Bidirectional Relation between Employment and Chronic Disease Prevalence and Medical Care among Older Population in India.

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This study assesses the employment, financial support, health and medical care aspects of aging in India. Findings provide evidences for a bi-directional relationship between employment and chronic morbidity in older population. Older population, who engaged in regular paid work have lower likelihood of having disease compared to those who are not working. In other words, older persons suffering with chronic diseases may be unable to work in regular paid jobs. Similarly, greater proportions of non-working older persons those are suffering with chronic diseases and have financial support through pension and retirement savings from previous job seek more modern treatment and expense on their treatment. The results reveal that employment determines and determined by chronic disease prevalence and treatment seeking behavior among older population. These results would allow policy makers to better ascertain the needs, design pension, other social protection programs, and develop appropriate labor market policies for older population.

Key words: Employment, chronic diseases, medical care, linkages, older population

Background

The 21st century will witness even more rapid population ageing than did in the past century. Worldwide, the percentage of the population aged 60 and above has increased by eight percent in the second half of the 21st century. However, the pace of population ageing is faster in developing countries than developed countries. It is expected that by 2025, nearly 71 per cent of the world's older population will live in developing countries (United Nations, 2008). Consequently, developing countries will have less time to adjust to the consequences of population ageing.

Population ageing is profound, having major consequences and implications for all facets of human life. In the economic sector, population ageing will have an impact on

economic growth, savings, investment, consumption, labour markets, pensions, taxation and intergenerational transfers. In the social domain, population ageing influences family composition and living arrangements, housing demand, migration trends, epidemiology and the need for healthcare services. In the political affairs, population ageing may shape voting patterns and political representation (Hermalin*et al.* 2002; Bloom*et al.*2010).

India has the second largest number of older persons (8.5 million) in the world, next to china. The average life span in India has increased from 32 years in 1951 to 68 years in 2007 and expected to cross 76 years by 2031 (Jamuna, 2000; Rajan1995). Accordingly, the proportion of older population (60 +) in India has increased from 6 percent in 1950 to 8 percent in 2001 which is further expected to rise to 20 percent by 2050. Moreover, older population in India is growing at an annual rate of more than 3 percent. On the other hand, comparatively, the socio-economic status of India is much lower than many other economically advanced countries (Bloom *et al.* 2010).

Why older population employment matters for India?

Increasing urbanization and rapid economic development tend to go hand in hand with higher rates of rural-urban migration, changing patterns of labor force participation, and other major social changes. All of these changes raise concerns about the possible weakening of the traditional family-value system of responsibility that historically has provided care and retirement security for the older population. In addition, the current older population in India is very transitional generation: with increase in life expectancy and fertility falling, future cohorts of elderly can expect to have smaller numbers of living children—and fewer sources of familial support—than the current generation of elderly.

With the economic liberalization started during 1990, India is now trying to become economic super power in the near future. However, current poverty, unemployment, disease burden, regional disparities and political instability all these add to population ageing and large number of aged workers in the informal sector and those who are not working are the growing concern for India (Alam 2004). In a country such as India, where no universal social security exists, people tend to work as long as they can. Casual, informal sector workers and the self-employed are not entitled to retirement benefits. Regularly employed, salaried persons in several sectors may, upon retirement, be entitled

to one-time gratuity based on final salary and a provident fund from contributions made while working. In a limited number of cases, salaried employees receive a monthly pension in addition to a gratuity and provident fund (Alam, 2004;Rajan, 1995). Moreover, the overall formal sector workers constitute a small share of the workforce among prime working age group and this number is further small for older population. Labour force participation among older population is only 40.3 percent, of which 60.2 per cent for men and 20.9 percent for women, with more of them in rural than urban areas. Substantial socio-economic variations are also observed in labour force participation among older population (Government of India, 2001).

Therefore, there are growing concern for the collagens of population aging and old age security in India. When people live longer, what mechanisms are available to them to remain active and productive, in employment and other gainful activities? How much unemployment and poverty exists among older persons? Those who are not working or unemployed have covered under existing social security schemes and/or do they own financial assets and property? Are they assured of income through pension and retirement benefits? Are widowed women dispossessed? Is there any special social security provision for older women and widows? What are the policy responses?

Why chronic morbidities in older population matters and how they are related with employment?

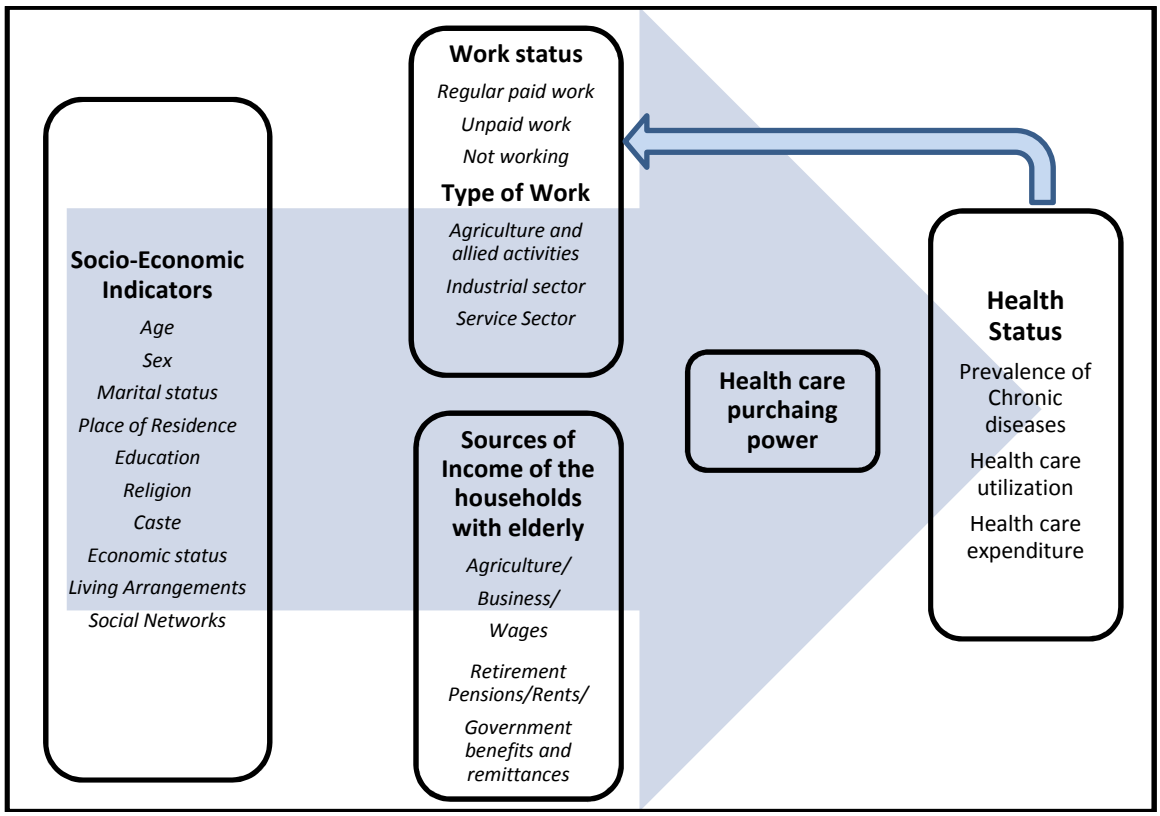
The older people generally require significantly more health care than young and middle-aged people; the coming demographic shift is likely to place great demands on countries' health care systems despite the increase in the years of life spent in a healthy condition. Population aging also changes the types of health care required. In the first few decades of life, health care is generally focused on communicable diseases and accidents; in later years, health care centers on chronic diseases, such as cancer and heart disease, as well as functional and cognitive disabilities that become more common with age, such as problems with mobility or eyesight (Bloom et al. 2010).

In addition, employment of the elderly can be interrupted by retrenchment, sickness and disability. While opportunities for gainful employment (regular paid work) decline as age

advances towards the 70s and 80s, but many older persons need employment for their financial wellbeing at even at oldest old age. Therefore, health of older population is a critical determinant of their works status. However, work status can also affect the health care utilization behavior of older population and particularly, engaging in regular paid work enables financial sources to purchase better health care.

In this study, we have used a conceptual framework to understand the relationship between in employment, health care and health care expenditure. Many of the previous studies are fostering socioeconomic factors such age, sex, marital status, place of residence, education, caste, religion and household economic status, living arrangement, social networks as the key predictors of older population health. However, employment also equally affects health status. A framework presented in figure shows the mechanism of linkage between Employment, Health and health care expenditure. It indicates that the employment provides financial security and increases the health care purchasing power of older population. On other hand, being healthy helps in more engaged in work that also further increased the financial and social security of the older population.

