

Concept of Male contraception and Herbal Drugs used for Contraception in Unani system of Medicine.

* Pathan Abdul Qayyum khan Abdul Hameed Khan ¹, Sameena Nasreen Jafar Khan Pathan ², Dr. Husain Vazir Shaikh ³, Shaikh Firoz shaikh Ayyub ⁴, Pathan Imran khan Ghaus Khan ⁵

¹Associate Professor, Dept. of Medicine (Moalijat) Y.F.U.M.C., Tal. Kunjkhedha, Aurangabad

²Associate Professor, Dept. of Pediatrics (Ilmul Atfaal) Y.F.U.M.C., Tal. Kunjkhedha, Aurangabad

³Associate Professor, Dept. of Physiology (Manafe ul Aaza) Y.F.U.M.C., Tal. Kunjkhedha, Aurangabad

⁴Assistant Lecturer, Dept. of Anatomy (Tashri ul Badan) Y.F.U.M.C., Tal. Kunjkhedha, Aurangabad

⁵Associate Professor, Dept. of Pathology (Mahiyatul Amraz) Y.F.U.M.C., Tal. Kunjkhedha, Aurangabad

ABSTRACT

Medicinal plants are part and parcel of human society to combat diseases, from the dawn of civilization. Information about the benefits of herbal drugs is known in our ancient literature of Ayurvedic, Siddha, Unani and Chinese medicine. According to the WHO, 2003 about 80 % of the population of developing countries being unable to afford pharmaceutical drugs relies on traditional medicines, mainly plant based, to sustain their primary health care needs. The consequences of this long neglect of developing acceptable and reliable male contraceptives in poor developing countries has been lack of or less participation of males in family planning. Recently, it has come apparent that neglecting men in matters of family planning is a losing strategy with adverse consequences for both men and women. Ayurvedic literature and folk medicine have been screened and searched thoroughly for antifertility effects in males all over the world. The World Health Organization has set up a task force on plant research for fertility regulation with an objective to find new orally active non-steroidal contraceptive.

Contraception is a process or technique for preventing pregnancy by means of medication, device or method that blocks or alters one or more of the processes of reproduction in such a way that sexual union can occur without impregnation. Promotion of family planning is central to the World Health Organization work on improving maternal health & is core to achieve the Millennium Development Goal. It is estimated that 90% of abortion related and 20% of pregnancy related morbidity and mortality, could be prevented by the use of effective contraception. Hence it is necessary to control the population by the use of contraceptives. Unani physician has mentioned the various medicines & techniques of contraceptives. Scientific research has confirmed the efficacy of most of the herbal drugs like *Ruta graveolans* (Suddab), *Juniperus communis* (Abhal), *Piper longum* (Filfil daraz), *Mentha arvensis* (Pudina), *Azadirachta indica* (Neem), *Punica granatum* (Anar), *Alium cepa* (Piyaz) and *Daucus carota* (wild carrot) etc. Therefore, the aim of this article is to review the ancient concept of contraception in Unani System of Medicine in the light

of available scientific research.

Keywords: Unani medicine, Contraceptive, Herbal drugs, Medicinal plants, Health care, Antifertility effects, Non-steroidal contraceptive, male Anti-infertility

1. INTRODUCTION

There is a great concern of population growth worldwide such that several methods are being used to reduce both men and women total fertility rate, especially in developing countries. Over population continues to be a significant contributor to environmental degradation and human suffering worldwide. Much of the current growth in the population is unintended. It is estimated that half of all conceptions are unplanned and half of the resulting pregnancies are undesired. In most cases, half of the unintended pregnancies are due to failure to use contraception, and the other half to difficulties with contraceptive use or method failure in poor nations, contraception use is further limited by restricted access to many available methods, both economically and culturally. Undesired pregnancies result in unwanted children who suffer disproportionately from poverty and neglect. Women have a wide range of contraceptive choices.

Research and family planning organizations have for a long time focused upon female methods of contraception because women bear a disproportionate portion of the health and economic consequences of childbearing and rearing. Consequently, women have many contraceptive choices, ranging from daily oral medications to intrauterine devices implanted every 5 years to sterilization. There are many references to plants in literature with antifertility properties.

