Association between Time Use Behaviour and Health and Well Being among Elderly: Evidence from the Longitudinal Ageing Study of India

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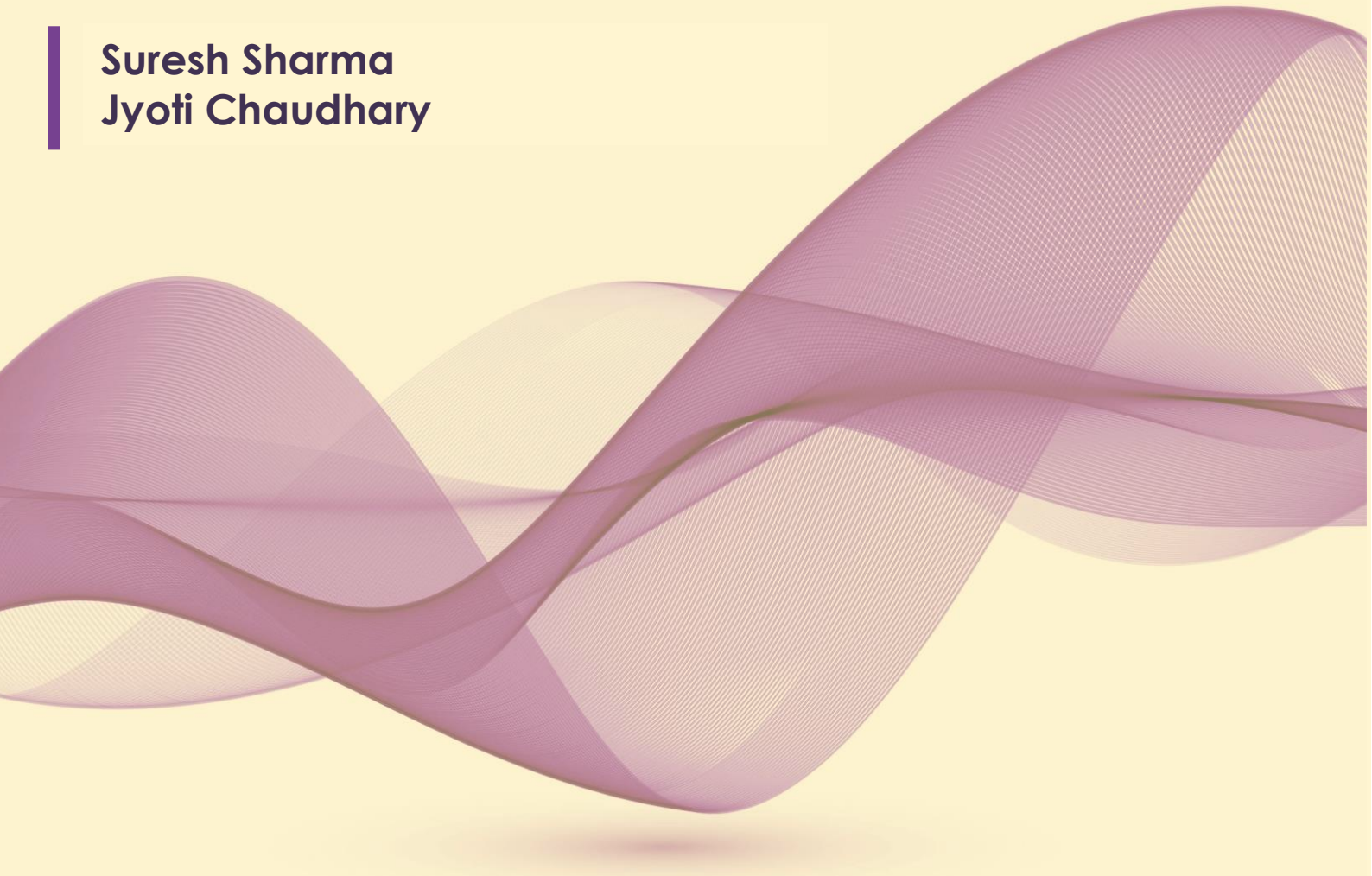

2022

IEG Working Paper No. 450

February 2022

Association between Time Use Behaviour and Health and Well Being among Elderly: Evidence from the Longitudinal Ageing Study of India

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Abstract

Ageing is an inevitable demographic process occurring globally. Coming decades are projected to see a substantial increase in the elderly population and with rise in their number, the social, economic and health policy landscape for the elderly would also need upgradation in response to their needs. Thus identifying the drivers of health and well-being in elderly is essential. One such potential driver of health could be the daily routine of the elderly which focuses on the nature of activities being performed by them.

