

**A REVIEW OF CONTRACEPTIVE METHODS: AN OVERVIEW OF MODERN
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INTRODUCTION

In the present era, family planning has become an important aspect of individual well-being and national development. The need to regulate family size has increased owing to the rising cost of living, limited availability of housing, the growing demand for quality education, and the desire to provide children with better opportunities and an improved standard of living. At the national level, population stabilization is essential for ensuring the adequate distribution of resources, including food, shelter, healthcare, and educational facilities, as well as for the effective implementation of developmental programmes.

One of the principal approaches to regulating population growth is the prevention of unintended pregnancies through effective contraceptive measures. Contraception plays a significant role in controlling fertility and enabling individuals and couples to make informed reproductive choices. Contraceptive methods are broadly classified into temporary and permanent methods. Temporary methods are employed to postpone pregnancy or maintain an appropriate interval between successive pregnancies, whereas permanent methods are intended for individuals or couples who have decided not to have any further children.

Various temporary contraceptive methods are available, including natural or fertility-awareness-based methods, barrier methods, intrauterine contraceptive devices, hormonal preparations, and emergency contraception. Hormonal contraceptives are widely used because of their effectiveness when employed correctly and consistently. However, they may be associated with adverse effects such as nausea, headache, menstrual irregularities, and changes in body weight. Certain estrogen-containing contraceptives may also increase the

risk of venous thromboembolism, while the relationship between hormonal contraception and specific cancers varies according to the contraceptive formulation and individual risk factors. Therefore, the selection of a contraceptive method should be based on its efficacy, safety profile, affordability, accessibility, reversibility, and suitability for the individual.

Consequently, there is a continuing need to promote contraceptive options that are safe, effective, affordable, readily available, and acceptable to individuals and couples. Appropriate contraceptive counselling is essential to facilitate informed decision-making and ensure the selection of a method that meets individual reproductive needs.

Ayurveda, the traditional system of Indian medicine, has its historical roots in the Vedic literature. Although the term *Ayurveda* may not occur uniformly in all early Vedic texts, references concerning longevity, disease prevention, health promotion, and the treatment of ailments can be identified in ancient Indian literature. These references provide a historical context for

understanding the evolution of medical knowledge in the Indian tradition.

Certain interpretations of Vedic literature describe practices intended to influence male and female fertility. Descriptions involving the impairment of male reproductive capacity and the prevention of conception in women have been interpreted by some authors as possible early references to fertility regulation. However, such descriptions require careful textual and historical examination before they can be equated with modern contraceptive procedures such as vasectomy or the insertion of intrauterine contraceptive devices.

The present review provides an overview of contraception, its indications, and the major methods employed in contemporary reproductive healthcare, while also considering historical references associated with fertility regulation in Ayurvedic and Vedic literature.

REVIEW OF LITERATURE

CONTRACEPTION

Definition

Contraception refers to the deliberate prevention of pregnancy through methods that interfere with fertilization, the reproductive process, or the establishment of pregnancy. It encompasses a range of temporary and permanent methods that enable individuals and couples to plan the timing and number of children.

An ideal contraceptive method should be highly effective, safe, affordable, readily accessible, convenient to use, reversible when desired, and acceptable to the user. It should also have minimal adverse effects and should not interfere unnecessarily with sexual well-being. However, no single contraceptive method is universally suitable for every individual. The choice of method depends on personal preference, reproductive intentions, medical eligibility, accessibility, and other individual circumstances.

Temporary contraception comprises reversible methods used to delay pregnancy or maintain an appropriate interval between pregnancies. Permanent contraception, on the other hand, is intended to provide long-term, irreversible fertility control.

INDICATIONS FOR CONTRACEPTION

1. Population Stabilization

Advances in medical science, improvements in public health, and increased life expectancy have contributed to changes in population patterns. Rapid population growth may place considerable pressure on food supplies, housing, healthcare, education, and other essential resources. Family planning and access to effective contraception are therefore important components of reproductive healthcare and population stabilization strategies.

2. Early Marriage and Delayed Childbearing

Young couples may require contraception to postpone pregnancy until they are physically, psychologically, socially, and economically prepared to assume parental responsibilities. Preventing unintended pregnancies during adolescence and early adulthood is particularly important for protecting maternal health and supporting educational and personal development.

3. Birth Spacing

Appropriate intervals between pregnancies are important for maternal and child health. Closely spaced pregnancies may be associated with adverse maternal and neonatal outcomes and may limit the mother's opportunity to recover nutritionally and physically after childbirth. Effective temporary contraception enables couples to plan pregnancies and provide adequate attention, care, and resources to each child.

