Association between marital status and health: examining the role of age and gender

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26 October 2008

Association between Marital Status and Health: Examining the Role of Age and Gender[1]

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Abstract

The paper examines the association between marital status and self-reported health status of Indian adults. A nationally representative cross-sectional data surveyed by National Sample Survey Organisation (NSSO) in 2004 is used. Results confirm linkages between marital status and health and show that this relationship is sensitive to the age and gender. Based on findings, the paper argues that the implication of marital status on health could be different for adults of different age group and gender.

Key words: Self-reported Health Status, Marital Status, Ordered Probit Regression

JEL Classification: I12, J12, J14, J16, C31

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1. Introduction

Despite sustainable economic growth, reduction in mortality rate and increase in life expectancy, a large section of Indian populations live with poor health conditions. Over 9 percent of the Indian population report for acute and chronic ailments and it varies from 7.4 percent in children of age 0-14 years to 30.4 percent among persons of age 60 years and above (NSSO, 2006). Therefore, to provide better health is one of the biggest challenges for India. Further, in the last few decades India has also witnessed a number of demographic changes related to marital and other socio-economic behavior of population e.g. increase in age at first marriage; decline in marriage rates, which results rise in proportion of never married; increase in divorce rate, leading to more share of divorced or separated in the population. These changes in the marital status composition of population may have important implications for health care as the association between marital status and mortality is well-known. Though numerous studies in developed and developing countries are focused on association of marital status and health, very little is known in Indian context. Moreover, it is quite possible that for India the relationship between health and marital status is different from earlier studies due to its diversified and unique cultural and societal bond. Motivated by this, using 60th round of NSS data the present paper plans to make a fresh look at the relationship between marital status and health and to see how this association varies by sex and phases of life.

The rest of the paper is organized as follows: section 2 is devoted to a brief review of literature. Estimation methods are outlined in section 3 and data and variables used in the analysis are described in section 4. Section 5 of the paper reports estimation results and paper ends with discussions on the findings in section 6.

2. Review of Literature

The association between marital status and health has been a quite interesting area of research for more than a century[2] and many scholars from different disciplines have tried to establish the

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[2] see Durkheim (1951) for the association between social relationships and suicide in the 18th century

mechanism through which marriage and health are associated to each other[3]. Over the last few decades, numerous studies have shown advantages of being married on health of individuals (Rahman 1993; Zick and Smith 1991; Hu and Goldman 1990; Kisker and Goldman 1987; Livi-Bacci 1984) and it is found that married have lower rates of mortality, morbidity, and mental disorders in comparison to single[4] (Goldman, Korenthan, and Weinstein 1995; Verbrugge 1979a; Kobrin and Hendershot 1977; Gove 1972; Berkman 1962). Also, divorced and separated have the highest rate of poor self-reported health status, followed by the widowed (Verbrugge 1979b). Furthermore, married people experience less psychological distress than those who are single and also report greater life satisfaction (Barrett 1999; Ross 1995; Gore and Mangione 1993; Ross, Mirowsky, and Goldsteen 1990; Gove, Hughes, and Style 1983). Recent literature found that household composition and living arrangements associated with marital status may partially explain the differences in health status among various marital status groups (Hughes et al. 2002; Lund et al. 2002; Michale et al. 2001). However, two major theories which studies suggest are theory of marriage protection and theory of marriage selection. These theories explain possible mechanism through which the association between marital status and health works (Kobrin and Hendershot 1997; Gove 1973). In one hand, former theory asserts that marriage may have protective effect on health through social integration and social regulation (Kobrin and Hendershot 1977); increase in economic resources (Trovato and Lauris 1989); reduction in risk behaviors like smoking, heavy drinking and substance abuse; by providing social and psychological support and also a source of instrumental support for tasks like household work (Umberson et al. 1992) etc. On the other hand, theory of marriage selection suggests that healthier people are more likely to get married and remain into the marriage, whereas less healthy people either do not marry or are more likely to be thrown out of marriage system via separation, divorce, or widowhood. Though marriage positively affects health of both men and women, several studies suggest for gender differential in its association with health and generally its advantages have been found greater for men than women (Lillard and Waite 1995; Cherlin 1991; Hu and Goldman 1990; Ross et al. 1990; Weiss 1984; Kobrin and Hendershot 1977; Gove 1973; Gove and Tudor 1973). Also it has been widely reported that even among women, single enjoys better health status than married women (Carter and Glick 1976; Bernard 1972) and

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[3] see Gove (1973) and House, Landis, and Umberson (1988)
[4] includes never married, divorced, separated and widowed

