Contraceptive Technology

* Dr. Kokila Vaidya

In Nepal, there has been tremendous effort in curtailing fertility and an increasing number of births. This phenomena is occurring inspite of efforts currently implemented to control fertility and increased hirths. Perhaps fertility patterns and increases in births may be due to inadequate utilization of contraceptives available. However, available contraceptive methods have proven to be quite effective if utilized as per instructions of medical personnel.

Research in contraceptive use by highly qualified scholars have concluded that available contraceptives may be highly effective and relatively safe if utilized properly. However, there may be relatively minor side effects when using certain contraceptives, such as the pill and IUDs. These side effects are more of a minor nature rather than a life threatening nature. It appears that many clients who have shown a preference for the pill and IUDS are enthusiastic about their use during the first few months. However, the discontinuation of utilizing these contraceptives is extremely high following a few months. There is no immediate answer to why there is such a large dropout rate, however, it is assumed that with the heavy burden Nepalese women must follow, there is less time and often forgetfulness in following essential instructions.

Male and female sterilization procedures have proven to be safe and effective and may be used for couples who have succeeded in having two healthy babies survive beyond the age of five years. These sterilization procedures performed on both males and females are increasing annually in Nepal. There is also an increase in non-medical contraceptive practices such as condoms, spermicides, diaphragms. These non-medical contraceptives are practically free from side effects, however, getting the target population to utilize these methods require extra time in terms of constant motivation, medical conselling, explicit instructions and a need to assure clients that there will be regular access to supplies.

* Deputy Chief FP/MCH Project His Majesty's Government of Nepal, Ministry of Health.

Therefore in countries where populations are expected to double in 25-30 years, there is a great need to make available simple, safe, effective and convenient contraceptives which will assure a high continuations rate. The fact related to contraceptives use is that no contraceptive with a 100 per cent effectiveness is available. However, those methods cited above as relatively safe and convenient should continue to be utilized along with other types of contraceptives that have proven to be safe with minor side effects.

With this brief introduction, the author would like to discuss various types of contraceptives available in Nepal and in other countries.

Injectable contraceptives:

An injectable contraceptive known as Depo-provera (depo-Medroxy Progesterone Acetate, DMPA) was introduced in Nepal during the fiscal year, 1973-74 for trial experiments in the Gokarna FP/MCH Clinic. Following several years of experimentation, Depo-provera was made available in various parts of Nepal since it appeared to be suitable and acceptable to Nepalese women.

The standard dosage of Depo-provera is an injection of 150 mg. in 1 ml. with a No. 22 or 23 needle in the arm or hip muscle every 12 weeks. The area to be injected should not be massaged. The dosage is the same amount for all clients regardless of weight or height, and produces pronounced progestational action for a long period. The most appropriate time for administering Depo-provera is following a delivery, a miscarriage or from day one to day nine in the menstrual cycle. For most women, there is a safety period for about three weeks prior to the next scheduled injection. Therefore, if for any reason, a woman is unable to meet a scheduled clinic appointment for her next injection, she may still be protected from an unwanted pregnancy for the stated period above.

Functions of Depo-provera:

Depo-provera prevents pregnancy by inhibiting secretion of Gonadotrophic Hormone, (especially Leutinising Hormone), thus inhibiting pregnancy. Depo-provera also alters the normal functions of the cervical mucus by increasing the viscosity of it, thereby forming a natural barrier to passage of spermetazoa. The altered secretory changes of the endometrium provides an unsuitable environment for fertility.

Client selection criteria:

1. Women not desiring to be pregnant for three years.
2. Women suffering from severe side effects of other types of family planning methods.
3. Lactating women since Depo-provera appears not to decrease quantity or quality of breast milk.
4. Women who have at least one healthy child.

Depo-provera is not administered to women suffering from breast cancer or other types of cancer, liver disorders, hypertension, diabetes and blood abnormalities. Drawbacks to the use of Depo-provera are amenorrhea, spotting, irregular periods, and in certain instances heavy bleeding.

