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The Influence of Female Age at Marriage on Fertility and Child Loss in India

Influencia de la edad de la mujer al casarse en la fecundidad y pérdida de hijos en India

RESUMEN

Al utilizar los datos de la Encuesta Nacional de Salud y Familia-2 de la India (1998-1999), este trabajo pretende investigar la relación entre la edad de la mujer al casarse, la fecundidad y la pérdida de hijos al nacer. Se tomaron como muestra dos estados, socioculturalmente diferentes, de la India: Rajastán y Tamil Nadu. Aquí se ha utilizado el número de niños nacidos como una medida de fecundidad. Así, se demuestra que, cuando la edad de acceso al matrimonio disminuye, la fecundidad y la pérdida del recién nacido aumentan. El resultado del análisis multivariado indica que la edad al casarse es mayor cuando existen mejores condiciones socioeconómicas. El estudio arrojó una relación inversa entre el lugar de residencia, educación, nivel de vida del hogar y la pérdida de hijos.

Palabras clave: edad al casarse, fecundidad, pérdida de recién nacidos, Rajasthan, Tamil Nadu, India.

ABSTRACT

Using data from the 1998-99 National Family Health Survey-2, India, this paper attempts to investigate the relationship between the age at marriage on fertility and child loss in two socioculturally different states of India: Rajasthan and Tamil Nadu. In the research, I have used the number of children born as a measure of fertility, which shows that lower age at marriage results in higher fertility and child loss. The result from multivariate analysis indicates that age at marriage increases with higher socioeconomic conditions. The study yielded an inverse relationship between the place of residence, education, household standard of living, and child loss.

Key words: Age at marriage, fertility, child loss, Rajasthan, Tamil Nadu, India.

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INTRODUCTION

Biological, cultural and socioeconomic conditions together determine the ability to conceive a child, as well as number of children a woman wishes to have (Population Reference Bureau, 2000). Generally, the age at which a woman enters to her first nuptial life is directly related to number of children she will bear, because it affects the length of time she will be at risk of becoming pregnant. Of course, unmarried women may also have children, but the vast majority of childbearing takes place after marriage, making age at marriage a valuable indicator of a woman's lifetime fertility.

From time to time, Indian demographers have advocated that women's age at marriage should be raised, so as to reduce the reproductive span of women, and bring down the birth rate. For example, studies by Zachariah & Talwar (1964), Jain (1964) and Agarwala (1967) indicate that we can observe a 10-20% reduction in total birth rate in India, if we raise the female age at marriage from 18 to 20 years old.

Similarly, Afzal, Khan & Chaudhry (1976) studied 700 married women in the suburb of Lahore, Pakistan in an attempt to gather knowledge concerning the major determinants of fertility and family size. They found that the total number of children born to these mothers was 3531 or an average of 5.2 children per mother. The overall average number of children alive for mothers whose age at marriage was under 15 is 5.4; for those married at an average age of 15, the number of children ranges from 4.4 to 4.6. In the case of failed pregnancies and infant mortality also, they obtained a similar relationship, that is to say; women who were married under 15 experienced more pregnancy miscarriages compared to women married at 15 or older.

Adhikari (1996) conducted a study among women in the 15 to 29 age groups in Nepal to see the relationship between early age of marriage, and childbearing and its risk. His findings were that women who were married at a younger age reported more child loss than women who married at later age.

In most of the countries, fertility is predominantly confined to marriage and marriage itself signals the beginning of exposure to the risk of pregnancy. In societies like India, where there is less control of marital fertility, the pattern of first marriage and the proportion of who marries jointly determine the level of fertility. Even in populations in which marital fertility is modestly controlled, marriage patterns still play a dominant role in govern-

ing fertility levels (Sinha, 1996). The above studies indicates that age at marriage is a major factor associated with fertility level and child loss and that this is especially true in the case of India, where not only large families are the norm but also there is a low use of contraception.

Earlier research shows that premature age at marriage results in early childbearing age, which likewise affects the health of both mother and child and leads to child loss and maternal mortality. A number of studies on fertility rate indicate that higher and lower fertility levels in a country are related to variables such as women's education, employment and the modernization process. However, these are the same variables which could contribute to postponing marriage age, ultimately leading to shortening the reproductive period. Therefore, considering the above discussion, the present paper attempts to examine the existing relationship between the variables *age at marriage* and *fertility* (completed family size) and *child loss* in two states (Rajasthan and Tamil Nadu) of India. Rajasthan is located in Northwest part of India, predominantly a patriarchal society, and Tamil Nadu is a Southern state, principally a matriarchal society (Map 1).