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unemployed married women had better health trends than their unmarried counter parts (Waldron, Hughes, and Brooks 1996). But Hahn (1993) and Lillard and Waite (1995) argue that unlike men, among women much of the differential in marital status and health is explained by the differences in economic well-being. Possibly due to this reason, women's health is more vulnerable to poverty than that of men. Further, the life course perspective[5] suggests that the association and mechanism operating relationship between marital status and health changes with age. This may be due to a range of factors associated with age, such as the change in marital quality, propensity to engage in risky or otherwise negative health behaviors, social norms which prescribe marriage, social supports for or acceptance of the non-married status, and the quality of other relationships throughout the life course. Most of the studies find that quality of marital life follows a curvilinear pattern in which marital quality is found highest in younger adulthood and old age and lowest during middle age (Orbuch et al. 1996; Glenn 1989; Lawson 1988)[6]. Thus, from the above literature it is evident that ageing, marital status and health are inter-linked and the relationship may vary from male to female and within and between age group.

3. Estimation Methods

The empirical estimation is based on reduced form of Grossman's (1972) basic model which has been tested in numerous studies (Grossman 2000 and 1972; Nocera and Zweifel 1998; Erbsland et al. 1995; Pohlmeir and Ulrich 1995; Wagstaff 1993 and 1986; Leu and Gerfin 1992; Van Doorslaer 1987; Cropper 1981) related to health. Multiple outcome dependent variables are widely used in studies and estimations have been done with multinomial logistic or multinomial probit techniques (Greene 2003; Amemiya 1981). However, in cases where multiple choice outcomes are ordered, these techniques fail to account their ordinal nature and in that situation ordered logistic or ordered probit models are the only appropriate tools of analysis. The key feature of these models is the dependence of all the choices on a single index function and there are not many differences in these two models in terms of estimates. We will use ordered probit

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[5] arose from a confluence of movements in sociology and psychology in the 1960s subsequently came to involve economists, anthropologists, historians, and others
[6] however, studies due to VanLaningham, Johnson, and Amato (2001) and Umberson et al. (2005) are exceptions of this finding

model of estimation by formulating it through a latent health variable h^* which is unobserved (an individual's 'true' health status) and depends on a linear combination of regressors:

$$h^* = \beta' x + \varepsilon, \qquad\qquad (1)$$

where x is a set of explanatory variables, β is a set of unknown parameters associated with these regressors and ε, disturbance term uncorrelated with $x's$ and $\varepsilon \sim N(0, \sigma^2)$.

Here, self-reported current health status has been used as dependent variable. In series of estimations, the latent health variable h^* defines variable h_i, which is related to the health variables. Higher the value of latent variable, higher will be the probability that the individual reports a higher category in the self-assessed health scale from poor to excellent or very good health status.

However, h^* and h_i are related to the above mentioned categories in the following way:

$$h_i = \begin{cases} 0 & if \quad \gamma_1 \geq h_1^* \\ 1 & if \quad \gamma_2 \geq h_1^* \geq \gamma_1 \\ ... & ..... \quad ...... \\ M-1 & if \quad h_1^* \geq \gamma_{(M-1)} \end{cases}$$

where $\gamma_1, \gamma_2, ...\gamma_{(M-1)}$ are unknown parameters (thresholds) to be estimated with β_s and M is the number of categories.

Greene (2003), however, points out that the interpretation of the estimates is not straight forward. A positive estimate of explanatory variable X_k indicates that an increase in the variable X_k shifts weight from low end category (category 0, say) to highest end category (M-1), which means that the probability of highest end category (M-1) increases and the probability of low end category decreases. Further, the sign of the coefficients shows the tendency of the variation in the probability of belonging to the highest category due to an increment in the corresponding explanatory variable.

4. Data and Variables

The present study is based on 60th round (Schedule 25.0) data which is collected by National Sample Survey Organization (NSSO) during a period of January to June 2004. This particular

survey has been conducted using a stratified multistage sampling design and covers 73,868 households from all over India except some inaccessible regions. The data set provides a wealth of information on socio-economic, demographic and health status of individuals. Following the nature of study, analysis is carried out by taking a sample of individuals having age 18 years and above from the entire dataset.