Figure1: Conceptual framework of linkage between Employment, Health and Expenditure



Rationale and objective of the study

Rates of employment and sectoral location remain important indicators of individual and family position. But to understand how older population manage the opportunities and risks of the modern economy, we also need to look at how older population, diversify their employment patterns across the sectors, combining agriculture and non-agriculture labour or cultivation with private business. Simple estimations of prevalence rates of older population health will not give clear insights in to the policy for the welfare of older population. To understand how well the older population will be able to take care of their own needs (especially in light of the changing roles and responsibilities of families), it is important to have a clear picture of both employment, chronic morbidities and expenditure on medical care and their linkage in older population of India. This information would allow policy makers to better ascertain the needs of vulnerable older populations, design government benefits, health care facilities and other social protection programs. Therefore, this paper aims to address employment, financial, health and medical care and aspects of aging in India under the following objectives:

- To study the employment status of older persons by industry and background characteristics.
- To examine the linkages between employment and chronic disease prevalence among older population in India.
- To understand the association between employment and medical care utilization among older population in India.

EMPIRICAL APPROACH

Data and Method

This study used India Human Development Survey 2005 (IHDS) data in assessment of employment and its linkage with chronic diseases and health care among older population in India. IHDS is collaborative project of researchers from the University of Maryland and National Council of Applied Economic Research, New Delhi. It is a household survey whose primary goal is to deepen our understanding of human development in India. The IHDS was administered to a nationally representative sample of 41,554 households located across all states and union territories of India with the exception of Andaman &Nicobar and Lakshadweep and contains an urban as well as rural sample.

The questions finally fielded in IHDS were organized into two separate questionnaires, household and women. The household questionnaires were administered to the individual, who was the most knowledgeable about income and expenditure, frequently the male head of the household; the questionnaire for health and education was administered to a woman in the household, often the spouse of the household head. In the present study, we have used information on socio-economic characteristics; employment, health, medical care and medical expenditure are used.

IHDS's main purpose was to provide the means for gaining insight by analyzing the relationships among these human development outcomes and the connections between human development and its background causes but not directly focused to estimate on education, employment and health outcomes. Nevertheless, it is useful to compare IHDS estimates of human development levels with estimates from other more narrowly focused surveys that usually have larger sample sizes and smaller sampling errors. Though, the

employment rates in this study (based on IHDS) are more or less similar to the 61st round of National Sample Survey (NSS), the prevalence rates on chronic disease are lower bounds prevalence rates in population. IHDS data indicates the greater number of missing values and we have tried to handle missing cases carefully according to the instructions given in the technical notes of IHDS technical team.

Constructed variables: In this study, we have constructed following variables for the analysis of different chapters which are directly not given in the data.

a). *Social network* category is constructed like any network includes network with any medical, School(educational) or government employee (personnel) and no network means no network with any one of them.

b). *Living Arrangements* variable is constructed by number of persons in the family, with unmarried sons, married sons, married females, teen etc. and relationship to household head variable.

c). *Work Status* is defined as, <240 hours per year considered as no work and >=240 hours per year considered as working status. Those who work in regular paid jobs are included in the category of regular paid work.

d). *Type of work* is categorized into Agricultural and allied activities, Industrial Sector, Service Sector for regular paid work. These sectors are divided with the help of National Classification of Occupations-1968 and actually divided by National Industrial Classification (NIC)-1987 provided by IHDS codebook.

e). S*ource of income* variable is categorized into 1) agriculture, business, wages 2) Retirements, pensions, rents, dividends and others. 3) Government benefits 4) Remittances. However, we have computed this variable by using information available of on different sources of income from different variables. Agriculture includes cultivation, agricultural allied actives, agricultural labor; Business includes Artisan, petty trade, other business; Wage includes salaried, profession, non-agricultural labor. Pensions from government work, including military, and from any private work, rent includes income from renting property, then income from interest, dividends or capital gains, others include income from sale of non-agricultural land or other property and from the sale of agricultural land also, and other also includes income from scholarships or gifts and income from any other govt. sources, IRDP (Integrated Rural Development Program) or

Insurance payout from government. Government benefits include the income received from government by national old age pension scheme, Widow Pension scheme, National Maternity scheme, National Disability Pension, Annapurna, Other govt. programs including income generation and assistance from NGO's. Remittances include money which was sent/received by the household in past 12 months in Rupees.

f) *Chronic diseases* by which older people suffering in last one year from the reference period have included non-Communicable diseases (NCD) like Cataract, High BP, Heart disease, Diabetes, Cancer, Asthma, Paralysis and Mental illness.

g). *Treatment received in modern medical care* includes treatment by public & private doctors and public & private nurses. Treatment taken outside the village includes another village and neighborhood, other town, and district town. Treatment received within village and neighborhood includes the same place.

h). *The median health expenditure of household* is calculated by total cost for the treatment for outpatient as well as in-patient services in last 12 months including for doctor, hospital surgery; for medicine and tests and expenses; for tips, bus/train/taxi fare, or lodging while getting treatment in rupees.

The median expenditure on medical health care is calculated for all long term diseases mentioned in report though study have taken only selected NCDs for analysis.

i) *Wealth index:* An index of economic status (wealth quintile) for each household was constructed using principal components analysis based on data from households. The wealth quintiles is based on 30 assets and housing characteristics, each household assets is assigned a weight (factor score) generated through principle component analysis, and the resulting assets scores are standardized in relation to normal distribution with the mean of zero and standard deviation of one.

Statistical analysis

Bivariate and trivariate association is tested among dependent variables as work status, regular work status, chronic disease prevalence, medical care, and independent variables as socio economic predictors. Bivariate relationship among dependent and independent variables are tested for statistical significance with Pearson chi-square test. The statistical significance of bivariate association among socio-economic factors and median health care expenditure was tested with ANOVA test.

For estimating the adjusted effect of socio-economic predictors on employment and health, we have used multivariate analysis. Both Binary logistic regression and Multinomial logistic regression have been used. Further, Multinomial logistic regression coefficients are converted to adjusted percentages by using MCA conversion model for better comparison.

MCA multinomial analysis formulae=

$$Z_1 = Log\left(\frac{P_1}{P_3}\right) = a_1 + \sum b_{1j} * X_j$$

$$Z_2 = Log\left(\frac{P_2}{P_3}\right) = a_2 + \sum b_{2j} * X_j$$

$$\text{and } P_1 + P_2 + P_3 = 1$$

Where,

$a_{i\ i=1,2}$: constants

$b_{ij\ i=1,2;\ j=1,2\ldots n}$: multinomial regression coefficient.

P_1=Estimated probability of reporting regular paid work status by an older person.

P_2=Estimated probability of reporting unpaid work status by an older person

P_3 (Not working) was reference category.

The procedure consists of following steps:

Step 1: By using regression coefficient and mean values of independent variables the probability was computed as:

$P_i = \frac{\exp(Z_i)}{\{1+\sum \exp(Z_i)\}}$, i=1, 2, 3 and P_3 = 1- $P_1 + P_2$ where Z was the estimated value of response variables for all categories of each variable category.

Step 2: To obtain the percentage values, the probability P was multiplied by 100.

In this way, tables consisting of unadjusted and adjusted percentages were generated.

SPSS 18 program has been used for all statistical analyses undertaken in this study.

Morbidity prevalence of a particular disease

$$= \frac{number\ of\ reported\ cases\ of\ that\ disease\ \ during\ the\ reference\ period}{Sample\ population\ exposed\ to\ the\ risk\ of\ having\ that\ disease} * 100$$

Results

Socio-economic profile of older population

The 61st round of the NSS(2004) reported that the elderly constitute about 7.2 percent, and IHDS data, collected in 2005, found slightly higher percentage (8 percent) of elderly persons (table 1). In most parts of the world, women have a relative advantage in terms of greater life expectancy than men, which results, in an elderly population that is disproportionately female. But in India, the situation is more complicated and, overall, the feminization of the elderly is at the initial stage. While the distribution of the elderly between socioeconomic groups based on wealth and education, mirrors the distribution of the general population. Rural area constitutes substantially larger proportion of older population than urban area, showing about 53 percent of rural-urban differentials.

