cycle by pointing out that the uterine wall increases during the menstrual cycle and that the menstrual blood comes from the uterus inner lining. He also remarked that the inner uterine wall decreases after the menstrual blood flow stops.

CONCLUSION

This paper acquaints the admirable work done by Unani physicians, who compiled their observations and research work about Tashrīḥal-Raḥim (uterus anatomy) which is present in our ancient Unani literature. Ancient Unani literature became the basis for today's advanced reproductive anatomy. In today's modern world, where everything is evidence-based, Unani physicians had already been mentioned about Tashrīḥal-Raḥim on the basis of observations and evidence. According to this, Unani physicians have achieved a big milestone in the field of Tashrīḥal-Raḥim. Herophilus was the first to give a great contribution to demonstrating the female genital parts such as uterine tubes and broad ligaments, explaining that the uterus was a hollow organ securely fixed in place by the wide ligaments. Rāzī explained the gross anatomy of the uterus, which Masīḥī, Ibn-Rushd, H. Baghdādī and MasīḥīIbn al-Quff followed. He described the special characteristic of the uterus for carrying a fetus as it has the capacity to expand and constrict. Majūsī claimed that the cervix of the uterus is a tubular structure and continued with vagina. He explained the two layers of fiber of the uterus. Ibn Sīnā described the lie and location of the uterus and is very well-known about uterosacral ligaments. Advances in understanding uterus structure, location and function have occurred in the Grek o arab period. Therefore, we can say that it was the early work of Unani physicians on which our current knowledge about Female Reproductive System anatomy is based. Hence, we can conclude that current medical knowledge would not have been possible without their astonishing observations.

CONFLICT OF INTEREST

None.

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