The definitions and descriptive statistics of variables used in the analysis are presented in Table 1. The paper uses self-assessed current health status as dependent variable which is an ordered categorical variable with 3 response categories on a self-rating scale of 1 to 3 (1=Excellent/very good, 2=good/fair, 3=poor) in descending order of health status. To avoid any confusion in interpretation of results, these variables have been recoded in reverse order (ascending order) before using in the analysis. Evidences suggest that these type of categorical health measure are increasingly common and comprehensive measure of health in empirical research (e.g. Smith 1999; Deaton and Paxson 1998; Keneddy et al. 1998; Idler and Benyamini 1997; Ettner 1996; Saunders 1996; Schofield 1996) as it predicts disability, morbidity, and subsequent mortality (Idler and Kasl 1995; McCallum et al. 1994; Connelly et al. 1989; Okun et al. 1984). Further, a close correlation has been observed between self-reported health status and actual physical measures of health (Rahman and Barsky 2003) and allows examination of how health status varies over the life course (Case and Deaton 2003). Analysis is based on four different models each for seven age groups: younger adults, middle aged, older, older old adults, adults, elderly and all persons and for men and women separately. These four models are characterized by marital status variables[7] used in different forms. In model I, three 0-1 dummies for marital status: never married, widowed, and divorced/separated are included whereas currently married is kept outside the model as reference category. In model II, currently married 0-1 dummy for marital status is used with single as reference marital class. Similarly, model III compares effect of never married versus others and in model IV, the effect of widowed and divorced/separated are compared with currently married and never married taken together[8].

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[7] marital status is classified as never married, currently married, widowed and divorced/separated
[8] For the sake of simplicity, only effects of marital status variables have been reported in the estimation tables 5, 6 and 7. However, full estimation results can be obtained from the author

Table 1: Definitions and Descriptive Statistics of the Variables used in the Analysis

Variable	Definitions	%	Mean	SD	Min	Max
Dependent Variable						
Current Health Status: Ordered	Assessment of own current health status on a three-point scale (1=poor; 2=good/fair; 3= Excellent/very good)	-	1.8	0.5	1	3
Poor		23.4	-	-	1	1
Good/Fair		70.9	-	-	2	2
Excellent/Very Good		5.7	-	-	3	3
Explanatory Variables						
Gender: dummy	1 if male; 0 if female	50.3	-	-	0	1
Age (years)	Age (years)		38.1	15.3	18.0	110
Age-Square/100	Age squared/100		16.9	13.6	3.2	121
Marital Status						
Never Married: dummy	1 if never married	15.6	-	-	0	1
Currently Married: dummy	1 if current married (Reference Category)	75.4	-	-	0	1
Widowed: dummy	1 if widowed	8.4	-	-	0	1
Divorced/Separated: dummy	1 if divorced/separated	0.6	-	-	0	1
Educational Status						
Illiterate: dummy (reference category)	1 if illiterate	41.6	-	-	0	1
Literate but up to primary : dummy	1 if literate but up to primary (includes informal schooling, below primary and primary	21.3	-	-	0	1
Middle or secondary: dummy	1 if middle or secondary; 0 otherwise	24.7	-	-	0	1
Above higher secondary : dummy	1 if above higher secondary	12.4	-	-	0	1
Location Characteristics			-	-	0	1
Sector: Dummy	1 if rural; 0 if urban	72.5	-	-	0	1
Religion			-	-	0	1
Hindu: dummy (reference category)	1 if Hindu	83.8	-	-	0	1
Muslim: dummy	1 if Muslim	11.0	-	-	0	1
Christianity: dummy	1 if Christianity	2.2	-	-	0	1
Sikhism: dummy	1 if Sikhism	1.9	-	-	0	1
Others religion: dummy	1 if Jainism/Budhism/ Zoroastrianism/others	1.2	-	-	0	1
Social Group						
Social Group: dummy	1 if Scheduled Tribe/Scheduled caste	27.0	-	-	0	1

Table 1 Contd…

Variable	Definitions	%	Mean	SD	Min	Max
Size of household	Size of household	-	5.8	2.9	1.0	40.0
Logarithm of hh mpce	Logarithm of household monthly per capita expenditure (Rs.)	-	6.3	0.6	-2.3	11.1
Facility Index	Index for facility[9]	-	0.5	0.6	-0.1	1.9
Relative Health Status Compared to previous year*						
Deteriorated: dummy	1 if current health status deteriorated (somewhat worse/worse) compared to previous year	20.5	-	-	0	1
Almost the Same: dummy (reference category)	1 if current health status is almost same as compared to previous year	66.4	-	-	0	1
Improved: dummy	1 if current health status improved (somewhat better/better) compared to previous year	13.1	-	-	0	1
Age group						
Younger Adults	Adults having age >=18-<=34 years	47.3	-	-	0	1
Middle Aged Adults	Adults having age >=35-<=59 years	41.1	-	-	0	1
Older Adults	Adults having age >=60-<=75 years	9.8	-	-	0	1
Older Old Adults	Adults having age > 75 years	1.9	-	-	0	1
Adults	Adults having age >=18-<=59 years	88.4	-	-	0	1
Elderly	Adults having age >=60 years	11.6	-	-	0	1