Table 1 evident that proportion of older population decreases with increasing age. Results indicate that in India still, about 85 percent of older population is living with their children and other members; this figure increases with increasing age. Forty seven percent of older people are having any social networks with medical, educational and government personnel. About 63 percent of older population in India is illiterate; it is highly skewed towards female and 80+ older population. Though 62 percent of older population are currently married, there is huge sex differential in marital status. Eighty one percent of older male are currently married compared with only 43 percent of older female population. Specifically, the widowhood among older females is much vulnerable than older males. Out of total (37 percent) widowed population, nearly 56 percent of females in 60+ age group are widowed and only 18 percent males are widowers. This may be due to 1) high female life expectancy 2) low age at marriage for female. 3) Males are more likely to remarry than females. By religion, Hindus are larger in number at older ages as compared to Muslims and other religions. The proportion of older population is

larger in OBC than other castes and SC/STs. Among wealth quintile category, the proportion distribution of older population is more or less equal.

Employment in older population

The percent distribution of older population by work status in terms of regular paid work, unpaid work and not working by background characteristics is presented in Table 2. The IHDS line of questioning provide the results that are broadly similar, although not identical, to the work participation rates given by the 'usual status' employment questions used by the NSS or Census. The most important exception is that the IHDS questions on caring for livestock yield higher rates of rural female labour force participation. A second definitional difference is how the IHDS and NSS exclude work undertaken for less than thirty days. Under the IHDS definition, those working for two hours per day would have to work 120 days in a year to be considered employed, while those working for four hours per day would need to work sixty days. This definitional difference leads to a slight reduction in work participation rates using the IHDS definition.

Among older population, the proportion of working is decreasing by age. However, by increasing age, reduction in regular paid work among older persons is much greater than unpaid work. Proportion of female working population is very low as compared to men. The table reveals that the proportion of involvement in work among older population is high in rural area compared to urban areas. Moreover higher no of not working population is residing in urban area than in rural area. By work status and living arrangements, the percentage working among older persons living with their spouse are more engaged in unpaid work than the persons who live as single or living with their children and others. In regular paid work category, older persons living with their children and others are less engaged in paid work than single older persons but more than older persons living with their spouse. Married older population is more involved in work and getting payment for work than widowed and others. Hindus are more engaged in paid and unpaid work followed by Muslims. Among caste group, the work participation is greater among OBCs in unpaid work but majority of SC/STs are more engaged in regular paid work. Older persons belonging to middle income quintile are working more in unpaid work but older persons, those who belong to lowest and lower wealth quintile, are

more engaged in paid work because they work for having daily livelihood. Highly socioeconomic advanced groups are not working as they might have saving support.

Table 3 shows the percentage working in regular paid work is less than half of the working population that means more than half of the older population is working without getting paid for that work. The proportion of working and engaged in paid work is much higher for males than females. As expected, Work participation rate is decreasing with increase in age and that decrease in work participation is much greater among socio-economically advanced groups than their counterparts. This indicates that work participation has inverse relation with growing age and social-economic status. Around 14 percent of older populations in rural area are working compared with only 12.3 percent in urban area but both in rural and urban regular paid work is very less. Surprisingly, a higher proportion of 16.5 percent of older persons who don't have any social network in medical, government and education field are working than 10.9 percent those who are having these social networks.

Population not having education is contributing substantial proportion in workforce and this could arise because they are more engaged in agricultural and allied activities where mandatory retirement does not exist. Uneducated and less educated older persons are more active in workforce than higher educated older persons. By marital status, the work participation among currently married older population is working and getting paid for survival and supports their family than others. Among the social groups, older persons belonging to Hindu religion, SC/STs caste and poor wealth quintile are more engaged in work than others.

As mentioned earlier, a higher proportion of male are working than females in all the older age groups. But, there is considerable difference in paid work status among females than males. It means youngest old females are more engaged in work than counterparts. Oldest old females contribution in regular paid work is just negligible. Both in urban and rural areas, sex differentials in work status are prominent. Marital status is not making any substantial difference in female work participation, but it is indicating the greater

differences in male work participation; this may be because currently married men have more family responsibilities compared with others. By socio-economic groups, greater numbers of lower socio-economic groups are working compared with higher socio-economic groups. However, sex differentials in work status are greater among higher socio-economic groups compared with lower socio-economic groups.

Table 4 shows the distribution of older population by type of work such as agriculture sector, industrial sector, and service sector in different age groups. By age groups, results indicate that young older persons are more engaged in agricultural and allied activities compare with oldest of old persons (aged 80+). At age 80 and above, older persons are more engaged in service sector jobs which have comparatively low physical efforts than agricultural and industrial sectors. By sex, results indicate that more females are engaged in agricultural and allied activities than males in younger ages (60-64) but at age 80+ and above, the trend reverses drastically. Greater proportion of older persons living in single are engaged in agricultural and allied activities, particularly in 60-64 and 65-75 age groups but more in 80+ age group. However, those who are living with children and other are also more engaged in service sector jobs in 60-64 and 65-75 age groups. Having any social networks makes huge difference in finding a job in service sector at oldest of old age. As expected, higher educated and wealth quintile older persons are working more in service sector jobs compared to their counter groups. Hindus are more engaged in agriculture than counterparts in all ages. However, these differentials are greater among younger old persons compared to oldest of old age persons.

The work status of older persons by different sources of household income is presented in table 5. Results indicates that households with elderly who are engaged in regular paid work received greater share of their income mainly from agriculture, business and wages compared to households with not working older person or older person working in unpaid work. A notable finding is that receiving retirement pensions, rent and dividend on savings are greater among the households with not working older population followed by population working in unpaid work than regular paid work. It clearly indicates that those older persons who are not working or working in unpaid work depends on retirement pensions, rents on property and dividends on savings for their financial security. The differentials in retirement pensions, rents, and dividend from saving as a source of

income for households are substantially high by living arrangement and social networks. Those elderly living single and have any social network having higher proportion of income from retirement pensions, rents and dividend from saving than others followed by government benefits.

The proportion of older females receiving retirement pensions, rents and government benefits is greater than older males in all the categories. Table reveals that older population residing in urban area is receiving more income from pensions than older population residing in rural area. However, rural people are receiving more government benefits than urban people. Table shows that older persons who are less educated or not educated at all depend on government benefits. Currently married older population, who are not involved in unpaid work are receiving pension support and government benefits than older persons engaged in paid work. By caste, SC/STs depend more on government benefits than other castes. Older people belonging to lowest and lower quintile irrespective of working status receive large government benefits than their counter groups (table 5).

Table 6 shows the odds ratios of the logistic regression analysis for the work status of older persons by background characteristics. By age, results indicate that with reference to age group 60-64, the likelihood of involvement in work in both unpaid and regular paid work is significantly lower among higher older age groups. Similarly, the odds of working among females are much lower compared to males in both unpaid and regular paid work categories. The odds of working in any work in urban area are much lower than the rural area but older population residing in urban area are more likely to work in paid work than rural area. By living arrangements, the likelihood of working for single older persons is significantly higher compared with those who are living with their spouse and living with children and others. As compared to older persons with no network, the likelihood of involvement in work is significantly higher among the older person with any work but odds are low in regular paid work status. The odds of working among higher educated older persons are lower as compared with older persons with no education. Likewise, the odds of working in older widowed and other category are less as compared to currently married older persons. The likelihood of working in Muslims is

lower as compared to Hindus. Likelihood of working among OBCs is significantly higher as compared with SC/STs but in the regular paid work odds of working are much higher in SC/STS as compared to OBCs and other category as compared to SC/STs. This may arise because of SC/STs work for the daily livelihood as they do not have much savings to cover their older age financial security. By wealth quintile, results reveal that the likelihood of working in higher wealth quintiles is lower in both unpaid and regular paid work category as compared to lowest wealth quintile and likelihood of working is coming down as economic status increases.

Results of multinomial regression (adjusted percentages) presented in table 7 shows the work participation of older population by background characteristics. By age of older population, work participation is two times higher among younger old persons than oldest of old persons. In 60-64 ages, the likelihood of working in regular paid work is quite high on the other hand in 80+ ages likelihood of not working is very high. In comparison to females, males have two times higher likelihood of workforce participation. The adjusted percentage of older population working in rural area is nearly three times higher than urban area. But rural population is more likely to work in unpaid work and mostly urban older population is not working or mostly work in regular paid work. In case of older population by living arrangements, older persons living with children and others having significantly lower workforce participation in regular paid work as compared with older persons living as a single on the other hand those who are living with spouse are more engaged in unpaid work following by older persons living with their children than single older population. The workforce participation by social networks indicates that those who don't have any social network are having higher workforce participation compared with those who have any social network in regular paid work category but people having network are significantly involved more in unpaid work compared to people with no network. By education, workforce participation among higher educated older persons is lower compared with no educated and less educated older persons in regular paid work category. It is because of we have included agricultural and allied activities in regular paid work and educated persons also have savings support so they don't tend to work in older ages. Among marital status categories, workforce participation in

widowed/widower and other category is significantly lower than currently married older persons in regular paid work category. Similarly, among the caste groups, workforce participation in SCs/STs is much higher compared with other castes in regular paid work but the likelihood of working in unpaid work is higher in OBCs and other castes than SC/STs. The workforce participation among lower wealth quintiles is greater than richer wealth quintile in regular paid work category but likelihood of working in unpaid work is comparatively higher in higher middle class older people and again likelihood of not working increases with socioeconomic advancement.

