

Methods of Contraception and associated risks: A Review

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Abstract

Good health is considered to be a greatest wealth in everyone's life. A physically fit person enjoys the healthy living ,but just like any other chronic diseases related to various organs and sites, reproductive problems have also been reported to affect the status of health in developing as well as developed countries. Acquired Immunodeficiency Syndrome (AIDS), Endometriosis, Poly cyst ovarian syndrome (PCOS), Gynaecological cancer etc are found to be more profound diseases. So, these problems also needs to be addressed and awareness must be spread to ensure the hygiene to avoid any unanticipated situation.The causes behind most of these diseases are either related to ignorance, unhygienic environment or unsafe sexual intercourse, which does not only leads to poor family planning, but also affects the reproductive health to the extreme. In order to avoid and overcome the occurrence of such diseases, contraception has gained greater importance worldwide. Therefore, the present review highlights and summarizes different types of contraceptives with their advantages and disadvantages for better selection of an appropriate contraception method.

Introduction

Importance of Reproductive health

Reproductive health as per World Health Organization (WHO) is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes" [1]. Alike other chronic diseases such as cancer, diabetes, stroke, reproductive problems have also been reported as one of major concern in both; developing as well as in the developed countries [2]. In order to eradicate these problems, care must be taken to ensure the personal hygiene as well as education and awareness related to maintenance of reproductive health should also be

spread around. As per the reporting and surveys, it has been found that the reproductive problems start to arise at an early Adolescence age, with the major sexual changes and growth. Therefore, it becomes essential to understand and maintain a good reproductive life from the early stage [3]. The major challenges in regard to sexually transmitted diseases and problems like Acquired Immunodeficiency Syndrome (AIDS), Syphilis, Urinary tract infections (UTIs), Gonorrhea, Herpes, Trichomoniasis etc. is either unsafe sexual intercourse or poor hygiene. Therefore, it requires special concern and effective prevention so as to maintain a good reproductive health [4].

Maintenance of personal hygiene:

In order to stay away from any disease and to enjoy an illness-free life, it becomes important to maintain proper hygienic conditions. Therefore, it includes proper washing and cleanliness of the private areas to keep the genital area free from any kind of infection. For the women, cleaning of pubic area, use of regular and proper sanitation must be taken care [5]. Accumulation of oil, dust as well as sweating around these private areas leads to infection [6]. Additionally, improper use of the sanitary pads also spreads the infection. Similarly for the men, proper washing as well as cleaning of the genital area is crucial for ensuring proper hygiene. Various signs such as irritation, blisters on genital areas, severe pelvic pain must not be ignored and should be taken special care of [7].

Basic Requirements and various methods of Contraception

Every men and women in the world have the right to have the effective, safe and affordable family planning of their own choice. Many new methods and techniques with better results of contraception as shown in Fig. 1, have been introduced nowadays that are really helpful in preventing the reproductive problems [8]. Contraception is the use of various devices, drugs, agents, sexual practices, or surgical procedures to prevent conception or impregnation. It helps both women and men to plan and manage if and when they want a child. Use of all the above devices, drugs, agents also helps the people to prevent them from all kinds of the reproductive diseases and to have a good reproductive health [9]. The contraceptives devices are personalized based upon the gender in men and women. In the case of women, the contraceptive methods include; hormonal, barrier, emergency, long lasting reversible, and permanent contraception. For males, it include barrier methods, which are been widely used

[10].

History of Contraception

Before 20th century, it was thought that the major use of the contraceptive was linked to hide the illegal sexual relationship. During that time, there were no such methods that could prevent the pregnancy and so the only way was to go for the coitus interrupts. With the advancements later, barrier methods were developed to achieve contraception. While, development and designing of the devices in this regard, Intrauterine devices (IUDs) came into existence [11]. These were initially been used to cure painful periods and were made from the metal pessaries. Other than the IUDs Vaginal pessaries loaded with contraceptive drugs and condoms as the effective barriers were been developed to be used as the contraceptives. Vaginal pessaries were made from the goat's bladder and condoms were made from the animal's intestine. By the end of the 20th century, another techniques like vasectomy and tubectomy became the most popular methods to control the pregnancy [12-15]. As per the current information and surveys, it is clear that the all the contraceptives play a vital role in the living and maintaining a healthy life [16-19]. Many contraceptives have been used in the present day with their different boon or bane. So, it is very important to choose the appropriate method of contraception by keeping their risk factors in mind.