MAP 1

Source: Office of the Registrar General (2001).

DATA SOURCE

For the present study, data was obtained from National Family Health Survey-2 (NFHS-2), which was conducted during 1998-99. This survey provides information on fertility, mortality, family planning and important aspects of nutrition, health, and healthcare. The International Institute for Population Sciences (IIPS) in Mumbai, India coordinated this survey, which collected information from a representative national sample of more than 90 000 married women, age 15-49. It covered 91 196 households in 25 states. In addition, this survey also collected information on 32 393 children born during the three years preceding the study. Women currently married, in the age group 15-49, have been taken into consideration in this study (IIPS, 2000).

SOCIO-DEMOGRAPHIC BACKGROUNDS OF TAMIL NADU AND RAJASTHAN

Tamil Nadu is the sixth most populous state of India with a population of 62.41 million (2001), accounting for approximately 6 percent of India's total population and the eleventh most densely-populated state. In 2001, population density was 478 persons per sq. km., having increased from 429 in 1991. This is significantly more densely-populated than the Indian average of 324 persons per sq. km. The population of Tamil Nadu grew by 11.19 percent between 1991 and 2001, the second lowest rate (after Kerala) for that period among populous states of India (states whose population exceeded 20 million in 2001). Its decadal rate of population growth has declined in every decade since 1971, one of only three populous states, along with Kerala and Orissa, to show this trend. The economy of the state is largely agriculture-based, although it is well-developed industrially. The percentage of the population living below the poverty-line was 35 percent in 1993-2004, compared to the national figure of 36 percent. Between 1993-1994 and 1999-2000, poverty declined in Tamil Nadu to 21 percent, compared to 26 percent nationally.

On the other hand, national data indicates that Tamil Nadu performs better in terms of demographic and socioeconomic indicators than India nationally and most other states in the country. The sex ratio of Tamil Nadu is high compared to other states and to India as a whole, second only to Kerala. Approximately 44 percent of the population of Tamil Nadu lives in urban areas, much higher than the national average and also high compared to

Gujarat, one of the more developed states in India. This rapid urbanization is a cause of concern for public-health specialists because of the increase in urban slums. The total fertility rate dropped from 2.1 in 2000 to 1.7 in 2005, possibly due to strong political commitment from governments related to family planning, progressive socioeconomic movements of the past, sustained information programs, increasing educational levels, rising aspirations, and an increase in the standard of life.

The institutional delivery rate of 90.7 percent is very high compared to the national average of 40.7 percent and is even higher than in Andhra Pradesh (68.6 percent), a neighboring state. In Tamil Nadu, skilled birth attendants (SBAs) assist most (93.2 percent) deliveries, compared to 68.6 percent in Andhra Pradesh. Tamil Nadu infant and maternal mortality rates are low compared to the national average and to other states.

Regarding sociocultural practices, Tamil Nadu is predominantly a matriarchal society. In Tamilian families, a daughter enjoys more rights and freedom then a son. In the state, sex-selective abortions are legally banned. The sex ratio in the Dharmapuri district of Tamil Nadu is 952, much higher than that in Gujarat or the national average. Female literacy is higher compared to the national rate. Decision-making powers lie with the females.

Insofar as maternal healthcare is concerned, compared to other states, the state has become one of the top performers in the country in terms of maternal health with its MMR (Maternal Mortality Rate) at 90 in 2008. The reasons behind the decline in maternal mortality in Tamil Nadu are assumed to be the increase in institutional deliveries, deliveries assisted by a skilled birth attendant (SBA), and use of emergency obstetric care (EmOC), when required.

Rajasthan is India's largest state in terms of land area and home to about 6 percent of its population. The 2001 Census registered a population of 56 473 122, a rise of about 28.33 percent since the last census. Both the male (29 381 657) and female (27 091 465) population percentages witnessed growth: 27.51 percent and 29.23 percent, respectively. The sex ratio that stood at 910 in 1991 soared to 922 in 2001. The Census also projected the literacy profile of the state. Among its 28 086 101 people (61.03 percent) found to be literate, 18 279 511 (76.46 percent) were male and a meager 9 806 590 (44.34 percent) were female, a clear picture of the deep-rooted gender division affecting Rajasthan's social fabric.

