

PREVENTION AND MANAGEMENT OF INFERTILITY IN PRIMARY HEALTHCARE SETTINGS

AN INFORMATION BOOKLET
FOR POLICY PLANNERS, PROGRAM MANAGERS

AND

SERVICE PROVIDERS
IN
HEALTHCARE SYSTEMS



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PREFACE

Reproduction is one of the most important biological functions for all life forms. For most couples, having children is a somewhat primal need and inability to reproduce can be devastating to individuals and couples.

There are certain myths about infertility. One of them is that infertility is not a problem in countries with high fertility rates. Paradoxically, countries with high fertility rates also have high prevalence of infertility. Another myth is the common belief that infertility is a woman's problem. However, research evidence indicates that the best results for infertility treatment are obtained when both partners are investigated together. Another myth is the belief that infertility is neither preventable nor treatable.

Infertility is a major reproductive health concern. It affects an estimated 50 to 80 million couples globally. In many pro-natalistic cultures, the consequences of infertility can be devastating, especially for women.

There has been a paradigm shift in

population programs after the Cairo Conference, the focus shifting to meeting reproductive health needs of all individuals by providing quality reproductive health care services. Considering the magnitude and the social consequences of infertility, it is time that population and health programs in India include cost-effective interventions for prevention and appropriate management of infertility. Furthermore, the range of interventions at different service delivery levels should be chosen on an incremental basis.

We hope that this booklet will serve as an important resource for those engaged in designing and implementing reproductive health programs in primary health care settings and for those keen on piloting innovations to expand the package of quality Reproductive and Child Health (RCH) services. The social stigma of infertility is often gender biased and impacts heavily on women, who invariably bear blame for it. The prevention of infertility is far more cost-effective than treatment. In

resource-poor settings, simple evidence-based prevention interventions would easily make a difference. Similarly, a planned approach for evaluation and management of infertile couples can offer relatively easy and inexpensive solutions.

This booklet is an attempt to facilitate appropriate interventions by program managers and service providers in their initiatives to address the problem of infertility with special reference to primary health care settings. Obviously, there cannot be any uniform blueprint for all settings, as socio-cultural diversities and maturity of programs, among other factors, need to be taken into account while formulating strategic interventions. Emphasis on prevention

of infertility will entail drawing synergy with extant reproductive health interventions.

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Francois M. Farah
UNFPA Representative

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INTRODUCTION

Family Planning Programs have traditionally been understood to provide services to help couples to achieve the desired family size. Programs often emphasize that assisting couples to have children is as much part of family planning as providing means to prevent pregnancy. However, in reality, these programs have largely devoted their resources and singularly pursued problems of excess fertility rather than sub-fertility.

According to estimates, between 8 percent and 12 percent of couples around the world have difficulty in conceiving a child at some point in their lives. In some parts of the world, especially in Sub-Saharan Africa, one-third or more couples face the problem of infertility. In such places, where infertility is widespread, couples seeking medical help can place a heavy burden on limited healthcare resources (Sciarra 1994)¹.

Childlessness has become an increasingly important public health concern. However, it is only after the 1994 International Conference on

Population and Development (ICPD), held in Cairo, that the problem is finding space in discourses related to reproductive health programs. The Program of Action endorsed during the Cairo ICPD² conference includes provision of services for “prevention and appropriate treatment of infertility” in the reproductive healthcare package of services.

Reproductive health programs are being expanded to address health problems of non-pregnant women i.e., prevention and management of sexually transmitted infections (STIs) or reproductive tract infections (RTIs). In that context, programs and services addressing infertility should be seen as a move towards an integrated approach for helping couples in achieving their reproductive aspirations.

In the Indian context, procreation is considered the most vital and sacred function in the institution of marriage. Though infertility is a problem involving both men and women, failure in procreation invariably makes women more vulnerable to neglect /

desertions and even violence. Similarly, men also face pressures to marry other women or engage in risky behavior such as multiple sex partners in quest of fatherhood.

The problem of infertility also deserves attention in light of the wider recognition to reproductive rights. It is significant that expressions like “Voluntary Childlessness” and DINK (double income no kids) are now popular terms to describe couples. Increasingly, policy instruments are being formulated to give impetus to realization of reproductive rights.

The purpose and scope of this information booklet is to orient policy and program managers, service providers, NGOs and other stakeholders regarding key issues on distribution and determinants of infertility. It also aims to facilitate design and operationalization of appropriate and feasible interventions for prevention and management of infertility in primary healthcare settings.

