

IUD: AN EFFECTIVE, SAFE, REVERSIBLE, NON - ABORTIFACIENT CONTRACEPTIVE

Contraception (birth control) is a topic that is often addressed quickly and with some trepidation by most high school teachers because the subject is fraught with emotional, psychological, and religious overtones. However, it is a topic that must be addressed because many students are sexually active (or have plans to be), the AIDS crisis has once again brought reproductive activity into the limelight, and overpopulation is often given as a major cause of numerous ecological and geopolitical problems.

Contraception will be defined as those techniques that prevent fertilization from occurring. Any device or technology that prevents implantation or allows for early termination of pregnancy will be considered abortion. In the minds of some United States citizens the line between contraception and abortion is somewhat vague - both are somewhat morally neutral. For many others a definite distinction exists and the issue is an ethical one.

These questions that are not only topical and controversial, but are also debated over a long period of time. The topic of Contraception, birth control to be exact is one such topic where the line of division is deep and compromise is not a possibility. The pro- life activist supported by the Catholic Church condemn the use of any and all forms of birth control calling it a "Murder" of a new life and abuse of the right of the unborn. This paper is to look into the misconceptions and getting the right of choice across. **The contraceptive device in question is the IUD (INTRAUTERINE CONTRACEPTIVE DEVICE) or what is popularly known as the COPPER T.**

Historically, the use of contraception has depended as much on the religious, political, moral, or ethical context of the time as much as it has on the existence or knowledge of a particular technique. No religion or ethical system has ever been indifferent to the issues involved in reproduction: (WHO, 1990) Social or governmental pressures have often existed to encourage or discourage births related to the dominance of a particular ethnic or political group

Birth control has been used to increase the quality of life. (Many 19th century European women did not want children because of the high mortality rates of women and children.)

1. There was betterment in the quality of life for the women due to the use of the birth control methods.

2. More opportunities to explore the unending potential in the work place and gaining the required knowledge in the system of education.
3. There is also a decrease in the Maternal Mortality Rate due to the use of the birth control method.
4. There is also increase in the planned pregnancies and hence decrease in the number of unwanted children.
5. This in turn decreases the fertility rate for the country.

Religious views, such as the desiring of one male child, have increased or decreased birth control

The theology of the Roman Catholic Church has influenced the contraceptive use of the Western World. The historical definition of personhood has changed to include or exclude women, ethnic groups, children, etc.

The issue of contraception has been an extremely controversial and debated one in the Catholic Church. The authoritative voice of the church, the Magisterium, holds that artificial contraception is a sin and only accepts the form of contraception called Natural Family Planning. The Catholic Church is opposed to the use of the IUD, which it considers an "abortive" method of birth control, arguing that the device impedes the implantation of the embryo in the wall of the uterus. Several contraceptives, the pill, the IUD and Norplant, are themselves abortifacients. That is, occasionally they work by causing an early term abortion; conception takes place but the fertilized egg, the new tiny human being, cannot implant itself in the uterine wall. Break-through ovulations occur some 2-10% of the time; who knows how many of these ova are impregnated and then aborted due to a uterine environment rendered inhospitable by contraceptives?

This is also true for the country like Argentina and it is evident from the fact that the Argentine Congress is debating a controversial bill on reproductive health that would make birth control information available free of cost, even to minors, in an attempt to curb sexually transmitted diseases, back alley abortions and teen pregnancies.

IUDS: UNDERSTANDING THEIR MECHANISMS OF ACTION

It is imperative to understand the workings of the IUD in order to form an informed opinion. The objections raised by the church and the different reasons given for the nonuse needs to be addressed with a through working knowledge of the device. **The report from CONTRACEPTION ONLINE- THE**

CONTRACEPTION REPORT (Volume 9 November 1998 Issue 5) clearly states that the IUD is not an abortifacient.

IUDs produce a local foreign-body response in the human endometrium. This foreign-body reaction results in the release of white blood cells, prostaglandins and enzymes. For many years, researchers and clinicians believed that a normally fertilized egg entered the uterus but could not complete implantation in a hostile endometrium.

STUDIES TO SUPPORT

New evidence gathered over the past 15 years, however, suggests otherwise. Few, if any, fertilized ova actually reach the endometrium. Studies also suggest that medicated IUDs containing copper interfere with sperm motility and integrity. Hormonal IUDs also interfere with sperm motility via thickening cervical mucus. Thus, the weight of current evidence suggests that the main mechanisms of action of IUDs occur prior to fertilization.

Early studies described a foreign-body reaction in the uterine cavity associated with inert (nonmedicated) IUDs. Interestingly, the foreign-body reaction was not found to be the mechanism of action of inert IUDs in many animal species. For example, nonmedicated IUDs work in the ewe by preventing sperm migration beyond the uterus, in the goat by inhibiting fertilization, and in the water buffalo by suppressing ovulation. Despite the finding of a wide variety of IUD mechanisms of action in various species, however, the main hypothesis among clinicians was that the foreign-body reaction constituted the mechanism of action in the human

A.EFFECTS ON SPERM

IUDs, especially the now most widely used copper containing IUDs (TCu-380A and Multiload) hinder ascent of sperm to the fallopian tubes (where fertilization occurs) or reduce the ability of sperm to fertilize an egg. Several studies have shown that IUDs influence the number of sperm reaching the uterine cavity and the fallopian tubes. The sterile foreign-body reaction in the uterine cavity causes both cellular and biochemical changes that may be toxic to sperm. There is also evidence that the copper released from the IUDs may have a toxic effect on the sperm.

