Original Article

Effects of age, years of schooling, income, and cash incentive on postponement of first pregnancy among newly married couples in Satara district of Maharashtra (India)

Abstract

Context: Postponement of first pregnancy is known to be associated with a variety of interdependent factors such as age, education, income, occupation, religion, caste, and cash incentives. This paper examines the relationship and effects of some of these factors on postponement of first pregnancy among newly married couples in Satara district. **Objective:** To study the interdependency of age, years of schooling, income, and cash incentive on postponement of first pregnancy among newly married couples. **Materials and Methods:** This study employed quasi-experimental study design. Duly trained multipurpose workers interviewed husbands and auxiliary nurse midwives (ANMs) interviewed the wives; preferably in separate rooms using pretested semi-open proforma. Statistical analysis was done using STATA® version 12 statistical software. **Results:** Out of 1,355 participants; 704 couples successfully postponed first pregnancy by 2 years, but 651 couples could not do so. Participants were significantly successful in postponing pregnancy by 569.13 vs. 353.89 days for controls. Age and education of female participants were significantly associated with postponement of first pregnancy; while age, education, and income of male participants were not associated with postponement. **Conclusions:** Higher age, more education, and higher income appear to be associated with acceptance of postponement of pregnancy and appear to be acting synergistically in both male and female participants as compared to nonparticipants.

Key words: Multivariate analysis, postponement of first pregnancy, second honeymoon package

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INTRODUCTION

Since 2007, Satara district has introduced the voluntary scheme "Second Honeymoon Package" (SHP). SHP has been designed for postponement of pregnancy among newly married couples within few months of their marriage. By the time the couple is enrolled for the benefit of postponement of first pregnancy, their first honeymoon is already over. Their second honeymoon would commence after the desired period of postponement of first pregnancy. Hence the name "Second Honeymoon Package" is given to the scheme. If couples who had married after April 2007 and registered themselves with the Zilla parishad and deferred having children for 2 years, they were promised an incentive of Rs. 5,000. Couples who opted to wait for a third year would earn Rs. 7,500. Postponement of first pregnancy is known to be associated with a variety of factors such as age, education, income, occupation, religion, caste, and cash incentives. This paper examines the relationship and effects of some of these factors on postponement of first pregnancy among newly married couples in Satara district. Identification of influencing factors may help to improve the participation in SHP.

Objective

To study the interdependency of age, years of schooling, income, and cash incentive on postponement of first pregnancy among participants and nonparticipants of SHP in Satara district.

MATERIALS AND METHODS

Institutional ethics committee has given clearance wide its letter dated 12th October 2010. This study employed quasi-experimental study design. Cases were the participants of SHP program. Participants were selected by stratified random sampling. The strata being considered is taluka (smaller administrative unit of the district). In the state of Maharashtra, there are 33 districts. In Satara district, there are 11 talukas. Sample size was calculated using the formula:

$N = 4\sigma^2 (Zcrit + Zpwr)^2/D^2$. Minimum required sample size was 1,157. Considering the population of various talukas in 2001 census, proportionate weightage was given to the acceptors and nonacceptors from each taluka. Considering 10-15% possible dropouts and taluka wise population; adequate sample size was selected. The controls were taken from the same area as that of acceptors, married in the same year without matching for their age, literacy, socioeconomic status, etc. Criteria for inclusion: Bride should be more than 18 years of age and groom should be at least 21 years old. They are required to produce birth certificates. They should be residents of Satara district. They should be legally married on or after 1st April 2007. They should produce the marriage certificate within 3 months of participation.

Criteria for exclusion-Couples having any living issues, participants having second wife or living children from second wife, extramarital relationship (live-in relationship), underaged couples where wife is less than 18 years of age and husband less than 21 years of age and couples who are not permanent residents of Satara district (e.g., sugarcane cutters, brick plant workers, etc.)

Data collection tool was filled up by duly trained auxiliary nurse midwife (ANM) and multipurpose male health workers (MPW). Separate training sessions were held in each primary health centers by the investigator, taluka medical officer, health supervisors from the district health office, Zilla parishad, Satara. ANM and MPW were required to visit each house as a pair. MPW interviewed husbands and ANM interviewed the wives preferably in separate rooms using pretested semi-open proforma. Name was recorded as first name, husbands name followed by name of the father-in-law, and lastly surname. Age was recorded in completed years, detailed residential address is noted. Average monthly income of the entire family was recorded. Participants were asked whether they are eligible for the prize or not and whether they have got the prize money. Data collection was done from November 2010-June 2012 period. Statistical analysis was done using STATA® version 12 statistical software.