Considering the magnitude of the problem and its consequences, such

programmatic interventions are likely to be more responsive to the needs of clients these are intended to serve.

How do we define infertility?

There is no consensus on the definition of infertility, the same term variously defined by clinicians, epidemiologists, demographers and researchers. However, distinction should be made between sterility and infertility. Sterility is an absolute condition of total inability to reproduce, whereas infertility is a relative condition in which there is involuntary reduction in the ability to reproduce.

A socially determined expression, “childlessness” results either from primary / secondary infertility, or infant or child mortality in the lives of married couples.

The WHO task force (1987)³ defines infertility as one year of unprotected coitus of average frequency, not resulting in pregnancy. This definition is based on the observation that 80 percent of normal couples achieve conception within a year of marriage. However, this definition is misleading as it confuses the total inability to

conceive with delay in conception. A majority of infertile couples do conceive, irrespective of whether or not they were treated for infertility. For example, 38 percent of infertile couples attending an infertility clinic in India conceived before any treatment began and another 27 percent conceived before completion of treatment (Singh 1996)⁴.

As per the revised definition given by WHO (1991)⁵, *primary infertility is the percentage of never pregnant women exposed to the risk of pregnancy for at least 2 years without conceiving.*

Secondary infertility is defined as a condition where a couple previously conceived, but was unable to conceive subsequently despite cohabitation and coitus for a period of two or more years.

Thus, though WHO defines infertility in the context of a two-year timeframe, researchers have adopted their own definitions. In a recent study conducted in Mumbai, primary infertility was defined as any ever married or currently married woman, who has never conceived despite

cohabitation ... in the absence of contraception for a marital duration of three or more years." (Mulgaonkar 2001)⁶.

Probability of conception remains roughly constant for an individual couple, assuming sexual behavior does not change much. However, the incidence of contraception would progressively decline for a group with the passage of time, since most fecund women will become pregnant first.

The duration of infertility is an important prognostic factor. Service providers should not rush expensive and invasive diagnostic testing for couples with short duration of infertility. This, in the absence of any risk factors, may complicate the couple's fertility.

Coital frequency is also an important factor in reproductive efficiency. In a study that examined coital frequency and fertility, probability of pregnancy in six months was only 17 percent for the couples that had intercourse less than once a week. The probability increased to 46 percent for a weekly

coital frequency of two to three, and 83 percent for couples that had sex more than four times a week (Macleod and Gold, 1953)⁷.

Women attempting pregnancy at the age of 40 or more have a 50 percent decreased fertility rate and a two-fold to three-fold increased risk of spontaneous abortion compared with younger women (Toner and Flodl, 1993)⁸.

What are the requirements for fertility?

For an unassisted conception, both partners should be fecund.

Male partner's requirement:

1. Normal spermatogenesis and ductal system (normal count, motility, and biologic structure and functions).

2. Ability to transmit spermatozoa in the female vagina through.
 - Adequate sexual drive and frequency of sexual contacts
 - Ability to maintain an erection
 - Ability to achieve a normal ejaculation
 - Placement of ejaculation in the vaginal vault

Female partner's requirement:

- a. Functioning reproductive anatomy and physiology
- b. Normal immunogenic response to accommodate sperm, conceptus and fetal survival
- c. Adequate nutritional, chemical and health status to maintain nutrition and oxygenation of placenta and fetus.
- d. Adequate sexual drive to permit coitus and its frequency.

EPIDEMIOLOGY OF INFERTILITY IN INDIA

The prevalence of infertility varies widely between and within countries. Moreover, varied data sources, different definitions and methodological problems make it difficult to compare infertility rates.

Researchers continue to refine operational definition of infertility and develop new methodologies to measure its prevalence more precisely. There are difficulties in measuring infertility on account of vague perceptions of time lapsed since the start of the marriage, discontinuation of contraceptives, ignoring early abortions (thus underestimating secondary infertility), and so on.

Magnitude

Community-based surveys and hospital-based studies provide information on estimates of infertility. However, data from community-based studies are scarce in India, and available estimates are highly variable. The WHO sponsored a multi-centric study covering three hospitals in India, one each at Mumbai, Chandigarh and

Delhi. The primary and secondary infertility rates from the multi-centric WHO study are 3 and 8 percent, respectively, for India (Cates *et al* 1985)⁹. Based on 11 percent prevalence of infertility, the estimated number of infertile couples in India is around 12 million.

