

Review Article

Epidemiological risk factors associated with infertility

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ABSTRACT

Infertility is a serious and stigmatic health issue especially in a country like India. On one side India is dealing with population overgrowth and limited resources while on other side problem of infertility haunts many reproductive age group couples. According to world health organisation (WHO), one in every fourth couple in the developing country is suffering from infertility. The globally prevalence of infertility is 10-15%. Infertility can be primary or secondary. Male or female factors or both can cause infertility. Prevalence of infertility varies with diversity in the customs, traditions, climatic condition and health status. In addition, prevalence of infertility is increasing due to depression, anxiety, stress, and other physiological conditions. Few preventable conditions such as infection, lifestyle factors, advancing maternal age, age at marriage, postponement in child bearing for more than 1 year or more, socio-economic status, and occupational hazards also predispose to infertility. The main challenge of infertility is to estimate the actual prevalence of infertility due to varying definitions of infertility. The magnitude of the problem calls for urgent action, particularly when in the majority of cases the infertility is avoidable.

Keywords: Infertility, Epidemiological risk factors, Sterility, Public health problem

INTRODUCTION

Global estimates show that about 1.5 million couples encounter fertility problems. Infertility is defined as being unable to pregnant after one year of trying to get without using contraceptive methods and agents. The incidence is based on the outcome (pregnancy or live birth) and the target population is from 1% to 5%. The most important factors in infertility include pelvic inflammatory disease (PID), sexually transmitted diseases (STD), age, polycystic ovary syndrome (PCOs), and endometriosis. Besides known diseases that affect women's fertility, socioeconomic factors can also affect women's fertility and cause problems. The prevalence of mental disorders in infertile couples has also been reported to be 33% and psychological factors along with physical (psychosomatic) factors must be considered in infertility treatment.^{1,2}

Infertile women are more susceptible to physical, psychological, and social stressors because of infertility and its treatment than men. Sexual dysfunctions are also increased by Infertility. The pattern and prevalence of infertility is a good indicator of family health and planning for it, but data on reproductive health and its individual and social aspects are insufficiently available. While the most important and rational approach to reducing the problem of infertility is, first, identifying the various causes of infertility and promoting reproductive health in order to prevent infertility. The epidemiological aspects and factors affecting infertility in developing countries are important. Infertility is a serious health issue worldwide, affecting approximately 8-10% of couples worldwide.^{3,4} Of 60-80 million couples suffering from infertility every year worldwide, around 15-20 millions (25%) are in India alone.^{5,6} According to report by WHO, one in every four couples in developing countries is

affected by infertility.⁷ The magnitude of the problems calls for urgent action, particularly when in the majority of cases the infertility is avoidable.

The main challenges in estimating actual burden of infertility are the paucity of population-based studies and the varying definitions used in the few high-quality studies. In population-based studies of infertility, there has been little consistency in how prevalence is calculated. A clear and consistent idea of the numerator and denominator of each definition is needed to make clear what is being measured. Epidemiologists define infertility as "trying for" or "time to" a pregnancy, generally in a population of women exposed to a probability of conception whereas demographers tend to define infertility as childlessness in a population of women of reproductive age.⁴⁻⁸ The time needed to pass (during which the couple tries to conceive) for that couple to be diagnosed with infertility differs between different jurisdictions. In United States, a couple is eligible for treatment of infertility if a woman under 35 has not conceived after 12 months of contraceptive-free intercourse or a woman over 35 has not conceived after 6 months of contraceptive-free sexual intercourse.⁶ In contrast to this, in United Kingdom, infertility is defined as failure to conceive after regular unprotected sexual intercourse for 2 years in the absence of known reproductive pathology.⁷ Existing definitions of infertility lack uniformity, rendering comparisons in prevalence between countries or over a period of time difficult. Also, clinical and epidemiologic infertility definitions are used to monitor infertility. However, they are not appropriate when making population-based estimates of infertility using household surveys.