2. Modern contraceptives

Today hundreds of contraceptives methods are available broadly grouped as barrier methods (condoms, diaphragms, vaginal sponge), chemical methods (foams, creams, jellies, suppositories made up of spermicidal agents), intrauterine devices (lippes loop, Cu-T, Nova T, multiload, progestaserte), hormonal contraceptives (oral pills, injectable, subcutaneous implants, vaginal rings) etc. Each has its own advantages and disadvantages. The unmet need for contraception remains too high. Reasons for this includes-

- ✓ limited access,
- ✓ limited choice,
- ✓ fear of side-effects/
- ✓ complications,
- ✓ cultural or religious opposition,
- ✓ gender-based barriers etc.

Most common being the side effects / complications. The commonest with modern contraceptives in female are headache, bleeding disorders, nausea, metabolic disturbances, pain, adverse effects on liver, lactation, breast, pelvic infection, uterine perforation, pregnancy, ectopic chances, cancer, teratogenesis, cardiovascular effects etc. Men are limited to male condoms and sterilization (vasectomy). Thus unfortunately, no contraception has proved perfect and there is no single method likely to meet the social, cultural, aesthetic and service needs of all individuals and communities and the search for an ideal

contraceptive is still a challenge.

3. Need for male contraception:

There are varying reasons why couples practice contraception. The reasons vary from postponing childbearing, spacing births and limiting family size as well as to have absolute freedom from childbearing. These needs usually vary depending on the type of relationship, purpose of contraception and the age of the couple. The current available methods on the market for men and women do not adequately meet the varied and changing personal needs of couples in their reproductive lives and in the widely different geographical, cultural, religious and service delivery settings around the world. While increasing the choice available to either partner will ensure the wider availability of safe and effective means for fertility regulation, the shortcomings of currently few available male contraceptive methods are a major barrier to the involvement of men in family planning. Current research into male contraceptives will potentially increase the equitability of family planning between males and females. This would greatly address issues of population growth and its related detrimental effects on the environment.

4. An ideal male contraceptive:

Development of effective, safe and acceptable male contraceptive is challenging. For it to be embraced by males it must have no effect on libido or sexual function as well as it must be reversible. The approach to development of male contraceptive can be either to inhibit the production of sperm (spermatogenesis), interference with sperm function and structure, interruption of sperm transport, interruption of sperm deposition or prevention of sperm-egg interaction. Recent research efforts have demonstrated high efficacy rates for hormonally based male contraceptives. Current barriers to expanded use include limited delivery methods and perceived regulatory obstacles, which stymie introduction to the marketplace. Probably, advances in herbal orally delivered contraceptives may cause optimism that these hurdles may be overcome. Historically, efforts in male contraception have lagged substantially behind development of female contraceptives due to the complexity of the male reproductive system, social/behavioral aspects and economic considerations. The last reasoning is based on the assumptions that (a) due to availability of safe and effective female contraceptives, male methods are unnecessary; (b) men are unwilling to take contraceptive pills or injections; and (c) men will not adhere to contraceptive drug regimens as careful as do women. These suppositions are in contrast to studies conducted in more than 9000 men in nine countries on four continents. In these studies, men of all nationalities and religions indicated a willingness to use a male contraceptive if a safe, effective product was available.

Contraception is a process or technique for preventing pregnancy by means of medication, device or methods that blocks or alters one or more of the processes of reproduction. The UN Secretary- General's Global Strategy for Women's and Children's Health aims to prevent 33 million unwanted pregnancies between 2011 and 2015 and to save the lives of women who are at risk of dying of complications during pregnancy and childbirth, including unsafe abortion to reduce maternal mortality. Contraceptive goals are on higher priorities to achieve Millennium Development Goals, especially for those concerned with child mortality, maternal health, HIV/AIDS, and gender equality.

Modern medicine has provided several preventive and corrective methods of contraceptives none of which is safe, effective and have side effects which include obesity, VTE, cholelithiasis, carcinoma of breast and cervix, asthma, inter-menstrual bleeding, headache, mood swings, breast tenderness and loss of libido. The World Health Organization suggested that effective, locally available plants to be used as substitutes for these drugs and population control programs are created which includes studies of traditional medical practices.

5. Historical background of contraceptive method.

The Kahun Papyrus, an Egyptian papyrus (1850 BC) is probably the first text book on gynecology and discovered to possess number of prescription for contraception viz, local use of paste containing crocodile dung, it is believed that the low pH of the dung may have had spermicidal effect. In earliest time people used various plant and animal products to block the cervix and absorbs semen, these were vegetable seed, plugs of grass, crushed roots, empty halves of pomegranates, squeezed half of lemon and rock salts etc. Also in Ebers papyrus (1550 BC) it is mentioned that a mixture of acacia tips, bitter apple and dates bound together with honey and placed in the vulva as spermicidal.