*compared to previous years

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[9] constructed using type of house (1 if structured; 0 otherwise), latrine availability (1 if latrine, 0 otherwise), drainage system(1 if drainage; 0 otherwise), quality of drinking water (1 if from bottled water/tap, tube-well/ handpump, tankers, pucca well; 0 if from tank/pond reserved for drinking/ treatment of water (1 if treated by ultra-violated/resin/reverse osmosis/boiling/filter/cloth screen; 0 if by any disinfectant and other modes) applying principal component analysis

Among various regressors age is one of the important predictor of health status as numerous health related studies suggest that age acts as rate of health depreciation since increase in age is expected to deteriorate individual's health status. The models of the study use two functional forms of age variable, age and age square/100, simultaneously in single equation model so that its non-linear characteristic can be accommodated. A 0-1 dummy for gender is used in the full sample and also a 0-1 dummy for location of residence (rural=1) is included in the model. Further, logarithms of household monthly per capita expenditure are used as a proxy for the household income (Deaton, 1997; Blundell, 1995). Three 0-1 dummies of household's religion are also used in the model by considering dummy for Hindu religion as reference category. A single 0-1 social group dummy (1 if Scheduled Tribe and Schedule Caste; 0 if OBC and others) and household size are also included in the model. Further to reflect facilities available an index for facilities is used and to capture previous health characteristics: two 0-1 dummies of self-assessed relative health status compared to previous year has been added in the model by taking almost same status as reference category.

5. Estimation Results

Table 2 documents percentage distribution of self-assessed health status for younger, middle aged, older, older old and all adults by gender. It reveals that irrespective of their marital status about 22% younger and 25% middle aged adults are living with poor health in comparison to 21% older and 38% of older old adults. Proportion of adult women reporting poor health is higher than men in all the age groups except for middle age (35-59 years) where share of men with poor health is dominating. While exactly opposite is true in reporting excellent/very good health status, the percentage of adult men reporting good/fair health status is greater than that of women except in the age group 35-59 years.

Further, simple characterization of the data displayed in Table 3 and Figure 1 show that overall average health status scores for currently married adults is 1.83 whereas single adults are living with average health of 1.79, slightly smaller than currently married persons (1.83). However, never married and currently married persons have almost same average health score of 1.83 but greater than that of widowed and divorced (1.75).

Table 2: % Distribution of Self-Assessed Health Status by Age and Sex

|	Younger Adults	Middle aged Adults	Older Adults	Older old Adults	All Adults
Poor					
All	22.21	24.95	20.71	38.41	23.35
Male	21.85	26.83	18.08	36.24	22.81
Female	22.47	23.45	23.23	41.10	23.90
Good/Fair					
All	71.70	69.67	73.51	58.23	70.81
Male	71.88	69.03	74.44	60.62	71.24
Female	71.51	70.17	72.59	56.17	70.56
Excellent/V. Good					
All	6.22	5.44	5.73	2.93	5.68
Male	6.28	4.27	7.29	3.14	5.88
Female	6.17	6.33	4.18	2.73	5.48

