Journal of Community & Public Health Nursing

Editorial Open Access

Recent Advancement in Contraceptive Technology

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Introduction

Contraception means preventing the union of the sperm and ovum; suppressing ovulation; or interfering with the implantation of fertilized ovum in the uterus.

The term contraception includes all measures temporary or permanent, designed to prevent pregnancy due to the coital act.

Ideal contraceptive should fulfill the following criteria.

- Widely acceptable
- Inexpensive
- Simple to use
- Safe
- Highly effective
- Requiring minimal motivation, maintenance &supervision.

The last few years have witnessed a contraceptive revolution; i.e. man is trying to interfere with the ovulation cycle.

The failure rate of any contraceptive is calculated in terms of pregnancy rate per hundred women years (H.W.Y)o use. It is calculated according to formula (pearl index).

$$\text{Pregnancy failure rate/H.W.Y} = \frac{\text{No. of accidental pregnancies} \times 1200}{\text{No. of patients observed months' of use}}$$

Where 1200=no. of months in 100 years.

The present approach in family planning programme is to provide a cafeteria choice" that is to offer all methods from which an individual can choose according to his needs and wishes and to promote family planning as a way of life [1].

The contraceptive prevalence rate for modern methods of contraception in India is 42.8% (48%for all methods), with female sterilization 'accounting for 34.2%, pill use for 2.1%, IUD use for 1.6% and condom use for 3.1%[2]. Male sterilization accounts for 1.9%. China has a modem contraceptive user ate of 83.3% with IUD use accounting for 36.4%and female sterilization for 33.5%. Despite the rise in use of family planning as evidenced in surveys, One-fourth of births worldwide are unplanned. Over the past 30 years, there have been significant advances in the development of new contraceptive technologies, including transition from high dose to low dose combined oral contraceptives and from inert to copper and levonorgestrel releasing intrauterine devices (IUDs). In addition, combined injectable contraceptives, a combined hormonal patch and ring and progestogen-only injectable and implants have been introduced in the last four years [3].

This review will focus on the non-daily hormonal contraceptives introduced in the last few years. Along with new evidence-based recommendations on other commonly used methods of contraception.

Sino- implant II

A contraceptive implant manufactured by Shanhai Dahua Pharmaceuticals in china. According to Ruth Merkatz of population council, the sino- implant is available at more than 60% less than the price of the other implants available on the market. It is registered in china, Indonesia, serriaand Kenya. More than 7 million implants have been distributed, and 11published clinical trials show that this new device is safe and effective. The device will probably cost about $6 to $7. It is not currently seeking U.S approval but is undergoing the approval process in several other markets [4].

SILCS diaphragm

A one size, easy to use, over the counter diaphragm produced by GHC member PATH. This new product eliminates the need for a fitting exam, and women can comfortably insert the device themselves at home with the assistance of written instructions. An effectiveness and safety study of new diaphragm began in 2008 and is near completion in six sites across United States. Evidence collected suggests that the majority of women can insert this device safely and position it correctly, suggesting that it will meet the criteria for OTC marketing [5].

NES/EE contraceptive vaginal ring (CVR)

A user-controlled CVR produced by the population council. Unlike other CVRs that can only be used for a month. This new CVR can be used for upto 13 cycles or one year, reducing costs and increasing user convenience. The NES/EE CVR is currently undergoing phase III clinical trials to determine if it is safe and effective, and to assess cycle control, return to fertility and side effects. Preliminary findings suggest this new device is highly effective in preventing pregnancy and has a safety profile that is similar to other contraceptives. Population council aims for this contraceptive to hit markets in 2011 [6].

Depo-subQ Provera 104 in the uniject Device

A technology that packages a familier injectable contraceptive into a one- use, prefilled injection system. The uniject device is a single prefilled delivery service with subcutaneous needle." It is basically like a pre-filled syringe that is only good for one use. The proper amount of Depo- subQ Provera 104(similar to currently used Depo but reformatted to fit the new device) is already loaded into the uniject device, and can be injected under the skin rather than the muscle. This new contraceptive technology will help to reduce waste (packaging) and improve safety (one- use needle), and is easier to deliver by nature of the pre-loaded uniject device [7].

Many of these new contraceptive devices are most cost efficient

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Received: 2-May-2022, Manuscript No: JCPHN-22-61734, **Editor assigned:** 5-May-2022, PreQC No: JCPHN-22-61734(PQ), **Reviewed:** 11-May-2022, QC No: JCPHN-22-61734, **Revised:** 17-May-2022, Manuscript No: JCPHN-22-61734(R) **Published:** 25-May-2022, DOI: 10.4172/ 2471-9846.1000343

Citation: Habeeb S (2022) Recent Advancement in Contraceptive Technology. J Comm Pub Health Nursing, 8: 343.

and easier to use than the other devices on the market. The SILCS diaphragm and the CVR are both user- controlled contraceptives that can be easily inserted by women and can be used again and again for many months. In addition many of these new contraceptives could be easily distributed or delivered by community health workers.

The new packaging of Depo e.g. makes it feasible for a community health worker to administer it directly. More information is needed on the removal of the implant, as some women may not come back at the appropriate time after insertion. In addition, the instructions to use the diaphragm are only written in English, which might be problematic for non- English speakers or illiterate populations.

Collectively these new contraceptives represent a promising new variety of methods, both short- term to long – lasting, to help meet the needs of women during different stages of their reproductive lifespan [8-10].

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