Linkages of Employment with chronic diseases and Medical Care

The prevalence of chronic non communicable diseases among older population by background characteristics are demonstrated in table 8. Prevalence of chronic diseases is higher among the non-working elderly in age group 60-64 and 65-79 . Among regular paid work category, the prevalence of chronic diseases increases with increase in age and it is highest in open age group 85+. By sex, the prevalence is high among males who are engaged in regular paid work than females. However, the females those are not working and working in unpaid work are having higher prevalence of chronic diseases than males. Results reveals that the older population who resides in urban areas having higher prevalence of chronic disease than rural area among all working categories. Similarly, in regular paid work, older persons who are single are having more chronic diseases than older persons who are living with their spouse or with children and others. The results also indicate that older persons who are well educated are having high prevalence of chronic diseases compared with no educated or less educated. Results also indicate that the prevalence of chronic diseases among the currently married older persons is higher than counterparts. In all advanced socio-economic groups, the prevalence of chronic diseases is higher than their counter groups in all working categories. Overall, the findings of table 9suggest that socioeconomically advanced groups and not working elderly have high prevalence of chronic diseases.

Table 10 gives the odds ratios of binary regression for chronic diseases by employment and other related determinants. Compared with not working category people who are

working in any work and specially working in regular paid work and people who received government benefits have slightly less likelihood of having chronic diseases. The likelihood of having chronic diseases is more among age group 65-79 and 80+ as compared to 60-64 age groups. The odds of having chronic disease are significantly higher among females than males. The older population who stays single is more likely to have chronic disease than the people who are living with their spouse and others. The likelihood of chronic disease is higher among older people who are having any social network than people who don't have any social network. Older persons with better education have significantly higher likelihood of having chronic diseases than older persons who are not educated. The odds of having chronic disease is lower among widowed and others than currently married older persons. The odds of chronic diseases are higher in other castes than among SC/STs. The likelihood of having chronic disease is significantly higher among older persons belonging to middle and rich wealth quintile households of compared to older persons in poor households.

"Both bivariate and multivariate results of chronic morbidity prevalence demonstrate that older persons with higher socio-economic status are having higher prevalence rates of chronic disease than their counter groups. These results are not confounded with conventional expectations of socio-economic differentials in morbidity prevalence. Following are some of the possible reasons: 1) IHDS counts only doctor diagnosed diseases and given the fact that 50 to 60 percent of disadvantaged socio-economic groups are don't go for doctor's diagnosis for chronic diseases. 2) Among advantaged socio-economic groups mortality due to cause of these disease will take later ages and since they take proper medical care, they can prolong their diseased life years; this leads to accumulation of diseased older persons in this advanced section of population. On other hand disadvantaged socio-economic groups die often without diagnosing the cause of death. 3) Since we have taken most the life style diseases so this may also arise because of differentials in lifestyle practices. 4) Underreporting from lower socio-economic class due to their low health knowledge and lack of awareness could also be one of the reason for this pattern of results".

Table 9 shows the utilization of medical services by work status of older people and other socio-economic predictors and background characteristics. Results are evident that receiving treatment with modern medical care is high among older persons who are not working or works in unpaid jobs than those who works in regular paid work. Table shows that as the age increases, the percentage of receiving modern treatment increase for those who are not working but decreasing among older who are in paid work. This clearly indicates that the severity of chronic disease is more among those who are not working and in other way we can also interpret that may be due to severity of this problem they are not working.

In not working and unpaid work categories, females had lower chances of receiving modern treatment than males. Similarly, older population in rural area had lower chances of getting modern treatment than older population residing in urban area. However, within the rural area, those who are not working or involved in unpaid work had higher chances of receiving modern treatment than those who are doing paid work. This is may be because most of the paid workers in rural area are poor and working for their basic needs and livelihood in old age. Older persons living single and with no social networks are comparatively less likely to receive modern treatment for chronic disease than their other counterparts. As expected, among all working categories, greater proportions of socio-economically advanced groups are seeking modern treatment for their chronic morbidities than other counterparts. Similarly, older persons belonging to socio-economically advanced groups are spending more on modern medical care expenditure than weaker socio-economic poorer groups.

The bivariate analysis for the place of treatment received with modern medical care by work status and background characteristics of older population indicate that most of the older populations taking modern treatment outside their own place are not working or working in unpaid jobs. This pattern is may be due to severity of the chronic diseases among those categories and those who are engaged in regular paid work may unable to go outside village due to limitation on leaves or holidays. As we discussed earlier, most of the older people who are not working and working in unpaid jobs are possibly suffered from severe chronic diseases as a result they are unable to work. However, by age the

treatment seeking outside own place is increasing in age in regular paid category. Older females receive more treatment within the village than older males but on the other hand older males receive more modern treatment outside the village may be for better facilities in urban areas so gender disparity in treatment seeking behavior is noticeable here. By living arrangements of older persons, results reveal that those who living single in all working categories had lower chances of receiving medical treatment outside the own place than those living with children and living with spouse. Older people having social network going outside for better treatment so social network is playing important role in treatment seeking behavior for elderly. Better educated people going outside for modern treatment. Across all the working categories, greater proportion of higher socio-economic groups are going outside the own place for treatment for chronic diseases than their counter groups. Medical expenditure of not working older people is higher than those who are working in unpaid work and regular paid work. Moreover expenditure is higher in unpaid old workers than regular paid workers. Older people who are oldest old, living in urban area, having any social Network, better education and socioeconomically advanced are spending more on treatment. Those older persons who living single are having less medical expenditure than those who are living with their children and others and spouse.

We can conclude here that older people who are active in regular paid work and even in unpaid work having low prevalence of chronic diseases and they are spending less on medical care, may be their financial condition is not so good to spend on medical expenses that's why they are active in work and may be this involvement and activism in work leads to low prevalence of diseases and better health as compared to not working older population. (Table 10).

Table 11 b) presents the result of odds ratios of binary logistic regression for modern medical care by their sources of household income and socio-economic predictors. The likelihood of utilization of modern medical care is significantly higher in older population who are engaged in regular paid work and having retirement pension support, rents dividends as compared to not working people and those who have greater share of government benefits in their household income. The odds of modern medical care are

higher among the older population belonging to 80+ age group as compared to older population aged 60-65 and 65-79 age groups this may be because of severity of diseases and low physical resistivity. The likelihood of taking modern medical care for females is slightly lower than that of males. The odds of receiving modern medical treatment are significantly higher among the older population who stay with their spouse in comparisons to other counterparts. The odds of utilizing modern medical care among the older population who do not have social network category are significantly lower than the older persons who have any social network. Here we can guess the importance of joint living arrangement and better social network for treatment seeking among elderly. The likelihood of modern medical care is significantly higher in better educated people with reference to people who do not have education or less educated older people. Widowed/widower and other older population is less likely to go for modern medical care compared to married older persons. As compared to Hindu older population, older population from other religion is significantly more likely to receive modern treatment. With reference to SC/STs category, odds for medical care are higher among OBCs and significantly higher in other castes. As expected, the odds for medical care are significantly higher among richer wealth quintile households compare to older persons in poorer wealth quintile households and middle quintile households.

The odds ratios of binary logistic regression analysis for older persons who received modern medical treatment outside the own place by their background characteristics are showed in (table 11 c). The odds are not accordance with the pattern of its bivariate results (table 10). In the logistic results, after separating the retirement pensioners and older people who are getting government benefits from not working category of older persons, the likelihood of seeking modern treatment outside the village for not working has significantly declined and still the odds for government beneficiaries are much lower than that of not working category. Compared with urban areas, the odds of treatment seeking outside the own place is significantly higher among rural older population because all modern facilities are in urban areas. . The likelihood of seeking treatment outside their own place among older population who have any social networks and living with spouse are significantly higher than their counterparts. Interestingly the odds for

Muslim and other religions for treatment outside village are higher than Hindus it may be because of high prevalence. The odds of seeking medical treatment outside own place among older population belonging socio-economically advanced and better educated sections significantly higher than socioeconomically disadvantaged sections.