Marital status and Health
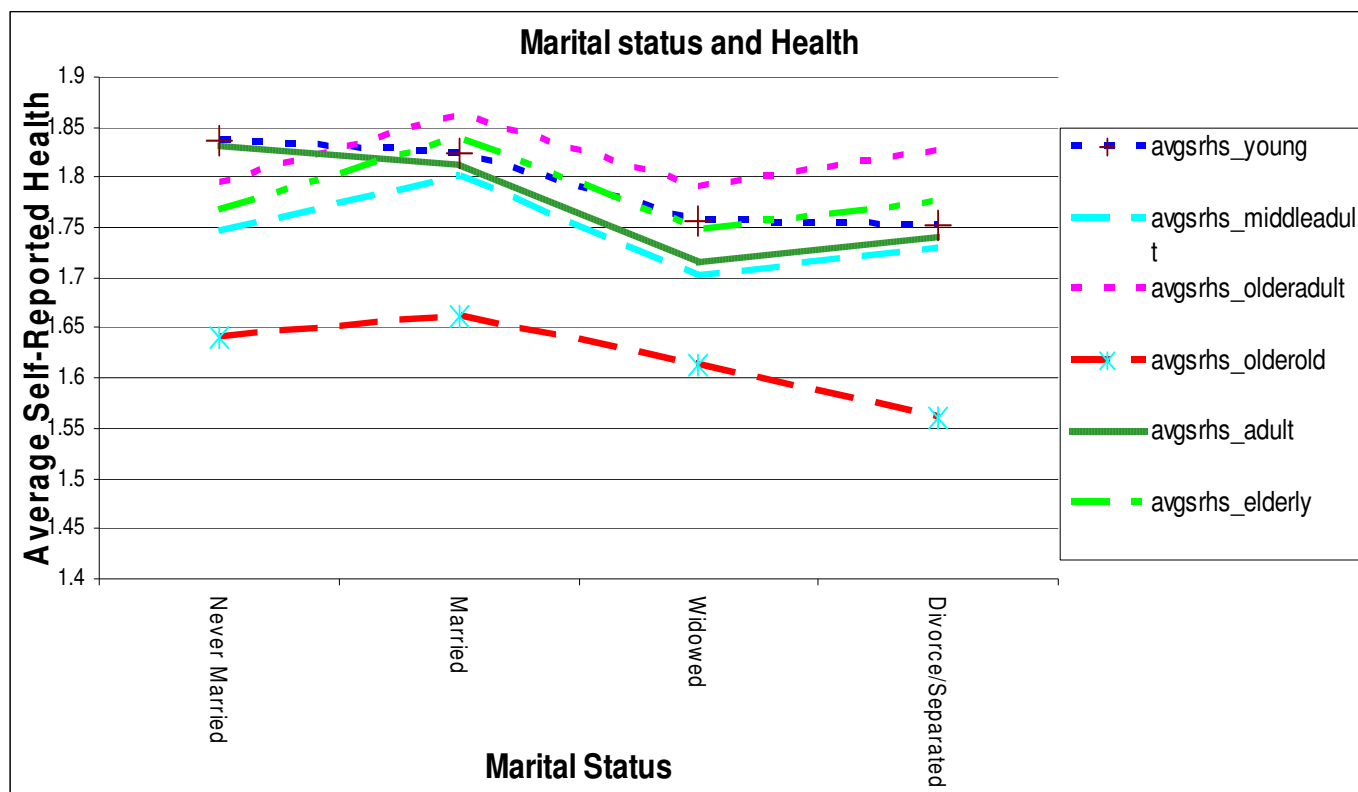
Figure 1: Distribution of Self-Assessed Average Health by Age-Group and Marital Class

Table 3: Mean Health Status by Gender, Age-Group and Marital Status*

Age-group	Currently Married (1)	Never Married (2)	Widowed (3)	Divorced/ Separated (4)	Single (5=2+3+4)	All (1+5)
Younger adults	1.84	1.83	1.84	1.76	1.83	1.84
	(0.50)	(0.52)	(0.54)	(0.48)	(0.52)	(0.51)
Middle aged adults	1.81	1.74	1.72	1.73	1.73	1.81
	(0.52)	(0.51)	(0.53)	(0.49)	(0.52)	(0.52)
Older adults	1.87	1.80	1.80	1.81	1.80	1.85
	(0.49)	(0.54)	(0.50)	(0.48)	(0.50)	(0.49)
Older old adults	1.65	1.62	1.61	1.74	1.61	1.64
	(0.53)	(0.51)	(0.54)	(0.74)	(0.54)	(0.54)
Adults	1.82	1.83	1.75	1.74	1.82	1.83
	(0.51)	(0.52)	(0.53)	(0.49)	(0.52)	(0.51)
Elderly	1.85	1.77	1.75	1.80	1.76	1.82
	(0.50)	(0.54)	(0.51)	(0.54)	(0.51)	(0.50)
All adults	1.83	1.83	1.75	1.75	1.79	1.82
	(0.51)	(0.52)	(0.51)	(0.50)	(0.52)	(0.51)

*Figures in the parentheses are the standard deviation

Table 4 documents how percentage distribution of marital status and self-assessed health status varied in different age-groups. Now we turn to test whether there is any association between marital status and health status. To test the null hypothesis that these two are associated to each other statistically, the Pearson's chi-square test is used. Chi-square statistic along with row and column percentages of health and marital categories for each age-group are reported in Table 4. It can be observed that in each of the age-group, the null hypothesis is rejected at 1% level of significance and therefore, the association between marital status and health across ages of adults can not be ruled out.

Now, to see the possible association between marital status and health status both in terms of magnitude and direction, we need to analyze ordered probit estimation results presented in Table 5, 6 and 7. For younger adults no causal relationship between marital status and health is evident. For middle aged women and persons as whole in comparison to single marital categories, being currently married has positive impact on health; however, the result is not true for adult men where the association is not significant. Further, being widowed or divorced/separated is negatively linked with health status if compared with never married and currently married taken together for middle aged women and adults in general but the effect of being divorced or separated is not

significant as compared to currently married.