Investigators have done flushing studies of the uterine cavity and fallopian tubes after exposure to semen. Women using IUDs had lower concentrations of sperm

in the uterus and tubes than did women not using IUDs. In addition, the sperm found in women using copper IUDs were likely to be damaged and not able to fertilize.¹² Thus, the evidence suggests that fewer sperm reach the site of fertilization in women using IUDs than in women who are not using the device, and, for women using copper devices, the sperm may not be able to fertilize the egg. This effect on the sperm is considered the main mechanism of the IUD's contraceptive action.

B. EARLY DEVELOPMENTAL EVENTS

No contraceptive method is perfect, but the efficacy of IUDs is exceptionally good -- 99 percent effective for copper IUDs. Most studies of early pregnancy rates have relied on sensitive measurements of serum beta-hCG, a hormone produced by the fertilized egg near the time of implantation and thereafter. Using this marker, a large number of studies indicate that women using IUDs rarely show evidence of fertilization, and some of these cases may result in an early embryonic loss, a natural occurrence. One study using a more sensitive assay found a transient rise and fall of beta-hCG in only 1 percent of IUD users, supporting other studies that have estimated copper IUD effectiveness at 99 percent.¹³ However, among couples trying to conceive, early embryonic loss is very high, ranging from 8 percent to 57 percent.¹³ Whether the rate of this natural early embryonic loss among IUD users is similar to that in other women is unknown.

***Mechanisms of the Contraceptive Action of Hormonal Methods and Intrauterine Devices (IUDs)...FHI Network**

FLUID ALTERATIONS

IUDs also induce changes in the endometrial and tubal fluids. Sperm and ova are highly sensitive to variations in ionic concentrations of the tubal and endometrial fluids. **According to Luigi Mastroianni, MD, Associate Editor of *The Contraception Report*, "If the copper content of the fluids of the uterus and fallopian tube impairs spermatozoa function, it would equally inhibit fertilization. Those of us with extensive laboratory and clinical experience with the fertilization process are acutely aware that even the slightest contaminant in the fluids in which the eggs and spermatozoa are placed dramatically impairs fertilization."** Reflux of uterine fluids into the tubes could explain the ionic alterations.

According to the American College of Obstetricians and Gynecologists, IUDs work primarily by inhibiting fertilization.

ACOG's 1998 position statement on contraceptives explains, "Progesterone release causes thickened cervical mucus that blocks sperm transport; the release of copper alters fluids in the fallopian tubes and uterus in a way that interferes with sperm and egg transport and function. Both can act by inhibiting fertilization, which is considered their primary mechanism of action.

The World Health Organization also recognizes interference with fertilization as the primary mechanism of action of IUDs. In its *Technical Report Series*, WHO states, "It is unlikely that the contraceptive efficacy of IUDs results, mainly or exclusively, from their capacity to interfere with implantation; it is more probable that they exert their antifertility effects beyond the uterus and interfere with steps in the reproductive process that take place before the ova reach the uterine cavity. It is likely that the uterine and tubal fluids that are altered in the presence of an IUD impair the viability of the gametes, thus reducing their chances of union and impeding fertilization. Copper ions released by an IUD probably potentiate these effects."

INTERFERENCE WITH OVA

Several other effects are more likely to be primarily responsible for the antifertility effect of IUDs. This is particularly true of today's modern, medicated IUDs. For example, IUDs have been shown to alter endometrial and tubal fluids and to interfere both with ova and sperm.

Alvarez et al examined tubal flushings from women using an IUD or no contraception at the time of female sterilization. They examined the tubes of women who had a bilateral salpingectomy, flushing the fallopian tubes to check for ova in women who had had intercourse prior to their sterilization procedure. One hundred fifteen control women and 56 IUD users enrolled in the study.

The researchers found profound differences in the quantity and quality of ova recovered. Women using the IUD had substantially fewer ova recovered (39%) compared to women using no contraception (59%) (The smallest percentage of recovered ova (30%) came from women using the copper IUD.

Furthermore, among IUD users, no recovered ova had the microscopic appearance of normally developing pre-implantation embryos. Especially for

copper IUD users, the recovered ova showed no development, or had abnormal or uncertain development. In contrast, about half (48%) of the ova recovered from women using no contraception exhibited normal post fertilization development.

MEASUREMENT OF HUMAN CHORIONIC GONADOTROPIN

Evidence from studies measuring human chorionic gonadotropin (HCG) also indicates fertilization in IUD users is rare. The blastocyst begins to produce HCG near the time of implantation. In a review of the literature, Ortiz and Croxatto found that the majority of studies reported that less than 3% of women using IUDs had measurable amounts of HCG. In two studies using highly sensitive assays for HCG, fertilization was found in only 1 of 137 cycles (0.7%) among women using a copper IUD.