SIMPLIFICATION OF INFERTILITY

The clinical definition of infertility used by the WHO is "a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse", while the WHO's epidemiologic definition is "women of reproductive age at risk of becoming pregnant who report unsuccessfully trying for a pregnancy for more than two years".^{8,9} Clinical definitions are designed for early detection and treatment of infertility.⁸⁻¹⁰ A definition and assessment of infertility based on medical histories and diagnostic tests is appropriate for clinical settings, where the aim is to understand causes and provide treatment as soon as it is indicated. However, measuring patterns and trends in infertility at the population level necessitates a measure that may be elicited using a standard set of survey questions. The WHO's epidemiologic definition is more closely aligned with clinical practice than demographic definitions are, and may be measured using survey data.

Infertility can be primary or secondary. If the couple has never conceived despite cohabitation and exposure to pregnancy (sexually active, non contraceptive and non

lactating) for the period of two year, it is called primary infertility.¹¹ It is also called primary sterility. Infertility is labelled as secondary if the couple failed to conceive following a previous pregnancy, despite cohabitation and exposure to the risk of pregnancy (in the absence of contraception, breastfeeding or postpartum amenorrhoea) for a period of 2 years.¹¹

FRAMEWORK OF INFERTILITY ENGULFING THE WORLD

Worldwide, around 50 million couples are unable to have a child, of which 19.2 million couples are unable to have a first child, and 29.3 million couples are unable to have an additional child (the latter figure excludes China). Around 14.4 million of these couples live in South Asia, and a further 10.0 million live in Sub-Saharan Africa. The number of couples suffering from infertility has increased since 1990, when 42.0 million couples were unable to have a child. Though the number of infertile couples has increased globally and, in most regions, it has decreased from 4.2 million in 1990 to 3.6 million in 2010 in the High-Income region, and from 4.4 million in 1990 to 3.8 million in 2010 in the Central/Eastern Europe and Central Asia. Reduced child-seeking behaviour coupled with a lack of population growth resulted in a decrease in the absolute number of infertile couples in these regions.⁴

The human fertilization and embryology authority (HFEA) estimates that infertility affects 1 in 7 couples per year.¹² Thus, of all the couples trying to conceive, 16% will be unable to become pregnant after 1 year. After 2 years, 8% will still be unsuccessful, while after 3 years, 7% will still not be able to conceive.^{13,14} A marked natural decline in the female fertility is seen from approximately age 35 onwards and health care professionals take this age as significant when determining what treatment, a patient receives.^{15,16}

Only a limited number of papers report on the prevalence of infertility in developing countries. In less developed countries 12-month prevalence rate ranges from 6.9 to 9.3%. Substantial geographical differences in the prevalence are noted, and these differences are largely explained by different environmental, cultural and socioeconomic influences and access to the health care system.¹⁷ In sub-Saharan Africa, the prevalence differs widely from 9% in the Gambia and 11.8% in Ghana compared with 21.2% in northwestern Ethiopia and between 20 and 30% in Nigeria.¹⁸⁻²³ Even less data are available from Asia and Latin-America, but a report compiled by the WHO indicated that the prevalence of infertility in these regions fell within the globally expected range 8-12% of couples of reproductive age and thus, lower when compared with African countries.²⁴

Among Indian women reporting primary infertility and PID, prevalence of sexually transmitted infections are high.²⁵ The WHO estimates the overall prevalence of primary infertility in India to be between 3.9 and 16.8

percent.²⁵ Estimates of infertility vary widely among Indian states from 3.7 per cent in Uttar Pradesh, Himachal Pradesh and Maharashtra, to 5 per cent in Andhra Pradesh, and 15 per cent in Kashmir.²⁶⁻²⁸ Moreover, the prevalence of primary infertility has also been shown to vary across tribes and castes within the same region in India.^{26,29} However, it should be noted that many of these estimates use different definitions of infertility and consider different time periods, which makes direct comparisons difficult between any studies.