Table 4: % Distribution of Marital Status and Self-Assessed Health Status by Age group

Marital Status	Self-Assessed Health Status			Chi-Square Test for testing independence of Marital and Health Status
	Poor	Good/Fair	Excellent/V. Good	
Younger adults				
Never Married	23.46 (35.89)	69.76 (36.06)	6.79 (41.69)	*Pearson $\chi^2_{(6)}$ =*
Currently Married	23.82 (62.23)	70.72 (62.43)	5.47 (57.36)	*53.6102****
Widowed	30.77 (1.20)	64.93 (0.85)	4.30 (0.67)	
Divorced/Separated	25.41 (0.69)	71.99 (0.66)	2.61 (0.28)	
Middle aged adults				
Never Married	29.94 (3.76)	66.19 (3.20)	3.87 (2.50)	*Pearson $\chi^2_{(6)}$ =*
Currently Married	25.94 (90.30)	68.80 (92.23)	5.26 (94.34)	*61.5667****
Widowed	33.31 (4.90)	63.12 (3.57)	3.57 (2.70)	
Divorced/Separated	28.12 (1.05)	69.50 (1.00)	2.39 (0.46)	
Older adults				
Never Married	26.80 (1.25)	67.13 (0.98)	6.08 (1.09)	*Pearson $\chi^2_{(6)}$ =*
Currently Married	20.54 (55.67)	72.68 (61.95)	6.78 (70.60)	*189.0022****
Widowed	25.63 (42.65)	70.04 (36.67)	4.33 (27.68)	
Divorced/Separated	23.29 (0.44)	67.81 (0.40)	8.90 (0.64)	
Older old adults				
Never Married	34.48 (1.08)	64.37(1.45)	1.15 (0.55)	*Pearson $\chi^2_{(6)}$ =*
Currently Married	38.28 (38.27)	59.37(42.55)	2.35 (35.52)	*27.6236****
Widowed	42.34 (59.93)	54.78 (55.59)	2.88 (61.75)	
Divorced/Separated	50.00 (0.72)	40.00 (0.41)	10.00 (2.19)	

Note: percentages in the parenthesis are the column %s across marital categories. *** indicates rejection of the null hypothesis that marital status and health status are independent at 1% level of significance.

Again, the impact of being never married is significant and negative on health in comparison to being married for sometime in the past[10] for adults in general and women in particular but not significant for middle aged men. For the older adults as whole, marital status does not have a significant impact on health but this effect is visible for men and women of the same age-group separately.

For older women, being never married has negative impact on health in comparison to being married for sometime in the past whereas for older men it has positive impact on their health status. Moreover, for older male as compared to being never married and currently married taken together being widowed or divorced or separated has negative effect on health. For the older old men,

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[10] currently married or widowed or divorced/separated

marital status does not have significant effect on their health but women and older old population as a whole experiences positive impact of divorce or separation over being currently married. However, there is no significant effect of being never married or being widowed in comparison to being divorced/ separated.

Again, for adult of age group 18-59 ordered probit estimation results confirm that while there is no impact of marital status on the current health status of men, being single has negative impact on health status of adult women and adults persons in comparison to the currently married. However, for adult women of the same age group, being currently married has advantages on health in comparison to single. The role of marital status is different for the elderly (60 years and above) where widowhood of men and women has exactly opposite impact on health. While among elderly men widowhood has negative impact on health over being currently married, for elderly women it shifted weight from poor to excellent and very good health status showing positive impact on health. Moreover, among elderly men being divorced or separated has positive effect on current health compared to married elderly men and being married increases the probability of being healthier than never married but relationship reverses if we compare single minus never married with never married and currently married taken together.

Now, looking at other important variables like sex and age, we see that there is no impact of being a male or female on health for all (sample with persons >=18 years), younger adults (18-34) and adults (18-59 years) in general but surprisingly, being male has disadvantages of health in the middle age (35-59 years) as compared to women of same age group. Also, male dominates over female in terms of health status in the old age.

Table 5: Ordered probit estimation result for all adults

Dependent variable: Self-assessed current health status: 1=poor, 2= good/fair, 3= excellent/very good						
Age Group	All	Younger adults	Middle Aged adults	Older Adults	Older old Adults	Adults	Elderly[&]
No. of obs.	90788	34561	26201	25082	4944	60762	30026
Pseudo R^2	0.16***	0.15***	0.16***	0.17***	0.18***	0.15***	0.18***
Explanatory Variables	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)
Model I[@]							
Never Married: dummy	0.02 (0.71)	-0.02 (-0..66)	-0.15*** (-3.34)	-0.09 (-1.08)	-0.12 (-0.71)	-0.05* (-1.91)	-0.10 (-1.30)
Widow: dummy	-0.07*** (-3.34)	-0.01 (-.11)	-0.13*** (-3.35)	-0.00 (-0.27)	0.05 (1.17)	-0.11** (-2.16)	0.01 (0.30)
Divorced/ Separated: dummy	-0.13** (-2.05)	-0.12 (-1.38)	-0.10 (-1.32)	-0.08 (-0.68)	0.56*** (2.42)	-0.11* (-1.83)	0.05 (0.46)
Model II[@]							
Married: dummy	0.03*** (2.17)	0.02 (0.83)	0.13*** (4.74)	0.00 (0.50)	-0.05 (-1.25)	0.06*** (2.89)	-0.00 (-0.12)
Model III[@]							
Never Married: dummy	0.02 (0.74)	-0.02 (-0.62)	-0.14*** (-3.19)	-0.09 (-1.06)	-0.14 (-0.89)	-0.04* (-1.85)	-0.10 (-1.33)
Model IV[@]							
Widow/div/ separated: dummy	-0.07*** (-3.67)	-0.06 (-0.76)	-0.12*** (-3.39)	-0.00 (-0.25)	0.06 (1.48)	-0.11*** (-2.63)	0.01 (0.44)