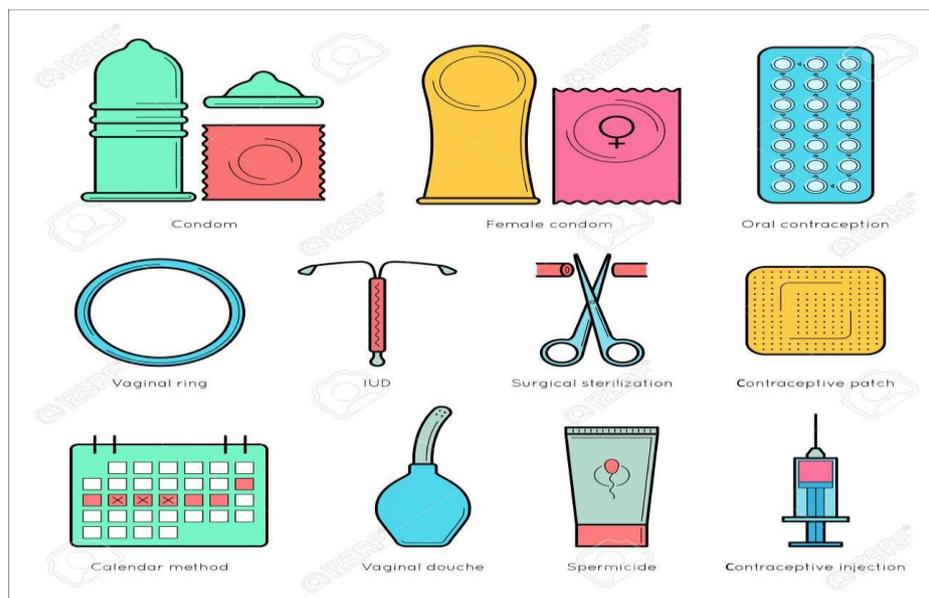


Fig.1. Types of contraception methods used by males as well as females.

Contraception and its classification based upon the methods

As discussed earlier, contraception is the process that helps in preventing the pregnancy by interfering with the normal process of ovulation, which helps to control the unwanted birth in the females [2,20-23]. The major principle behind the protection activity is based upon the physiology of ovulation. It is well known that at every month an egg starts to mature, the mucus that is secreted by the cervix changes to be more inviting to sperm and the lining of the uterus grows in preparation for receiving a fertilized egg [10,24-28]. Different kinds of the birth control methods are available that mainly act at different points in the process i.e from ovulation through fertilization to implantation. Each and every method contains its own side effects. Methods are broadly divided into the 2 categories i.e Hormonal and the non Hormonal contraceptives [29-31] . There are several methods shown in Fig.2. which are used as contraception method.

Hormonal Method of Contraception:

It is the method of birth control that helps in preventing the pregnancy by the use of hormones. Hormonal contraceptives contains the progesterone and estrogen. This methods usually works by blocking the release of eggs from the ovaries, thinning the line of uterus or

by thickening the mucus in the cervix [32-33]. Route of administration of the hormonal contraceptives includes oral, injectables or insert under the skin, or it can be placed on the skin as a patch, and sometimes can be placed in the vagina or uterus [16]. Contraceptive implants are allowed to be placed under the skin of women's arm and it provides continuous, highly effective pregnancy protection for 3-5 years. Other methods of hormonal contraception includes emergency contraceptive pills, that can help to prevent the pregnancy if taken within 5 days after unprotected sex [7]. Next comes the IUDs i.e Intrauterine contraceptive devices, those are small flexible plastic devices that are inserted into women's uterus. Most common IUDs contain copper, that work by preventing sperm from reaching an egg [32,34].

Non Hormonal Method Of Contraception

The non hormonal contraception methods create a barrier between the egg and sperm or to change the environment in the reproductive tract. Barrier methods includes the devices that block sperm from reaching the egg. It is seen that the barrier methods are more effective only when they are used correctly by the people. Another non hormonal contraception method includes the surgeries like vasectomy and tubecotomy, in which the vas deferens and fallopian tube of the respective male and females are tied. One major method includes the fertility awareness method in which each couple must know the fertile days of women's menstrual cycle as well as the days when the pregnancy is most likely to occur. So, in the fertile days, the couple must avoid sex or should use a barrier method to avoid the chances of pregnancy [32,34-35].

Types of Hormonal Contraception

Various types of the hormonal contraceptives are introduced nowadays are as under:

- a. Oral Contraceptives
- b. Contraceptive Patches
- c. Vaginal Rings
- d. Intrauterine Contraceptive Devices
- e. Injectable Contraception

f. Implantables**a. Oral Contraceptives**

They are effectively used to prevent the unwanted pregnancy and are also called as the birth control pills. Estrogen and progesterone are present in combined form and so known as the 'combined pills'. Greater effect is seen when not even a single dose is missed [36].