Meanwhile, although the number of towns and urban centers has grown substantially in the past three decades, nearly three-quarters of the state's

population lives in rural areas and is primarily employed in agriculture, livestock and forestry production. Wheat, millet, edible seeds, cotton, and sugarcane account for almost one-half of the state's income, with animal husbandry and dairy production contributing an additional 10 percent. Development is concentrated in its urban centers of Jaipur, Udaipur, Jodhpur, and Ajmer. Literate and educational levels, electrification, access to public-health facilities, and income levels all show a marked urban bias. Rajasthan's extensive system of rural-development programs targets extending educational, medical and technological benefits to underdeveloped rural areas. However, according to the 2001 Census, 45 percent of rural households lack safe drinking water, electricity and toilets. The status of women and children in rural areas is a significant indicator of unequal development and social conservatism in Rajasthan.

Adverse female sex ratios are documented throughout the state and are attributed in part to childbearing risk, although other factors of female discrimination throughout northern India include male-biased differentials in nutrition, access to medical care, and increasing availability of fetal sex-determination technologies. Dowries, or pre-marriage payment from the bride's to the groom's family, are practiced by almost all caste and class groups in Rajasthan, placing additional economic and social burdens on families with female children. Rajasthan's female literacy rate is 44 percent. While showing improvement over the past three decades, it is below the national rate of 54 percent. Some 80 percent of the thirty-five states reported having higher female literacy in 2001. Encouraging schooling and literacy for female adults and children, particularly in rural areas, is a major agenda for the state's social activists.

Social conservatism in the form of *parda* (literally, "curtain" or "screen") or female seclusion is still observed by the women of some Rajput families and is echoed in restrictions on public activity, modesty of dress and acceptable behavior for girls and women of all castes and classes. Most marriages in all caste and class groups are arranged by parents or other kin. They follow the northern Indian norms of marrying outside one's village or town (exogamy) and marrying within one's caste (caste endogamy). After marriage, girls live in the household of their husband's family (virilocal postmarital residence pattern) and become part of his multi-generational extended family. The life cycle, particularly of young women, revolves around the major event of marriage. This includes young women's sadness at separation from their own natal households and their uncertainties about their reception in

their husband's home. These themes pervade the sad songs sung by young girls during the wedding season, as they walk through their own villages as protected daughters for the last time.

METHODOLOGY

In this study, univariate and bivariate analysis was carried out to see the differentials in age at marriage according to selected socioeconomic and demographic variables. Furthermore, in order to isolate the effect of the independent variable on the dependent one, multivariate analysis involving logistic regression was carried out. In calculating the average number of children born and child loss, women currently married, age 40 to 49, were taken into account, because only these women have experienced the complete family. In case of logistic-regression analysis, I have only considered women currently married, 25 to 49 years old, in order to have a large-enough sample size across the various categories of predictors. Here, the dependent variable is age at marriage, which is categorized by less than or equal to 15 years of age, as a reference category, and 16 years and older as the other. Predictor variables have been selected in order to understand the relationship with dependent variable. Also, in the next step, child loss was taken as the dependent variable, with age at marriage as one of the predictors to understand the effect of early age at marriage.

RESULTS AND DISCUSSION

Marriage in Indian society is a religious duty. It always remains a point of discussion by demographers, due to this peculiar feature. Some demographic data indicates that Indian women have always entered nuptial life at a very young age. Prior to 1951, the average female age at marriage in India was 13. From 1961-65, it rose to 16.3 years and, after three decades, it increased to 17.7 years in 1991. The 2001 Census data indicates that the current age at marriage of Indian women is 18.3 years (Census of India, 2001). In the state of Rajasthan, the current average age at marriage for women (according to the 2001 Census) is 17.6 years and, in Tamil Nadu, 20.6 years (Census of India, 2001).

Sociologists such as Krishnakumar & Rajalakshmi (2005) argue that: "Indian parents are scared to keep their daughters unmarried after puberty as

they have a big responsibility of protecting them due to poverty." They find it difficult to feed everyone in the family and so prefer to "send off" their daughter as early as possible to another family. The United Nations Children's Fund (UNICEF) explains that poor families in India see young girls as an economic burden and their marriage as a necessary survival strategy for the family (Krishnakumar & Rajalakshmi, 2005). The same study indicates that there is a strong relationship between the early age at marriage and various socioeconomic factors in most Asian countries.

