

The prevalence and aetiology of infertility in Sri Lanka

W. Indralal De Silva¹

The Ceylon Journal of Medical Science 1995; 38: 1-10

Summary

This study investigates the incidence of primary and secondary infertility and its regional variation in Sri Lanka by using the 1987 Sri Lanka Demographic and Health Survey. Even though primary infertility is estimated to be over 5 per cent for ever-married and currently married women aged 25-49, the estimate has declined considerably when marital exposure of five years and current pregnancy is considered. During the period of 1975 and 1987 the level of primary infertility has further declined and this is probably due in part to general improvement in women's health and nutrition and the treatment of diseases that affect the ability to bear children. The estate women of Sri Lanka have a higher level of primary infertility than the urban and rural women, presumably related to the practice of unhygienic abortion. Secondary infertility is estimated to be more widespread in Sri Lanka than primary infertility. However, the observed level of secondary infertility is influenced by voluntary curtailment of childbearing, mainly due to economic hardship and increasing participation of women in the labour force, after the birth of the first child. Changes in the level of infertility in Sri Lanka seem to have no impact on the country's overall level of fertility which had already achieved replacement level by early years of the present decade (1).

Introduction

Many couples in most countries are gravely worried over their inability to have children even after several years of their normal married life. Thus, it is a problem that affects men and women of reproductive age in all areas of the world and varies in aetiology and prevalence according to age group and geographic location. Although reliable data are scarce, those that are

available consistently point to distinct regional patterns (2, 3).

Some of the infertile couples in the world seek medical advice while others leave it to their fate. However, the incidence of infertility has many causes, which may lie with either one of the partners or both. Although infertility has been known to exist since ancient times, a real interest in helping couples to conceive arose recently. Despite many policies and programs aimed at reducing the level of fertility in developing countries, the majority of them provide medical assistance to infertile couples through governmental and non-governmental organizations (4).

The incidence of infertility in a population has important demographic and health implications. Since a high rate of infertility, as observed in Sub-Saharan Africa, has a dampening effect on the overall fertility and the rate of population growth, improvements in the ability to bear children may impede efforts to lower fertility rates (5, 6). Compared with other South Asian countries, Sri Lanka has had the highest rate of fertility decline; over the period 1960-65 to 1985-90, Sri Lanka's total fertility rate declined by almost 50 per cent (7). Sri Lanka is aiming to achieve replacement level fertility, that is on average 2.1 children per woman, by year the 2001 (8). Therefore, it is important to examine the trends in infertility in Sri Lanka over the past few decades in order to assess whether infertility levels have any significant impact on the fertility decline.

The presence of children is the source of happiness of a couple. In many societies, specially in Asia, women who are incapable of bearing children are looked down upon not only by the men but also by other women (9, 10).

¹ Senior Lecturer in Demography, Demographic Training & Research Unit, University of Colombo, Colombo.

Therefore, a study of the incidence of infertility and its regional variation, which has not been so far examined in detail, is an important step for the formulation of programs to reduce infertility in Sri Lanka.

Population and Methods

The data for analysis are primarily drawn from the 1987 Sri Lanka Demographic and Health Survey (SLDHS). The sample of the 1987 SLDHS is a multi-stage stratified probability sample representative of the entire country excluding the Northern and Eastern provinces, the two provinces which contain approximately 14 per cent of the 1986 estimated population of Sri Lanka. During the enumeration 8,119 households and 6,170 eligible women were identified and interviews were completed among 5,865 ever-married women aged 15-49, with a response rate of 95.1 per cent. The questionnaire in SLDHS has two distinct parts; household questionnaire and individual questionnaire. The household questionnaire listed all usual residents and any visitors who slept in the household during the night before the interview, together with some basic information such as age and marital status. The household questionnaire was used to identify women who were eligible for the individual interview. The individual questionnaire obtained information not only on fertility but also on marriage, family planning, fertility preferences, husband's background information and health status of children (11).

The term 'infecundity' is equivalent to the term 'infertility' which, in medical terminology, can be described as the inability to conceive after several years of exposure to the risk of pregnancy. The epidemiological definition of infertility recommended by the World Health Organization depends on a two year period of exposure, while clinical studies often use a one-year period and demographic and health survey measures generally cover a five-year period (12).

Two aspects of infertility can be distinguished. One is commonly called 'primary infertility' (or

'primary sterility'), that is, inability to bear any children at all as a result either of an inability to conceive or an inability to carry a full-term pregnancy. The second is called 'secondary infertility' which relates to the inability to have a child subsequent to an earlier birth after a reasonably long period of exposure. In this paper estimates on both these aspects (primary and secondary infertility) are presented.

As is common with many demographic and health surveys, the 1987 SLDHS survey did not include a complete pregnancy history. Therefore, it is not possible to obtain a measure of the proportion of women with no pregnancies throughout their lives; pregnancy history is necessary to estimate primary infertility according to the medical definition. Thus, the two basic measures of primary infertility discussed in this paper slightly differ from the medical definition. The first measure is the proportion of women with no live births. The second measure is the proportion of women who neither had a live birth nor were pregnant at the time of the survey - that is the proportion of women who have never had a 'fertile pregnancy' (13). The latter measure considers women who are currently pregnant to be fertile on the assumption that most of those pregnancies will result in a live birth. Since pregnancies are usually not reported in Sri Lanka until they are of relatively long duration, say at least three months, this assumption is reasonably acceptable.

Results

Primary Infertility

Measures of primary infertility presented in this study are based on successively refined denominators, starting with ever-married women and adding in turn the conditions that the respondent was currently married, and had married at least five years ago. The period of five years was chosen because few women in Sri Lanka have a first birth more than five years after their marriage. Unlike in most developing countries, in Sri Lanka mean age at first marriage (singulate mean age at marriage) for

females has increased to above 25 years in recent periods. Thus, there is a general tendency among Sri Lankan women to produce children as early as possible once they get married (14).

The proportion of ever-married women who had never had a live birth is shown in Table 1. The measures are presented for each of the three oldest five-year age groups (35-39, 40-44, 45-49), and a summary measure for all the ever-married women aged 25-49. The measure based on the 25-49 age group has smaller sampling errors, but it may overestimate primary infertility since it includes some women of short duration of marriage. Among ever-married women aged 25-49 about 5.2 per cent had not had a live birth at the time of the 1987 SLDHS.

Overall, the level of primary infertility among urban women is higher than among rural or estate women; about 6.6 per cent of urban women aged 25-49 are identified as infertile. Rural women demonstrate the lowest level of primary infertility among the ever-married aged 25-49. In all the three residence categories, ever-married at the end of reproductive span 45-49 show a lower level of primary infertility than women aged 35-39. It is more likely that some women aged 25-34 and even 35-39 were not necessarily continuously exposed to conception for sufficiently long periods.

As shown in Table 2 the level of primary infertility is slightly lower among the currently married women (5.18 per cent) than the ever-married women (5.21 per cent) of age group 25-49; the measure based on currently married women may underestimate the level of primary infertility in couples who, without any children, are more likely to get divorced or separated. The incidence of primary infertility is greatly reduced when only women who got married at least five years before the survey are considered. For women currently aged 25-49 and exposed to conception for a period of at least five years, the level of primary infertility is 1.76 per cent only. This figure is significantly lower than the corresponding estimates from the age groups 35-39, 40-44 and 45-49. If primary infertility

among the women aged 25-34 who were married for five or more years is considered the corresponding estimate is reduced to the level of 1.24 per cent. When those aged 25-49 and married for at least five years or more are considered, estate women show a higher level (2.63 per cent) of primary infertility than their counterparts in urban and rural areas (last column of Table 2).

The level of primary infertility could be further refined by incorporating the fertile pregnancy concept. Fertile pregnancies are defined as either live birth or current pregnancy at the time of the survey. Table 3 shows the percentage of currently married women who have not had a fertile pregnancy; they have no live birth and no current pregnancy. The base population of this estimate has been restricted to currently married women.

Adding current pregnancy to the measure of infertility makes a great difference, when primary infertility among currently married women aged 25-49 drops from 5.2 per cent to 3.8 per cent. However, the addition of current pregnancy to the currently married women aged 40-44 and 45-49 made no difference to their level of primary infertility; it is only women younger than age 40 that made a contribution to reduced infertility in the broader age group of 25-49. At the regional level again women in the rural sector show the lowest level of primary infertility (3.5 per cent), in contrast to women in the urban sector who recorded the highest (4.8 per cent).

For women who were first married at least five years ago the percentage who have not had a fertile pregnancy is slightly lower than the percentage who have not had a live birth; the estimated level of primary infertility has dropped from 1.76 per cent to 1.74 per cent (Table 2 and 3). At the regional level, the introduction of the fertile pregnancy concept made no reduction to the estimate of infertility in the rural and estate sector; however, in the urban sector it was influential in reducing the estimate of primary infertility. Even when marital duration is controlled, older women of

Table 1. Percentage of ever-married women who have not had a live birth, by age of women, 1987 SLDHS

Sector	Ever-married women			
	35-39 %	40-44 %	45-49 %	25-49 % (N)
All	4.32	2.81	3.31	5.21 (5002)
Urban	4.97	2.46	3.60	6.62 (891)
Rural	4.29	2.87	3.12	4.81 (3569)
Estate	3.41	3.15	4.00	5.53 (542)

Source: 1987 SLDHS individual data tape.
N = Number of women.

Table 2. Percentage of currently married women who have not had a live birth, by age of women, 1987 SLDHS

Sector	Currently married women				Currently married women who first married 5+ years ago			
	35-39 %	40-44 %	45-49 %	25-49 % (N)	35-39 %	40-44 %	45-49 %	25-49 % (N)
All	4.00	2.66	2.62	5.18 (4625)	2.25	2.02	2.16	1.76 (3958)
Urban	4.25	2.16	3.26	6.59 (834)	2.22	1.68	2.29	1.94 (719)
Rural	4.01	2.69	2.64	4.78 (3279)	2.32	1.89	2.23	1.58 (2784)
Estate	3.53	3.52	1.56	5.46 (512)	1.85	3.61	1.56	2.63 (455)

Source: 1987 SLDHS individual data tape.
N = Number of women.

Table 3. Percentage of women who have not had a live birth and are currently not pregnant, by age of women, 1987 SLDHS

Sector	Currently married women				Currently married women who first married 5+ years ago			
	35-39 %	40-44 %	45-49 %	25-49 % (N)	35-39 %	40-44 %	45-49 %	25-49 % (N)
All	3.62	2.66	2.62	3.82 (4625)	2.25	2.02	2.16	1.76 (3958)
Urban	3.72	2.16	3.26	4.79 (834)	2.22	1.68	2.29	1.80 (719)
Rural	3.60	2.69	2.64	3.50 (3279)	2.32	1.89	2.23	1.58 (2784)
Estate	3.53	3.52	1.56	4.29 (512)	1.85	3.61	1.56	2.63 (455)

Source: 1987 SLDHS individual data tape.
N = Number of women.

reproductive ages (35-49) in Sri Lanka clearly show a higher level of infertility than the younger women.

Changes in the level of Primary Infertility

Changes in the level of primary infertility over the period of 1975 and 1987 in Sri Lanka and two other countries of Asia are examined by using the two different measures of primary infertility. In all the five year age groups the percentage of ever-married women who have not had a live birth has decreased in Sri Lanka over the period 1975 and 1987 (Table 4). However, among the ever-married women aged 25-49, the percentage has decreased much more sharply in Indonesia (6.7 to 4.8 per cent) than the corresponding decline in Sri Lanka (5.5 to 5.2 per cent). Unlike in Sri Lanka and Indonesia, in Thailand the level of primary infertility among the ever-married women demonstrates an increase from 3.5 per cent in 1975 to 5.0 per cent in 1987.

The second measure, that is the percentage of currently married women with marital duration of at least five years who have not had a fertile

pregnancy, also indicates a decline of primary infertility in Sri Lanka. In the 1975 SLWFS the measure was 2.5 per cent, however, by 1987 it had declined to just 1.7 per cent. Indonesia shows a much stronger decline than Sri Lanka in primary infertility while during the same period women in Thailand showed an entirely opposite trend.

Secondary Infertility

Estimation of secondary infertility through the DHS type surveys is difficult as secondary infertility may occur at any time in a woman's life after the first pregnancy. Nevertheless, it is possible to obtain an approximation about the incidence of secondary infertility by examining subsequent births after the first live birth. Table 5 shows the subsequent fertility behaviour of currently married women whose first child was born at least five years before the time of the 1987 SLDHS. It may be argued that although primary infertility is low in Sri Lanka, secondary infertility is considerably more widespread; about 6 per cent of the currently married women in the 1987 SLDHS had been identified as having secondary infertility (Table 5). The

Table 4. Level of primary infertility in Sri Lanka (SLDHS 1987), and Indonesia and Thailand, 1975 SLWFS.

Country/Age	Percentage of ever-married women who have not had a live birth		Percentage of currently married women (with marital duration of at least 5 years) who have not had a fertile pregnancy	
	WFS (1975)	DHS (1987)	WFS (1975)	DHS (1987)
Sri Lanka				
35-39	4.4	4.3	2.4	2.2
40-44	4.2	2.8	3.4	2.0
45-49	3.8	3.3	2.2	2.1
25-49	5.5	5.2	2.5	1.7
Indonesia*				
25-49	6.7	4.8	5.1	3.4
Thailand				
25-49	3.5	5.0	1.9	2.7

Source: 1987 SLDHS individual data tape;
World Health Organization (1991);
Vaessen (1984).

Note: * WFS of Indonesia was conducted in 1976.

Table 5. Among currently married women aged 25-49 whose first child was born five or more years ago, the percentage who have not had a second child, 1987 SLDHS

Sector	Percentage of women with secondary infertility		Percentage distribution of secondary infertile women by their productive intentions of 1987				
	%	(N)	Want More	Undecided	Want no more	Sterilized	Total % (N)
All	4.82	4625	57.4	5.8	32.3	4.5	100.0 (223)
Urban	6.95	834	51.7	10.3	34.5	3.5	100.0 (58)
Rural	4.30	3279	58.9	4.2	31.2	5.7	100.0 (141)
Estate	4.69	512	62.5	4.2	33.3	0.0	100.0 (24)

Source: 1987 SLDHS individual data tape.
N = Number of women.

lowest level of secondary infertility is observed among the currently married women in the rural sector, while the highest is among the urban women.

It is likely that some women who did not have a second child were experiencing problems of secondary infertility, while others may have made a conscious decision not to have any more children. Thus the 'only one live birth' definition must be seen as a rough indicator of secondary infertility and can be overestimated, depending primarily on women's reproductive intentions and contraceptive behaviour. Therefore, Table 5 examines the reproductive intentions of women who have been identified as having secondary infertility along with their sterilization behaviour as a separate category.

The proportion of women who do not want another child is largely determined by the number of living children they have. In Sri Lanka about 16 per cent of currently married women with only one child, irrespective of their marital duration, wished to cease their childbearing (15). However, 57 per cent of all secondary infertile women identified in this study (223 women), said that they wish to cease their childbearing (Table 5). Although some women may profess not to want another child because they think that they and their husbands are physically unable to have any more, it is clear that in Sri Lanka the voluntary cessation of childbearing after the first child is substantial. Thus the level of secondary infertility reported for Sri Lanka (4.82 per cent) in Table 5 should be regarded as the maximum value, the actual prevalence being somewhat lower.

More appropriately, if reproductive intentions are incorporated into the concept of secondary infertility, then only 57 per cent of the currently married women whose first child was born at least five years before the 1987 survey could be categorized more specifically as the secondary infertile women of Sri Lanka. When regional variations are considered, not only do the urban women report the highest level of secondary infertility, but of all the residence categories the lowest proportion in the urban sector wished to

have more children (52 per cent). Thus the refinement of the secondary infertility, which has been done by incorporating the reproductive intentions of women, shows less effect on the urban women while the effect on the estate women could be substantial.

Discussion

Compared with many other Asian and African countries the level of primary infertility of Sri Lankan women remains low (16). When women aged 25-29 who first got married at least five years before the 1987 survey are considered, the level of primary infertility is estimated to be 1.76 per cent only, and the estimate has further declined to 1.74 per cent when women who are currently pregnant are considered as fertile. However, estimates obtained from currently married women may underestimate the actual level of primary infertility since it is found in many countries that childless women had an increasing probability of marriage dissolution (17). It has been noted elsewhere that in Sri Lanka rates of divorce and widowhood are low during the childbearing years and largely compensated for by remarriage (18).

Many governments in Sri Lanka, particularly after its independence in 1948, attempted to improve overall health and to reduce nutritional deficiencies among its people, particularly among women, by introducing a number of policies and programs. Among them expansion of the national health care system, including control of venereal diseases and the free food distribution program for the people in the lower socio-economic strata, would have been influential in reducing the level of primary infertility (19).

As a result of the success of these policies and programs not only has the level of mortality declined in Sri Lanka but also the level of primary infertility in Sri Lanka has declined; from 1975 to 1987 the level of primary infertility dropped from 2.5 per cent to 1.7 per cent. Some specific factors could also have been related to the observed decline in infertility. Establishment of two infertility clinics in Colombo, one at the

Family Health Bureau and the other at the Family Planning Association of Sri Lanka (non-governmental organization), has attracted a large number of couples who wanted to correct their fertility impairment problems. Apart from these two special infertility clinics, most of the gynaecological and obstetric sections of the government hospitals scattered throughout the main towns of the country also provide the basic treatment for couples who seek such a facility, and complicated cases are referred to the infertility clinics in Colombo. As in many developed countries, couples seeking infertility treatment in Sri Lanka are also more likely to have primary than secondary infertility (4), and have been infertile for about three years on average.

Even though Sri Lanka does not have *in vitro* fertilization techniques, where the egg of the female is taken and fertilized with the male partner's sperm outside the uterus and the developing embryo is implanted back in the mother's uterus, as available in developed countries, infertility clinics are providing treatments for increasingly large numbers of males and females. Treatment of the male is to investigate the underlying cause of infertility and manage it accordingly either by surgery, improvement of nutrition or administration of various hormonal preparations and vitamins.

The recent decline in the level of primary infertility in Sri Lanka could also be related to some socio-cultural and political factors. An increasingly large proportion of Sri Lankan couples with fertility impairment problems adopt children legally from many governmental or non-governmental agencies and individual families. Because of the civil war since 1983 a large number of children have lost their parents and a considerable number of them have been adopted legally by many childless couples; some government agencies estimate that the number of displaced children due to loss of either or both parents in recent years was as high as 300,000. It is possible that a significantly large proportion of couples who were unable to have their own children might have reported these adopted children as their own, thus

reducing the recorded level of primary infertility.

Although in the country as a whole the level of primary infertility remains low, on the estates it is considerably higher than in the urban or rural sectors; 2.6 per cent of the currently married women with at least five years of marital duration have no live births or are even not currently pregnant. The higher incidence of primary infertility on the estate sector may be related to the higher incidence of induced abortions there; even in the 1975 SLWFS the estate sector reported the lowest level of fertility and Langford (20) believed that induced abortion acted as a significant fertility inhibitor there.

Although induced abortion is technically illegal under the criminal code, throughout Sri Lanka qualified as well as unqualified medical practitioners daily perform a large number of abortions in response to growing demand for such services (21). Abortions are related to the growing number of young, unmarried women who become pregnant as a result of changes in their sexual practices, particularly among the Free Trade Zone migrant workers. Since the hygienic conditions in which these abortions are performed are very poor, many women are faced with post-abortion complications and even death. As a result of this trend presumably the level of primary infertility will not come down in future in Sri Lanka, in fact it may, as found in Thailand, slightly increase.

Unlike in the rest of South Asia, in contemporary Sri Lanka, a large number of married women are also employed in manufacturing and service industries and they are finding it quite costly to have more than one child in their marriages. For many women in the labour force smaller families become the norm, and even non-working women will tend to have a smaller number of children. Therefore, mothers who become pregnant when they have only one child are at a high risk of demanding abortion. An increasingly large percentage of these women who seek induced abortions,

many of which are unhygienic, may face secondary infertility problems in future.

Survey results of 1975 and 1987 on infertility indicate that it occurs less frequently than was previously thought, and in fact the level of primary infertility in Sri Lanka shows a decline. It is very likely that this is the result of two opposing trends: a reduction in involuntary infertility and a growth in voluntary infertility large enough to compensate for the reduction in involuntary infertility. However, this decline did not outpace Sri Lanka's fertility decline. As reported elsewhere, even though Sri Lanka was expected to achieve replacement level fertility by the year 2001 (total fertility rate of 2.1 children per woman), it had already hit the target by 1993 and fertility seems even to be falling below replacement level (1). At this juncture, induced abortion seems to be playing a role in fertility decline irrespective of its legal status. However, unlike in the United States and in many other developed countries (22, 23, 24), the overall level of fertility in Sri Lanka would not be affected by the continuing decline in the level of infertility.

References :

1. De Silva WI. Ahead of target: achievement of replacement level fertility in Sri Lanka before the year 2000, *Asia-Pacific Population Journal*, 1994; 9:3-22.
2. Caldwell JC, Caldwell P. The demographic evidence for the incidence and cause of abnormally low fertility in Tropical Africa, *World Health Statistics Quarterly*, 1983; 36:2-34.
3. Farley TMM, Belsey EM. The prevalence and aetiology of infertility. In: *African Population Conference, Dakar*, vol. 1, 2.1: 15-30, 1988; Liege, Belgium: International Union for the Scientific Study of Population.
4. Rowe PJ, Vikhlyaeva EM. *Diagnosis and Treatment of Infertility*. Toronto: Hans Huber Publishers, 1985.

5. Frank O. Infertility in sub-Saharan Africa: estimates and implications. *Population and Development Review*, 1983; 9:137-144.
6. Larsen U and J Menken. Measuring sterility from incomplete birth histories. *Demographic*, 1989; 26:185-201.
7. United Nations, 1993. *World Population Prospects: the 1992 Revision*. New York: United Nations.
8. Ministry of Health and Women's Affairs. *Sri Lanka Country Report, Fourth Asian and Pacific Population Conference, 1992; 19-27 August 1992, Bali, Indonesia*. Colombo: Population Division.
9. Cartwright A. *How Many children?*. London: 1976; Routledge and Kegan Paul.
11. Department of Census and Statistics 1988. *Demographic and Health Survey 1987, Sri Lanka*, Colombo.
10. Kiernan KE. Who remains childless? *Journal of Biosocial Science*, 1989; 21:387-398.
12. World Health Organization. *The Epidemiology of Infertility: Report of a WHO Scientific Group, 1975*. Geneva: World Health Organization, 1975.
13. Vaessen M. *Childlessness and infertility, WFS Comparative studies, No. 31.*, 1984. Voorburg, Netherlands: International Statistical Institute, 1984.
14. De Silva WI. Age at marriage in Sri Lanka: stabilizing or declining? *Journal of Biosocial Science*, 1990; 22:395-404.
15. De Silva WI. Relationships of desire for no more children and socio-economic and demographic factors in Sri Lankan women. *Journal of Biosocial Science*, 1992; 24:185-200.

16. World Health Organization. *Infertility: A Tabulation of Available data on Prevalence of Primary and Secondary Infertility, 1991*. Geneva: World Health Organization, 1991.
17. Cherlin AJ. *Marriage, Divorce, Remarriage: Social Trends in the United States*, Cambridge, Mass: 1981. Harvard University Press, 1981.
18. Caldwell JC, Gajanayake I, Caldwell B, Caldwell P. Is marriage delay a multiphasic response to pressures for fertility decline? The case of Sri Lanka. *Journal of Marriage and the Family*, 1989; 51:337-351.
19. Frisch RE. Demographic implications of the biological determinations of female fecundity. *Journal of Social Biology*, 1982; 29:187-192.
20. Langford C. The fertility of Tamil estate workers in Sri Lanka, WFS Scientific Reports, No. 31, 1982. Voorburg, Netherlands: International Statistical Institute, 1982.
21. Caldwell JC, Gaminiratne KHW, Caldwell P, De Silva S, Cladwell B, Weeraratne N, Silva P. The role of traditional fertility regulation in Sri Lanka. *Studies in Family Planning*, 1987; 18:1-21.
22. De Jong GF, Sell RR. Changes in childlessness in the United States: a demographic path analysis. *Population Studies*, 1977; 31:129-141.
23. Veivers JE. *Childless by Choice*, 1980. Butterworth, Toronto.
24. Rindfuss RR, Morgan SP, Swicegood G. *First Births in America: Changes in the Timing of Parenthood*. Berkaley: University of California press, 1988.