MICROSCOPIC EVIDENCE OF FERTILIZATION

Microscope studies provide further evidence of the contraceptive effect of IUDs. Fertilized eggs are found in the fallopian tubes and in the uterine cavity with predictable frequencies in women who are sexually active and not using contraception. The rate of recovery of fertilized eggs from the fallopian tubes of copper IUD users is much lower than that in sexually active women who are not using a contraceptive method. Furthermore, in studies searching for eggs, no fertilized eggs have been found in the uterine cavity in copper IUD users.¹⁴

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COUNSELING

Counseling is the key to patient compliance and satisfaction with contraception. A well-informed patient is more likely to continue with the IUD method and less likely to request premature removal. A good description of possible adverse effects is listed in the patient package insert, and these effects should be reviewed with the patient to ensure that she completely understands the effects and her risk of experiencing them.

The patient should be prepared to experience some cramping and discomfort during insertion and mild spotting and cramping for one to three days after insertion. The bleeding is usually minimal, and the cramping normally responds well to an over-the-counter analgesic such as ibuprofen or acetaminophen. The

patient should also be told that if these symptoms become more severe or are not controlled by an analgesic, reevaluation by the physician is recommended.

It is important to instruct the patient to check for the presence of the tail after her first menstrual period and to notify the physician if she feels the stem of the IUD or does not feel a tail. The patient should be encouraged to check for the tail on a regular basis, at least after every menstrual period. Any extended period of amenorrhea should also prompt the patient to see her physician for evaluation

MYTHS AND RUMORS

There is a myth that the IUD is an abortifacient, it means that the use of IUD causes early abortion.

An international mail survey being conducted by IPPF and the World Health Organization (WHO) has found that inaccurate information about IUDs is a barrier to use worldwide. Dr. Huezo says preliminary data about clients' questions and concerns revealed that rumors are commonplace. The survey was sent to national institutions providing family planning services in 75 countries. "The most common misconception was that IUDs work by causing an abortion," says Dr. Huezo. "We also heard that the IUD causes cancer. This was a quite common perception, but it came as a surprise to researchers. Another concern is that the IUD moves outside the uterus and can travel as far as the heart or brain."

IPPF and WHO are preparing a list of these misconceptions for providers and responses providers can give to address clients' concerns. For example, no scientific evidence indicates IUDs cause cancer. In fact, research suggests the devices reduce the risk of endometrial and cervical cancers. Although the IUD can be expelled through the vagina or very rarely can perforate the uterus during insertion, the IUD does not travel outside the uterus to other organs. IUDs prevent fertilization. Studies show the IUD effectively interrupts the reproductive process before implantation and pregnancy, suggesting that it does not act as an abortifacient.

"If we want to increase the acceptability of the IUD, or any other method, it is important to provide information and education to the community, the clients and potential clients," Dr. Huezo said. "It is also very important to update knowledge among the service providers -- not only those who directly provide (contraception) but those who provide other reproductive health services."

FACTS OF THE IUD

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Intrauterine devices (IUDs) prevent fertilization primarily by interfering with the ability of sperm to survive and to ascend the fallopian tubes, where fertilization occurs. Having a foreign body in the uterus, such as an IUD, causes both anatomical and biochemical changes that appear to be toxic to sperm. Studies have generally found that sperm are not as viable among IUD users, compared to other women.

Particularly in the presence of copper-bearing devices, sperm have been absent or few in number in the upper female genital tract, concluded a report of a World Health Organization study group. "Spermatozoa can migrate to the fallopian tubes in some cases but are less likely to reach the normal site of fertilization. Scientists in Chile and the United States reached similar conclusions in their 1996 review of mechanism of action research. When a foreign body **is in** the uterus, the endometrium reacts by releasing white blood cells, enzymes and prostaglandins; and these reactions of the endometrium appear to prevent sperm from reaching the fallopian tubes. In addition, copper-bearing IUDs release copper ions into the fluids of the uterus and the fallopian tubes, enhancing the debilitating effect on sperm.

Evidence for these mechanisms includes physical examination of women's eggs. When an ovum is fertilized, it begins to produce human chorionic gonadotropin (HCG) near the time of implantation. A 1987 study to monitor HCG production in 40 women using IUDs found only one probable fertilized egg among 107 cycles. "Whatever the IUD's specific mechanism of action, it appears that the IUD effectively interrupts the reproductive process before implantation," the study concluded.⁴

Another way researchers have documented the IUD's mechanism of action is to recover an ovum during a woman's fertile period. Using this approach, researchers recovered ova from 115 women using no contraception and 56 women using IUDs.

IS THE IUD AN ABORTIFACIENT?

Some people incorrectly believe that the principal mechanism of action of IUDs is prevention of implantation of fertilized eggs.¹⁶ The existing evidence does not support the theory that the mechanism of action of IUDs includes the destruction

of embryos in the uterus. The foreign body reaction induced by copper and inert IUDs is hostile to sperm and possibly eggs in the upper genital tract. Few sperm reach the site of fertilization in the fallopian tubes, and those that do are unlikely to be capable of fertilizing an egg. Eggs may be similarly impaired. Should fertilization occur, the chances for establishing a pregnancy likely decrease as the fertilized egg approaches the uterine cavity? Thus, the IUD appears to work at a much earlier stage of human reproduction than was previously thought; prevention of fertilization seems to be the dominant mode of action.

As noted by the World Health Organization Scientific Group: 17 "It is unlikely that the contraceptive efficacy of IUDs results, mainly or exclusively, from their capacity to interfere with implantation; it is more probable that they exert their antifertility effects beyond the uterus and interfere with steps in the reproductive process that take place before the ova reach the uterine cavity." Similarly, the American College of Obstetricians and Gynecologists¹⁸ reviewed the evidence and concluded that, "As such, the IUD is not an abortifacient". ***Mechanisms of the Contraceptive Action of Hormonal Methods and Intrauterine Devices (IUDs)...FHI Network**

HEALTH PROBLEMS: The IUD often causes lacerations in the uterus, which result in severe pain and permanent infertility. Abortion is a serious cause of breast cancer. It is also a proven fact that the longer child-bearing is delayed, the more likely a woman is to get endometriosis.

FACTS

The risk of PID with modern IUDs is very low. An analysis of World Health Organization trials including over 22,000 women found that the primary risk of PID with IUD use occurs within the first 3 weeks after insertion; thereafter the risk declines to baseline levels and remains low. Research links PID to bacterial contamination of the endometrial cavity during insertion, rather than to the IUD itself or to its string.

A woman's risk of contracting PID is related primarily to exposure to STDs. Women at low risk of STDs who receive an IUD have little long-term risk of PID. Data from the Women's Health Study, a large, case-control study analyzed by the Centers for Disease Control and Prevention, found that "For women who were married or cohabiting and with only one sexual partner in the past 6 months, there was no significant increase in the risk of PID even in the first critical months after insertion."

Early studies finding an association between PID and IUDs were plagued by several important biases. These included failure to control for number of sexual partners and risk of STDs, inappropriate use of oral contraceptive (OC) and barrier method users as the control group (who gain protection from PID), and other weaknesses of the case-control method. When these biases were taken into consideration, a reanalysis of the Oxford Family Planning Association study found no statistically significant increase in the risk of PID associated with medicated IUDs.

Screening clients at high risk of sexually transmitted diseases can reduce PID risks. Women at risk of sexually transmitted diseases should consider another contraceptive option, such as condoms. "If an infection follows insertion, perhaps the woman had an infection, such as gonorrhea, that was present in the lower reproductive tract and was introduced into the upper tract," says Dr. Irina Yacobson of FHI, who has conducted IUD training in several countries. Leaving the IUD in place for its recommended life span can also help minimize infection risks. Providers should also use sterile insertion procedures, and encourage condom use if women have sex with potentially infected men.

WHAT DOES THE CATHOLIC CHURCH TEACH ABOUT THE RELATIONSHIP OF MARRIAGE?

Marriage is a permanent relationship created by God and entered into by the free consent of man and woman. It is a relationship of love and service, and it is a Christian sacrament.

Then in relation to the marriage principles: **"Submitting yourselves one to another in the fear of God---- Husbands love your wife, even as Christ loved the church and gave Himself for it; that He might sanctify and cleanse it with the washing of water by the Word" (Ephesians5: 21-26)**. These commands are given by God for His children, not to overwhelm us, but to set the standard as a goal and pattern after which we should strive.

The Roman Catholic Church states that:

"The sexual act should reflect the total self-giving of two couples in love, through marriage. Likewise it should express the quality and the potential of the relationship as open, loving and life-giving."

Have a single partner who does not have other sexual partners (and so you are not at high risk for pelvic inflammatory disease, or PID), or you and your partner are willing to use condoms too.

Women at low risk of sexually transmitted diseases (STDs) are good candidates for using IUDs. **The IUD is best for a woman who is in a steady and faithful relationship with a partner who is faithful and who does not have any sexually transmitted infections.**

IUDs DO NOT protect against STDs. STDs can increase a woman's risk of becoming infertile. If you are using an IUD and believe you may be at risk of getting an STD, use a latex condom to help protect yourself. You may also want to discuss with your doctor or nurse whether the IUD is still a good choice for birth control. Women attempting pregnancy after IUD removal conceive almost immediately on removal of the IUD and approximately 80 percent achieving pregnancy within one year.

- ✓ **It is a reversible method of contraception where the user can get pregnant immediately after the removal of the IUD and hence the woman has more choice in family planning.**
- ✓ **Have had at least 1 child. Women who haven't had children are more likely to expel the IUD or have more pain and cramping after insertion. However, childless women can still use the IUD.**

Null parity is not a contraindication for the use of an IUD but a history of Pelvic infection, previous Ectopic pregnancy or multiple sex partners make the choice of an IUD inappropriate. The woman using the IUD has to have atleast one child for the device to work successfully.

- ✓ **Want an effective, long-acting method of birth control that requires little effort but don't want to have a tubal ligation (sterilization).**

To sum up the IUD as a contraceptive method is highly safe effective and above all reversible. There are lot of myths surrounding the IUD, which are not true, and need to be addressed to get a full advantage of the method.

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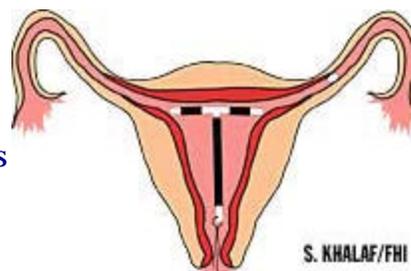
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Network IUD Mechanism Affects Sperm

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Intrauterine devices (IUDs) prevent fertilization primarily by interfering with the ability of sperm to survive and to ascend the fallopian tubes, where fertilization occurs. Having a foreign body in the uterus, such as an IUD, causes both anatomical and biochemical changes that appear to be toxic to sperm. Studies have generally found that sperm are not as viable among IUD users, compared to other women.¹



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When a foreign body is in the uterus, the endometrium reacts by releasing white blood cells, enzymes and prostaglandins; and these reactions of the endometrium appear to prevent sperm from reaching the fallopian tubes. In addition, copper-bearing IUDs release copper ions into the fluids of the uterus and the fallopian tubes, enhancing the debilitating effect on sperm.

Evidence for these mechanisms includes physical examination of women's eggs. When an ovum is fertilized, it begins to produce human chorionic gonadotropin (HCG) near the time of implantation. A 1987 study to monitor HCG production in 40 women using IUDs found only one probable fertilized egg among 107 cycles. "Whatever the IUD's specific mechanism of action, it appears that the IUD effectively interrupts the reproductive process before implantation," the study concluded.⁴

Another way researchers have documented the IUD's mechanism of action is to recover an ovum during a woman's fertile period. Using this approach, researchers recovered ova from 115 women using no contraception and 56 women using IUDs.

Half of the women using no contraception who had intercourse during the fertile period had ova that were consistent in appearance with fertilized eggs. In contrast, none of the ova taken from copper IUD users who intercourse had

appeared to be fertilized. Also, no ova were found in the uterus of any of the copper IUD users. "IUDs exert effects that extend beyond the body of the uterus and interfere with steps of the reproductive process that take place before the eggs reach the uterine cavity," concluded Dr. Frank Alvarez and colleagues.⁵

The levonorgestrel IUD, called an intrauterine system, uses different mechanisms. Like other progestin methods, this device prevents pregnancy primarily by thickening cervical mucus, which inhibits the ability of sperm to enter the uterus.

-- **William R. Finger**

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Mechanisms of the Contraceptive Action of Hormonal Methods and Intrauterine Devices (IUDs)

Modern methods of contraception have had an important impact in improving the health of women and children. However, in certain countries or regions of the world, incorrect and intentionally misleading information about the mechanism of action of these contraceptive methods has proliferated. This summary, originally created for distribution in Latin America, reviews the scientific evidence concerning the mechanisms of action.

The introduction in the last few decades of modern methods of contraception has had an important impact in improving the health of women and children.¹ However, in certain countries or regions of the world, incorrect and intentionally misleading information about the mechanism of action of these contraceptive methods has proliferated. These contraceptive methods prevent pregnancy; they do not terminate an already established pregnancy. There is no scientific evidence to support the claim that the hormonal contraceptive methods and IUDs have an abortifacient action. Actually, in current medical practice the presence of a pregnancy is considered an absolute contraindication to initiate the use of any of these methods.²

Understanding how modern contraceptives work is fundamentally important. Providers should be prepared to describe the mechanisms of action to women considering the use of these methods. Similarly, women need to know how contraceptives work in order to make a truly informed choice and to use the methods correctly. Substantial misinformation on this subject exists worldwide, among policy makers, providers, users and the public at large.

This paper will review the evidence concerning the mechanisms of action of modern hormonal contraceptives and intrauterine devices (IUDs). Most methods have more than one potential mechanism of action. For example, combined oral contraceptives are highly effective in preventing ovulation (egg release). However, should ovulation occur, fertilization is still unlikely due to the effect of oral contraceptive hormones on thickening the cervical mucus, impairing sperm penetration. One cannot say with certainty what the contribution of various contraceptive effects may be for a given woman. However, existing evidence does not support claims that either hormonal methods or the IUD are abortifacients or prevent implantation.