Conclusion

In this analysis, we have assessed and presented evidences of employment and its linkages with chronic disease prevalence and medical care among Indian older population. This study has found some intriguing findings about levels and pattern of employment by age and other socio-economic background characteristics. The study also presented the evidences for the association between work status and type of work with chronic disease prevalence. Analysis on medical care and medical expenditure also gives insights into the nature of health care utilization and health care expenditure among older population who are engaged in different type of industry sectors.

The assessment of employment by background characteristics reveals that greater proportions of lower socio-economic groups and belonging rural areas are working at older ages. The results demonstrate that those elderly who retired from regular paid jobs are getting retirement pensions or those who are getting dividend or rent on their savings are not merely engaged in work at older ages. This could be the reason why most of the lower socio-economic groups are working than higher socio-economic groups. Larger proportion of older population is engaged in agriculture at age 60 to 79 years. However, at oldest of old most of the older population are working in service sector jobs, this phenomena is more prominent in rural area than urban. Living with children and having any social network positively associated with older population work status in service sector jobs.

Findings demonstrate that there are clear evidences for the bi-directional relationship between employment, type of employment, and chronic morbidity. Those who are engaged in regular paid work are comparatively had lower prevalence of chronic diseases and those who are not working had higher prevalence of chronic morbidities. The results

indicate that those who suffer with chronic diseases may unable to engage in regular paid jobs. Similarly, greater proportions of not working older persons who suffer with chronic diseases are using more modern treatment. Since greater proportions of not working older persons sought more treatment outside their own living place, they are spending more money on their treatment costs. Therefore, employment status of older persons determines and determined by chronic disease prevalence among older population. These results would allow policy makers to better ascertain the needs of vulnerable older populations, design pension and other social protection programs, and develop appropriate labor market policies.

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Table 1. Percent distribution of older population by background characteristics in India, 2005

Background characteristics	Percent of older population						Total persons
	60-64	65-79	80+	M	F	Total	
Age							
60-64	-	-	-	34.9	36.9	35.9	6295
65-79	-	-	-	54.5	53.6	54	9822
80+	-	-	-	10.6	9.6	10.1	1787
Sex							
Male	49.3	51.0	53.2	-	-	50.6	8963
Female	50.7	49.0	46.8	-	-	49.4	8941
Residence							
Rural	75.8	76.4	77.6	76.8	75.8	76.3	12647
Urban	24.2	23.6	22.4	23.2	24.2	23.7	5257
Living Arrangements[1]							
Single	1.8	2.9	1.9	1.1	3.8	2.4	398
With spouse only	18.8	10.7	2.0	11.6	13.9	12.7	2399
With children and others	79.4	86.4	96.0	86.9	82.3	84.9	15107
Social Networks[2]							
No network	55.8	52.1	51.6	50.5	52.6	53.4	9092
Any network	44.2	47.9	48.4	49.5	47.4	46.6	8542
Education							
No education	60.8	63.0	70.9	46.6	80.2	63.0	10672
<5 years complete	9.7	12.2	11.1	15.0	7.2	11.2	2007
5-9 years complete	17.5	15.7	13.5	22.6	9.4	16.2	2915
10 & more years complete	11.9	9.0	4.6	15.8	3.2	9.6	1909
Marital Status[3]							
Married	73.8	59.5	34.4	80.8	43.0	62.1	11254
Widowed	24.8	39.0	64.6	17.7	55.8	36.5	6416
Others	1.4	1.4	1.0	1.5	1.2	1.4	234
Religion[4]							
Hindu	82.8	83.9	83.8	83.1	83.9	83.5	14641
Muslim	11.0	9.3	9.0	10.3	9.3	9.8	1758
Others	6.2	6.9	7.2	6.6	6.7	6.7	1505
Caste[5]							
SC/ST	27.7	23.9	21.0	24.5	25.4	25.0	4293
Other Backward Class	42.1	41.4	43.3	42.1	41.5	41.8	7191
Other	30.2	34.7	35.7	33.4	33.1	33.2	6420
Wealth Index							
Lowest	25.6	23.5	20.7	23.7	24.4	24.0	3532
Second	17.1	17.2	15.7	17.0	17.1	17.0	2852
Middle	22.5	22.0	22.5	22.1	22.4	22.3	3741
Fourth	15.3	16.4	17.3	16.0	16.2	16.1	3205
Highest	19.5	20.8	23.8	21.3	19.9	20.6	4574
Total	100	100	100	100	100	100	17904

Note: 1. Living arrangements variable is constructed by no of persons in the family, relationship with head and Marital status and with unmarried sons, married sons, married females, teen and etc. are included in other category.

2. Social network category is constructed like any network includes network with any medical, school (educational) or government personnel and no network means no network with any one of them.

3. For marital Status variable, other category includes singles, sep/div, sp. absent.

4. For n religion variable, other category includes Christian, Sikh, Buddhist, Jain, and Tribal, Other, None.

5. For caste variable, other category includes Brahmin and others.

Table 2 Percent distribution of older population by work status and background characteristics: 2005

Background characteristics	Regular paid work	Unpaid work	Not working	Total
Age				
60-64	21.4	32.7	45.9	6295
65-79	11.0	26.2	62.8	9822
80+	3.0	12.3	84.7	1787
Sex				
Male	20.2	35.2	44.6	8963
Female	7.4	18.9	73.7	8941
Residence				
Rural	14.4	32.0	53.6	12647
Urban	12.3	11.5	76.2	5257
Living Arrangements[1]				
Single	32.1	11.1	56.8	430
With spouse only	9.3	28.8	61.9	2274
With children and others	14.1	27.4	58.5	15200
Social Networks[2]				
No network	16.5	25.5	57.9	9092
Any network	10.9	28.9	60.2	8542
Education				
No education	15.0	25.1	60.0	10672
<5 years complete	13.5	35.5	51.0	2007
5-9 years complete	13.5	31.8	54.7	2915
10 & more years complete	10.2	27.8	62.0	1909
Marital Status[3]				
Married	17.5	34.1	48.4	11254
Widowed	8.0	15.2	76.8	6416
Others	8.7	29.3	62.1	234
Religion[4]				
Hindu	14.2	27.9	57.9	14641
Muslim	13.0	24.3	62.6	1758
Others	11.0	22.4	66.5	1505
Caste[5]				
SC/ST	22.4	22.8	54.8	4293
Other backward class	13.7	29.1	57.2	7191
Other	7.8	28.0	64.2	6420
Wealth Index				
Lowest	23.1	27.4	49.6	3532
Second	17.5	29.8	52.7	2852
Middle	11.9	31.6	56.4	3741
Fourth	9.7	28.6	61.7	3205
Highest	5.7	18.8	75.5	4574
Total	13.9	27.2	58.9	17904

Note: 1. Living Arrangements variable is constructed by no of persons in the family, with unmarried sons, married sons, married females, teen and relationship with household head etc. are included in other category.

2. Social network category is constructed like any network includes network with any medical, school (educational) or government Personnel and no network means no network with any one of them.

3. For marital Status variable, other category includes singles, sep/div, sp. Absent.

4. For religion variable, other category includes Christian, Sikh, Buddhist, Jain, Tribal, Other, None.

5. For caste variable, other category includes Brahmin and others.

6. Work status has defined as, if <240 hours per year considered as no work and >=240 hours per year considered as working status.

7. Job status has defined as, if 0 job (regular paid work), then that considered in 'no regular paid work" and more than one job (regular paid work) considered in 'any regular paid work'.

8. Unpaid work has calculated with the help of above two variables.

9.. The bivariate association is tested statistically significance with Pearson's chi square test at 1% level of significance with p value 0.01 for all background characteristics.