Hippocrates (460-377 BC) in his treatise "Nature of Women" described „coitus interruptus" and „using finger to wipe out vagina" for contraception. He had also mentioned the use of Wild Carrot (*Daucus carrota*) as an oral contraceptive. Pomegranate was the first hormonal contraceptives widely used by Greek women. The famous Greek philosopher Aristotle (384-322 B.C.) proposed the idea of family planning and prescribed several remedies like local application of oil of Cedar, ointment of Lead etc. which formed a barrier or had spermicidal effect.



Fig. 1 Doiscorides (40-90 AD)



Fig. 2 Ebers papyrus (1550 BC)

The next documented reference of contraceptive method mentioned in Bible, The Book of Genesis was coitus interruptus. Doiscorides (40-90 AD) recommended suppositories of peppermint or sicklewort mixed with honey and mentioned several other drugs for contraception. His book, De Materia Medica, was a standard resource for contraceptive information until 16th century.

Galen (130-200 AD) made his contribution to the subject by mentioning several drugs bearing upon procreation, in his book Kitab ul Advia al Mufradah. In middle ages during glorious era of Arabic medicine,

contraception was thought to be worthy of discussion thus, an extensive information about the indication, methods, prescriptions, contraindications and even their mechanism of action put in by legendary. Personalities of the era like Mohammed Ibn Zakariya Razi, Ali Ibn Abbas Majoosi, the great philosopher Abu Ali Sina, and Ibn Baitar. In 12th century, an excellent medical compendium Zakheera khwarzam Shahi was written by sharfuddin Ismail Jurjani (110 AD) where he first described the method of wrapping the penis with a soft cloth before coitus to avoid conception which led to think of modern day condom. Several natural and barrier methods invented since then. Intrauterine contraceptive devices: The discovery of modern IUD can be traced back to the Arabs who inserted pebbles into the uteri of their camels to protect them against pregnancy during long journeys. In 11th century Islamic scientist Avicenna used intrauterine Pessaries for contraception in women.

6. Techniques of contraception or Male contraceptive options:

Currently researchers have focused their investigations on three general categories of male contraceptives. The first method involves the physical blockage of the vas deferens, the channel that carries sperm from the epididymis to the ejaculatory duct. The second uses heat to induce temporary sterility. The third involves medication to halt sperm production.

(I) Vasectomy:

Male vasectomy is the most effective of male methods of contraception currently available. Despite its effectiveness, there are two major disadvantages that make it unattractive to many men as an option for contraception. The first is the psychological component relating to surgery. Although vasectomies are relatively non-invasive, when compared to taking a pill the procedure seems drastic. The second reason is that, although vasectomies are reversible, the rate of return to normal fertility is only about 40 %.

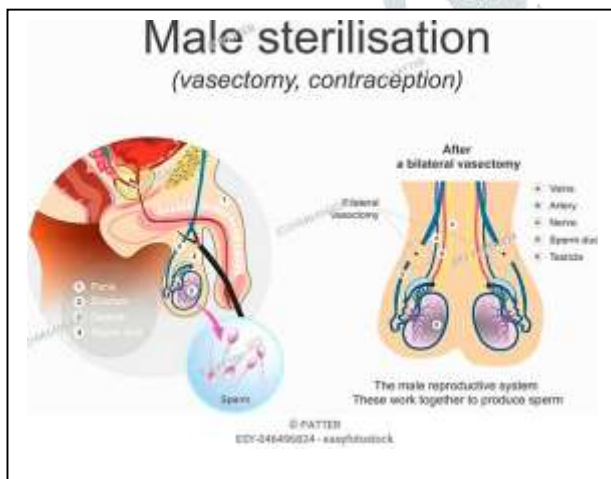


Fig. 3 Vasectomy contraception

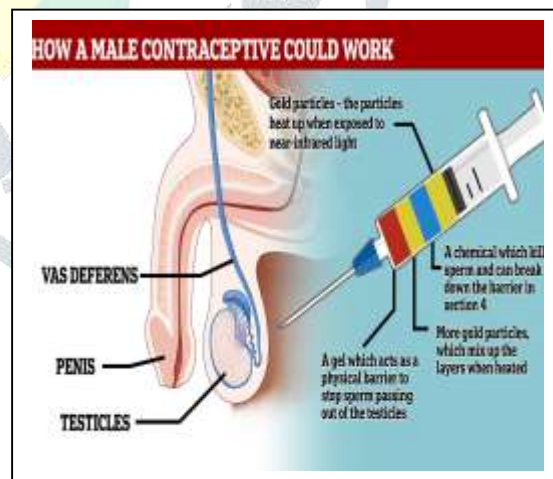


Fig. 4 Male Contraception

(II) Condoms:

Male latex condoms offer very effective prevention from unplanned pregnancy and HIV/AIDS infection. A significant drawback to condoms is their poor long-term compliance, with more than half of users reporting inconsistent use with every act of intercourse. In addition; many men dislike condoms because they feel condoms diminish sexual pleasure again hampering consistent usage. However, even when used correctly, condom breakage and slippage are not infrequent, occurring in up to 2–8% of cases.



Fig. 5 condom used for contraceptive



Fig. 6 Jelly used for contraceptive

(III) Withdrawal

The withdrawal method is a behavior that involves halting penile-vaginal intercourse to remove the penis out and away from the vagina prior to ejaculation. Pulling out is a popular contraceptive behavior that many couples use because of convenience, dissatisfaction with other methods, it's free of expense, and has constant availability. Failure rate varies with population studied, but withdrawal is overall not considered to be efficacious enough to be the sole method of pregnancy prevention being utilized. The accepted rate of failure is about 4% with perfect use at every act of intercourse, but the failure rate with typical use ranges in between 18% and 27%.

(IV) Retrograde ejaculation

Intentional retrograde ejaculation (*coitus saxonicus*) is a primitive form of male birth control. It involves squeezing the urethra at the base or applying pressure to the perineum during orgasm. However, the practice is not considered a reliable method compared to most modern types of birth control.

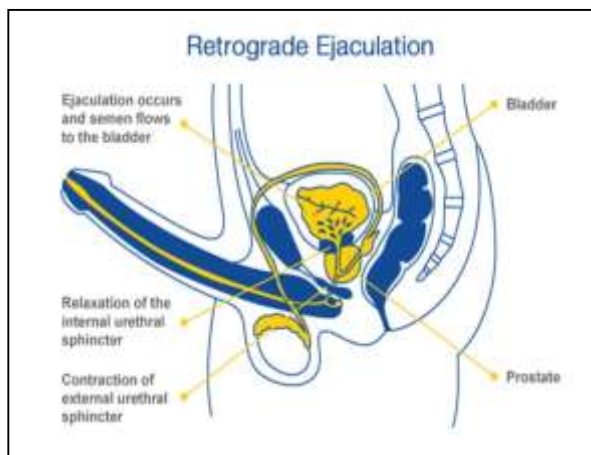


Fig. 7 Retrograde Ejaculation

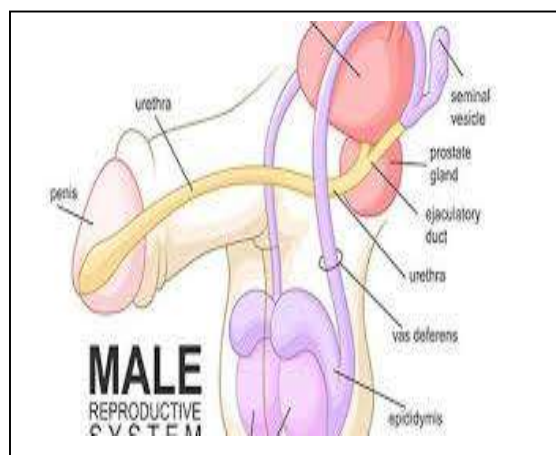


Fig. 8 Male reproductive system

Techniques for preventing the entrance of semen in the uterus. Coitus interruptus, Insertion of some tablets and suppositories of drugs into vagina so that opening of uterus is closed thereby prevent entrance of semen in the uterus. Techniques to be adopted if the semen has entered the uterus: The couple should

retrieved quickly after the sexual union, and the women should sneeze, shout loudly, jump repeatedly on back side so as to remove ejaculate from the vagina before fertilization. The more effective method was to induce menstruation before fertilization or implantation can take place by many Unani medicines.

The ancient literature of Unani medicine is very rich in contraceptive drugs for permanent as well as temporary sterilization, in the form of oral or local applications. Drugs are used orally either in the form of powder or extract, while the locally applied drugs have been prescribed in various dosage forms, viz. suppository, pessary, liniment, douche, sitz bath, ointment, fumigation and paste to be applied on the male or female genital organs and scientific research has confirmed the efficacy of most of the *Unani* drugs. Plants that have contraceptive properties may act as antiovarulatory, anti-implantation, abortifacient, anti-spermatogenic and spermicidal.

7. HERBAL DRUGS USED AS MALE CONTRACEPTIVES IN UNANI SYSTEM OF MEDICINE:

(I) *Carica papaya* linn (Family - Caricaceae):

Administration of chloroform extract of Papaya seeds showed suppression of cauda epididymal sperm motility and counts in rats and suggested that contraceptive effects are mainly post testicular in nature without influencing toxicological profile and libido of animals 36. In langur monkey the extract induces long-term reversible azoospermia. An oral dose of crude ripe paw seeds in male albino rats caused degeneration of the germinal epithelium and germ cells reduction in the number of Leydig cells and vacuoles in the tubules.

(II) *Azadirachta indica* (Family-Meliaceae):

The administration of a leaf extract of this plant has been reported to affect the structure and function of the testis and spermatozoa in male rats). Some studies have also reported the antiandrogenic effects of *Azadirachta indica* leaves in male rats.



Fig. 9 *Azadirachta indica*



Fig. 10 *Carica papaya* linn

The ethanol extract of its bark and flowers has been shown to induce reversible infertility in male rats by interfering with spermiogenesis at the late spermatids level. Many African countries have set up research

facilities to study plant medicines with the hope that the plants and their derived compound may be utilized for drug production. There is now a wide belief that standardization of plants should be given priority so that the near end products, free of toxic material can be dispensed to patients. This alternative route is shorter and much more meaningful since it takes a very long time for a drug to be developed from a medicinal plant.

(III) *Abrus precatorius* Linn (Family -Fabaceae) Abricin:

It has long been claimed by Ayurvedic physicians in Sri Lanka that the powdered seeds of *A. precatorius* (Indian Liquorice) inhibit conception in humans when taken orally. Degenerative changes were reflected in testes of rats, rabbits and pres bytis monkey after administration of 50% ethanolic extract of seeds. The extract-receiving animals how ed altered sperm morphology, reduced sperm motility and metabolism, which is correlated with its decreased fertility rate. Dose dependent reduction in testicular weight, sperm count and degeneration in later stages of spermatogenesis were found in the testis of rats treated with steroidal fraction of seeds.



Fig. 11 *Abrus precatorius* Linn



Fig. 12 *Gossypol herbaceum*

(IV) *Gossypol herbaceum* Family-Malvaceae:

Gossypol, a phenolic compound isolated from cotton seed oil was proposed as a male contraceptive. Hadley et al found that gossypol treatment reduced the level of serum Testosterone and luteinizing hormone levels in dose and duration dependent manner. Gossypol acts directly on testes and induce azoospermia or oligospermia. Zavos and Zavos demonstrated that gossypol blocked cAMP formation in sperm, which resulted into inhibition of sperm motility. The effect of gossypol on pituitary gonadal axis and found the decreased secretory activity of accessory sex glands. Spermatogenic cells study was carried out to examine the role of Sertolicells in the anti-spermatogenic action of two non-steroidal male contraceptive compounds by evaluating their effect on some key parameters of Sertolicell function in vitro. The authors concluded that that the anti-spermatogenic action of CDRI-84/35 and gossypol is routed through Sertoli cells by disruption of important cell functions that support spermatogenesis in-vivo. However, the two compounds appear to have different course of action in Sertoli cells, ultimately leading to spermatogenic failure.

(V) *Allium Sativum* Family- Amaryllidaceae:

Garlic and its effects on the male reproductive system has caused a tremendous amount of interest in

the Andrology and reproductive field as some researchers believe it to have a beneficial influence and others believe it to have a detrimental effect on the male reproductive system. The



Fig.13 Allium Sativum



Fig.14 Ocimum sanctums

(VI) Ocimum sanctum family- labatae:

Recent studies shown that benzene extract of *Ocimum sanctum* leaves induces the ultra-structural changes in the epithelial cells of the cauda epididymis, its subsequent recovery, after withdrawal of treatment, in the process of spermatogenesis and fertility of male albino rats and morphological changes in the rat cauda epididymal sperms upon graded dose treatment. As there is little information concerning the influence of *O. sanctum* leaves on the cauda epididymal sperm at the ultra-structural level, the present investigation is designed to study whether benzene extract of *O. sanctum* leaves could cause some of the sperm parameters, morphological alterations in cauda epididymal spermatozoa and its organelles by electron microscopic studies and fertility of male of albino rats as this medicinal plant has anti-spermatogenic and anti-androgenic like properties.