The National Family Health Survey (1992)¹⁰ shows considerable variations in the level of childlessness across the states. In Haryana and Assam, it is 1.4 percent, and in Andhra Pradesh 4.4 percent, though a study reported 5 percent prevalence of childlessness in the rural areas of Andhra Pradesh (Unisa 1999)¹¹. In a more recent study conducted in the slums of Mumbai, prevalence of childlessness was found to be 4.54 percent (Mulgaonkar 2001)⁶.

Distribution

Several epidemiological factors contribute to the problem of infertility. Since many women delay childbearing on account of education and career, fertility rates have been shown to decline with increasing age of either

spouse and with duration of marriage, presumably secondary to decrease in sexual activity. Advancing age also enhances exposure of women to potentially damaging effects on fertility, as for example, endometriosis, sexually transmitted disease (STD) and pelvic inflammatory disease (PID). Several other factors also affect the possibility of conception. Lack of awareness regarding fertility, especially regarding timing and frequency, is also a barrier for optimal fertility. Coital frequency is positively correlated with pregnancy rates. Similarly, intercourse prior to ovulation is key to maximizing chances of pregnancy. Sperm can survive for five days in the female genital tract, while the ovum has a life span of less than one day if not fertilized.

Women with eating disorders such as anorexia nervosa or bulimia are at an increased risk of menstrual dysfunction. Similarly, obesity may lead to reduced ovulation or to less frequent intercourse, thereby contributing to reduced fertility (Shoupe 1991)¹².

Women and men around the world who expose themselves to nicotine,

alcohol, caffeine and other chemically active substances are also at risk. Conception is delayed when women smoke or drink alcohol beverages, even in moderate amounts, perhaps because smoking disturbs the menstrual cycle (Jaisan *et al*/1998)¹³. There is consensus on reducing consumption of smoking and drinking alcoholic beverages for women who have difficulty in conceiving. Smoking may also pose a problem for men with borderline fertility. In men, smoking and alcohol use may cause poor sperm quality.

Exposure to excessive heat (high scrotal temperature) at work places increases the risk of oligospermia and also affects the quality of sperm. A large number of women who participate in strenuous sports have amenorrhea. Although there is no clear evidence, it is believed that some women under severe stress may also have amenorrhea.

Increasingly, men and women in developing countries face exposure to environmental and workplace pollution, which affects fertility. Occupational exposures also have demonstrated increased risks of

idiopathic infertility. Exposure to radiation, which may be occupational, accidental, iatrogenic or therapeutic, can contribute to infertility. Some recent studies also link exposure to pesticides with poor sperm functions in men.

Unhygienic obstetrical practices and inappropriate gynecological practices by unqualified practitioners, leading to postpartum infections, unsafe abortions and other related complications, may also cause infertility.

The relationship between infertility and psycho-social disorders has also been the subject of a study by Jain *et al* (2000)¹⁴. According to the study, premature ejaculation was noticed in 66 percent of men. Among females, sexual dysfunction was recorded in 58 percent of the study subjects.

Common causes of infertility

Nearly five percent of infertile couples suffer from anatomical, genetic, endocrinological and immunological problems. The rest are infertile largely because of the following conditions:

- STIs, infections (mumps leading to orchitis) and parasitic diseases, as for example, toxoplasmosis, filariasis, leprosy and tuberculosis.
- Unhygienic obstetrical practices, trans-cervical procedures and unsafe abortions.
- Exposure to potentially toxic substances, such as arsenic / lead / pesticides.
- In men, sickle cell disease is a cause of recurring priapism (erection of penis for unusually longer duration), with possible impotence due to tissue and nerve damage. In women, sickle cell disease is associated with increased rate of fetal wastage.
- Exposure to radiation—occupational, iatrogenic or therapeutic—leads to incapacitation of seminiferous tubules in men and ovarian failure, fetal wastage in women.
- Exposure to radiant heat in work environment may increase scrotum temperature, thus reducing sperm quantity and quality.
- Socio-cultural factors, for example, consanguineous marriage.

result of a delicate and well-synchronized balance between the central nervous system (CNS) hypothalamus, pituitary gland and ovary. Approximately 20 percent of all instances of female infertility may

disorders of the uterus, as a result of genetic factors, may also cause repeated miscarriages.