Table 3 Percentage of working older population by age and by Sex, paid work status and background characteristics: 2005

Background characteristics	Regular paid work				Unpaid work				Regular paid work			Unpaid work		
	60-64	65-79	80+	Total	60-64	65-79	80+	Total	M	F	T	M	F	T
Age														
60-64	-	-	-	--	-	-	-	-	31.3	11.9	21.4	37.7	27.4	32.5
65-79	-	-	-	-	-	-	-	-	16.2	5.5	11.0	36.5	15	26
80+	-	-	-	-	-	-	-	-	4.7	1.0	3.0	17.6	6.2	12.3
Sex														
Male	31.3	16.2	4.7	20.2	37.7	36.5	17.6	35	-	-	-	-	-	-
Female	11.9	5.5	1.0	7.4	27.4	15	6.2	18.8	-	-	-	-	-	-
Residence														
Rural	22.9	11.1	2.8	14.4	38.6	30.4	14.9	31.8	20.6	8.0	14.4	40	23.2	31.8
Urban	17.0	10.7	3.5	12.3	13.2	11.7	3.3	11.4	19.1	5.6	12.3	18.1	4.9	11.4
Living Arrangements														
Single	50.3	27.7	8.2	32.1	14.3	8.3	12.5	10.2	40.5	29.6	32.1	17.1	8.1	10.2
With spouse only	11.8	6.6	-	9.3	32.7	24.1		28.7	4.9	9.3	9.3	9.2	28.9	28.7
With children and others	23.1	10.9	2.9	14.1	32.9	26.9	12	27.2	20.0	5.6	14.1	35.3	15.6	27.2
Social Networks														
No network	24.6	13.2	3.5	16.5	30.6	24.7	9.1	25.4	23.6	9.6	16.5	31.8	18.9	25.4
Any network	17.3	8.6	2.3	10.9	35.1	27.3	15.8	28.7	16.4	4.9	10.9	38.4	18.6	28.7
Education														
No education	23.6	11.8	2.9	15.0	31.2	23.6	11	24.8	25.1	8.8	15.0	32.1	20.4	24.8
<5 years complete	19.1	12.5	2.0	13.5	43.9	32.8	22.7	35.3	18.1	3.5	13.5	43	18.7	35.3
5-9 years complete	21.5	8.8	5.2	13.5	33.7	33	12.9	31.6	17.5	3.4	13.5	38.7	14	31.6
10 & more years complete	13.0	8.6	1.3	10.2	31.5	26	12.9	27.8	11.9	1.7	10.2	32.2	4.5	27.8
Marital Status														
Married	23.6	13.8	5.2	17.5	36.5	33.1	21.8	33.9	22.4	8.1	17.5	36.8	28.3	33.9
Widowed	15.5	6.8	1.8	8.0	20	15.3	7.2	15	11.3	6.9	8.0	26.4	11.4	15
Others	13.3	6.8	-	8.7	41.5	22.5	14.8	28.8	9.5	7.6	8.7	37.4	17.8	28.8
Religion														
Hindu	22.4	11.1	2.6	14.2	33.5	26.6	12.6	27.7	20.6	7.8	14.2	35.6	19.5	27.7
Muslim	16.7	11.5	5.6	13.0	28.6	23.8	8.8	24.4	20.1	5.0	13.0	32	15.6	24.4
Others	17.1	8.8	4.0	11.0	26.5	21.7	12.5	22.4	16.1	5.9	11.0	31	13.8	22.4
Caste														
SC/ST	33.4	16.9	4.3	22.4	25.8	22	9.6	22.5	32.4	12.5	22.4	27.3	17.7	22.5
Other Backward Class	21.0	11.1	1.8	13.7	35.3	27.3	14.4	28.9	19.3	7.9	13.7	37	20.3	28.9
Other	11.2	6.7	3.5	7.8	34.6	27.2	11.4	27.9	12.5	3.0	7.8	37.9	17.6	27.9
Wealth Index														
Lowest	32.6	19.2	4.8	23.1	31.1	25.7	13.9	26.7	31.2	14.9	23.1	32.8	20.7	26.7
Second	28.1	12.9	3.4	17.5	34.9	28.7	14.9	29.6	24.9	9.9	17.5	38.2	20.9	29.6
Middle	19.3	8.7	3.0	11.9	38.3	29.7	17.3	31.6	18.3	5.5	11.9	40.4	22.6	31.6
Fourth	15.0	8.0	1.7	9.7	36.2	27.4	11	28.6	15.5	3.9	9.7	38.7	18.4	28.6
Highest	8.5	4.9	1.9	5.7	22.7	19	5.4	18.8	9.8	1.3	5.7	26.4	10.3	18.8
Total	21.4	11.0	3.0	13.9	32.5	26	12.3	27.1	20.2	7.4	13.9	35	18.8	27

Note: 1. work status has defined as, if <240 hours per year considered as no work and >=240 hours per year considered as working status.

2. Job status has defined as, if 0 jobs considered as a no job and more than one job (regular paid work) considered as 'any job'.

3. Unpaid work has calculated with the help of above two variables: unpaid work is equal to the difference between working and regular paid work

4. All percentages are taken valid cases after excluding missing cases.

5. Statistical significance of the trivariate association was tested with Pearson's chi square test between 1% to 5% level of significance. (p value<0.01 to p value<0.05.).

Table 4 Percent distribution of older population who are in regular paid work by age and type of industry and background characteristics: 2005

Background Characteristics	Regular paid work									Number of Persons
	60-64			65-75			80+			
	1-Agri.	2-indu.	3-ser.	1-Agri.	2-indu.	3-ser.	1-Agri.	2-indu.	3-ser.	
Sex										
Male	55.7	20.7	23.6	49.5	22.6	28.0	52.2	13.5	34.3	1642
Female	73.9	12.5	13.6	63.2	16.4	20.4	19.5	11.0	69.5	633
Residence										
Rural	70.6	15.5	13.8	63.3	16.6	20.1	57.6	7.0	35.3	1675
Urban	20.1	30.2	49.6	18.7	35.6	45.7	18.0	28.7	53.3	600
Living Arrangement										
Single	75.3	5.1	19.6	52.0	23.1	25.0	-	32.9	67.1	128
Living with spouse	80.0	8.8	11.3	78.1	8.8	13.1	-	-	-	208
Living with children and others	57.8	20.2	22.0	51.0	21.8	27.2	49.5	11.9	38.7	1939
Social Networks										
No network	63.5	18.6	17.9	55.4	21.9	22.7	66.5	7.2	26.3	1424
Any network	56.2	18.4	25.4	48.6	19.8	31.7	14.2	24.4	61.4	816
Education										
No education	68.8	18.4	12.8	60.8	19.9	19.3	54.0	10.8	35.2	1488
<5 years complete	59.8	11.1	29.1	48.6	26.1	25.3	50.1	-	49.9	262
5-9 years complete	49.5	23.4	27.1	27.6	25.9	46.5	23.3	17.5	59.2	333
10 & more years complete	10.0	17.9	72.1	24.8	13.8	61.4	-	100.0	-	175
Marital Status										
Married	59.9	19.2	20.9	52.9	20.7	26.5	54.9	18.8	26.4	1761
Widowed	65.2	15.3	19.5	53.2	21.2	25.6	34.5	4.7	60.8	490
Others	64.1	5.7	30.2	51.9	42.0	6.1	-	-	-	24
Religion										
Hindu	63.6	17.9	18.6	56.3	20.6	23.1	41.6	13.0	45.4	1890
Muslim	36.0	22.6	41.4	20.4	27.5	52.1	61.0	17.4	21.6	229
Others	57.9	19.6	22.5	57.9	16.0	26.1	56.3	5.8	37.9	156
Caste										
SC/ST	70.3	16.4	13.3	71.5	14.4	14.1	45.4	13.7	40.9	872
Other Backward Class	57.3	21.5	21.2	47.3	26.0	26.6	48.2	12.7	39.1	943
Other	43.7	15.5	40.8	31.1	22.6	46.2	46.6	12.8	40.6	460
Wealth Index										
Lowest	73.6	16.3	10.2	65.9	14.6	19.5	73.7	9.9	16.4	850
Second	68.6	18.5	12.9	65.4	18.3	16.3	76.2	-	23.8	477
Middle	56.8	19.1	24.0	53.6	22.7	23.6	20.1	9.6	70.3	434
Fourth	42.3	20.7	37.0	23.5	37.8	38.7	-	38.0	62.0	267
Highest	10.1	23.5	66.4	6.9	29.4	63.7	20.5	23.0	56.5	247
Total	60.9	18.4	20.7	52.9	21.0	26.1	46.6	13.1	40.3	2275

Note: 1. Agricultural and allied activities 2 .Industrial Sector 3. Service Sector for regular paid work.

2 .All values are taken valid cases after excluding missing cases.

3. These sectors are divided by the help of National Classification of Occupations-1968 and actually divided by National Industrial Classification (NIC)-1987 provided by IHDS codebook.

4. The statistical significance of the trivariate association was tested with Pearson's chi square test between 1% to 5% level of significance. (p value<0.01 to p value <0.05.)