Utilizing time use data from the Longitudinal Ageing Study of India (LASI), we examine the time allocation of the elderly, looking into how much time the elderly spend on active participation and how this allocation varies according to their socio-economic and demographic context. We further explore the association between self-rated health, wellbeing and daily activity engagement decisions of the elderly.

The results from the analysis provide insight into activity engagement choices of the elderly across varying socio-economic classes. Time spent in working/volunteering and in exercising was found to have significant positive association with health and well-being indicators. Our results also show that the gender difference in nature of time utilisation by elderly is pervasive.

For ageing to be successful, an active daily schedule for elderly needs to become a key concept of the social policy. Building employment opportunities for elderly and considering increasing the retirement age in a phased manner would not only lead to financial independence but also contribute to better health and well-being among them. Setting up community elderly associations aimed at teaching and promoting health enhancing activities among elderly can be considered.

Key Words: Elderly, Time-Use Data, Health & Wellbeing, Policy

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Introduction

With changing demographic structures, the age composition of population is seeing rising share of elderly population. As cited in the LASI report "In the 2011 census, people aged 60 and above accounted for 8.6% of the total Indian population, numbering 103 million elderly persons. The share of the elderly population is projected to further rise to 19.5% (319 million) by 2050." As individuals grow older, their physical, social, and emotional selves change, posing obstacles to their ability to fulfil prior roles and obligations, work, and engage with people, among other things (Adjei & Brand, 2018).

Over the last decade, there has been a surge in interest in studies on issues related to ageing and its dynamics. Concerns about the consequences of population ageing have prompted research into economic, social, and health insecurity among the elderly. For ageing to be successful, the WHO has emphasized the importance of 'active ageing'- a concept wherein the elderly are provided opportunities to contribute to society and are promoted to stay in charge of their own lives. A dynamic daily routine with time being utilised in varied activities inside and outside home can be taken as an indicator of active ageing.

In the context of health, time use research (TUR) is the study of health-promoting and health-harming behaviours throughout the course of a 24-hour day. TUR is used to better understand the factors that influence health behaviours, as well as to monitor behavioural trends over time as a sort of population surveillance.(Bauman, Bittman, & Gershuny, 2019). Time use approach in health can also be used to link people's daily behaviour to existing institutional opportunities and constraints(van Tienoven, Craig, Glorieux, & Minnen, 2020).

Time use through day-to-day activities as a link to promote health and well-being is being increasing researched. It has been found to have positive effects on the satisfaction and overall wellbeing of individuals (Raymond et al., 2013). Promoting healthy ageing has been found to a good implementation strategy for reducing the burden of age-related diseases.(Enam, Konduri, Eluru, & Ravulaparthy, 2018). Active participation of the elderly in activities that promote social productivity and social value could serve as a mechanism/tool to address the challenges posed by ageing such as isolation and loneliness(Kim, 2019). Role of daily activities of varied nature in bringing meaning and purpose to life is being established (Hurd & Rohwedder, 2007). Importance of maintaining active daily routine in order to have a healthy lifestyle has been considered important in several other research.

An investigation into daily activities of the elderly can help us understand their lifestyle and living attitude and thus help us comprehend if they are pursuing active ageing. How an individual spends his time can tell a lot about the quality of his lives.(Lee, Lee, & Park, 2014) Given, that the elderly have a relatively greater amount of spare time, studying time use could serve as an effective tool to examine their lifestyle. One can infer whether the person is actively engaged in indoor/outdoor chores and social bonding or has a sedentary lifestyle and spends most of the time in solitude. Such analysis would highlight the specific needs and problems of elderly with respect to active ageing and can eventually guide us to conceive measures to improve their quality of life.

In an ageing society, research on elderly's time utilisation and time management will aid understanding of how their daily lives are structured. This will lead to a deeper understanding of the daily lives of the elderly, as well as generate practical evidence on how to address the social difficulties that older persons face. However, such research is very limited in India. How much time older people devote to active participation and whether their time allocation is associated with well-being remains under-investigated. Thus the goal of the current research is to contribute to this line of inquiry.