Depo-provera is also used as non contraceptive in instances of threatened and habitual miscarriages, treatment of a painful female pelvic condition commonly known as "Endometriosis", treatment in cases of males with abnormal sexual drives and finally has shown much promise in bringing relief and prolongation of life in persons suffering from a blood diseases known as Sickle-cell Anaemia. Depo-provera has also proven to be effective in the palliative treatment of cancer of the upper part of the uterus. Scientific studies indicate that Depo-provera represents safe, reliable and acceptable form of contraception. Another importance of Depo-provera is the fact that it is simple to administer and convenient with long lasting, highly effective results. Also, this injectable contraceptive is most suitable for women who cannot tolerate side effects of other forms of contraceptives.

Many problems associated with oral contraceptives are eliminated with the use of Depo-provera. Studies in Thailand, Egypt and Bangladesh indicate that Depo-provera enhances the quantity of a mother's milk, also, there is a high continuation of 90.4 percent following two years of studies and follow-ups. Following discontinuation of the use of Depo-provera, fertility returns between 3-6 months. These findings suggests that if side effects menstrual irregularities are minimized with proper medical care and follow-up, Depo-provera will have a tremendous impact on fertility control programs.

Natural family planning:

Natural family planning affords an alternative to other temporary family planning methods which cannot be tolerated by some women. This method assists a woman in identi-

ifying her fertile period through careful observations of changes within her body which occur during the time of ovulation. Fertile women normally have a mucus discharge that can be seen and felt. This mucus discharge changes characteristics during various periods of the menstrual cycle. Wet sensations along with the type of discharge indicate to a woman the period of ovulation. There are two main types of mucus discharges; one being thin, colourless, clear or cloudy, slippery and starchy leaving a feeling of wetness. This type of mucus discharge indicates that a woman is fertile and ovulation is in progress. Another type of mucus discharge is a thick, white or yellow sticky, non-scratchy, rubbery and without the feeling of wetness or lubrication. This type of discharge indicates that the woman is not fertile and ovulation is not in progress. While fertile mucus discharge is present two days and two nights following noticeable symptoms, a couple should take precautions to avoid pregnancy.

The effectiveness of the natural family planning method depends upon two main factors; motivation of the couple and quality of teaching given to a couple. Natural Family planning may be as high as 98 percent effective, provided a couple has fully understood the technique and has accepted this method as the form of family planning to be practiced. Another important advantage of this method is that it is entirely harmless, uses no chemicals or hormones and no surgery or other devices is required. Therefore, natural family planning is an excellent method for spacing deliveries. This method has been in use in Charikot and Makgibari Panchayat for several years showing many promising results.

Fertility control for the future

Many new drugs and family planning devices, some of them being studied for several decades may soon be available for widespread consumer use. The safety and effectiveness of these fertility control methods have been laboratory tested with animals, with a few tested with human subjects in controlled situations. Perhaps, none of these methods may be classified as perfect contraceptives, but instead should be considered as additions or improvements to currently available methods. However, each new method will broaden the range of choices available to couples seeking to limit the number of children they can afford to have.

IMPLANTS

NORPLANT is the registered trade mark of the population council for contraceptive subdermal implants.

NORPLANT is a long acting hormonal contraceptive method designed for women. The active substance is the Progestine Levonorgestrel which consist of six small silastic capsules made of silastic-silicone rubber tubing filled with Levonorgestrel. Each end is closed and implanted subdermally in the arm by a minor surgical technique. Once implanted, the capsules begin to release a steady, but low dosage of Levonorgestrel into the blood stream giving stable concentrations of Levonorgestrel in the plasma. Average concentration tends to be 0.30 nanograms per millilitre. The level sufficient to prevent conception is usually reached within 24 hours following insertion of the implants which are maintained for five years with a safety margin of up to two years.

Levonorgestrel may be released from NORPLANTS by diffusion through the wall of the silastic tubing and may be flushed away from the outer surface of the capsules at a continuous rate. The release rate is determined by the total surface area of the capsules, and by the thickness of the capsule wall.

The contraceptive action is based on three major mechanisms; ovulation inhibition in approximately 50 per cent of the cycles, thickening of the cervical mucus, and suppression of the endometrium. During the first few months after insertion, some women may experience minor disturbances of the menstrual cycle with symptoms of irregular bleeding or spotting. Amount of blood lost monthly, however, generally does not increase and there is minimal risk of anemia.