Considering the important relationship between the socioeconomic factors and age at marriage, in Table 1, I have analyzed the percent distribution of age at marriage of women currently married, age 15-49, according to their socioeconomic characteristics. For this purpose, age at marriage was classified into two categories: *1)* less than or equal to 15 years of age and *2)* 16 years or older. The selected background variables are: age, residence, religion, caste, education (women's), occupation, standard of living, and exposure to mass media. Findings indicate that, in Rajasthan, the majority of women (more than 60 percent) were married at the age of 15 or less, whereas in Tamil Nadu more than 80 percent of women entered marital life at the age of 16 or more. This indicates that in India there is still a widespread practice of early age of marriage. In the 1978, the government of India passed the amendment Child Marriage Restraint Act, specifying that the legal age for marriage of women is 18 years of age and for men 21.

On the other hand, analysis of the age at marriage *vis-à-vis* place of residence shows that, in Rajasthan, nearly 70 percent of women from rural areas married at the age of 15 or younger and, in Tamil Nadu, both in rural and urban areas, the majority of women married at 16 and older. With regard to religion, it is observed that women from Hindu, Muslim and other religions in Rajasthan entered into marital life at a very young age (15 or younger) compared to Tamil Nadu, where more than 80 percent women of all religions preferred marrying at 16 years or older. Similarly, in Rajasthan, the practice of early-age marriage is predominant among the Scheduled Caste (SC)/Scheduled Tribe (ST) and Other Backward Caste (OBC), as compared to General Caste. The same is true in the case of Tamil Nadu, though the percentage of women is lower as compared to Rajasthan.

Female literacy is considered to be an important determining factor in women's age at marriage, particularly in developing countries. In Western countries, female literacy has little to do with age at marriage, because vari-

ance in female literacy across countries is small. Insofar as female education is concerned, Malaker (1978), Pathak (1980) and Pandey (1984) describe that female literacy in India can alone explain nearly 70 percent variation in female age at marriage. This can likewise be observed from Table 1: more than 73 percent women in Rajasthan who married at 15 or younger were illiterate, 30 percent in the case of Tamil Nadu. This reflects the fact that female education is a strong positive variable for the women's age at marriage.

Another variable which is considered important for female age at marriage in India is work. Nevertheless, Hussain (1968) found that there is almost no relationship between female work and mean age at marriage for females in different divisions of the state of Uttar Pradesh. In one study, Malaker (1978) analyzed rural-urban data on women's employment and age at marriage, and found a negative relationship between these two variables. My analyzed data shows (see table 1) that women who are working entered nuptial life at a very young age (71 percent in Rajasthan and 24 percent in Tamil Nadu married at less than or equal to 15). It is important to point out that most of the women in Rajasthan were employed in the primary sector, such as agriculture.

As expected, the relationship between standard of living and age at marriage indicates that both, in Rajasthan and Tamil Nadu, as the standard of living increases, the age at marriage decreases. In other words, economic well-being is directly related and poverty is inversely related to age at marriage. In a region where poverty is acute, young girls may be regarded as an economic burden and their early marriage is believed to benefit the girl and her family both financially and socially.

In Rajasthan, out of a population of 56 million, 15 million live below the poverty line (Office of the Registrar General, 2001). Therefore, in this state, the marriage of young girls is regarded as a transaction, often representing a significant economic activity for the family. A daughter may be the only commodity a family has left to trade and, sometimes, girls can be used as currency or to settle debts. A girl's marriage may also be perceived as a means of creating stability. Moreover, a close relationship can be observed between exposure to mass media and women's age at marriage. For example, women who are partially or fully exposed to mass media got married at a later age than women not exposed.

To understand the influence of different background variables on age at marriage, a multivariate analysis was carried out. Table 2 summarizes the

TABLE 1

AGE AT MARRIAGE BY WOMEN'S SOCIOECONOMIC CHARACTERISTICS

Background characteristics	Rajasthan		Tamil Nadu	
	Less than 15 years	16 years and older	Less than 15 years	16 years and older
Age				
15-24	59.3	40.7	16.1	83.9
25-34	64.0	36.0	15.1	84.9
35-49	66.6	33.4	22.8	77.2
Residence				
Urban	43.4	56.8	12.5	87.5
Rural	69.6	30.4	23.6	76.4
Religion				
Hindu	65.0	35.0	19.0	81.0
Muslim and others	55.0	45.0	12.0	88.0
Caste				
SC/ST	69.0	31.0	29.0	71.0
OBC	72.6	27.4	15.5	84.5
General	55.0	45.0	2.4	97.6
Education				
Illiterate	73.0	27.0	29.5	70.5
Literate	34.1	65.9	9.7	90.3
Work status				
Not working	58.0	42.0	13.5	86.5
Working	71.0	29.0	24.0	76.0
Standard of living				
Low	71.0	29.0	26.3	73.7
Medium	69.0	31.0	17.4	82.6
High	44.5	55.5	7.2	92.8
Exposed to mass media				
Not exposed	72.6	27.4	27.4	72.6
Fully/partially exposed	35.7	64.3	12.6	87.4

Source: National Family Health Survey, 1998-99.

odds ratio from the results of logistic regression. An odds ratio greater than 1 indicates a positive effect on age at marriage, and a value less than 1 indicates a negative effect. Variables such as age, residence, religion, caste, education, exposure to mass media, and standard of living have a significant relationship to age at marriage in Rajasthan, though the occupation of women does not. However, in Tamil Nadu, variables such as caste, education, occupation,

exposure to mass media, and standard of living of women show a significant relationship to age at marriage. In Rajasthan, women 25-34 show a lower likelihood of having a lower age at marriage, compared to women 35-49 years of age. In this state, women in urban areas are 1.42 times more likely to have a higher age at marriage than those residing in rural areas. Similarly, women who are Muslim and other religions are 1.3 times more likely to have higher age at marriage than Hindu women. On the other hand, education also indicates that literate women are twice as likely to have a older age at marriage than illiterates in either state.

TABLE 2

ODDS RATIOS FROM LOGISTIC-REGRESSION ANALYSIS OF THE LIKELIHOOD OF FEMALE AGE AT MARRIAGE AMONG WOMEN 25-49 YEARS OF AGE

Demographic variables	Rajasthan	Tamil Nadu
	Exp (B)	Exp (B)
Age		
25-34 ®		
35-49	1.225*	0.862
Place of residence		
Rural ®		
Urban	1.422**	1.150
Religion		
Hindu ®		
Muslim and others	1.303*	1.230
Caste		
SC/ST ®		
OBC	0.678*	1.560**
Others	1.040**	7.270*
Education		
Illiterate ®		
Literate	3.410**	2.452**
Occupation		
Not working ®		
Working	0.943	0.783*
Expose to mass media		
Not exposed ®		
Fully/partially expose	0.865*	1.414*
Standard of Living		
Low ®		
Medium	1.160	1.050*
High	2.803**	1.413*

* Significant at 5 percent level. ** Significant at 1 percent level.
Source: National Family Health Survey, 1998-99.

AGE AT MARRIAGE AND FERTILITY

Age at marriage is an important demographic variable, having a great influence on overall fertility. In India, since most births take place after marriage, it seems quite reasonable to assume that age at marriage is likely to affect the number of children a woman eventually bears. A lower age at marriage results in a long reproductive span and higher fertility in Indian societies, as contraception is low (according NFHS-2, only 48.2 percent women practice contraception in India). However, an increase in the age at marriage may lead to a decline in fertility by reducing the reproductive period. For example, Ryder (1959) observed that late marriage eliminated fecund exposure and McDonald *et al.* (1980) analyzed WFS (World Fertility Survey) data from several countries and argued that the level of fertility during the first 30 years of marriage is somewhat lower for women who marry at a very young age, but their completed fertility is at least equivalent to those marrying at older ages. Furthermore, women marrying at an older age may try to compensate for the loss of reproductive life by bearing children at relatively shorter intervals.

In addition, in Table 3, I have analyzed the mean number of children born (CEB) by the women who entered marital life at 15 years or younger, and at 16 year or older for the both states. In Rajasthan, for women who currently have one child, more than 50 percent of them married at 15 or younger, whereas, in Tamil Nadu, for women who currently have one child, 90 percent of them married at 16 or older. For women who currently have two or three children in Rajasthan, nearly 60 percent of them were married at 15 years or younger and, in Tamil Nadu, 80 percent of women currently with two to three children entered marital life after the age of 16. For women in Rajasthan who currently have four or more child, 74 percent of them married at 15 or younger. In the case of a socio economically developed state like Tamil Nadu, the figure is surprising: nearly 37 percent of women married when they were 15 years old or younger, with 64 percent entering conjugal life after 16 (Table 3). This indicates a clear demographic shift in this state, where fertility started declining a decade ago.

To see the relationship between children born and women's age at marriage, I analyzed the average number of children born to women 40-49 and their age of marriage in Table 4 and Figure 1. Both table and figure indicate that the total number of children born in the state of Rajasthan is compara-

TABLE 3

MEAN NUMBER OF CHILDREN BORN BY AGE AT MARRIAGE

Children born	Rajasthan		Tamil Nadu	
	Less than 15 years	16 years and older	Less than 15 years	16 years and older
One child	50.2	49.8	9.9	90.1
Two and three children	59.3	40.7	16.0	84.0
Four and more children	73.9	26.1	36.4	63.6

Source: National Family Health Survey, 1998-99.

tively higher than Tamil Nadu. For women who married younger than 11, their total number of children born is 5.5, whereas for women married between 11-12, 13-14 and 15-16 years of age, their total number of children born is little more than 5.5.

Rajasthan is characterized as a high-fertility state in India. My analysis shows some interesting results: for women who entered marital life after 16, the number of children born is less than 5. In Tamil Nadu, it can clearly be seen that, for women marrying before 16, the children born are more than 4, while women marrying after this age have fewer than 4 children. It is important to note that, for women married at 21, their total number children born in Rajasthan is 3.7 and, in Tamil Nadu, 2.5 (see Table 4 and Figure 1). This finding clearly indicates there is an inverse relationship between the age at marriage and the total number of children born. Also, in a country like India, where there is a low contraception and its use is still debated in religion (Sotelo & Acharya, 2005), the best way to achieve low fertility is to promote an older age at marriage among women.

AGE AT MARRIAGE AND CHILD LOSS

Early marriage as well as early childbearing is harmful to the health of both mother and child. The bodies of mothers who conceive at a young age are still developing and there is competition for growth and development between the mothers and the fetuses. Consequently both mother and child suffer vitamin deficiencies. Babies born to such mothers suffer from low weight at the time of birth. According to the World Health Organization (WHO), such babies show higher mortality and, even if they survive, show poor physical and mental growth. Similarly, the Population Reference Bureau (2000) points

TABLE 4

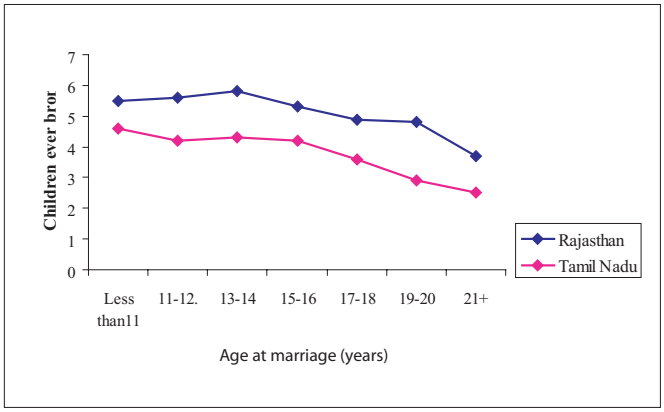
AVERAGE NUMBER OF CHILDREN BORN TO WOMEN 40-49 AND AGE AT MARRIAGE

Age at marriage	Rajasthan	Tamil Nadu
Less than 11	5.5	4.6
11-12	5.6	4.2
13-14	5.8	4.3
15-16	5.3	4.2
17-18	4.9	3.6
19-20	4.8	2.9
21+	3.7	2.5
All ages	**5.3**	**3.5**

Source: National Family Health Survey, 1998-99.

FIGURE 1

AVERAGE NUMBER OF CHILDREN BORN TO WOMEN 40-49 AND AGE AT MARRIAGE



Source: National Family Health Survey, 1998-99.

out that it is generally accepted that childbearing among the women 15-19 doubles the risk of death from pregnancy-related causes compared to women in their twenties.

On the basis of the above discussion in Table 5, I have analyzed the mean number of child loss by age at marriage. In the state of Rajasthan, 74 percent women who married before 15 experienced child loss, while it was 26 percent for women who married after the age of 16. Meanwhile, in Tamil Nadu, nearly 67 percent women who entered conjugal life after 16 experienced

child loss and 33 percent women who married before 15 underwent the same (Table 5).

TABLE 5

MEAN CHILD LOSS BY AGE AT MARRIAGE

	Rajasthan		Tamil Nadu	
Children born	Less than 15 years	16 years and older	Less than 15 years	16 years and older
No child loss	58.6	41.4	14.9	85.1
Child loss	74.1	25.9	33.3	66.7

Source: National Family Health Survey, 1998-99.

The Table above gives us an idea of how age at marriage has is strongly related to child loss. In India, it is common that cohabitation starts immediately after marriage. Wife and husband begin cohabitating after their formal religious ceremony and the age of the woman is not important. In India, the young marriage age has consequences for the bride: by this time, she is not yet physically and sexually mature, with this having severe repercussions on her health. As soon as a woman gets married, she becomes pregnant. Young mothers face higher risks from pregnancy, including complications such as heavy bleeding, fistula, infection, anemia and eclampsia, which contribute to higher mortality rates for both mother and child.

A child born to a young mother is more vulnerable to dying. It is necessary to mention that most of the time young women do not have the autonomy to negotiate with their husbands regarding pregnancy. Hospital-based studies from Nepal show a relationship between teenage pregnancy, pregnancy-induced hypertension (PIH) and anemia. Same studies found that fetal loss and complications during delivery is higher among teen-age mothers (Malla & Shrestha, 1996). In another study of hospital-based data, Adhikari & Amatya (1996) stated that the prenatal mortality rate is twice as great among the children of adolescent mothers as compared to those whose mothers were 19 or older. In addition, evidence suggests that the children of older adolescents (aged 17-19) fared better than those born to younger ones (aged or younger), when comparing low-birth weight and preterm birth.

As the earlier discussion suggests, as can be seen in Table 6 and Figure 2, in Rajasthan, for women marrying younger than 14, the average child loss is 1.3. But, women from this state who entered nuptial life after 15 years of age,

the average child loss is low compared to those marrying at 14 or younger. A similar trend can be observed for Tamil Nadu. For women marrying younger than 11, 11-12 or 13-14, their average child loss is nearly 1. It can be clearly seen that, as the age at marriage increases, the average child loss decreases in Tamil Nadu. In Rajasthan, the average number of children lost per women is 1 and, in Tamil Nadu, 0.58. Child mortality is associated with so many other factors, such as nutrition, immunization, medical attention, morbidity, etc. From the above analysis, it can be said that female age at marriage is a factor associated with child loss. Similarly, some medical-based studies indicate that a child born to a young mother is always at a higher risk of morbidity and

TABLE 6

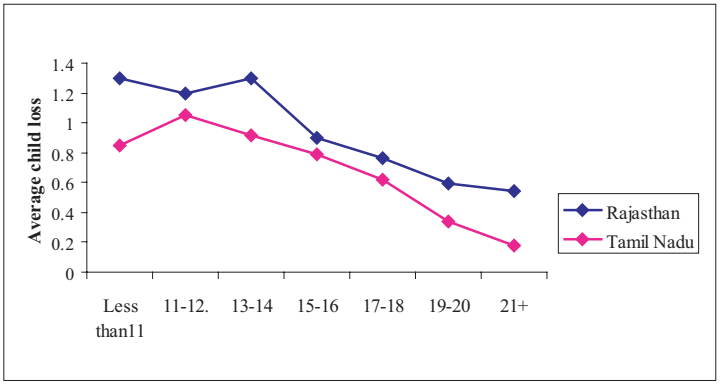
AVERAGE CHILD LOSS TO WOMEN 40-49 AND AGE AT MARRIAGE

Age at marriage	Rajasthan	Tamil Nadu
Less than 11	1.30	0.85
11-12	1.20	1.05
13-14	1.30	0.92
15-16	0.90	0.79
17-18	0.76	0.62
19-20	0.59	0.34
21+	0.54	0.18
All ages	**1.00**	**0.58**

Source: National Family Health Survey, 1998-99.

FIGURE 2

AVERAGE CHILD LOSS TO WOMEN 40-49 AND AGE AT MARRIAGE



Source: National Family Health Survey, 1998-99.

mortality because of the immaturity of mother's body and the same result can also be observed from the analyzed data (Malla & Shrestha, 1996).

In order to see the above relationship, a multivariate analysis was carried out, taking child loss as a dependent variable. Findings indicate that the age at marriage is one of the significant predictors for both states. Table 7 pre-

TABLE 7

ODDS RATIOS FROM LOGISTIC-REGRESSION ANALYSIS OF THE LIKELIHOOD OF CHILD LOSS AMONG WOMEN 25-49 YEARS OF AGE

Demographic variables	Rajasthan	Tamil Nadu
	Exp (B)	Exp (B)
Age		
25-34 ®		
35-49	2.150**	2.760**
Age at marriage		
15 or less ®		
16 or more	0.767**	0.535**
Place of residence		
Rural ®		
Urban	0.953*	0.613**
Religion		
Hindu ®		
Muslim and others	1.215*	1.201
Caste		
SC/ST ®		
OBC	0.754**	0.915*
Others	0.768*	0.617*
Education		
Illiterate ®		
Literate	0.648**	0.655*
Occupation		
Not working ®		
Working	1.218**	1.214
Expose to mass media		
Not exposed ®		
Fully/partially expose	0.610*	0.972*
Standard of living		
Low ®		
Medium	0.868*	0.996
High	0.541**	0.575*

Source: National Family Health Survey, 1998-99.

sents the influence of background variables on child loss and it found that the age of women, age at marriage, place of residence, women's education, household standard of living, and exposure to mass media have significant relationships to child loss in both the states. Controlling other variables, such as age at marriage, indicates an inverse relationship to child loss. Insofar as age at marriage less than or equal to 15 is concerned, there is less likely to be lower child loss compared to women who married at 16 or older. Place of residence, education and household standard of living also showed an inverse relationship to child loss. Similarly, women in urban areas have a lower likelihood of child loss (0.953) compared to the rural areas of Rajasthan, similar to the trend observed in Tamil Nadu. In the case of education, literate women have a lower likelihood of child loss compared to illiterate women. The odds ratios are 0.648 and 0.655 for Rajasthan and Tamil Nadu, respectively. Similarly, this analysis indicates that exposure to mass media and standard of living have negative relationships to child loss.

CONCLUSIONS

The link between age at marriage, and fertility and child mortality has been shown in several experimental studies. The importance of these results should not be understated. In both a positive and normative sense, these insights have potential to solve important puzzles in economics and, more generally, in the social sciences. In this study, I use a procedure to see how two distinct societies affect demographic characteristics. These societies are unique in that Tamil Nadu represents an example of a matrilineal and Rajasthan represents an example of a patriarchal society. This study strongly confirms the hypothesis that there is an inverse relationship between age at marriage, and fertility and child loss. Women who entered their conjugal life at an early age have a higher number of children born, as well as higher child loss. The same result is also obtained from multivariate analysis.

The findings from the analysis show that there are some considerable differences between the two states studied (Rajasthan and Tamil Nadu). About half of the female population 25-49 years of age married before the age of 15 in Rajasthan and about four-fifths of the women before reaching the legal minimum age at marriage. This kind of practice is common in low socio-economically developed states in India, as can be seen in the case of Rajasthan. This is an obstacle to the country's achieving stable population growth. In

this context, it is important to enforce legal female age at marriage in lower socio-economically developed states such as Rajasthan.

Earlier discussion also points out that higher fertility rate and child loss are strongly related to early age at marriage. This indicates that if a woman gets married at an early age, she has a more fecund life, maximizing the time to get pregnant, as we can observe in the case of Rajasthan. Another factor which is highly related to early age at marriage is lower level of education in women. More education for women can be expected to yield greater use of reproductive health services and better prospects of employment. Programs improving the economic status of women can also bring about positive changes, since economic factors are responsible for early marriage and child bearing. Finally, IEC (Information, Education and Communications) needs strengthening so that people will be aware of the adverse effects of early age at marriage.

In conclusion, women's age at marriage is an important variable in reducing fertility levels and child loss, as we have seen in earlier discussions. Therefore, population policies aimed at reducing fertility levels should consider marriage as an element of fertility change and child loss. It is observed that the pattern of female age at first marriage in both states is undergoing transformation, but there is still enough room to raise females' age at marriage, especially in the case of lower socio-economic developed states like Rajasthan.

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