Utilizing time use data from LASI, we examine how the elderly allocate their daily time among different activities and study how this allocation varies according to their demographic and socio-economic context. We further explore gender differences in how elderly engage in housework and other productive activities. Most importantly, we examine the association between health, wellbeing and daily activity engagement decisions of the elderly. The results from the analysis provide insight into activity engagement choices of the elderly across varying socio-economic classes. These insights would guide policy aimed at promoting active ageing for elderly in India.

Materials and Methods

Data

The present study utilizes data from the Longitudinal Ageing Study of India (LASI). The LASI is a nationally representative survey, collecting data on the health, economic, and social determinants and consequences of population aging in India. It covers a sample of 72,000 older adults aged 45 and above across all states and union territories of India. For this research study,

the age group ‘60 years and above’ has been selected. The study sample size thus equals 31,464 elderly individuals.

The Time Use Data is collected as part of the experimental Module in LASI. In India, it is the only survey at present that provides comprehensive information on how elderly spend their time, with whom they spend the time and their emotions during the activities performed. The routine activities performed by the elderly are the primary variable of interest in this research study. These include watching television, walking/exercising, socializing with friends & family, healthcare activities, travelling and working/volunteering. The outcome variables studied include self-rated health, satisfaction with life, sleep and presence of chronic illness. Control variables included are age, sex, place of residence, living arrangement, education, religion and caste. A detailed account on construction of these outcome and control variables is given in the appendix.

Methods

The method of this study is secondary analysis of the time use data obtained from Longitudinal Ageing Study in India. The first part of the analysis is primarily descriptive in nature, where information on socio-economic and demographic characteristics of the study sample is provided. Next, bivariate analysis of all time use activities across the socio-economic variables has been presented.

In the second part of the analysis, logistic regression models have been used to study the association between health and wellbeing and time use categories. In particular, four models have been run with difference being in the dependent variable.

Analysis and Results

The general characteristics of the participants are presented in Table 1. Of the participants, 15098 are male (48%) and 16366 are female (52%). As for the residing region, 65 percent lived in rural area, and 35 percent in urban area. Around 67 percent of the sample belongs to the age group 60-70 years, 25 percent are in the age group 71-80 years and the rest 8 percent belong to the ‘oldest-old’ age category ie, are above 80 years of age.

Table 1: Background characteristics of the study sample

Background Characteristic	Classification	Sample Size	Frequency (%)
Place of Residence	Rural	20,725	65.87
	Urban	10,739	34.13
Gender	Male	15,098	47.98
	Female	16,366	52.02
Age	60-70	21,201	67.38
	71-80	7,773	24.7
	81-90	2,124	6.75
	90 and above	366	1.16
Religion	Hindu	23,037	73.22
	Muslims	3,731	11.86
	Christian	3,150	10.01
	Sikh	979	3.11
	Others	566	1.8
Caste	Schedule Caste	5,140	16.9
	Schedule Tribe	5,173	17.01
	Other Backward Caste	11,886	39.08
	None of them	8,218	27.02
Living Arrangement	Living alone	1,622	5.16
	Living with spouse and/or others	6,215	19.75
	Living with spouse and children	13,465	42.79
	Living with children and others	8,418	26.75
	Living with others only	1,744	5.54
Education	Less than primary school	3,781	25.94
	Primary school completed	6,017	41.28
	Secondary school Completed	2,376	16.3
	Higher Secondary school Completed	946	6.49
	College and above	1,220	8.37
	Professional Course/Degree	235	1.61
Work	Never Worked	8,776	27.9
	Currently working	9,307	41.04
	Currently not working	13,373	58.96
MPCE Quintile	Poorest	6,484	20.61
	Poorer	6,477	20.59
	Middle	6,416	20.39
	Richer	6,170	19.61
	Richest	5,917	18.81

Note: Authors own computation from the LASI data on elderly.

With regard to religion, 73 percent belong to the religious group Hindus, representing the highest ratio. 12 percent are Muslims, 10 percent are Christians and the rest belong to other religions. Ethnic composition of elderly shows that 17 percent belonged to SCs, another 17 percent belong to STs, 39 percent are from OBC, and 27 percent belonged to other castes.

As for living arrangement, 1622 elderly (5 percent) live alone and the rest 95 percent live with either spouse or children or with both. Forty-one percent of the sampled elderly have completed primary schooling, 16 percent have completed secondary schooling, 8 percent have completed some college degree (graduation and above) and 2 percent have done some professional course. Around 28 percent of the sampled elderly have never worked in their lifetime. Of those who have ever worked, 41 percent are still working.

The mean participation time for the elderly across the last 24 hours' period for six major activities has been listed in table 2. The participants spent the most time in work and volunteering (236.15± 152.35minutes), followed by socializing with friends and family (229.16± 256.54 minutes). The third activity wherein most of the time was spent is travelling (133.69± 148.17 minutes). The least mean time spent was on walking (57.92± 75.52 minutes) and healthcare related activities (58.59± 78.73 minutes). The elderly, on an average spent 125.92 minutes in watching television.

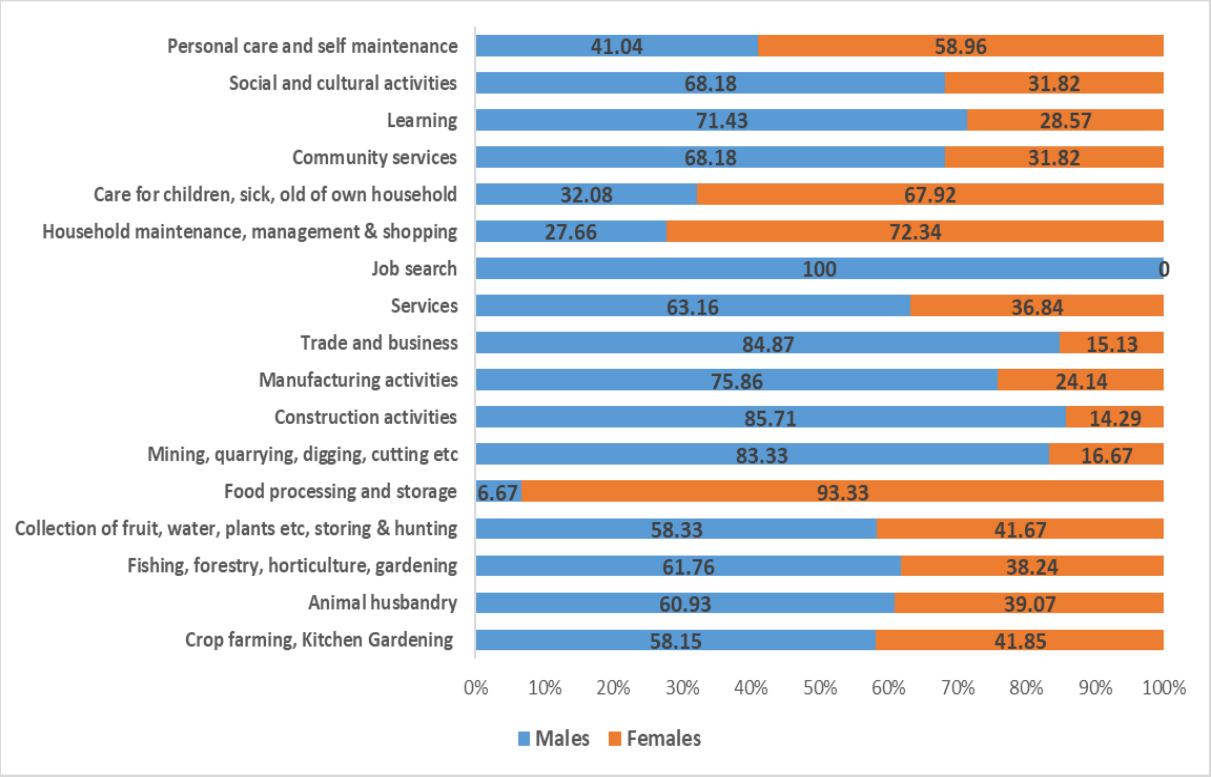
Table 2: Participation Time in activities across 24 hours

Activity Type	Sample Size (N)	Minimum Time	Maximum Time	Mean time Spent	Standard deviation
			(In minutes)		
Watching Television	1734	1	860	125.92	90.72
Work or Volunteer	1053	1	1200	236.15	152.35
Walking & Exercising	532	1	900	57.92	75.52
Healthcare related activities	280	2	720	58.59	78.73
Travel anywhere	310	10	1440	133.69	148.17
Socialise with friends & family	1146	1	1440	229.16	256.54

Note: Authors own computation from the LASI data on elderly.

Figure 1 shows a gendered distribution of the elderly's participation in other routine activities performed by them. Of the total individuals who participated in activities such as household management, maintenance, shopping; care for the child, sick and elderly; personal maintenance; the percentage is higher for women, whereas participation of men was higher in activities such as trade and business, construction, manufacturing, agriculture, animal husbandry etc.

Figure 1: Elderly's participation in other activities by gender



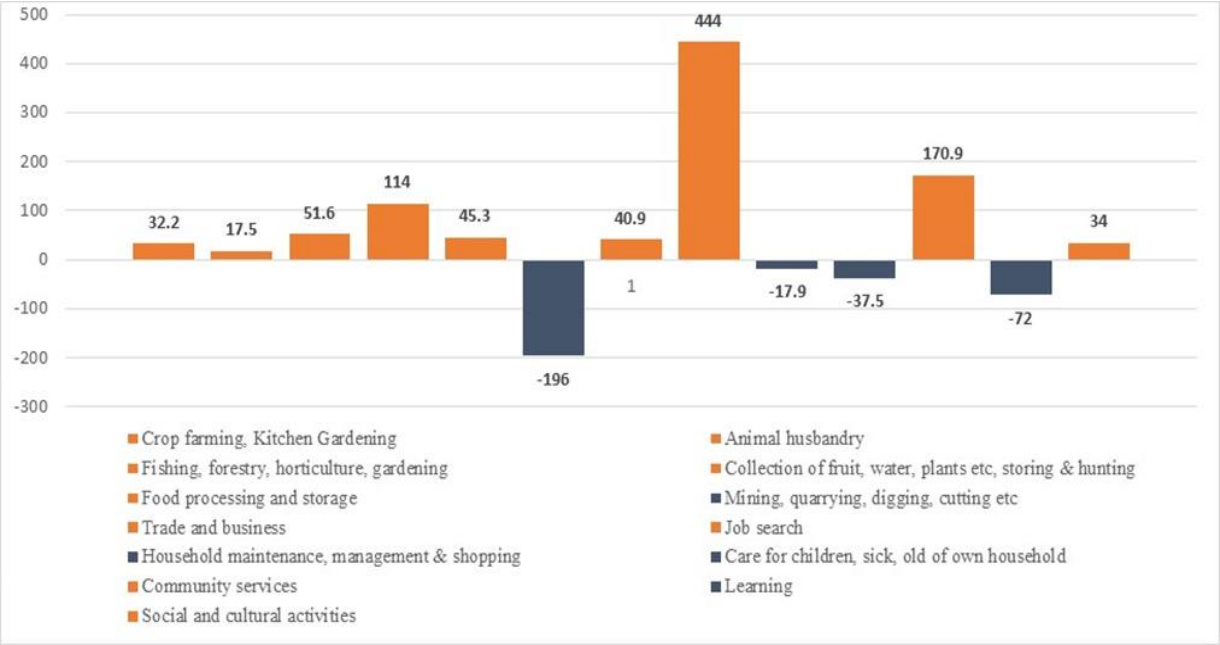
Note: Authors own computation from the LASI data on elderly.

For instance, of the total individuals who reported to have spent time on household maintenance and management, 72 percent are women and only 27 percent are men. Similarly, of the total participants, 68 percent women reported to have spent time in taking care of the children, the sick and old of their households leaving 32 percent males to have done the same. Approximately 85 percent participants who spent time in trade, business and construction happen to be males. It is interesting to note that only elderly men have reported to have spent time on 'Job Search' with female representation being zero.

This shows clear segregation in the nature of work being done by men and women. Majority of the time spent by women is on activities which are being performed in and around the

household while men are spending their time on activities being performed outside. The figures obtained here support the narrative where men are considered the breadwinners of the family who go outside and work and women are restricted to performing household chores.

Figure 2: Difference in Mean Time Spent (in minutes) on activities among Males and Females



Note: Authors own computation from the LASI data on elderly.

Figure 2 shows the difference in mean time spent on activities by males and females. The orange bars show the activities in which males spend more time compared to females while the blue bars show the activities in which females spend more time. The first orange bar shows that in a day, on an average, men spend 32 more minutes than females on crop farming and kitchen gardening. Similarly, the first blue bar shows that on an average, females spend 196 more minutes on household maintenance, management and shopping compared to the males. The other activities where the mean time spent by females is higher are mining, quarrying, digging; care for children, sick & old and learning. Elderly men spend 444 minutes on an average in a day on 'Job Search', while the time spent on the same by female elderly is zero.

Average time spent on activities across the demographic and socio-economic characteristics of participants is presented in Table 3. Elderly in rural areas appear to spend more time on healthcare related activities and on walking and exercising when compared to their urban counterparts. While those residing in urban areas, on an average spend more time on watching television, travelling and socializing with family and friends. The difference in mean time spent

across residence type was found to be significant for three time use activities namely, watching television, healthcare related activities and socializing with friends and family.

With increase in age, the time spent on any activity tends to reduce. Functional limitations could be one of the main reasons explaining the decrease in time duration. For instance, the time spent on work/volunteer for the age group 60-70 years is 242 minutes while the same for the age group 80-90 years is 163 minutes and further reduces to 150 minutes for the 90 above age group.

Females tend to spend more time on watching television, on travelling and on socializing with friends and family compared to men. The difference in mean time spent by males and females type was found to be significant for four time use activities namely, watching television, working/volunteering, travelling and socializing with friends and family.

When mean time spent on activities in seen across the living arrangements, those living alone are found to spend more time on all activities (except socializing) compared to any other group. No specific pattern emerges with respect to level of educational attainment and the mean time spent in activities. Those who have "never worked" tend to spend more time on watching television, travelling and socializing with friends and family, compared to those who are currently working and those who have worked previously but are not currently working.

The results of logistic regression analyses are presented in table 4. Model 1 shows a significant positive association between self-rated health and the activities walking/exercising and working/volunteering. Higher the time spent in working/volunteering and in walking/ exercises, higher are the odds of reporting optimal self-rated health. Model 2 predicts a significant positive association between self-rated health and the activity walking/exercising.

For sleep as the dependent variable, the activities found to be positively associated are working/volunteering and socializing with friends and family. Results show that elderly who spend more time in working and in socializing have higher odds of reporting better sleep patterns. For model 4, where the dependent variable is presence of chronic conditions, the only activity that is found to be significantly associated is working/volunteering. Odds Ratio show that those who spend more time in work, have lower odds of reporting chronic illness.

Table 3: Mean Time spent in activities across socio-economic & demographic characteristics

Background Characteristic	Time Use Activity Type					
	Watching Television	Walk/ Exercise	Work or Volunteer	Healthcare related activities	Travel anywhere	Socialise with friends & family
Place of Residence						
Rural	112.1	60.9	236.9	67.3	120.6	216.9
Urban	139.3	53.6	233.6	47.6	152.4	257.8
Age						
60-70	125.3	55.5	242.8	61.3	146.8	230.2
71-80	127.4	63.2	215.1	57.9	98.6	221.0
81-90	129.1	66.7	163.3	42.0	71.9	260.8
90 and above	90.0	52.5	150.0	41.0	90.0	175.0
Gender						
Male	121.7	59.7	267.0	62.4	120.6	208.0
Female	129.8	54.2	199.8	54.7	152.4	251.5
Living Arrangement						
Living alone	153.4	61.0	240.5	59.3	162.9	180.4
Living with spouse and/or others	138.3	57.9	252.5	60.9	157.7	240.9
Living with spouse and children	116.9	58.4	236.6	61.1	116.5	211.5
Living with children and others	125.6	58.3	218.7	52.2	140.3	251.3
Living with others only	146.4	38.3	228.6	58.0	104.2	258.8
Education						
Less than primary school	124.7	52.7	232.2	42.9	135.7	182.3
Primary school completed	130.7	55.8	243.8	49.2	143.0	223.3
Secondary school Completed	133.2	54.2	218.3	60.6	168.3	205.7
Higher Secondary school Completed	140.3	82.2	238.7	33.8	112.5	276.5
College and above	130.4	46.7	210.9	42.5	140.5	189.8
Professional Course/Degree	133.5	73.4	331.7	28.1	153.3	365.6
Work						
Never Worked	135.0	53.12		57.1	184.3	251.2
Currently working	111.3	66.9	288.2	52.0	125.6	202.1
Currently not working	127.9	54	163.6	62.4	124.9	235.7
MPCE Quintile						
Poorest	121.8	57.8	232.2	49.2	123.7	237.4
Poorer	123.2	56.2	232.9	73.8	157.3	215.3
Middle	122.0	58.7	255.1	50.8	107.7	228.5
Richer	130.8	53.6	232.4	58.2	148.0	218.6
Richest	129.2	61.6	224.3	62.1	141.0	248.3

Note: Authors own computation from the LASI data on elderly.

Table 4: Logistic Regression Results

Time Use Activity	**Self-Rated Health(1)**		**Life Satisfaction (2)**		**Sleep(3)**		**Chronic Condition(4)**	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Watching TV	1.08	(0.99-1.07)	0.997	(0.96-0.99)	1.00	(0.99-1.00)	1.00	(1.00 - 1.09)
Work or volunteer	1.02*	(1.00-1.02)	1.001	(0.99-1.04)	1.00*	(0.99-1.00)	0.99*	(0.997-0.99)
Walk or exercise	1.03*	(1.00-1.01)	1.002*	(0.99-1.00)	1.00	(1.00-1.01)	0.99	(0.997-1.00)
Healthcare related activity	.98	(0.98-1.00)	1.001	(0.99-1.00)	1.01	(0.98- 1.01)	1.00	(0.996-1.00)
Travel	1.03	(0.99-1.02)	1.000	(0.99-1.03)	0.99	(0.99- 1.02)	0.99	(0.997-1.00)
Socializing	0.98	(0.99-1.03)	0.997	(0.99-1.00)	1.00*	(1.00-1.05)	1.00	(0.997-0.99)

Note: * p<0.05; each model controls for socio-demographics.
Note: Authors own computation from the LASI data on elderly.

Discussion and Conclusion

Coming decades are projected to see a substantial increase in the population age group of 60 years and above, an age group considered to be 'dependent'. With rise in their number, the social and economic landscape for them would also need upgradation in response to their needs. Thus identifying the drivers of health and well-being in elderly is essential. One potential driver of health is the daily routine of the elderly which focuses on the nature of activities being performed by them, the duration of the activity and its intensity etc. Thus utilisation of time through day-to-day activities as a link to promote health and well-beings among the individuals is being increasing researched.

Previously, time use data have been used to study outcomes that are relevant to public health such as physical activity patterns, mental health states, and trends in nutrition (Bauman et al., 2019). However, such research is very limited in India. Utilizing time use data from the Longitudinal Ageing Study in India (LASI), we examine the time allocation of elderly, looking into how much time elderly spend on active participation and investigate if this relates to their health and wellbeing. The results from the analysis provide insight into activity engagement choices of the elderly across varying socio-economic and demographic groups.

Analyses in the current paper shows that, on an average, participants spent the most time in work and volunteering (236.15± 152.35minutes), followed by socializing with friends and family (229.16± 256.54 minutes). The third activity wherein most of the time was spent is

travelling (133.69± 148.17 minutes). The least mean time spent was on walking (57.92± 75.52 minutes) and healthcare related activities (58.59± 78.73 minutes).

Analysis of time utilisation across demographic characteristics shows that, with increase in age, the time spent on any activity tends to reduce. Functional and other health limitations could be one of the main reasons explaining the decrease in time duration. Another reason could be unavailability of enough opportunities and people to spend time with. When mean time spent on activities in seen across the living arrangements, those living alone are found to spend more time on all activities (except socializing) compared to any other group. Similar to our results, another study found those living alone to spend more time in all sorts of activities compared to those who had companionship (Chai & Margolis, 2020). However, in this research those living alone also spent most time in socialising, which is not the case in our study.

A gendered distribution of the elderly's participation in other routine activities performed by them showed that majority of the time spent by women is on activities which are being performed in and around the household such as household management, maintenance, shopping; care for the child, sick and elderly while men are spending their time on activities being performed outside such as trade and business, construction, manufacturing, agriculture, animal husbandry etc. Moreover, this finding is in accordance with many prior studies. It was found that the active ageing level depends on gender in Thailand. Compared to men, women of all ages tend to spend more time on non-leisure activities such as unpaid housework. (Enam et al., 2018)

The World Development Report on Gender Equality and Development (World Bank 2012), highlighted that "in most countries, women allocate between one and three more hours per day to housework as compared to men, spend two to 10 times more hours on care-related activities, and up to four hours less on market activities". The findings of the current analyses are similar to those of the World Bank Report.

The regression results show that, time spent in working and exercising is positively associated with the health and wellbeing indicators for the elderly. Those who spent more time in walking/exercising and working/volunteering showed higher odds of reporting optimal self-rated health, higher satisfaction in life, better sleep patterns and lower odds of reporting chronic health conditions.

The findings from the study help us understand the daily engagement in activities and participation in social life by the elderly. Having the health enhancing activities identified, these can be used to augment policies and programmes aimed at promoting active ageing. The most important things that we need to cater to is to build opportunities for the elderly to participate actively. More employment opportunities need to be created as well as the awareness on maintaining healthy lifestyle needs to be raised. As a key indicator of active ageing, elderly persons participating in activities can help them reach their full potential, and aid their dignity, and self-respect.

For ageing to be successful, an active daily schedule for elderly needs to become a key concept of the social policy. Building employment opportunities for elderly and considering increasing the retirement age in a phased manner would not only lead to financial independence but also contribute to better health and well-being among them. Setting up community elderly associations aimed at teaching and promoting health enhancing activities among elderly can be considered. Also, while designing policies the social gradients including gender, age group and living arrangement are needed to be kept in mind to build inclusive environment for all.

This study is limited by the nature of time use data available. Only associations have been studied and not causation due to cross sectional nature of data. However, given that LASI is longitudinal in nature, with subsequent waves of data collection in LASI, this study can be extended to analyse causation.

Furthermore, the existing sample size is not large enough to study variations in time utilization across different regions of India. Given the existence of diverse cultures in India, one can expect regional variations to exist. Studying such variations could help in devising culture specific interventions. Future research, collecting time use data could use more detailed listing of everyday activities being performed by elderly to enable examination of activity variation throughout the day and facilitate standardised and comparative comparisons between nations and over time.

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APPENDIX

Supplementary Table 1: LASI Data Items used for constructing health outcome variables

Outcome	Question/Measurement	Construct
Self-Rated Health	Overall, how is your health in general? Would you say it is very good, good, fair, poor, or very poor?	Dichotomized as optimal, coded as 1 and sub-optimal, coded as 0.
Satisfaction with Life	Please think about your life as a whole. How satisfied are you with it? Are you completely satisfied, very satisfied, somewhat satisfied, not very satisfied, or not at all satisfied?	Dichotomized as satisfied, coded as 1 and not-satisfied, coded as 0.
Ability to sleep	How often do you have trouble falling asleep? Would you say never, rarely (1-2 nights/week), occasionally (3-4 nights/week), or frequently (5 or more nights / week)?	Categorised into 'not having problem in sleeping' coded as 1and 'having sleep problems' coded as 0.
Presence of Chronic Illness	Has any health professional ever diagnosed you with the following chronic conditions or diseases? This is followed by a series of nine chronic diseases whereby the individual is asked to reply in either yes or no.	Presence of any chronic condition is classified as 'having chronic condition' coded as 0 and having no chronic condition is classified as "no chronic condition" coded as 1.

Supplementary Table 2: LASI Items used for constructing time use activities

Activity	Question/Measurement
Watching Television	Yesterday, did you watch the TV? How much time did you spend watching TV yesterday?
Walking/Exercising	Yesterday, did you walk or do any other exercise? How much time did you spend walking or exercising yesterday?
Working/Volunteering	Yesterday, did you work or volunteer? Work includes both paid and unpaid work, such as helping with family farms or businesses. How much time did you spend working (or volunteering) yesterday?
Healthcare related activities	Yesterday, did you do healthcare related activities other than walking or exercising (e.g., visiting a doctor, taking medications or treatments)? How much time did you spend doing healthcare related activities yesterday?
Travel anywhere	Yesterday, did you travel anywhere (e.g., by car, train, bus or by walk)? How much time did you spend traveling yesterday?
Socialize with friends or family	Yesterday, did you socialize with friends or family? How much time did you spend with friends or family yesterday?

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