Types of oral contraceptives:

1. Combined oral Contraceptives (COCs): They contains both estrogen as well as progesterone. Both the hormones are present in the different doses and concentrations (usually the amount of estrogen is less). It is one of the safe, effective method that is mostly used by the reproductive aged women [27, 35-37].

2. Progesterone only Contraceptives (POCs): They contains only the progesterone hormone and are also known as the mini pills. Much more effective than the COCs [25].

Mechanism of action of oral contraceptives:

It works by preventing the ovary from releasing an egg, thickening the cervical mucus to make the difficulty in entry of sperm, and changing the lining of the uterus thus making the implantation difficult [25,36].

b. Transdermal Contraceptive Patches

It is a novel technique to prevent the pregnancy. Patch is applied to the skin which releases the hormone that helps in preventing pregnancy. It releases the hormone through skin into the blood stream as shown in Fig.3. The function is similar to the oral pills that prevents ovulation. A single patch can work for atleast 7 days and also used regularly for 3 weeks. Patch can be directly put on the skin [24].



Fig.2. Various types of contraception Methods



Fig.3. Transdermal contraceptive patch applied onto the arm.

Advantages of using patch:

Weekly application of this patch improves the chances of compliance. Along with this, it doesn't interrupt the sexual arousal. Major advantage of the transdermal patch is that the vaginal insertion isn't required. Moreover, it offers an excellent control on cycle after the three months [32,34].

Disadvantages of using patch:

Highest rate of breast pain occurs in first two months. Along with this, it can cause skin irritation. Major disadvantage of this is that it does not protect against the Sexually Transmitted Disease(STIs). Sometimes the reaction can also occur at the site of application

[4].

c. Vaginal Rings

Vaginal rings are also a method for contraception in which the hormones are released when they are inserted into the vagina as shown in Fig.4. It is so effective that even a single ring can provide the contraception for one month. Estrogen and progesterone hormones are released into the bloodstream to prevent the pregnancy. The mechanism of action of the vaginal rings are quite similar as compared to the other hormonal contraceptives i.e release of hormones [8,30].



Fig.4.Vaginal Ring

Advantages of vaginal ring:

Major advantage is that they are reversible, this can be taken whenever required. Moreover, minimal side effects are seen in this. Also, no long term effects are observed on fertility. Nodaily intake is required [3].

Disadvantages of vaginal ring [3,30,32]:

Headache

Dizziness

Fatigue

Tenderness

Change of Appetite

Biggest disadvantage is that it does not protect from the STIs

d. Intrauterine Contraceptive Devices (IUDs)

IUDs are reversible contraceptives that are inserted the women's body as shown in Fig.5. Only the hormone progesterone is released by the IUD into the uterus and it changes the environment of the womb and thus the pregnancy is prevented [26]. An IUD is a small T-shaped plastic device that is put into the womb of women by the physician. When it is inserted, it thickens the cervical mucus, thus preventing the entry of sperm through cervix. Along with this, it also cause thinning of the lining of uterus that inhibits the implantation of fertilised egg [28].

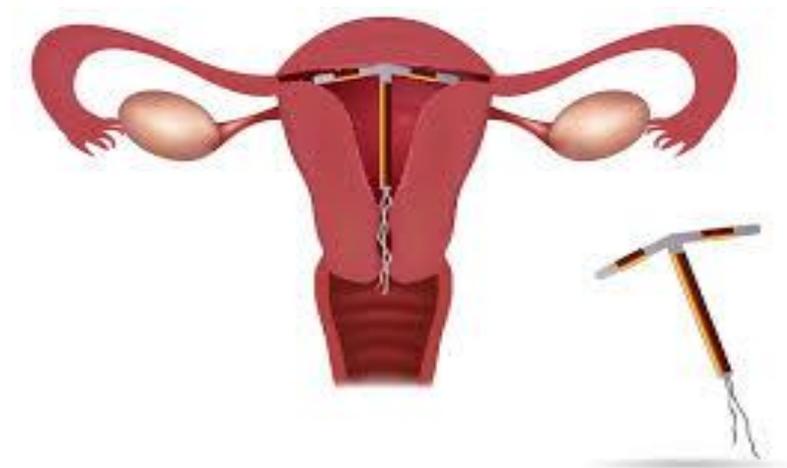


Fig.5. IUD inserted inside the uterus.

Advantages of IUDs:

It is very safe and is highly effective. Along with this, they also provide the long term protection. Sexual activity is not interrupted by this. Major advantage is that it can be used during breastfeeding. Moreover, complications are very rare in this case.

Disadvantages of IUDs:

Sometimes it may cause the serious side effects. For the insertion and removal purposes, a trained health care professional is required. Major disadvantage is that it does not provide any protection against STIs.

e. Injectable Contraceptives

It is one of the effective contraceptive method in which the hormones are injected through the injections. Only the hormone progesterone is injected in this case, which directly goes into the bloodstream and the prevention action of pregnancy is seen. When the level of progesterone is increased in the body, the ovulation is automatically prevented. Here, the cervix mucus thickens which makes sperm difficult to move. Effect of injection lasts for about 8 to 13 weeks depending on the injection given [18].

Advantages of Injectable Contraceptives:

It is rapidly reversible. Along with this, it has an excellent control on cycle for 3 months. It is easy to use. Its main use is when the estrogen is to be avoided. Moreover, risk of endometrial cancer decreases [14].

Disadvantages of Injectable Contraceptives:

Skin reactions may occur sometimes. It offers lack of protection against STIs. Sometimes, irregular bleeding may occur. Major disadvantage is that the prolonged use may decrease bone mass. Abdominal pain and depression are some of the common side effects.

f. Implants

New and advanced technique in contraception. Also an irreversible method in which the implant is inserted under the skin by subcutaneous route in the inner arm. Implants are made up of the plastic rod containing progesterone. This hormone is then released into the bloodstream that helps in preventing the sperm motility and thus ovulation is stopped [30].

Advantages of Implants:

It is effective for upto five years. Its main use is when we cannot use estrogen based contraception. Along with this, implants are also safer to use when the breastfeeding is going on. Moreover, fertility is also returned to normal as soon as the implant is removed. It may reduce painful periods.

Disadvantages of using Implants:

Mini surgery is required. Sometimes, local reactions may occur. It may show some inadequate release. Moreover, it is uneasy to simply discontinue the therapy.

Description of the Non-Hormonal Contraceptives

Non-Hormonal contraceptives are defined as those types of contraceptives whose main purpose is not to make any kind of change in the reproductive tract of female or to make any kind of barrier to prevent the pregnancy [11]. These types of the contraceptives do not contain any kind of hormones such as estrogen or progesterone but still they are inserted inside the reproductive tracts and due to this they will neither allow the sperm to move nor the egg to receive the sperm [35].

Types of Non-Hormonal Contraceptives

Various types of Non-Hormonal contraceptives are as following [5]:

- a. Barrier Methods
- b. Intra uterine Devices
- c. Sterilization Methods

a. Barrier Methods

These are one of the types of non- hormonal contraceptive whose major purpose is to create a barrier between the sperm and the egg so that the fertilization could not take place. Both chemical as well as the mechanical method are included in this. This method is used both by the males as well as by the females. Various types of the barrier methods are as under [22].

Diaphragm

The diaphragm is like in the shape of a cap, that is mainly used to cover the cervix so that the sperm cannot enter into the uterus. It is made up of latex or silicone and nylon (Fig.6). The gel is placed inside the diaphragm that is used to immobilize or kill the sperm. The diaphragm serves as a barrier between the sperm and the cervix. It must be inserted into the vagina 2 hours before having sex [15].

Advantage of using diaphragm: There is no such side effects of using diaphragm.

Disadvantage of using diaphragm: It has been observed that the diaphragm is not that much effective as compared to other types of methods. It must be used correctly to make it more

effective. Major problem for a women who is using diaphragm is of bladder infection. Moreover, it does not provide the protection against STIs. It can also cause the irritation in some women or in their partners.



Fig.6. Diaphragm.

Cervical Cap

It is called as the miniature diaphragm. It is also a kind of cap that fits in the cervix to prevent the entry of the sperm. It is mainly composed of the silicon. Working of the cervical cap is same as that of the diaphragm i.e. acts as a barrier between the sperm and cervix. It will not allow the sperm to pass through the cervix and in this way it will prevent the fertilization [37].

Condoms

It is one of the most widely used method of contraception that is used both by the females as well as by the males. A condom is a thin sheath, that is usually made up of the rubber and is used to cover the penis in males and vagina in females [34].



Fig.7. Cervical Cap

Male Condom: Male condoms are made of latex i.e. polyurethane and polyisoprene (Fig.8.). They are most effective in the prevention from the STIs. They are worn over the penis during the sexual intercourse. They are cheap and can also be bought without any prescription, at the time of sexual activity. They are nowadays available in a variety of sizes, flavours, thinness. The condoms acts as a barrier in preventing the direct contact of penis and the vagina so to prevent the fertilization [38].



Fig.8. Male Condom.

Female Condom: Female condom as shown in figure no.9 is inserted into the vagina before the sex and works by holding the sperms from entering in the vagina. Female condom is soft, seamless nitrile polymer sheath containing two flexible rings, one at each end. External rings opens outside of the vagina and the internal ring is inside the vagina. The inner layer is coated with the silicone based lubricant [6,34].



Fig.9. Female Condom

Advantages of using Condoms: Major advantage is that it helps to protect both the partners from STIs. It is the most reliable method of preventing pregnancy. They come in variety of shapes, sizes and flavours. No such side effects of using condoms are seen till now. It is available without the use of prescription [19].

Disadvantages of using condoms: Major disadvantage of condom can be of tearing if it doesn't used properly. Sometimes the condoms interrupts the intercourse. Sometimes they cause allergy to some people.

Sponges

It is a disposable, small foam like device that is placed inside the vagina of female as shown in figure 10. Sponge fits over the cervix and provides a barrier to prevent the entry of sperms into the vagina. Contraceptive action of the sperm is provided by the spermicide. Spermicide helps to absorb and trap the sperms. Sponge is inserted into the vagina 24hours before having sex. Sponge is available in one size and can get without the use of prescription [22-26].



Fig.10. Sponge.

b. Intra uterine devices (IUDs)

An IUD is a small, T-shaped plastic device that is put into the female uterus as shown in figure 11. It can be hormonal as well as non-hormonal. Hormonal IUD releases progesterone hormone and non hormonal releases the copper ions that prevents the pregnancy. Copper-T, Copper-7 are examples of the non hormonal [17,35].

Advantages of Non-Hormonal IUD: Major advantage is that it is independent of the sexual intercourse. It is one of the reversible method of contraception. It can be effective upto 10 years.

Disadvantages of Non-Hormonal IUD: Menstrual pain as well as heavy bleeding are the major disadvantages of non-hormonal contraception. These are expensive. A trained physician is always required.



Fig.11. Copper-T

c. Sterilization Methods:

Sterilization method is one of the permanent method of contraception that is completely irreversible. Both men and women are involved in this. It is a kind of a surgical method in which the cutting of either vas deferens (in males) or fallopian tubes (in females) is done [23,38].

Types of Sterlization Methods:

Vasectomy: It is done in the males to prevent the release of the sperms from the penis due to which the fertilisation is prevented. Short segment of each vas deferens is cut down, clamped, and tied to the remaining ends tightly with the surgical threads. It is 99.85 percent effective method of contraception (fig.12)

Tubectomy: In this process, the fallopian tubes of the females is cut down and the remaining ends are tied up with the surgical threads. It is 99.5 percent effective (fig.13) [20].

Advantages of Sterlization: Major advantage is that it doesn't interfere with the sex. Therefore, it is 99 percent effective.

Disadvantage of sterilization: Major disadvantage is that it is the irreversible method. It also doesn't give the protection against the STIs. Internal bleeding, infection are some of the major complications that are involved in this [39-40].

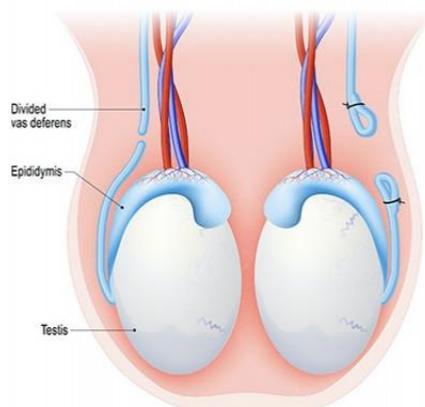


Fig.12.Vasectomy.

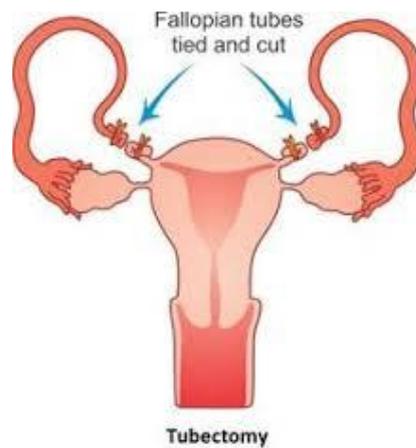


Fig.13. Tubectomy

Conclusion

From the review, it has been concluded that contraceptive is a day to day need of both men and women. Both men and women must maintain their reproductive lives, and for this, personal hygiene is very important. Contraceptive helps in controlling the birth rate. Various methods of contraception depending on the type of contraception to be used are available for both men and women. No doubt, the contraceptives have the number of advantages but have some risks too. Therefore, all the things must be kept in mind before choosing the correct contraception method.

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