RESULTS

Out of 1,355 participant couples selected for this study; all women and 1,303 men could be contacted. Out of 1,350 control couples; 1,267 men could be contacted; while all females were interviewed. Females were more accessible than males. All females could be contacted, whereas 52 male participants (3.8%) and 83 male controls (6.8%) could not be contacted in spite of repeated attempts. Most were out of station due to job-related reasons, some had moved away due to marital discords, etc.

Table 1 shows that female and male participants were significantly older, more literate, and wealthier than their controls. Avoiding pregnancies in initial few years of marriage was possible in 704 (51.95%) of participants. Duration of postponement in days was 569.13 ± 413.57 for participants and 353.89 ± 273.18 for controls. When this difference was subjected to two-tailed unpaired *t*-test, it was found to be highly significant ($P < 0.0001$). It indicates that the SHP was effective in postponing the pregnancy for 215.24 days more in the participants than controls. Considering the fact that difference in age, years of schooling, and income was highly significant between participants and controls; thereby both were not comparable directly. It was necessary to differentiate whether the observed difference in postponement between acceptors and controls was due to the SHP or due to the confounders like age, education, and income. In absence of volunteering for participation in SHP, the characteristics which were responsible for postponement of first pregnancy were education of the wife, education and occupation of the husband, socioeconomic status, etc., were naturally different between acceptor (study) and nonacceptor (control) groups. Study and control groups drawn from the same population should have had same characteristics. Study and control groups were comparable except the acceptance of SHP. Study group was therefore representative of acceptors in the community and control group representative of nonacceptors in the community. Stratification and application of multivariate analysis of variance (MANOVA) was undertaken to take care of these differences.

Table 1: Sex-wise distribution of age, schooling, and income of participants and controls

	Participants	Controls	Two tailed unpaired t value	*P*-value
Age in years				
Females	22.45±2.46 (*N*=1,355)	22.01±2.48 (*N*=1,350)	4.632 df=2,703	<0.0001
Males	27.56±2.86 (*N*=1,303)	27.1±3.16 (*N*=1,267)	3.871 df=2,568	<0.0001
Number of years of schooling				
Females	11.19±3 (*N*=1,355)	10.33±2.63 (*N*=1,350)	7.927 df=2,703	<0.0001
Males	11.81±2.82 (*N*=1,303)	10.75±2.85 (*N*=1,267)	9.477 df=2,568	<0.0001
Monthly family income in rupees				
Family	10,047.3±9,355.49 (*N*=1,355)	7,470.2±7,653.5 (*N*=1,350)	7.84 df=2,703	<0.0001

Df = Degrees of freedom

Stratification

In each variable (age, years of schooling, and income) three different strata were made. Acceptors and controls were divided according to these strata. Their mean postponement in days was compared in each strata using *t*-test. Table 2 shows the relationship of postponement of pregnancy with different strata of age, years of schooling of female participants/female controls, and monthly family income. In all these strata difference between participants and controls was statistically significant ($P < 0.0001$).

In all the three strata, difference between maximum and minimum postponement of pregnancy was more amongst older, better literate, and wealthier participants as compared with their controls. This means that postponement was accentuated synergistically in older, educated, and richer participants.

Multivariate analysis

There were 704 couples out of 1,355 participants (51.95%) who had postponed their pregnancy for more than 2 years. They were eligible to get the cash prize of Rs. 5,000. Six hundred and fifty-one couples could not postpone their pregnancy by at least 2 years and were not eligible for the prize. This gave the success rate of 51.95%.

In this study, participants were significantly better than controls with respect to age, educational standard, and income. Thereby, it was difficult to comment upon the impact of SHP program on the postponement of pregnancy unless these three confounders were adequately analyzed. In male and female participants; there was a range of age groups, income earned, and years of education. Each group was again split into those who could postpone the first pregnancy by 2 years and those who could not postpone the same by 2 years. This was a sort of natural experiment. This study exploited this natural experiment to analyze the effects of these interrelated variables. So in each group, the variance of dependent variable (success in postponement of first pregnancy) was analyzed with variance of age, education, income, and various combinations of them (independent variables). Here, the three variables; age, education, and income were treated as continuous variables.

Table 3 shows that multivariate tests with the model and variables like age, education, and interaction of age with education reject the null hypothesis indicating some kind of difference between the four dimensional mean vectors of the model. That means these factors are responsible for postponement of first pregnancy in female participants. Here 'W' stands for Wilk's lambda. Here, we were testing the model and variables age, income, and education. We were using residual error for the denominator of the test. The next column gave the multivariate statistics. Here, the Wilk's lambda was 0.9892. Wilk's lambda had F statistics of 2.10 with 7 and 1,348 degrees of freedom which produces *P*-value of 0.0405. In this table, the F statistics (and corresponding *P*-value) was exactly F distributed. Multivariate tests for variable 'income' and various interactions of income indicates acceptance of null hypothesis. That means there was no difference among multidimentional mean vectors for the groups. In this table the F test for Wilk's lambda is exact because there was only one dependent variable in the model.