4. Other Indications

Contraception may also be indicated in the following circumstances:

- A history of obstetric complications requiring careful planning of subsequent pregnancies.
- Chronic systemic diseases in which pregnancy may pose additional health risks.
- Temporary illness or other medical circumstances warranting the postponement of pregnancy.
- The need for emergency contraception following unprotected sexual intercourse or contraceptive failure.
- The desire to limit family size or avoid future pregnancies.
- The need to coordinate pregnancy with medical treatment or recovery from illness.

VARIOUS METHODS OF CONTRACEPTION

Contraceptive methods can be classified into natural or fertility-awareness-based methods, barrier methods, intrauterine contraceptive devices, hormonal methods, emergency contraception, and permanent sterilization.

1. Rhythm Method or Calendar Method

The rhythm method, also known as the calendar method, is a fertility-awareness-based approach in which the fertile phase of the menstrual cycle is estimated from the duration of previous menstrual cycles. The couple avoids unprotected sexual intercourse during the estimated fertile period or uses an appropriate contraceptive method during that time.

In the traditional calendar calculation, the first day of menstrual bleeding is considered Day 1. The first potentially fertile day is estimated by subtracting 18 days from the length of the shortest menstrual cycle recorded, while the last potentially fertile day is estimated by subtracting 11 days from the length of the longest cycle recorded over a sufficient observation period.

For example, the Standard Days Method is designed for women whose menstrual cycles generally range from 26 to 32 days. Under this method, Days 8 through 19 are considered potentially fertile. This should not be confused with the traditional calendar calculation, which uses different rules.

Advantages

- Does not require medication or medical devices.
- Has no direct pharmacological adverse effects.
- Encourages awareness of menstrual cycles and reproductive physiology.

Limitations

- Requires careful monitoring and consistent adherence.
- May be less reliable when menstrual cycles are irregular or vary substantially.
- Does not protect against sexually transmitted infections.
- Its effectiveness depends on the correct identification of fertile days and appropriate avoidance of unprotected intercourse during that period.

2. Cervical Mucus Method (Billings Ovulation Method)

The cervical mucus method, commonly known as the Billings Ovulation Method, is based on observing changes in the consistency and appearance of cervical mucus during the menstrual cycle. These changes occur in response to fluctuations in ovarian hormones, particularly estrogen and progesterone.

During the pre-ovulatory phase, rising estrogen levels generally cause cervical mucus to become clearer, wetter, more slippery, and more stretchable. These characteristics are associated with increased fertility. After ovulation, the mucus usually becomes thicker and less abundant under the influence of progesterone.

The individual observes and records these changes to identify potentially fertile days. Unprotected intercourse is avoided during the identified fertile phase, or an alternative contraceptive method is used. The precise rules for identifying the beginning and end of the fertile period should be followed according to the chosen method.

Advantages

- Does not require hormonal medication or an invasive procedure.
- Promotes awareness of reproductive physiology.
- Can be used by individuals who prefer non-pharmacological approaches.

Limitations

- Requires training, observation, and consistent record-keeping.

- Cervical secretions may be affected by infections, medications, and other factors.
- Does not provide protection against sexually transmitted infections.

3. Basal Body Temperature Method

Basal body temperature (BBT) is the body's resting temperature measured immediately after waking, before getting out of bed or engaging in physical activity. It is generally recorded at approximately the same time each morning using an appropriate thermometer.

Following ovulation, progesterone produces a slight rise in basal body temperature, commonly around 0.2–0.5°C, which may persist until the next menstrual period. By recording daily temperature readings, an individual may identify a pattern consistent with ovulation.

Because the temperature rise generally occurs after ovulation, BBT monitoring alone is limited in its ability to predict the beginning of the fertile period. It is therefore often combined with other fertility-awareness indicators.

Limitations

- Temperature readings may be influenced by fever, disturbed sleep, alcohol consumption, shift work, and changes in measurement time.
- Ovulation is identified retrospectively rather than reliably predicted in advance.
- Correct interpretation requires consistent monitoring and knowledge of the method.

4. Symptothermal Method

The symptothermal method combines several fertility indicators to identify the fertile and infertile phases of the menstrual cycle. These indicators may include basal body temperature, cervical mucus changes, menstrual cycle records, and other symptoms associated with ovulation, such as mid-cycle pelvic discomfort or breast tenderness.

By combining multiple observations, this method may improve the identification of the fertile period compared with relying on a single indicator. However, its effectiveness depends on appropriate instruction, consistent monitoring, and adherence to the specific rules of the chosen method.

Advantages

- Does not require hormonal medication.
- Encourages greater awareness of reproductive health.
- May be suitable for individuals who prefer fertility-awareness-based contraception.

Limitations

- Requires regular observation, record-keeping, and adherence.

- May be difficult to use during irregular cycles or when physiological changes interfere with fertility indicators.
- Does not protect against sexually transmitted infections.

5. Barrier Methods

Barrier contraceptives prevent sperm from reaching the ovum by creating a physical barrier or by combining a barrier with a chemical agent that impairs sperm function. These methods have been used in various forms throughout history, although the materials and techniques employed in earlier periods differ considerably from contemporary contraceptive products.

Barrier methods remain important because they are generally used at the time of sexual intercourse, do not usually involve systemic hormonal exposure, and may be suitable for individuals who prefer non-hormonal contraception. Male and female condoms also provide protection against many sexually transmitted infections when used correctly and consistently.

Classification of Barrier Methods

A. Mechanical Methods

- Male condom.
- Female condom.
- Vaginal diaphragm.
- Cervical cap.

B. Chemical Methods

- Spermicidal creams.
- Spermicidal gels and jellies.
- Spermicidal foams.
- Vaginal spermicidal tablets or suppositories.

C. Combined Methods

These involve the use of a physical barrier together with a spermicide, where appropriate. For example, diaphragms and cervical caps may be used with a compatible spermicide according to product instructions.

Different Types of Barrier Methods

1. Male Condoms

Male condoms are thin sheaths, commonly made from latex or other suitable materials, that are worn over the erect penis before sexual contact. They collect semen and prevent sperm from entering the female reproductive tract. When used correctly and consistently, condoms help prevent pregnancy and reduce the risk of many sexually transmitted infections.

2. Female Condoms

Female condoms are barrier devices placed inside the vagina before sexual intercourse. They provide a physical barrier that prevents semen from entering the reproductive tract. Correct insertion and use are important for their effectiveness.

3. Occlusive Caps

Diaphragms and cervical caps are devices placed inside the vagina to cover the cervix and restrict sperm entry into the uterus. Some types require the use of spermicide. Their suitability and effectiveness depend on correct placement, product design, and adherence to instructions.

4. Vaginal Sponge

The contraceptive sponge is a device inserted into the vagina before intercourse. It acts as a physical barrier over the cervix and contains spermicide in formulations where this is part of the product design. Availability and recommendations vary by country.

5. Spermicides

Spermicides are chemical preparations intended to impair or immobilize sperm. They are available in different formulations, including gels, creams, foams, and suppositories. When used alone, they are generally less effective at preventing pregnancy than many other modern contraceptive methods.

6. Intrauterine Contraceptive Devices (IUCDs)

Intrauterine contraceptive devices are small devices inserted into the uterine cavity by a trained healthcare professional to prevent pregnancy. They are among the most effective reversible contraceptive methods and may provide protection for several years, depending on the type of device.

IUCDs are broadly classified into copper-containing devices and hormone-releasing devices. Older inert devices were also developed historically but are no longer the preferred standard in contemporary contraceptive practice.

Types of IUCDs

A. Inert or Non-Medicated IUCDs

Historical examples include:

- Lippes Loop.
- Saf-T-Coil.
- Ota Ring.
- Mahua Ring.

These devices are of historical importance and should not be regarded as equivalent to currently recommended contraceptive devices.

B. Copper-Bearing IUCDs

Examples include:

- Copper-7.
- CuT 200.
- Multiload Cu-250.
- Multiload Cu-375.
- CuT 380A.

The availability of particular models varies by country and healthcare system.

C. Hormone-Releasing Intrauterine Devices

Examples include:

- Progestasert, a historical progesterone-releasing device.
- Levonorgestrel-releasing intrauterine systems.

Mechanism of Action

A. Inert IUCDs

Older inert devices produce a local foreign-body response within the uterine cavity that interferes with reproductive processes. These devices have largely been superseded by more effective modern contraceptive options.

B. Copper-Bearing IUCDs

Copper-bearing IUCDs release copper ions that impair sperm motility, viability, and fertilizing capacity. They produce local biochemical and cellular changes within the reproductive tract that prevent fertilization. Their contraceptive action does not primarily depend on preventing implantation.

C. Progesterone-Releasing IUCDs

Older progesterone-releasing devices exert local effects on the endometrium and cervical mucus. Their action differs from that of contemporary levonorgestrel-releasing intrauterine systems.

D. Levonorgestrel-Releasing Intrauterine Systems

Levonorgestrel-releasing systems thicken cervical mucus, thereby restricting sperm penetration, and alter the endometrium. Their principal contraceptive effects include preventing sperm passage and impairing fertilization. Ovulation may continue in many users, particularly with lower-dose systems; therefore, inhibition of ovulation should not be described as their sole or universal mechanism of action.

7. Oral Hormonal Contraception

Oral hormonal contraceptives are medicines containing synthetic hormones that prevent pregnancy by interfering with ovulation, cervical mucus, or other reproductive processes. They are broadly classified into combined oral contraceptive pills and progestogen-only pills.

Combined oral contraceptive pills were introduced into clinical practice during the 1960s and have since become an established method of reversible contraception.

Types of Oral Contraceptive Pills

A. Combined Oral Contraceptive Pills

Combined oral contraceptives contain an estrogen and a progestogen. Their primary mechanism is the suppression of ovulation. They also produce changes in cervical mucus and the endometrium.

Combined pills may be classified according to the hormonal composition of the tablets:

1. **Monophasic pills:** Each active tablet contains a consistent dose of estrogen and progestogen.

2. **Multiphasic pills:** The hormonal composition varies across the active tablets during the cycle. Multiphasic preparations include biphasic and triphasic formulations.

B. Progestogen-Only Pills (POPs or Mini-Pills)

Progestogen-only pills contain a progestogen without estrogen. They may be suitable for individuals for whom estrogen-containing contraception is not appropriate, subject to medical eligibility and the characteristics of the particular formulation.

Examples of progestogens used in oral contraceptive preparations include:

1. Desogestrel.
2. Levonorgestrel.
3. Norgestrel.
4. Norethisterone.
5. Lynestrenol.
6. Ethynodiol diacetate.

The availability and use of these compounds differ across countries. The mechanism of action and timing requirements also vary by formulation.

8. Non-Oral Hormonal Contraceptives

Non-oral hormonal contraceptives provide pregnancy prevention without requiring daily oral administration. Depending on the formulation, they may be administered by injection, implanted beneath the skin, applied as a patch, or delivered through a vaginal ring.

A. Injectable Contraceptives

Injectable contraceptives are broadly classified into progestogen-only injectables and combined injectable contraceptives.

1. Progestogen-Only Injectable Contraceptives

These preparations contain a progestogen that suppresses ovulation and produces changes in cervical mucus.

Examples include:

- **Depot medroxyprogesterone acetate (DMPA):** A commonly used formulation is administered at a dose of 150 mg by intramuscular injection approximately every 12–13 weeks, according to the applicable product guidance.
- **Norethisterone enanthate:** A formulation commonly administered at a dose of 200 mg by intramuscular injection approximately every eight weeks, according to the product instructions. The exact schedule, eligibility criteria, and recommendations for late injections should be confirmed with current clinical guidelines and the relevant product information.

2. Combined Injectable Contraceptives

Combined injectable contraceptives contain both an estrogen and a progestogen. They suppress ovulation and produce changes in cervical mucus. The specific formulation determines the administration interval and eligibility criteria.

B. Other Non-Oral Hormonal Methods

Other contemporary hormonal contraceptive options include:

- Subdermal contraceptive implants.
- Combined hormonal vaginal rings.
- Combined hormonal transdermal patches.

These methods provide reversible contraception and may be selected according to individual preferences, medical eligibility, and availability.

CONCLUSION

Contraception is an essential component of reproductive healthcare, enabling individuals and couples to plan pregnancies, maintain appropriate birth intervals, and make informed decisions regarding family size. A broad range of contraceptive methods is available, including fertility-awareness-based approaches, barrier methods, intrauterine devices, oral hormonal preparations, injectable contraceptives, implants, and permanent sterilization.

Each method has specific advantages, limitations, and eligibility considerations. Therefore, contraceptive selection should be individualized through appropriate counselling, with due consideration given to effectiveness, safety, affordability, accessibility, reversibility, and personal preference.

Historical descriptions of fertility regulation in Vedic and Ayurvedic literature are of interest from the perspective of medical history. Nevertheless, interpretations connecting these descriptions with modern contraceptive procedures require careful textual verification and should not be presented as established equivalences without adequate evidence.

Contemporary contraceptive practice should prioritize scientifically validated methods, informed consent, reproductive autonomy, and access to reliable healthcare information. Further historical and textual research may help clarify the relationship between traditional Indian medical literature and the development of concepts concerning fertility regulation.

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