Hormonal Methods

Combined Oral Contraceptives (COCs)

The primary mechanism of action of COCs is the inhibition of ovulation. The release of an egg, which commonly occurs in the middle of the menstrual cycle, is prevented by COCs. Two hormones produced by the pituitary, a gland located at the base of the brain, coordinate the development and release of an egg from the ovary. One is follicle stimulating hormone, abbreviated FSH, and the other is luteinizing hormone, or LH. A surge in both of these hormones ordinarily occurs in the middle of a woman's menstrual cycle. The surge in LH is the trigger for ovulation. COCs inhibit the production of both FSH and LH and consequently prevent ovulation.³

In the very rare cases where ovulation may occur, another contraceptive mechanism of COCs acts to prevent fertilization. COCs have an effect on the cervical mucus. The progestin contained in COCs causes the cervical mucus to become thick and prevents sperm penetration; the sperm can not pass through the cervix and fertilization cannot take place.⁴

Progestin-only Methods

Progestin-only Pills (POPs)

Progestin-only pills (POPs) prevent pregnancy through a combination of actions. The amount of progestin in POPs is much less than in COCs; because of this, POPs do not consistently prevent ovulation. Indeed, about 40 percent of women using POPs may ovulate. When POPs inhibit ovulation they do so in the same manner described for COC.³

Another mechanism of action accounts for the high efficacy of these pills. This mechanism is the alteration of the cervical mucus. Progestin-only contraceptives cause a "hostile" cervical mucus. POPs greatly reduce the volume of mucus,

increase its viscosity and cell content, and alter its molecular structure. These actions result in little or no sperm entry to the uterine cavity. Even in the rare cases when penetration does occur, sperm motility may be reduced and fertilization is very unlikely to take place.⁵

The use of POPs is mostly recommended for breastfeeding women, because combined hormonal methods reduce the production of breastmilk. During the period of amenorrhea (absence of menstruation) associated with breastfeeding, ovarian function is largely suppressed; ovulation is unlikely to occur and the cervical mucus is hostile to the sperm.⁶ These effects greatly enhance the contraceptive action of POPs during breastfeeding.

Injectables (DMPA)

The most widely used injectable contraceptive is depo-medroxyprogesterone acetate (DMPA), a long-acting, injectable progestin. The contraceptive action of DMPA occurs primarily at the level of the pituitary and the hypothalamus. As with COCs, DMPA interrupts the usual hormonal messages sent from the brain to the ovary that lead to ovulation. Specifically, DMPA prevents the mid-cycle surge of LH, which is necessary for ovulation.⁷

As with other progestin-only methods, DMPA also has an effect on the cervical mucus; the mucus becomes scanty and thick which makes it unfavorable for sperm penetration.⁵

Soon after the first injection of DMPA, the endometrium starts becoming thin and underdeveloped. Under these circumstances, DMPA could, theoretically, inhibit implantation. However, DMPA is highly effective in preventing ovulation and sperm penetration and the possibility of fertilization taking place is negligible. There is no data available to support prevention of implantation as a contraceptive action of DMPA or any of the other currently available hormonal contraceptives, including pills and implants.

Other injectable contraceptives are available in some countries. Another progestin-only injectable product is norethisterone enanthate (NET EN or Noristerat), which is given every two months. In addition, three types of combined injectable contraceptives, which are given every month, are available in some countries. These latter methods, like COCs, contain both a progestin and an estrogen. The progestin-only injectable works like DMPA,⁸ while the combined injectable contraceptives act mainly like COCs.⁹

Implants

Progestins can also be administered from implants placed under the skin. The progestin used currently is levonorgestrel (Norplant® implants), which is also

found in some COCs and POPs. The contraceptive effect of the levonorgestrel implants is similar to that of the POPs. Ovulation occurs in about 10 percent of cycles in the first year. With time, blood levels of the progestin decline, and ovulation occurs more often (30 percent to 75 percent of cycles).¹⁰

However, like other hormonal methods, implants thicken the cervical mucus. This prevents sperm from getting into the uterus and makes fertilization of the egg unlikely. The changes in the cervical mucus are more consistent compared with POPs.¹¹

Hormonal Method Mechanisms

Ovulation  Pituitary gland

Hormonal methods disrupt the balance of natural hormones, blocking hormonal signals from the hypothalamus and pituitary gland near the brain that are necessary for ovulation. However, progestin-only methods do not always block ovulation.

Cervical Mucus  Cervical canal

Cervical mucus normally fluctuates in thickness throughout a woman's cycle, becoming thin and watery at the peak of fertility. Hormonal methods keep the mucus thick all the time, making it difficult for sperm to get through. For progestin-only methods, this mechanism accounts for their high efficacy.

IUD Mechanisms

Affects Sperm  Uterine cavity

IUDs prevent sperm from reaching the uterine cavity and the fallopian tubes, where fertilization occurs. A foreign-body reaction in the uterine cavity to an IUD causes cellular and biochemical changes that may be toxic to sperm. Also, the copper in copper IUDs may be toxic to sperm.

Intrauterine Devices (IUDs)

Despite years of study, the precise mechanism of contraceptive action of intrauterine devices (IUDs) remains somewhat unclear. Relevant investigations in humans are difficult to conduct, and extrapolating from animal studies is not always meaningful. The high efficacy of IUDs in humans may stem from more than one mechanism of action. This section will summarize the evidence concerning potential mechanisms of action in humans and describe the conclusions of expert panels on this issue.