(VII) Momordica charantia family-cucurbitaceae:

Petroleum ether, benzene and alcohol extracts of the seeds of *Momordica charantia* tested in rats at the dose level of 25 mg/100 g body weight for 35 days showed anti spermatogenic activity as the number of spermatocytes, spermatids and spermatozoa decreased. Increase in cholesterol level and Sudanophili lipid accumulation indicates inhibition in the steroidogenesis. Out of the three extracts, the alcohol extract was more potent in its anti spermatogenic, anti steroidogenic and androgenic activities. It has been shown that oral administration of *M. charantia* root extract (5 mg/ kg b. wt. /day for 60 days) showed 100% antifertility in the rats. There was marked decline in testicular germ cell population, Leydig cell number and nuclear area as comported to controls. Serum testosterone level also reduced after extract treatment



Fig. 15 Momordica charantia



Fig.16 Black pepper (Piper longum

(VIII) Filfil daraz / Black pepper (Piper longum)

It act as a postcoital emergency contraceptive when it is used as a pessary mentioned in Al Hawi, Zakhire Khwarzam Shahi & Ghana Mana. Recent scientific studies showed that 20mg/ml hexane extract of Piper longum possesses potential contraceptive spermicidal activity in vitro as it contains compound Piperine.

(IX) Pudina / Pepper Mint (Mentha arvensis)

It has been mentioned in various Unani books that use of pessary made up of Pepper Mint extract before coitus act as a contraceptive. Recent study shows that uterotonic fraction of *Mentha arvensis* has anti- implantation activity by enhancing the estrogenic effect of estradiol as it contains menthol, menthone, camphene.



Fig. 17 Pudina/ Pepper Mint



Fig. 18 Daucus carota

(X) Wild carrot/Queen Anne's lace (Daucus carota)

The earliest written reference dates back to the late 5th or 4th century B.C. appearing in a work written by Hippocrates. They should be chewed within 8 hours of being exposed to sperm. The seed inhibits the implantation of fertilized egg by disrupting the endometrial lining. It possesses weak

oestrogenic property at dose of 80&120 mg/mouse orally from day 4 to day 6 post coitum due to presence of flavones, apigenine and quercetine.

(XI) Anar/Pomgranate (*Punica granatum*)

Ali Ibn Abbas Majoosi in his treatise Kamil us Sana mentioned the use of *P. granatum* with Aluminium hydroxide by female in the form of pessary before coitus prevent conception. 50% of ethanol extract of it showed anti-impalntation activity in rats. The seeds of the fruit contain oestrone identical to hormone estrogen are the best source of plant oestrogen to date and decreases follicular growth. Rind of pomegranate possesses tannins a type of polyphenols which exhibits spermicidal activity.



Fig.19 *Punica granatum*



Fig.20 Onion (*Allium cepa*)

(XII) Onion (*Allium cepa*)

Extract of *Allium cepa* is to be used as ointment on the glans penis in male and in the form of pessary in female. Ethanolic extract of *Allium cepa* showed significant anti-implantation activity at the dose of 300 mg/kg in mice.

8. CONCLUSIONS

Numerous drugs have been used historically to reduce fertility, and modern scientific research has confirmed anti- fertility effects in at least some of these tested. Though Unani contraception may never reach the level of contraceptive protection as the modern ones, but it offers an alternative for women who have difficulty with modern contraceptive options or who just want to try a different way. So it is the need to test the remaining Unani drugs as well as to do further clinical trials and make these drugs as patent contraceptives. This might provide a step to find the one ideal contraceptive in the upcoming future.

In classical literature of *Unani* medicine, physicians had described in detail both oral and local (pessary, fumigation, douches, sitz bath ointment, paste) forms of contraceptives. Modern scientific research on animals has confirmed antifertility effect in most of the drugs. However, there are many limitations regarding the safety and efficacy of these preparations to be used in human beings. Hence, there is need for further clinical studies to establish the efficacy & safety of these drugs.

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