The NORPLANT is most suitable for women of reproductive ages, and is particularly recommended for:

- Women who desire long-acting contraceptive protection for at least 3-5 years
- Woman who desire spacing of births
- Women contemplating sterilization but are unable to make a final and firm decision
- Immediate post-abortion use
- Women who are not ideal candidates for IUD'S, oral contraceptives and injectables
- Women for whom IUD'S are not recommended, who are unable to take the pill, and women over 35 years of age, for whom estrogens are not recommended

The contraceptive effectiveness of the method is comparable to certain sterilization procedures. During the five-year period of use, this method requires a minimum of attention.

Minor surgery similar to that used in the insertion is required for removal of the capsules. Following removal a woman's normal fertility returns without delay. If continuing contraceptive protection is required, a new set of NORPLANTS may be inserted. The effectiveness of this method is dependent upon following certain guidelines:

- careful insertion technique
- proper counselling for the client
- careful removal techniques

Paper pill

The paper pill contains a combination of oestrogens and progesterens implanted in rice paper and developed in the form of a tiny book. One page of the book is ingested each day in an attempt to avoid conception. This technique was developed in China several years ago, however, due to difficulties in mass manufacturing the paper pill has not been put into world wide use.

Female sterilization without surgery

This procedure has been of particular interest in Chinese Family Planning Programs. It involves an injection into the fallopian tubes of a chemical solution consisting of phenol, Aterbrin, and Biligrafin. Once the solution is injected, it has the effect of sealing off the fallopian tubes to prevent entry of ovum. Therefore, fertilisation cannot take place and the Chinese have estimated a 94 per cent success rate in 2000 procedures performed in two Shanghai hospitals.

Male contraceptive pill

The origin of male contraceptive pills known as Gossypol became known in the 1970's from research conducted in the Hunan province in China. Gossypol is a derivative from the cotton plant. Research has indicated that Gossypol may, following more years of study, be used as a safe, effective and economical contraceptive for men.

Vaginal rings

A silastic, vaginal ring with progestin and natural estrogen has been designed to be inserted by the woman herself. It may be removed after weeks to allow a menstrual period or it may be left in place until the menstrual cycle begins spontaneously. The vaginal ring

appears to be safe and as effective as oral contraceptives, while avoiding a need for taking a pill daily. Also the vaginal ring eliminates side effects some users may experience with the pill. Drugs applied to the vaginal ring are absorbed through the vaginal wall, by passing the digestive system and liver, therefore, allowing for lower dosage exposure.

Nasal sprays

Presently, there are two types of nasal sprays available which appear to have promising results in fertility control programs. One is LHRH, which prevents female ovulation and male sperm production by over-stimulating pituitary glands, interfering with Luteinizing Hormone production. This nasal spray is currently being tested in Sweden. Pituitary Hormone replacement studies have been conducted in Sweden for approximately six years. The nasal spray developed for women would be administered five to ten days early in the menstrual cycle. Another type of nasal spray, composed of progesterone and norethisterone, (the same type of steroids used in oral contraceptives), has been tested on laboratory monkeys in India with strong recommendations for human trials. This nasal spray avoids initial passage of drugs through the liver, therefore, eliminating side effects caused by the use of other contraceptives.

Vaccinations against pregnancy

Several immunological approaches for men and women are being investigated in animal and human experiments. These vaccinations would, theoretically provide long term contraceptive protection by preventing sperm transport, fertilization, blastocyst development and/or implantation. The most advanced research, thus far, involves immunizations with synthetic peptide fragments of Human Chorionic Gonadotrophin, (HCG), a hormone produced during the early stages of pregnancy. Immunizations with HCG assists in blocking a pregnancy. In theory (though not seemingly in practice) each successive pregnancy would act as a booster dosage to maintain high antibody levels. In early human experimentation of HCG immunizations, a series of vaccination were needed because the immunological effects were inconsistent and wore off quickly. Efforts continue to synthesize a vaccine which would last ten years or longer, however, experts estimate that it may be many years before a safe and effective vaccine with long lasting effects will be available for general use.

The author of this brief presentation has attempted to provide information on new techniques either already developed for family planning programs or to present new known techniques currently being developed.