Effects on sperm

IUDs, especially the now most widely used copper containing IUDs (TCu-380A and Multiload) hinder ascent of sperm to the fallopian tubes (where fertilization occurs) or reduce the ability of sperm to fertilize an egg. Several studies have shown that IUDs influence the number of sperm reaching the uterine cavity and the fallopian tubes. The sterile foreign-body reaction in the uterine cavity causes both cellular and biochemical changes that may be toxic to sperm. There is also evidence that the copper released from the IUDs may have a toxic effect on the sperm.

Investigators have done flushing studies of the uterine cavity and fallopian tubes after exposure to semen. Women using IUDs had lower concentrations of sperm in the uterus and tubes than did women not using IUDs. In addition, the sperm found in women using copper IUDs were likely to be damaged and not able to fertilize.¹² Thus, the evidence suggests that fewer sperm reach the site of fertilization in women using IUDs than in women who are not using the device, and, for women using copper devices, the sperm may not be able to fertilize the egg. This effect on the sperm is considered the main mechanism of the IUD's contraceptive action.

Early developmental events

No contraceptive method is perfect, but the efficacy of IUDs is exceptionally good -- 99 percent effective for copper IUDs. Most studies of early pregnancy rates have relied on sensitive measurements of serum beta-hCG, a hormone produced by the fertilized egg near the time of implantation and thereafter. Using this marker, a large number of studies indicate that women using IUDs rarely show evidence of fertilization, and some of these cases may result in an early embryonic loss, a natural occurrence. One study using a more sensitive assay found a transient rise and fall of beta-hCG in only 1 percent of IUD users, supporting other studies that have estimated copper IUD effectiveness at 99 percent.¹³ However, among couples trying to conceive, early embryonic loss is very high, ranging from 8 percent to 57 percent.¹³ Whether the rate of this

natural early embryonic loss among IUD users is similar to that in other women is unknown.

Microscopic evidence of fertilization

Microscope studies provide further evidence of the contraceptive effect of IUDs. Fertilized eggs are found in the fallopian tubes and in the uterine cavity with predictable frequencies in women who are sexually active and not using contraception. The rate of recovery of fertilized eggs from the fallopian tubes of copper IUD users is much lower than that in sexually active women who are not using a contraceptive method. Furthermore, in studies searching for eggs, no fertilized eggs have been found in the uterine cavity in copper IUD users.¹⁴

Implications of Ectopic pregnancy rates

If the mechanism of action of IUDs was to prevent implantation of fertilized eggs in the uterine cavity, then rates of Ectopic pregnancy (pregnancy in the fallopian tubes) should be unaffected by IUD use. In contrast, inert and copper-bearing IUDs confer powerful protection against tubal pregnancies.¹⁵ This fact strongly suggests that these IUDs prevent fertilization from occurring or have a contraceptive effect that extends beyond the uterus to include the fallopian tubes as well.

Is the IUD an abortifacient?

Some people incorrectly believe that the principal mechanism of action of IUDs is prevention of implantation of fertilized eggs.¹⁶ The existing evidence does not support the theory that the mechanism of action of IUDs includes the destruction of embryos in the uterus. The foreign body reaction induced by copper and inert IUDs is hostile to sperm and possibly eggs in the upper genital tract. Few sperm reach the site of fertilization in the fallopian tubes, and those that do are unlikely to be capable of fertilizing an egg. Eggs may be similarly impaired. Should fertilization occur, the chances for establishing a pregnancy likely decrease as the fertilized egg approaches the uterine cavity. Thus, the IUD appears to work at a much earlier stage of human reproduction than was previously thought; prevention of fertilization seems to be the dominant mode of action.

As noted by the World Health Organization Scientific Group:¹⁷ "It is unlikely that the contraceptive efficacy of IUDs results, mainly or exclusively, from their capacity to interfere with implantation; it is more probable that they exert their antifertility effects beyond the uterus and interfere with steps in the reproductive process that take place before the ova reach the uterine cavity." Similarly, the American College of Obstetricians and Gynecologists¹⁸ reviewed the evidence and concluded that, "As such, the IUD is not an abortifacient".

Pills for Emergency Contraception

Combined oral contraceptive pills (COCs) are the most commonly used method of emergency contraception. High doses of POPs can also be used for this purpose. The precise mechanism of action is not clear, especially with regard to mechanisms other than interfering with ovulation. If used before ovulation, the main mechanism of action is the suppression or delay of ovulation; as a result, fertilization is prevented.¹⁹

Some studies have described slight changes in the endometrium, but it is not clear if these histological changes would prevent implantation.²⁰ Other studies, however, have shown an absence of endometrial changes.²¹ If emergency contraceptive pills are taken after the estimated time of implantation, they are no longer effective and pregnancy continues unaffected.²² Stated alternatively, emergency contraception prevents pregnancy from starting. It cannot cause an abortion once pregnancy is established.

Contraceptive Failures and Duration of the Contraceptive Effect

Most accidental pregnancies that occur while using the modern methods of contraception are due to the incorrect and inconsistent use of the method. However, in a small percentage of cases, an accidental pregnancy may also occur while the method is used correctly and consistently. Therefore, fertilization, implantation and a normal pregnancy are certainly possible during contraceptive use.