Table 5 Percent distribution of households with at least one older person by work status and sources of income of the household: 2005

Background Characteristics	Regular paid work				Unpaid work				Not working			
	Agriculture/ business/ wage	Retirement pensions/ rent/ dividend/ other	Govt. benefits	Remittances	Agriculture/ business/ wage	Retirement pensions/ rent/ dividend/ other	Govt. benefits	Remittances	Agriculture/ business/ wage	Retirement pensions/ rent/ dividend/ other	Govt. benefits	Remittances
Age												
60-64	77.4	3.0	14.8	4.8	68.3	10.7	13.4	7.6	65.0	14.9	12.8	7.3
65-79	69.5	4.6	20.3	5.7	66.9	9.3	16.8	7.0	64.7	11.4	17.0	6.8
80+	74.6	7.0	16.2	2.1	67.5	6.6	18.4	7.6	66.3	7.0	19.2	7.6
Sex												
Male	75.8	3.6	15.0	5.6	68.2	11.3	13.4	7.1	62.7	16.5	13.7	7.1
Female	68.9	4.2	23.3	3.7	66.7	7.8	18.0	7.5	66.4	8.8	17.7	7.0
Residence												
Rural	72.5	3.0	19.1	5.4	67.7	6.2	18.1	8.1	65.2	7.5	19.3	8.0
Urban	79.8	6.4	9.8	4.0	66.6	19.8	8.9	4.7	64.5	21.6	9.1	4.9
Living Arrangement												
single	60.5	5.4	31.0	3.1	21.6	34.0	23.1	21.3	11.8	39.5	24.7	24.0
Living with spouse	74.1	6.5	16.5	2.9	62.5	15.6	13.3	8.5	59.1	19.9	12.3	8.8
Living with children and others	74.8	3.4	16.3	5.5	69.2	7.9	16.1	6.8	67.4	9.7	16.5	6.3
Social Networks												
No network	76.8	2.8	15.9	4.5	68.7	7.4	17.0	6.9	66.2	9.4	17.6	6.8
Any network	69.2	5.2	19.3	6.3	65.9	11.6	14.7	7.7	63.7	14.3	14.7	7.3
Education												
No education	72.1	3.1	19.9	4.9	68.3	4.8	19.9	7.0	66.9	6.0	20.3	6.8
<5 years complete	74.7	2.3	18.5	4.6	69.3	8.1	14.0	8.6	64.7	10.9	15.4	9.0
5-9 years complete	81.5	3.5	8.5	6.4	70.5	13.5	7.8	8.3	67.9	17.6	6.8	7.7
10 & more years complete	72.1	13.4	8.5	6.0	51.2	35.6	6.1	7.2	43.6	44.1	5.1	7.2
Marital Status												
Married	76.4	4.0	14.1	5.6	66.9	12.1	13.5	7.4	61.7	17.0	13.6	7.6
Widowed	65.5	3.0	28.5	3.0	68.6	5.6	19.0	6.9	68.7	6.3	18.7	6.3
Others	62.6		21.0	16.4	56.0	5.6	27.6	10.9	60.9	7.0	22.2	9.9
Religion												
Hindu	73.7	3.3	18.0	5.0	67.3	9.2	16.6	6.9	64.8	11.5	17.3	6.4
Muslim	76.5	6.5	9.9	7.2	70.7	8.5	11.6	9.3	68.5	10.8	9.6	11.1
Others	74.6	5.8	16.9	2.7	63.8	14.1	13.5	8.6	62.3	16.5	13.0	8.2
Caste												
SC/ST	70.4	2.1	22.5	5.0	62.2	6.0	25.5	6.3	61.1	6.7	25.9	6.3
Other Backward Class	76.2	3.3	15.4	5.0	69.2	7.5	15.7	7.5	66.1	9.9	16.3	7.7
Other	76.8	8.2	9.5	5.5	68.5	14.0	9.9	7.6	66.2	17.1	9.8	6.9
Wealth Index												
Lowest	70.3	3.2	21.4	5.1	64.4	5.2	25.0	5.5	60.7	7.4	25.6	6.3
Second	71.9	2.6	21.0	4.5	68.9	4.2	20.0	6.9	66.4	4.9	21.7	7.0
Middle	81.6	1.6	12.6	4.3	70.3	5.2	15.5	9.0	69.2	6.4	16.3	8.1
Fourth	75.1	6.5	11.0	7.4	66.8	11.9	13.2	8.1	64.4	13.2	14.7	7.7
Highest	78.1	10.2	6.1	5.6	66.7	19.9	6.5	6.9	64.6	22.5	6.5	6.3
Total	74.0	3.7	17.2	5.1	67.4	9.5	15.9	7.3	65.0	11.8	16.2	7.0

Table 6 Odds ratios of binary Logistic Regression for any work and regular paid work by background Characteristics: 2005

Background Characteristics	Work (Any Work)	Regular paid work
Age		
60-64@		
65-79	.496***	.465***
80+	.138***	.133***
Sex		
Male@		
Female	.261***	.299***
Residence		
Rural@		
Urban	.462***	1.851***
Living Arrangement		
single@		
Living with spouse	.578***	.203***
Living with children and others	.482***	.221***
Social Networks		
No Network@		
Any Network	1.142***	.826***
Education		
NO Education@		
<5 years complete	1.044	.812***
5-9 years complete	.951	.769***
10 & more years complete	.695***	.788**
Marital Status		
Married@		
Widowed	.554***	.594***
Others	.579***	.407***
Religion		
Hindu@		
Muslim	.835***	1.121
Others	.897	1.015
Caste		
SC/ST@		
Other Backward Class	1.146**	.679***
Other	1.070	.484***
Wealth Index		
Lowest@		
Second	.885**	.701***
Middle	.726***	.457***
Fourth	.614***	.302***
Highest	.408***	.182***

Note: @-first Reference category of different characteristics
***p<0.01; **p<0.05; *p<0.10

Table 7 Multinomial Regression analysis: Adjusted percentages of older population by work status and background characteristics: 2005

Background characteristics	Regular paid work	Unpaid work	Not working
Age			
60-64	37.89	33.53	28.57
65-79	21.47***	30.22***	48.31
80+	6.84***	16.26**	76.90
Sex			
Male	36.19	34.96	28.85
Female	14.76***	24.33***	60.91
Residence			
Rural	21.49	38.58	39.92
Urban	33.94***	13.34***	52.72
Living Arrangements			
single	28.34	21.88	49.78
with spouse only	5.96***	36.88***	57.16
with children and others	6.83***	33.18***	59.99
Social Networks			
No network	26.27	28.68	45.05
Any network	23.87***	32.61***	43.51
Education			
No education	26.24	28.85	44.91
<5 years complete	21.76***	34.75**	43.49
5-9 years complete	22.05***	31.82***	46.13
10 & more years complete	20.90***	29.59***	49.50
Marital Status			
Married	23.98	37.87	38.15
Widowed	16.00***	28.43**	55.57
Others	8.59***	39.99***	51.52
Religion			
Hindu	26.38	22.21	51.41
Muslim	5.44***	36.70***	57.86
Others	6.24***	33.03***	60.74
Caste			
SC/ST	10.42	27.85	61.73
Other Backward Class	7.06**	34.80***	58.14
Other	3.81***	35.25***	60.94
Wealth Index			
Lowest	11.86	33.73	54.41
Second	9.56***	34.63***	55.81
Middle	6.25***	35.13***	58.62
Fourth	4.97***	34.24***	60.80
Highest	2.07***	26.28***	71.02

Note: Not working is taken a reference category.
***p<0.01; **p<0.05; *p<0.10

Table 8 Prevalence (in percentage) of chronic diseases among older persons by work status and background characteristics: 2005

Background Characteristics	Regular paid work	Unpaid work	Not working	Total
Age				
60-64	18.1	27.9	32.1	26.3
65-79	29.7	29.3	29.5	29.3
80+	48.0	25.1	25.9	26.1
Sex				
Male	25.0	27.5	28.3	27.1
Female	23.9	29.0	30.6	28.8
Residence				
Rural	21.2	27.2	29.0	26.5
Urban	33.2	30.8	30.7	31.0
Living Arrangement				
Single	27.0	28.2	27.0	28.0
Living with spouse	20.9	31.7	34.3	31.2
Living with children and others	24.8	27.7	28.9	27.4
Social Networks				
No network	24.5	26.7	28.5	26.4
Any network	25.3	29.7	30.5	29.3
Education				
No education	19.9	26.0	28.3	25.3
Middle years complete	26.7	30.4	31.5	30.0
10 & more years complete	38.7	35.0	33.8	35.4
Marital Status				
Married	25.3	29.7	32.2	29.1
Widowed	22.9	26.3	26.9	26.1
Others		25.7	24.3	25.7
Religion				
Hindu	25.9	27.4	28.5	27.2
Muslim	19.4	22.1	23.4	21.6
Others	24.4	42.6	43.5	40.9
Caste				
SC/ST	17.4	27.0	28.5	25.2
Other Backward Class	25.0	25.7	27.8	25.7
Other	32.5	31.4	31.8	31.5
Wealth Index				
Poor	21.0	23.4	26.0	22.9
Middle	19.4	26.4	29.3	25.8
Rich	35.1	31.8	31.5	32.0
Total	24.7	28.3	29.6	27.9

Note: 1. chronic diseases include Non Communicable diseases (NCD) like Cataract, High BP, Heart disease, Diabetes, Cancer, Asthma, Paralysis, Mental illness.