Table 4 shows the multivariate analysis in the group of male participants. 51.95% male participants have succeeded in postponing the birth of their child for a minimum period of 2 years. Remaining 48.05% of them failed to postpone child birth by 2 years. This gave us the opportunity to test two groups within male participants with regard to variables like age, education, income, and interactions of these three. All multivariate tests accepted the null hypothesis,

Table 2: Stratification according to age and years of schooling of female participants/female controls and monthly family income

Subgroups	Mean postponement in days by participants	*N*	Mean postponement in days by controls	*N*	t value	Degrees of freedom	*P*-value
Age of female participant/female control							
≥20	356.7±135.3	281	258.3±58.9	402	12.94	681	0.0001
21-24	541.1±221.4	842	367±115.3	678	18.55	1,518	0.0001
≤25	612.7±210.9	232	407.5±123.7	223	12.6	453	0.0001
	256 days		149.2 days	Difference between mean duration of postponement by youngest and oldest participants and controls			
Years of schooling of female participant/female control							
≥7	410.6±241.3	197	361.2±201.3	307	2.485	502	0.013
8-10	522±185.2	601	331.7±125.8	587	20.67	1,186	0.0001
≤11	623.1±202.3	557	412.3±128.1	409	18.52	964	0.0001
	212.5 days		51.1 days	Difference between mean duration of postponement by lowest and highest educated participants and controls			
Family income of participants/controls in rupees							
≥4,000	427.1±281.3	287	321.7±122.1	494	7.24	779	0.0001
4,001-10,000	512.7±201.2	610	325.2±110.7	322	15.52	930	0.0001
≤10,001	679.1±189.6	458	487.3±108.9	487	19.21	943	0.0001
	252 days		165.6 days	Difference between mean duration of postponement by poorest and richest participants and controls			

Table 3: Relationship between age, years of schooling, and income among those who postponed first pregnancy and those who could not postpone first pregnancy among female participants

Source of variation		Statistic	df		F (df l, df 2) = F		Prob > F	
Model	W	0.9892	7	7.0	1,348.0	2.10	0.0405	e
Residual			1,348					
Age	W	0.9943	1	1.0	1,348.0	7.66	0.0057	e
Education	W	0.9950	1	1.0	1,348.0	6.82	0.0091	e
Interaction of age and education	W	0.9951	1	1.0	1,348.0	6.60	0.0103	e
Income	W	0.9981	1	1.0	1,348.0	2.57	0.1095	e
Interaction of age and income	W	0.9982	1	1.0	1,348.0	2.49	0.1146	e
Interaction of education and income	W	0.9979	1	1.0	1,348.0	2.87	0.0907	e
Interaction of age, education, and income	W	0.9978	1	1.0	1,348.0	2.92	0.0876	e
Residual			1,348					
Total (N)			1,355					

W = Wilk's lambda, df = Degrees of freedom, e = Exact

Table 4: Relationship between age, years of schooling, and income among those who postponed first pregnancy and those who could not postpone first pregnancy among male participants

Source of variation		Statistic	df		F (df l, df 2) = F		Prob > F	
Model	W	0.9931	7	7.0	1,296.0	1.28	0.2576	e
Residual			1,296					
Age	W	0.9999	1	1.0	1,296.0	0.09	0.7693	e
Education	W	1.0000	1	1.0	1,296.0	0.00	0.9484	e
Interaction of age and education	W	1.0000	1	1.0	1,296.0	0.00	0.9587	e
Income	W	1.0000	1	1.0	1,296.0	0.02	0.8826	e
Interaction of age and income	W	1.0000	1	1.0	1,296.0	0.03	0.8552	e
Interaction of education and income	W	0.9999	1	1.0	1,296.0	0.16	0.6935	e
Interaction of age, education, and income	W	0.9999	1	1.0	1,296.0	0.15	0.6969	e
Residual			1,296					
Total (*N*)			1,303					

W = Wilk's lambda, df = Degrees of freedom, e = Exact

indicating that there was no difference between the four dimensional mean vectors of the model. Here, the Wilk's lambda was 0.9931. Wilk's lambda has an F statistic of 1.28 with 7 and 1,296 degrees of freedom; which produced *P*-value of 0.2576.

This MANOVA analysis shows that there was no effect of age, education, income, and their various interactions on the postponement of pregnancy in case of male participants. So it may be deduced that the difference seen in participants and controls (both male groups) may be due to an extraneous factor such as cash incentive in SHP program.