Significance: *** at 1 % level, ** at 5 % level, * at 10% level

@includes other explanatory variables like dummy for gender, age, age-square/100, dummies for education (illiterate as reference category, below primary, middle and secondary, higher secondary and above), religion (Hindu as reference category, Muslim, Christianity, Sikhism and others), location (Rural=1), dummy for social group (ST/ST=1), household size, logarithm of per capita monthly expenditure, facility index, dummies for relative health status compared to previous year (almost same as reference category, deteriorated, improved)

& for elderly group some more explanatory variables could be included into the model but it is not done to make the models comparable.

Table 6: Ordered probit estimation results for male adults

Age Group	All	Younger adults	Middle Aged adults	Older Adults	Older old Adults	Adults	Elderly[&]
No. of observations	44167	17414	11431	12717	2605	28845	15322
Pseudo R^2	0.16***	0.15***	0.16***	0.17***	0.19***	0.16***	0.19***
Explanatory Variables	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)
Model I[@]							
Never Married: dummy	0.05 (1.55)	0.03 (0.82)	-0.07 (-1.26)	-0.11 (-1.16)	-0.30 (-1.44)	0.00 (0.1)	-0.15* (-1.65)
Widow: dummy	-0.06 (-1.59)	-0.15 (-0.69)	0.10 (1.39)	-0.09*** (-2.75)	0.03 (0.54)	0.05 (0.46)	-0.06** (-2.07)
Divorced/ Separated: dummy	0.00 (0.03)	-0.04 (-0.22)	0.06 (0.39)	0.17 (0.71)	0.47 (1.71)	0.00 (0.00)	0.31* (1.72)
Model II[@]							
Married: dummy	-0.00 (-0.2)	-0.03 (-0.71)	0.00 (0.10)	0.09*** (2.83)	-0.03 (-0.49)	-0.01 (-0.23)	0.06*** (2.17)
Model III[@]							
Never Married: dummy	0.0 5 (1.61)	0.03 (0.88)	-0.07 (-1.33)	-0.10 (-1.02)	-0.31 (-1.51)	0.00 (0.08)	-0.14 (-1.53)
Model IV[@]							
Widow/div/ separated: dummy	-0.06 (-1.6)	-0.12 (-0.77)	0.10 (1.47)	-0.08*** (-2.59)	0.05 (0.9)	0.04 (0.42)	-0.05* (-1.75)

Significance: *** at 1 % level, ** at 5 % level, * at 10% level

@includes other explanatory variables like age, age-square/100, dummies for education (illiterate as reference category, below primary, middle and secondary, higher secondary and above), religion (Hindu as reference category, Muslim, Christianity, Sikhism and others), location (Rural=1), dummy for social group (ST/ST=1), household size, logarithm of per capita monthly expenditure, facility index, dummies for relative health status compared to previous year (almost same as reference category, deteriorated, improved)

& for elderly group some more explanatory variables could be included into the model but it is not done to make the models comparable.