2. Statistical significance of the bivariate association was s tested with Pearson's chi square test at 1% level of significance with p value 0.01 for all background characteristics.

Table 9 Percent distribution of older population received treatment by work status and background characteristics: 2005

Background characteristics	Treatment received with modern medical care [1]					
	Regular Paid Work		Unpaid work		Not Working	
	Traditional Treatment	Modern Treatment	Traditional Treatment	Modern Treatment	Traditional Treatment	Modern Treatment
Age						
60-64	9.1	90.9	3.1	96.9	4.8	95.2
65-79	6.9	93.1	3.0	97.0	4.1	95.9
80+	20.5	79.5	-	100.0	1.5	98.5
Sex						
Male	10.4	89.6	2.2	97.8	3.3	96.7
Female	3.0	97.0	4.2	95.8	4.3	95.7
Residence						
Rural	10.1	89.9	6.9	93.1	3.8	96.2
Urban	5.7	94.3	3.5	96.5	4.0	96.0
Living Arrangements						
Single	5.1	94.9	5.0	95.0	2.1	97.9
Living with spouse	1.9	98.1	4.1	95.9	4.6	95.4
Living with children and others	0.5	99.5	2.7	97.3	3.9	96.1
Social Networks						
No network	6.4	93.6	6.8	93.2	9.0	91.0
Any network	2.6	97.4	2.7	97.3	3.0	97.0
Education						
No education	16.4	83.6	4.2	95.8	4.0	96.0
5-9 years complete	6.1	93.9	1.5	98.5	4.3	95.7
10 & more years complete	1.1	98.9	2.0	98.0	2.5	97.5
Marital Status						
Married	5.9	94.1	2.8	97.2	4.1	95.9
Widowed	8.3	91.7	3.4	96.6	3.5	96.5
Others	-	-	-	100.0	13.9	86.1
Religion						
Hindu	7.7	92.3	2.6	97.4	4.1	95.9
Muslim	14.5	85.5	5.3	94.7	3.8	96.2
Others	7.3	92.7	2.7	97.3	2.9	97.1
Caste						
SC/ST	16.5	83.5	3.8	96.2	5.1	94.9
Other Backward Class	10.9	89.1	3.4	96.6	3.7	96.3
Other	8.4	91.6	2.7	97.3	3.6	96.4
Wealth Index						
Poor	19.8	80.2	3.6	96.4	3.5	96.5
Middle	13.7	86.3	3.2	96.8	5.7	94.3
Rich	4.3	95.7	2.1	97.9	3.5	96.5
Total	8.8	91.2	2.9	97.1	3.9	96.1

Note: 1. Treatment received in modern medical care includes treatment by public and private doctors and public and private nurses.
2. The trivariate association is tested statistically significance with Pearson's chi square test between 1% to 5% level of sig. (p value<0.01 to p value<0.05.)

Table 10 Percent distribution of older population receiving modern medical care by place and expenditure on medical care by work status and background characteristics: 2005

Background characteristics	Place of treatment received with modern medical care						Median Expenditure on Medical care		
	Regular Paid Work		Unpaid work		Not Working				
	Received Within village and neighborhoods	Received Outside village	Received Within village and neighborhoods	Received Outside village	Received Within village and neighborhoods	Received Outside village	Regular Paid Work	No Regular paid work	Not Working
Age									
60-64	23.5	76.5	20.0	80.0	14.7	85.3	2000	2500	2500
65-79	21.1	78.9	19.6	80.4	17.5	82.5	1200	2400	2500
80+	16.7	83.3	22.0	78.0	22.5	77.5	3000	3000	3000
Sex									
Male	20.9	79.1	18.8	81.2	15.0	85.0	2300	3000	3100
Female	24.6	75.4	21.1	78.9	19.0	81.0	950	2200	2300
Residence									
Rural	32.2	67.8	31.4	68.6	29.4	70.6	1500	2400	2480
Urban	6.2	93.8	7.2	92.8	6.7	93.3	1825	2750	2750
Living Arrangements									
Single	48.5	51.5	21.1	78.9	16.6	83.4	945	1100	1000
Living with spouse	18.4	81.6	16.6	83.4	12.7	87.3	950	2600	2860
Living with children and others	20.4	79.6	20.4	79.6	18.1	81.9	2050	2500	2585
Social Networks									
No network	22.5	77.5	22.0	78.0	19.0	81.0	1440	2285	2400
Any network	19.2	80.8	18.2	81.8	16.0	84.0	1815	2800	2800
Education									
No education	29.1	70.9	28.2	71.8	25.3	74.7	1095	2015	2090
5-9 years complete	22.5	77.5	14.5	85.5	11.1	88.9	2200	2700	2800
10 & more years complete	3.8	96.2	6.5	93.5	6.5	93.5	4300	4200	4300
Marital Status									
Married	19.9	80.1	17.8	82.2	13.9	86.1	2000	3000	3060
Widowed	27.0	73.0	23.0	77.0	21.0	79.0	1200	2062	2090
Others	-	-	18.1	81.9	15.9	84.1		2000	2000
Religion									
Hindu	19.2	80.8	22.0	78.0	19.9	80.1	1500	2415	2500
Muslim	26.4	73.6	11.8	88.2	6.8	93.2	2000	2700	2825
Others	37.3	62.7	12.8	87.2	9.5	90.5	2500	3200	3185
Caste									
SC/ST	33.0	67.0	27.4	72.6	23.2	76.8	1440	1880	2000
Other Backward Class	17.4	82.6	24.5	75.5	22.0	78.0	1345	2200	2200
Other	13.5	86.5	13.5	86.5	12.0	88.0	3000	3100	3100
Wealth Index									
Poor	37.7	62.3	40.0	60.0	35.5	64.5	1150	1700	1755
Middle		100.0	25.2	74.8	25.8	74.2	1830	2415	2275
Rich	7.2	92.8	9.2	90.8	7.9	92.1	2900	3000	3050
Total	22.0	78.0	20.0	80.0	17.3	82.7	1560	2500	2550

Table 11 Odds ratios of binary logistic regression analysis for prevalence of a) chronic disease prevalence, b)Modern Medical Treatment received and c)Medical Treatment outside village and neighborhoods among older population by background characteristics: 2005

Background Characteristics	Chronic disease (a)	Modern medical treatment received (b)	Medical treatment received outside village and neighborhoods (c)
Sources of income of households			
Not working@	1	1	1
Working	.860***	1.186***	1.743***
Regular paid work	.845***	1.888***	1.549***
Retirement pensions ,rents ,dividends	.998	1.650***	1.565**
Government benefits	.929***	1.202**	.421**
Age			
60-64@	**1**	1	1
65-79	1.157***	1.176***	.763*
80+	1.030***	2.064***	1.153***
Sex			
Male@	**1**	**1**	1
Female	1.271***	.980***	.900***
Residence			
Rural@	**1**	**1**	1
Urban	1.001	1.931***	0.273***
Living Arrangement			
Single@	**1**	1	1
Living with spouse	.806***	1.519***	1.129***
Living with children and others	.804***	1.474***	.882**
Social Networks			
No network@	**1**	**1**	1
Any network	1.002**	1.193***	1.179***
Education			
No education@	**1**	**1**	1
Middle years complete	1.073**	.771***	1.046***
10 & more years complete	1.262***	1.743***	1.155***
Marital Status			
Married@	**1**	**1**	1
Widowed	.780***	.975**	.949***
Others	.790**	.382**	.522***
Religion			
Hindu@	**1**	**1**	1
Muslim	.723***	.726***	1.138***
Others	1.585***	1.269***	1.647**
Caste			
SC/ST@	**1**	**1**	1
Other Backward Class	.978**	1.027***	1.321***
Other	1.154***	1.144***	1.922***
Wealth Index			
Poor@	**1**	1	1
Middle	1.091***	.865***	.989***
Rich	1.333***	1.361***	1.845***

Note:1. @- first Reference category of different characteristics

***p<0.01; **p<0.05; *p<0.10

2. Remittance sample was very small so it has not taken into account in sources of income for logit analysis.