DISCUSSION

Findings of the present study suggested that the idea of not having children within 2 years of marriage is more acceptable to older, better educated persons having good job, and therefore wealthier. In the SHP program, the participation is purely on voluntary basis. It is known that individuals who volunteer for a community-based intervention possess different characteristics than the average individuals in the target population. This is known as volunteer bias. Bias is said to be introduced if the association between participation & the benefits accrued thereof differs between study volunteers and control group. They are related to the exposure to preferential healthcare and they can either bias the study or they may affect the external validity of the study.[1] Volunteer bias is defined as the bias that comes from the fact that a particular sample can contain only those participants who are actually willing to participate in the community-based intervention.[2] In this present study, this issue is addressed by two methods.[3]

1. Adjusting (stratification)
2. MANOVA

Adjusting (stratification)

In case of stratification according to the age, years of schooling, and family income; participants are significantly more successful in postponing pregnancy than their controls ($P < 0.0001$). Jejeebhoy have made similar observation that education empowers women, provides increased autonomy, and results in fewer children in almost every context. They raised the questions like what are the critical pathways influencing the relationship of woman's education to fertility? Is the fertility affected because education raises the age at marriage, or because it increases the practice of contraception, or because education reduces women's preference for large number of children? Improvement in education empowers women in other areas of life such as their increasing exposure to information,

decision making, control of resources, and confidence in dealing with family and outside world.[4] This study has observed that mature, well-educated, and wealthier women could postpone their first pregnancy to a maximum extent. Some difference was there in absence of SHP. Due to SHP, we observed the synergistic effect. Difference has accentuated and became more favorable to the previous trend.

MANOVA

It was observed that the model, age, education, and interaction of age and education were significantly associated with postponement of pregnancy of female participants ($P < 0.05$). But, income and various interactions of income with other variables did not have any effect on success in the program ($P = 0.09$, not significant (NS)). Similarly, multivariate analysis was performed for male participants. In this group; age, education, income, and various interactions of these three did not show any influence on success in postponement ($P = 0.25$, NS). So it can be inferred that the difference observed between failures and successful participants is more affected by the age and education of the females than males.

Sharma *et al.*, have found that maximum utilization of contraceptives was seen in women of age group 30 or more, educational level above high school and above, and those of higher socioeconomic class.[5] Similar findings also noted by Moore *et al.*, while studying age at first child birth and latter poverty. They found that the effect of age at first birth is hypothesized to be mediated by intervening variables like educational attainment, age at marriage, family size, women's work experience, earnings, and the earnings of other members of the household. They have observed that early child bearing leads to poverty.[6]

Bongaarts has studied the patterns of education differentially in wanted and unwanted fertility during demographic transition in 57 less developed countries. He observed that the educational composition of the population remains a key predictor of overall fertility and low levels of schooling can be a case of high fertility.[7] Moore *et al.*, have studied the association between teenaged parenthood and economic status. They have noted that early child bearing is more common among women from disadvantaged background. The effect of income on fertility is mediated by intervening variables including educational attainment, age at first marriage, family size, and woman's work experience.[6] Singh and Becker have observed that couples from richer wealth quintiles have longer desired waiting time to birth for newly wed couples in India.[8] Economist Caucutt *et al.*, have determined that women with the lowest wages have more children and have them earlier than do women with the highest wages. They have found that the age at which women have their first child increases from 23 years for women with the lowest wages to 26.7 years for women with the highest wages.[9]

Zhang *et al.*, have studied the current status of contraceptive use among rural married women in Anhui province of China. They have selected 53,652 married women aged 18-49 years by multistage sampling. They have observed that the use of contraceptive methods was associated with age, education, parity, frequency of sexual intercourses in a month, and contraceptive knowledge of rural married women.[10] These findings agree with those in the present study. Hogan and Biratu have studied the effect of education and socioeconomic status on the use of contraceptives in southern Ethiopia. They have collected data from currently married women in the age group of 15-49 years; during 1990-1997. They have concluded that household extension and polygamy characterize one-third of women sampled. Women's literacy and autonomy are the most significant forces in the movement toward low fertility in the region.[11]

Similar findings have been made by Schuler *et al.*, while studying the timing of child bearing among rural families in Bangladesh. Their findings have suggested that norms supporting early child bearing were beginning to erode and aspirations for women are a key factor in this erosion. Poor families have tended to see the costs of education and delayed marriage for daughters as high and the outcomes were uncertain. At the same time, they have also become aware that early child bearing entails costs and risks.[12]

CONCLUSIONS

1. Higher age, more education, and higher income appear to be associated with acceptance of postponement of pregnancy and appear to be acting synergistically in both male and female participants as compared to nonparticipants.
2. Age and education of female participants were significantly associated with postponement of pregnancy; while age, education, and income of male participants were not associated with postponement.

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