EPIDEMIOLOGICAL RISK FACTORS RELATED TO INFERTILITY

STD are prominent risk factors for infertility in developing countries. The organisms most commonly involved are *Chlamydia trachomatis* and *Neisseria gonorrhea*.^{31,32} Pelvic tuberculosis can also result in tubal infertility, and high incidences have been reported in studies from the Indian subcontinent. The high prevalence of infections is commonly compounded by a delayed or a complete lack of diagnosis together with incomplete, inappropriate or no intervention at all.^{33,34} Related risk factors include poor education, poverty, negative cultural attitudes to women, early age at first marriage, polygamy, lack of access to contraception and the adverse effects of migrant labour.³⁵ Effective and appropriate education, preventive and curative sexual and reproductive health programs are urgently required. The problem of infertility in India has to be interpreted in a context of poverty, class and gender inequality and unequal access to health-care resources.

Bilateral tubal occlusion is the most common underlying cause, a condition that is potentially treatable by assisted reproductive technologies (ART).^{36,37} Unfortunately, a large majority of the population cannot afford infertility treatment since new reproductive technologies are either unavailable or very costly.^{38,39} When reflecting on the possible role of ART in developing countries, many concerns and barriers become apparent.⁴⁰⁻⁴³ Central to these is the question whether expensive techniques, which have a low success rate (live birth rate <25% per cycle), can be justified in countries, where poverty is still an important issue. A related concern involves many shortcomings of health-care systems, which struggle with the immense problem of infectious diseases, such as malaria, tuberculosis, gonorrhoea and HIV. Further barriers include national and international health strategies, which during the past decades have focused on reducing total fertility rates (the so-called political 'top-down' perspective), while infertility care has received little or no attention. These are the challenges faced in developing countries like India.

Despite infertility occurring relatively often in the population, it is experienced as a lonely road for individual couples. In addition to isolation, infertility challenges women's sense of identity, expectations of their life trajectory and their perceived value in society.

This can lead to feelings of failure, guilt and shame.⁴⁴ Women with primary infertility reported more distress as compared to fertile women. Psychological distress among infertile women is associated with poorer education, being previously/currently investigated/treated, placing higher importance on having children, and having poor marital communication. There is need for psychological intervention targeting infertile women in clinics and community settings.⁴⁵

SOCIAL BURDEN OF INFERTILITY

The onus of infertility in most societies especially in developing countries like India is usually placed on the woman. When the couple is unable to produce children, the couple may divorce or separate, or the man may take another wife if they live in a culture that permits polygyny. The breakup of the relationship is therefore both a coping strategy for men and an unfortunate consequence for women. In some cultures, the woman needs to "prove" her fertility before entering into a formal union. In these societies, women may remain unmarried if they cannot bear children. Overall, women who have never had a child or are currently childless are more likely to be divorced or separated, 14% for primary sterility and 12% for childlessness.²⁶ The increased likelihood of divorce or separation due to secondary sterility is 5%, much less than the increase for primary sterility. By region, the largest difference for primary sterility is in Latin America, where 21 percent of women are more likely to be divorced or separated than women who are not primarily sterile.²⁶ This region also has the largest effect for secondarily sterile women, with 10% being divorced or separated. Rather than remaining divorced or separated, women who were in an infertile union may remarry and thus, be in a second or later marriage at the time of the survey. Childless women are 13% more likely to have married more than once than women with children.²⁶

CONCLUSION

According to literature, prevalence rate varies from 3% to 35% in different region and community within India. Hence, social, cultural and economic factors do play an important role in infertility. The significant risk factors for primary infertility among women are higher education, occupation, upper socio-economic class, age at marriage above 30 years, obesity, delayed age at menarche, irregular menstrual pattern. The study has provided significant information concerning the prevalence of infertility in study area and has informed about different demographical and etiological factors associated with infertility. Along with the epidemiological factors various reproductive tract infection is also responsible for the infertility. Treatment of infertility is possible if the early diagnosis of the underline cause will know. Awareness as well as health education is the best method to make aware the couples

so that it can prevent the further complications among the couple married life.

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