Concerns are sometimes expressed about the duration of the contraceptive effect and the return of fertility once the use of the method is discontinued. As a matter of fact, the return of fertility is very fast. Ovulation may occur immediately after discontinuing the use of oral contraceptives, combined injectables and IUDs. There is a delay in the return of fertility upon discontinuation of progestin-only injectables, namely DMPA. As an average, pregnancy occurs within 9 to 10 months after the last DMPA injection and by 15 months the pregnancy rates are the same for previous DMPA users and for non-users.²³

Comment

The World Health Organization Scientific Group noted the widespread confusion over terminology of early reproductive events. To clarify this issue, they suggested the following definitions: "Fertilization is the process that begins with the penetration of the secondary oocyte by the spermatozoon and is completed shortly before the first cleavage. It usually takes up to 24 hours to complete in humans." In addition, "Implantation is the process that starts with the attachment of the zona-free blastocyst (fertilized egg) to the uterine wall (days 5-6 post-fertilization); the blastocyst then penetrates the uterine epithelium and invades the stroma. The process is complete when the blastocyst develops primary villi and the surface defect on the epithelium is closed (days 13-14 post-

fertilization)." In the United States, the Code of Federal Regulations of the Department of Health and Human Services states that "pregnancy encompasses the period of time from confirmation of implantation (through any of the presumptive signs of pregnancy, such as missed menses, or by a medically acceptable pregnancy test), until expulsion or extraction of the fetus."

Stated alternatively, pregnancy begins when implantation is complete (about two weeks after fertilization in humans). Fertilization does not establish a pregnancy. Rather, fertilization is a necessary but insufficient step on the path to pregnancy. Any method of fertility regulation that acts before implantation is not an abortifacient, since no pregnancy exists. Major medical organizations, such as the World Health Organization, and the American College of Obstetricians and Gynecologists concur on this biological point.

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Birth Control and Contraception - Notes



Key Idea

God is the only being who can create life but some Christians believe that they should have a choice in when to "try" for a baby.

If a couple have regular unprotected sex there is a strong chance that the woman will get pregnant. Using a method to reduce the chance of pregnancy is called **contraception**. Sex is not seen as a sin in **Christianity**, but its place is seen within the loving relationship of marriage, and for many **Christians** as part of the procreative process. The **Roman Catholic** Church states that:

"The sexual act should reflect the total self-giving of two couples in love, through marriage. Likewise it should express the quality and the potential of the relationship as open, loving and life-giving."

For many years in the church the primary purpose of sex was for procreation:

"So God created Human beings and saidHave many children"

Genesis 1:26-27"

Pleasure was a secondary process. Many people have argued that if couples did not want to have children then they should not have sex at all. This is the official teaching of both the Roman Catholic and the **Orthodox** churches. In 1930 **Pope Pius XI** said contraception was wrong in the following statement:

"any use whatsoever of any method that stops the natural power of sex to generate life is forbidden" "

Why is contraception used?

- a married couple may not wish to have children
- a family may decide that is large enough for emotional, psychological or financial reasons
- it helps people to plan their future and the approximate ages of their children
- it allows married couples to have sex without worrying about pregnancy
- it helps to control the population
- it allows couples who are not married to avoid unwanted pregnancy=

Methods of contraception

'Natural' methods

The Rhythm method. For a few days of the menstrual cycle a woman is not fertile so a couple can have sex during those days. However keeping track of the "safe period" is very tricky so this method is not reliable.

The Withdrawal method. The man removes his penis from the woman just before ejaculation (coming). This is very unsafe since sperm is often released during sex. 'Unnatural' or artificial methods

The Pill. This alters the balance of hormones in the woman's body. The long term effects of taking the pill are not known. It must be taken regularly and forgetting to take the pill can make having sex unsafe for 28 days. If used properly it's 99% safe, the safest method.

A Barrier method. There are two of these. The woman may use a diaphragm or the man a condom. This is a rubber barrier that stops the sperm from entering the womb (diaphragm) or the vagina (condom). These are fairly safe but there is a danger of them breaking and so failing.

The IUD. (An inter-uterine device). This is a small coil or wire, with a piece copper attached. It is placed inside the woman's womb and is believed to work by preventing the egg from attaching itself to the uterus wall. It is fairly safe but can cause heavy periods or cramps.

Views on contraception

Humanists - Sex is one of the greatest of human pleasures and not just a method of reproduction. If contraception helps a couple to enjoy sex then it is a good thing.

Roman Catholic - The main purpose of sex is to have children. Sex is wrong unless there is the intention of having children, or at least the possibility. Any form of artificial contraception was formally forbidden by the Pope in 1968.

Protestant - The welfare of the whole family is important. If having more children would risk the health of the family then contraception is permissible if agreed by both partners.



Further reading

Ethics & Religions - page 28

Examining Religions - Contemporary Moral Issues - pages 46-47

Contemporary Issues A Christian View - pages 120-122

What the churches say - Medical Issues

Beliefs, Values and Traditions - page 27 "