Table 7: Ordered probit estimation results for female adults

Dependent variable: Self-assessed current health status: 1=poor, 2= good/fair, 3= excellent/very good							
Age Group	All	Younger adults	Middle Aged adults	Older Adults	Older old Adults	Adults	Elderly[&]
No. of observations	46621	17147	14770	12365	2339	31917	14704
Pseudo R^2	0.16***	0.15***	0.16***	0.16***	0.18***	0.16***	0.17***
Explanatory Variables	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)	Coefficients (z-value)
Model I[@]							
Never Married:	-0.02	-0.06	-0.23***	-0.01	0.16	-0.13***	0.03
dummy	(-0.65)	(-1.48)	(-2.99)	(-0.07)	(0.58)	(-3.50)	(0.21)
Widow:	-0.05**	0.05	-0.15***	0.02	0.11	-0.12**	0.04*
dummy	(-1.99)	(0.34)	(-3.27)	(0.83)	(1.62)	(-2.00)	(1.65)
Divorced/Separated:	-0.18***	-0.14	-0.09	-0.16	0.73*	-0.12*	-0.07
dummy	(-2.77)	(-1.41)	(-1.10)	(-1.08)	(1.68)	(-1.74)	(-0.52)
Model II[@]							
Currently Married:	0.05**	0.06	0.16***	-0.02	-0.11*	0.13***	-0.04
dummy	(2.33)	(1.49)	(4.25)	(-0.74)	(-1.66)	(4.21)	(-1.60)
Model III[@]							
Never Married:	-0.02	-0.06	-0.21***	-0.02	0.07	-0.13***	0.01
dummy	(-0.50)	(-1.46)	(-2.82)	(-0.14)	(0.25)	(-3.45)	(0.04)
Model IV[@]							
Widow/div/	-0.06**	-0.03	-0.13***	0.02	0.11	-0.12**	0.04
separated: dummy	(-2.47)	(-0.36)	(-3.2)	(0.76)	(1.57)	(-2.4)	(1.59)

Significance: *** at 1 % level, ** at 5 % level, * at 10% level

@includes other explanatory variables like age, age-square/100, dummies for education (illiterate as reference category, below primary, middle and secondary, higher secondary and above), religion (Hindu as reference category, Muslim, Christianity, Sikhism and others), location (Rural=1), dummy for social group (ST/ST=1), household size, logarithm of per capita monthly expenditure, facility index, dummies for relative health status compared to previous year (almost same as reference category, deteriorated, improved)

& for elderly group some more explanatory variables could be included into the model but it is not done to make the models comparable.

6. Discussions

Previous research on marital status and health has mainly focused on the causal mechanism through which they are associated. In this paper, the role of marital status and health in the light of ageing has been explored and results show that this association does not exists always and if exists, direction may not be same across all the age groups and gender. Also, consistent with the earlier studies there is gender differential in the relationship of marital status and health but despite of agreement with some earlier findings, the estimation result is full of surprises. While many studies document that married adults are healthier than single adults, the above result shows that it is true only for adults in general and women in particular but not for adult men. Possible reason for this could be the hindrances created by never married categories having no significant impact on health (which is again contrary to the finding that association of health and being never married is negative). Further, the result that for younger adults effect of marital status on health is not significant for both men and women is understandable because depreciation rate of health is lowest for this stage of life. Although no impact of being never married has been experienced by middle aged men on their health, women experience its negative impact on their health status. This may be due to the fact that societal supports for never married persons, especially for women, diminished with increase in age but its adverse effect can be experienced only when it combines with the higher rate of depreciation and lower health stock. And we know that middle and older aged women are more vulnerable than men of the same age group in this sense. Moreover, some additional catalysts like loneliness, sense of insecurity, poverty, and disability etc. also acts in negative direction which leads to negative relationship of being never married and health status for women of this age group. However, the positive impact of being never married on the health status of older men in comparison to currently married or widowed or divorced and separated is quite surprising. Further, result that in comparison to being currently married, impact of widowhood is positive on health of elderly women but negative for health of elderly men is quite interesting. However, despite of large sample size the relationship is significant only at 10% indicating for weaker association. Also, though weaker but positive association of divorce or separation and health status as compared to currently married elderly men is again surprising. Over all, marital status compounded with age plays a significant role in determination of health and it is evident from the above results that the relationship we investigated is sensitive to the ageing and gender and therefore, the health policy

should be such that it could take care of vulnerable group in a particular stage of life. Thus, study notes that a specific marital status in a particular stage of life could be an important target group for health policy intervention. Though the analysis has been done carefully, being based on cross-sectional survey the complete reasons for these findings cannot be determined completely and for that we need longitudinal studies accrued with qualitative evidences. This can be treated as one of the caveats of this study. Second limitation of this study could be the lack of information on the past and childhood health and marital history. Thirdly, presence of possible reverse causality of marital status on health, for example, following theory of marriage selection health status may affect marital status rather than other way round and if this is the case, the estimated coefficients of dummies capturing different health status will be biased, along with the effects of all other correlated explanatory variables. Unfortunately, the lack of instrumental variables precludes formal tests of possible endogeinety. Another econometric related caveat is the possibility of omitted variables as the study is not able to control for unobserved factors effecting health e.g. the cost of medical care in terms of time and money, childhood health, environmental factors etc. and it is possible that these omitted variables are highly correlated with several other variables included in the model. But in spite of these limitations the results are quite interesting and provoking for further studies by leaving some of the explanations incomplete and unanswered.

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