The risk of infertility as a result of tubal problems doubles with each

successive episode of pelvic inflammatory disease (PID) and is five times greater after a severe infection than a mild infection. PID may occur at any time during the reproductive life, and classic PID, along with post-abortion and post-partum infections, is responsible for a significant contribution to the worldwide problem

of infertility. Chlamydia infection also poses a problem as it is often asymptomatic and therefore goes untreated even as it causes severe tubal damage. Other etiological factors in tubal obstruction or pelvic adhesions include post-partum, post-abortion infections, acute appendicitis and iatrogenic causes.

Unexplained Infertility : Male factors

There are many couples that fail to conceive despite the absence of any apparent reasons, which remain undiscovered during complete infertility investigation or even after necessary treatment intervention. Criteria may include normal history and physical examination, adequate coital frequency, three normal semen analysis, regular monthly cycles with biphasic basal body temperature (BBT) and luteal phase of 12 days, adequate cervical mucus and normal post-coital test (PCT), normal hormone assay, Hystero Salpingo Graphy (HSG) and laparoscopy. Such a condition may be termed as unexplained infertility. The reported overall prevalence of unexplained infertility ranges from 6 percent to 27 percent. The available range of methods for investigation cannot assess sperm transport beyond the cervix, Semen evaluation does not throw any light on abnormalities in sperm transportation. Thus, male factors contribute significantly to unexplained infertility.

During the past couple of decades, several new methods for assessing human sperm functions have been introduced, and the IVF has provided a unique opportunity to determine the predictive value of these new tests. This new technology has helped detect several defects at different stages of temporal sequence of events taking place in human fertilization in patients with,

otherwise, unexplained infertility. These functional tests include:

The Sperm Mitochondrial Activity Index (SMAI) test;

The Follicular fluid (FF)-induced hyperactivation of sperms, a potential marker of capacitation of spermatozoa;

The Sperm-zona pellucida binding test;

The Acrosome intactness test;

The Acrosome reaction;

The Sperm membrane integrity evaluation by hypoosmotic swelling test (HOST); and

The Zona-free hamster oocyte penetration assay test.

Electron microscopic studies have helped in detecting ultra-structural defects of spermatozoa (Roy 1999).

These tests are difficult to conduct and are beyond reach of resource-poor settings. Judicious use of seminal evaluation, semen biochemistry and critical clinical judgement may facilitate to uncover unexplained infertility in a significant proportion of couples

STIs and infertility

One of the most common and potentially damaging complications of STIs is infertility. It results from the scarring of fallopian tubes, following ascent of gonococcal, chlamydia and possibly bacterial vaginosis organisms in the upper genital tract, which causes PID. Data from developed countries

indicates that anywhere between 10 percent and 40 percent women with untreated chlamydial / gonococcal infections develop symptomatic PID, and about one quarter of those with PID become infertile. As per one WHO multi-centric study, up to 64 percent of the female patients in Africa, and between 28 percent and -

35 percent patients in other parts of the world, had infertility that could be traced to prior infection.

Data from a WHO multi-centric study indicates that STDs, unsafe obstetrical practices and abortions may contribute differently to infertility in different parts of world. This highlights the importance of these issues in women's reproductive health. STDs (gonorrhea and chlamydia) also cause urethritis,

epididymitis and possibly accessory gland infection in men. Infection caused by the human papilloma virus often precedes cervical dysplasia, which requires some cervical surgical procedures. This may reduce fertility because of cervical transport problems subsequent to scarring or damage to cervical mucus producing cells, possibly leading to cervical incompetence associated with pre-term deliveries and fetal wastage.

What is "Sexual Dysfunction"?

Sexual dysfunction is the persistent or recurrent inability to react emotionally or physically to sexual stimulation in a way expected of an average healthy person or according to one's own standard of acceptable sexual response. Sexual dysfunction can occur during the desire, excitement, plateau, or orgasm stage of the sexual response cycle.

For example, a most common dysfunction is inhibited arousal during the excitement stage. This presents as erectile dysfunction (impotence) in men or lack of lubrication in women. Occasional inhibited arousal is common and not dysfunctional; however, chronic inhibited arousal is a sexual dysfunction that can be caused by recreational drug use, certain medications, certain diseases, physical damage or psychological factors. Any of the following factors can contribute to sexual dysfunction: