

Methods of Contraception

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Abstract: Contraception is the process of preventing pregnancy by various methods. This paper focuses on different kinds of methods of contraception used in India along with their advantages and disadvantages. As India being a diverse country and has certain beliefs in myths since ages, there is a direct impact on the psychological behaviour or attitude towards using contraceptives found even today. From this research we would like to draw the opinions of the gynecologists and finding out which is the best contraceptive method and what all are the difference of opinions between the doctors and the consumers regarding the same. Hence, we had also focused on the most commonly used contraceptives in India and further, we will be conducting a survey which will let us know that which contraceptives are in most demand in the market. It was also studied that how geographic and demographic behaviour affect consumer buying behavior when it comes to contraceptives.

Keywords: methods of contraception, psychological attitude towards contraceptives, difference of opinions between doctors and consumers

1. Introduction

India being an over populated country benefits a lot from different methods of contraception. The Indian Government sponsors a large amount of the family planning measures. Studies indicate that between 1965-2009 the use of contraceptives in the country has tripled from about 13% to 48% and the fertility rate has become half from 5.7 to 2.4 but the national fertility rate is still alarming allowing for the need of contraceptives. Family Planning has turned into a need with an end goal to check the anticipated population of 2 billion before the end of the 21st century.

Contraceptives are largely classified based on their mode of action. A common form of classification of contraception methods are: Barrier methods, hormonal strategies, emergency contraception, intrauterine methods and sterilisation. The barrier method is the prevention of fertilisation by blocking the male gamete from reaching the ova. Condoms, both male and female versions, diaphragms, cervical caps, preventative sponges and spermicides are few examples of barrier method of contraception. The hormonal strategy modifies the ovulation and womb cycle to avoid pregnancy. It can be achieved by means of pills, injections, hormonal patches, implantable rods or vaginal rings. Other methods that are not hormonal include intrauterine methods such as copper, IUD that causes minor inflammatory reaction and prevent sperm from fertilizing the egg. Intrauterine device that releases a controlled amount of hormone, like progesterone, can also prevent fertilisation as well as prevent implantation at the same time. A permanent approach to contraception is sterilisation in which pregnancy is prevented by avoiding release of sperm or woman from the egg fertilization. This can be achieved by surgical means and involves tube tightening that puts a barrier to sperm way. Another method is vasectomy in which the vas deferens is surgically blocked or removed. Blockage of fallopian tube is a means of preventing the female gamete from being fertilized by sperm.

There has been a huge amount of improvement in contraceptive measures however there still remains a need for effective contraception. Major methods of contraception

like IUD's, Pills and condoms have been available in most of the developed and developing countries. Now there is a huge amount of advancement consisting of newer formulations, extended use contraceptives, etc. The introduction of Long acting reversible contraceptives (LARC) is now made it possible for long term usage and reduction in unwanted pregnancies.

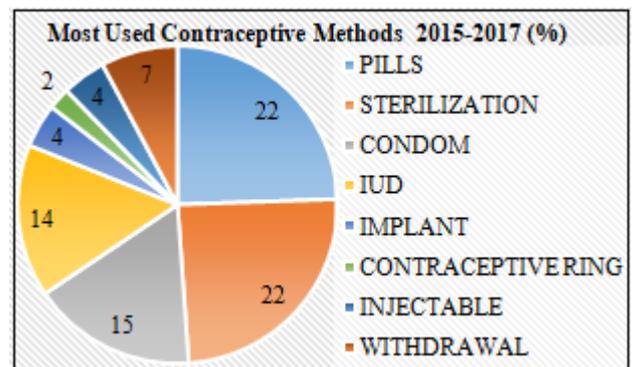


Chart 1: Most used contraceptive methods - Ref [1]

This study is majorly being conducted in order to find out which contraceptive measures are most widely used in India, overall and what is the most suitable and comfortable means for females to use as a mode of contraception.

2. Literature Review

Oral Contraceptives

Another extremely popular method of contraception in India are birth control or contraceptive pills to prevent pregnancy safely, easily and effectively.

These pills contain hormones such as estrogen, progesterone and derivatives in order to prevent Follicular stimulating hormone and luteinizing hormone which inhibit ovulation (release of eggs) and therefore inhibit fertilization with the sperm. [2] It also disturbs the lining of the uterus and mucus secretion.

Types of oral contraceptive pills based on the type of hormones released:-

- Monophasic pills– These have equal amounts of progesterone and estrogen and are normally taken throughout the cycle
- Biphasic pills– These contain both but level of progesterone increases after 21 days.
- Triphasic pills– Three different amounts of estrogen and progesterone or only progesterone which usually changes every 7 days.

Advantages of Oral Contraceptives

- Hormonal balance in the body
- Safe and convenient as they're easily available in medical stores and do not cause infections. Also pregnancy can be induced any time after stopping the intake of the pill

- Health benefits- Known to prevent acne, cysts, endometrial and bone thinning.[3]
- Cures irregular menstrual cycle by balancing hormones.

However these pills are being misused by the adolescence. Youngsters use this pill to have unprotected sex without even considering the side effects. The fabulous marketing campaigns conducted by these pill brands have made a huge impact on young minds and changed their perception of the product. Some of the potential side effects include spotting or light period, nausea, weight gain, sore breasts .[4]

Table 1: Five most commonly used pills in India [5]

Brand	Content	Company	Adverse effects
Saheli	Ormeloxifene/non steroidal	HLL life care limited	Nausea, vomiting
Unwanted 21	Levonorgestrel+ Ethynyl estradiol	Mankind pharma	Abdominal pain,stroke,blood clot formation
Yasmin	ethinyl estradiol +drospirenone	bayer	Breast tenderness,nausea,fluid retention
Bandhan	Levonorgestrel+ Ethynyl estradiol	Zyudus cadilla	Nausea, headache
Centron	Ormeloxifene	Torrent pharma	Acne,water retention

Injectable Contraceptives

The most widely used depot injectable medroxyprogesterone (DMPA) was introduced in mid-1960's and is now the fourth most popular family planning method worldwide. Indians began to use them in 1994, Norethisterone enanthate (Net-En) and medroxyprogesterone both were used. However the injectable use among women has hardly increased since the time it was introduced.[6]With the increase in safety evidence of injectables, Antara (Brand DMPA) was added to the national family planning program in 2016.

Mechanism of action-

- Block LH surge, thereby prevent ovulation
- Thicken cervical mucus
- Alter endometrial receptivity for implantation to occur

Intra Uterine Devices (IUD's)

The IUD was prominent in India – quite a long time ago. After India turned into a republic, one of its objectives was to control populace development. The recently stamped government started to advance family arranging, and in spite of the fact that it didn't make a lot of a gouge in the numbers, it popularized IUDs during the 50s. Truth be told, in post-freedom India, IUDs turned into the favored strategy for contraception, trailed by condoms, female disinfection and the pill. In the next years, a flawed American model of IUD went ahead the market, which gave the gadget its first negative criticism. The Dalkon Shield model, prevalent during the 70s, turned out to be effectively dislodged and caused significant issues like aperture of the uterine tissue; it was quickly ceased. Be that as it may, the IUD endured negative PR as of late as 10 years back, when there were claims documented against the producer of a hormonal IUD. Those suits were rejected, with the judge deciding that the proof was "not upheld by logical writing and had been created with the end goal of the prosecution," anyway the press around the pointless suit unquestionably did nothing to ease females nervousness about the IUD. Tragically, it

additionally made gynaecologists careful about suggesting IUDs. [7]

IUD's are considered as a safe option for contraceptive measures by a number of females as a means of reversible contraception. It is a device which is definitely not 100% effective and it is also not considered to be free of minor/major complications, occasionally. What an intrauterine device basically does is, it leads to a change in the environment of the uterus which affects the ability of the sperm to cause fertilization. Occasionally, it prevents the implantation of the blastocyst. The various changes that are caused by IUD's are mainly due to the incorporation of copper ions or progesterone within the device. The changes associated with the use of these IUD's are inflammatory responses along with biochemical changes within the endometrium, changes on the surface of the endometrial tissue, enhanced motility and a leucocyte activated response. [8] For nonparturitive, adolescent woman in their teenage years, there are quite a number of issues associated with the use of IUD's. These include a considerably small radius of the uterine cavity, social stress, fear, etc. The insertional procedure is painful and may require anaesthetic measures. Painful menstrual cycle is one of the side effects along with excessive bleeding and dyspareunia. All these problems can be reduced by selection of appropriate devices, such as the Lippes loop A or B, the nulliparous Saf-T-Coil, the Gyne T, and the Gravigard device. [8]

After extensive research conducted on the various types of chemical containing IUD's, TCu380A and TCu380S seem, by all accounts, to be more successful than different IUDs. No IUD demonstrated reliably lower expulsion rates for excessive bleeding and agony in contrast with different IUDs. [9]

The IUD is embedded into the uterus through the vagina and cervix – an outpatient technique that takes the professional a few minutes. During addition, the folds of the T are collapsed down so the IUD is a little vertical stick. The folds

open out on a level plane once the IUD is embedded in the uterus, and it quickly starts to do its job of discharging either copper particles or hormones into the uterus, counteracting undesirable pregnancies. [7,10] The major problem includes expulsion of the device that takes place followed by downward displacement. The IUD is less inclined to be

ousted from more parous ladies. This might be identified with the expanded collagen content and diminished versatility and contractility of the uterus. Also, a dominant part of patients experience some lower stomach torment and spinal pain looking like dysmenorrhea after inclusion of the gadget. [11]

Table 2: Different generations of IUD's along with their details. [12]

Variety	Content	Company	Mechanism of Action	Adverse effects	Effectiveness
1 st generation	Made of polyethylene (no biologically active agent)	Lippe's Loop	Foreign body in the endometrium makes it unsuitable for implantation.	Bleeding	As long as it is used.
2 nd generation	Copper Ions	PregnaCuT 380A	Inflammatory changes + Cu ions affect sperm motility.	Increases menstrual flow	10 years
3 rd generation	Impregnated with Progestogen, Levonogestrel	LNG-20 Mirena (Progestasert)	Non septic inflammatory changes in endometrium + suppression of endometrial growth	Bleeding (but minimal)	5 years
4 th generation	Indomethacin. Copper, etc.	GyneFix (Copper), FibroPlant (levonorgestrel)	Affects sperm motility and endometrial lining	-	5 years

3. Barrier Methods

The barrier methods of contraception include devices which prevent pregnancy by physically preventing sperm from entering in the uterus. Some barrier methods also protect against Sexually Transmitted Diseases (STDs).

The use of contraceptives to prevent unwanted pregnancies, the use of barrier method in preventing STDs alongwith the fact has got a significant impact since past many years both in developing (such as India) and developed countries. The strategy for population stabilization in India relies on various methods of contraception especially Barrier Methods.

However, use of barrier method of contraceptive remains a taboo in certain religious groups across the country. A comparison done of rural and urban population, we come to know that the use of birth control methods such as barrier methods is more in urban population compared to rural.

Barrier method is proved to be most convenient method amongst all others and should be used only during or after an act of sexual intercourse. In India, condom is the most widely used barrier method as a means of contraception.

India is the first country for starting a social awareness and marketing campaign of condoms after the launch of a brand called Nirodh. Since then, many governmental, non-governmental or private have actively participated in distribution of free and commercial condoms throughout the country. Hence, because of its widespread awareness, it is the most effective contraceptive method. [13]

But unlike male condom, the female condom which is available in the market under the name Femidom worn by female has limited acceptability in Indian context.

The common barrier methods are as follows:

- 1) Spermicide
- 2) Condom (Male/Female)
- 3) Fem shield
- 4) Diaphragm
- 5) Cervical cap
- 6) Vault cap

7) Sponge

Side effects of barrier methods include:

- There is an increased risk in urinary tract infections.
- Leaving a cervical cap or vault cap inside for more than 24 hours may lead to toxic shock syndrome.
- Some people may be allergic to the chemicals used in spermicide or sponge etc which may develop an irritation in vagina or penis.

Advantages of barrier methods:

- They are safe and non hormonal methods that can be almost used by every couple.
- They prevent pregnancy if used correctly.
- They can be used by lactating mothers.
- They can be discontinued without any professional advices.
- They most importantly prevent STIs and Allied conditions – Pelvic Inflammatory Disease (PID), infertility, ectopic pregnancy and possibly cervical cancer. [14]

Permanent Sterilization Method

These type of methods are irreversible type of contraception where surgical procedure is required. There are two types of permanent sterilization:

- 1) Vasectomy
- 2) Tubectomy

Tubectomy (female sterilization) or tube ligation is a technique in which a terminal sterilization is achieved by cutting and clamping back the fallopian tubes, this is done to prevent implantation of the ovum from the ovaries in the fallopian tubes. It is considered as a major surgery as anesthesia has to be given in the spinal cord. There are chances that there is reconnection in fallopian tubes if they are not tied or ligated properly. Women are disappointed with pregnancy if they have ectopic pregnancy. Different types of tubectomy are:

- 1) Bipolar Coagulation
- 2) Monopolar Coagulation

- 3) Irving's technique
- 4) Fimbrectomy [15]

There is a minimal risk but 1 in 200 women may have pregnancy if the operation is not carried out properly. Other factors of risk include bleeding and damage to internal organs as micro instruments are used in it. Recovery is easy but after tubectomy other contraceptives should be taken for at least 3 months.[15,16]

Vasectomy on the other hand is more safe compared to tubectomy as vas deferens are cut and tied so the semen don't contain any of sperms the effectiveness is very high as 1 or 2 in 1000 couple get pregnant in the first year of vasectomy. There is risk of infection associated with the vasectomy but compared to the tubectomy it is by far very less.[17,18]

The ratio of male to female sterilization is staggering 1:52 and this proves the patriarchal nature of our society. That more women are pushed to do tubectomy.

Table 3: Comparison of highly effective, reversible contraceptive methods [19, 20, 21] OC, oral contraceptives; DMPA, depot medroxyprogesterone acetate

Parameter	OC	DMPA	Implants	Copper Ultrauterine Device
Efficacy	User dependent	High	High	High
Length of protection	Continuous if taken daily	3 months	5 years	10 years
Rapid return of fertility	Yes	No	Yes	Yes
Regular cycles	Yes	No	Variable	Yes
Amenorrhea	Uncommon	Common	Variable	No
Appropriate in nursing mothers	Suboptimal	Yes	Yes	Yes
Procoagulant	Yes	No	No	No
Noncontraceptive benefits	Established	Established	Unknown	No
Provider required to initiate	Yes (Rx)	Yes	Yes	Yes
Provider required to discontinue	No	No	Yes	Yes
Privacy	Requires pill pack	Yes	Seen or felt by some users	Usually (string may be felt by partner)

4. Conclusion

By doing this research we would like to find out that which is best contraception method according to gynecologist as there are several myths regarding the contraceptive options prevailing in India and we would also like to find out if there any difference between the opinion of gynecologist and the common folks.

Rationale

The fundamental reason for this article is the various myths and confusion about which methods of contraception are safe and effective. In order to shun all the taboos related to contraception in India and in order to provide a deep insight on the various methods of contraception that are prevalent in

India we are conducting this in depth research on the topic. It discusses the side effects and benefits of each method and its prevalence in the country. The final study will focus more on a gynecologist's recommendation on the ideal method of contraception and the changes that can be made in this area. This article will bridge the gap between the existing knowledge and what should be the ideal practice that is clinically safe and cost effective at the same time.

References

- [1] <https://www.kff.org/womens-health-policy/fact-sheet/oral-contraceptive-pills/>
- [2] <https://www.ncbi.nlm.nih.gov/pubmed/27082029>
- [3] <https://www.ncbi.nlm.nih.gov/pubmed/11091985>
- [4] <https://www.ncbi.nlm.nih.gov/pubmed/23083413>
- [5] <https://www.elawoman.com/blog/family-planning/best-oral-contraceptive-pills-in-india>
- [6] <https://www.fhi360.org/sites/default/files/media/documents/india-efp-forum-background2.pdf>
- [7] <https://theswaddle.com/iuds-in-india-most-effective-long-lasting-birth-control-method-no-one-uses/>
- [8] British Library Cataloguing in Publication Data Hawkins, Denis Frank Human fertility control. 1. Contraception I. Title II. Elder, M G 613.9'4, RG136, 7940088 ISBN 0407-00127-1
- [9] O'Brien, P. A., Kulier, R., Helmerhorst, F. M., Usher-Patel, M., & d' Arcangues, C. (2008). Copper-containing, framed intrauterine devices for contraception: a systematic review of randomized controlled trials. *Contraception*, 77(5), 318–327.
- [10] Hawkins, Denis Frank Human fertility control. 1. Contraception I. TitleII. Elder, M G 613.9'4, RG136, 7940088, ISBN 0407-00127-1
- [11] Hawkins, Denis Frank Human fertility control. 1. Contraception I. Title II. Elder, M G 613.9'4, RG136, 7940088, ISBN 0407-00127-1
- [12] <http://www.pregna.com/blog/what-are-the-types-of-iuds/>
- [13] Felipe W & Kadri SM, 2014, Contraceptive devices in India, *Global Journal of Medicine and Public Health*.
- [14] https://www.aiims.edu/aiims/events/Gynaewebsite/ec_site/manual/3_barrier_method.htm
- [15] Audrey Kanen. Review version and detailed process of tubectomy. *Journal of Reproductive health and contraception*.
- [16] <https://www.plannedparenthood.org/learn/birth-control/sterilization>
- [17] https://healthcare.utah.edu/the-scope/shows.php?shows=0_r14awktv
- [18] <https://familydoctor.org/vasectomy-what-to-expect/>
- [19] <https://www.slideshare.net/drdeepakupadhyay/contraceptives-methods>
- [20] Coombe, J., Harris, M. L., & Loxton, D. (2018). Motivators of contraceptive method change and implications for long-acting reversible contraception (non-)use: a qualitative free-text analysis. *Sexual & Reproductive Healthcare*. doi: 10.1016/j.srhc.2018.12.004
- [21] Hubacher, D., Spector, H., Monteith, C., Chen, P.-L., & Hart, C. (2017). Long-acting reversible contraceptive acceptability and unintended pregnancy among women presenting for short-acting methods: a randomized patient preference trial. *American Journal of Obstetrics and Gynecology*, 216(2), 101–109. doi:10.1016/j.ajog.2016.08.033