**Title: Predictors of Preventive Health Check-up Utilization and Nutritional Status Among Older Adults in India**

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**Abstract:**

**Background:**

The elderly population of India has been growing exponentially over the past few decades, caused by a decline in fertility and an increase in life expectancy. The utility of the services by health programmes like the NPNCD, NPHCE, and NTCP by the public is always questionable. In a country like India where mandatory health check-ups are missing or due to the absence of a proficient health system like that of Western countries, the public must push themselves to undergo these health check-ups. preventative health care gives people confidence and knowledge about their health and the health of those they care for.

**Method**

A cross-sectional analysis was conducted on 31,902 adults aged ≥60 years. Descriptive statistics, chi-square tests, and Multivariate logistic regression were used.

**Results**

Only 9.49% of the sample utilized preventive check-ups. The use of these services was found to be notably higher among people living in urban areas compared to those in rural regions. It was also more common among individuals with higher levels of education, particularly those who had completed higher secondary schooling, when compared to those with only primary education

**Conclusion**:

Utilization of preventive services remains low, and significant disparities exist across sociodemographic groups. Interventions should focus on awareness, accessibility, and targeting vulnerable populations.

**Keywords:**

LASI, Older adults India, Preventive checkup, Malnutrition, Non- communicable disease.

Word count

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**Introduction**:

The older population in India is growing at a rate three times higher than the rate of growth of the population as a whole. This changing demographic landscape of India is largely attributed to an improvement in longevity, among other factors like falling fertility. Life expectancy at birth in India has increased from 42 years in 1961 to 69 years in 2018 and is projected to increase to 76 years by 2050. Likewise, both life expectancy at age 60 and 80 have improved considerably and stand at 18 and 7 years, respectively, projected to rise to 21 and 8.5 years by 2050. However, the more important question that lingers is whether this increase in longevity has been accompanied by a commensurate improvement in health status and health care utilisation among the elderly population in India(1)

Chronic illness is one of the major causes of mortality and morbidity among the elderly. The prevalence of chronic morbidity increases with an increase in the proportion of the elderly population, including several risk factors such as smoking, alcohol, and malnutrition.. Chronic diseases cause medical, social, and psychological problems among the elderly population, which would ultimately limit their activities.(2)

Preventive health check-ups deal with the identification and minimization of disease risk factors, existing disease course improvement, and early disease detection through screening. This has become crucial since it allows people to know about their health issues well within time(3)

Healthcare services in urban areas in India have been found to usually receive a larger share of public resources, resulting in lower investments in rural health infrastructure that suffers from issues of ill management, absenteeism among health facility staff, and lack of training for capacity building of health personnel.(4)

This increasing older adult population leads to economic, social, and health concerns that require immediate and prompt responses from the government, enterprises, and society(5)

The rising disease burden of the aged raises the need for healthcare facilities and staff, and the paucity of social security provisions for the elderly exacerbates the problem. Lack of adequate health infrastructure and sustainable financial condition, the elderly with varied social and economic factors, and patients suffering from communicable and non-communicable and infectious diseases all constituted significant barriers to healthcare utilisation. In addition, studies have also identified how utilisation of healthcare services among the elderly mainly depends on the availability, affordability, and quality of healthcare services. (6)

Prior studies on the older population and overall healthcare utilization have pointed out that age, sex, educational attainments, wealth status, health insurance, and place of residence are significant determinants of healthcare facilities (7)

The main gap is considered as a knowledge only few of the older adults know about the preventive health check-up, particularly in relation to nutritional status.

The present study utilizes LASI data to examine the prevalence and predictors of preventive health check-ups among the elderly in India, with a specific focus on sex differences and the association between socioeconomic factors and the utilization of such check-up.

**Methods:**

**Study design and data source:**

The research utilized secondary data from the Longitudinal Ageing research in India (LASI), a nationally representative survey of people aged 45 and over, including 72,250 participants from all Indian states and union territories, except Sikkim. Only respondents aged 60 and older were included in the study. The LASI dataset provided comprehensive data on sociodemographic, health, and behavioral traits of older persons in India. The study aimed to determine the prevalence of preventive health check-up use among participants. Marital status was classified into two categories: currently married and widowed, separated, divorced, or never married. Obesity was assessed using Body Mass Index (BMI), with participants classified as Underweight, Normal, Overweight, or Obese according to WHO. Factors such as age group, gender, housing location, caste, religion, educational attainment, current tobacco use, and alcohol intake were also considered. The study aimed to provide a comprehensive understanding of health behaviors and factors influencing health. The LASI dataset was used in all analyses to ensure national representativeness and address the complexity of the survey design.

**Outcome variable**

**Preventive health check-up utilization :**

Reason for last visit to the health care facility: 1. Preventive checkup

1= Yes

0= No

The response options were dichotomous (yes or no). In this analysis, if anyone chooses another option considered not going for a preventive checkup

**Statistical Analysis:**

Data analysis was done by using STATA version 17 software. A range of sociodemographic, health behaviour, and other factors were considered as independent variables for the utilization of preventive health check-ups. The sociodemographic variables included age group, sex, place of residence, marital status, education level, and working status.

Health-related behaviours included current use of tobacco and current alcohol consumption, both recorded as yes or no responses.

Nutritional status was assessed using Body Mass Index (BMI), calculated by dividing weight in kilograms by height in meters squared. Based on World Health Organization classifications, individuals were categorized as underweight (BMI less than 18.5), normal weight (BMI between 18.5 and 24.9), overweight (BMI between 25 and 29.9), or obese (BMI 30 and above).

Descriptive statistics were used to describe the characteristics of the study population. Chi-square tests were used to examine the association between each variable and the use of preventive health check-ups (p-value <0.05). Finally, a Multivariate logistic regression model was run to identify which variables truly predicted the likelihood of utilizing preventive check-ups.

**Results:**

**Table 1: Sample characteristics of the Study Population**

The study analyzed the sociodemographic data of 31,902 older individuals aged 60-69. The majority lived in rural areas, with 66.1% of respondents being female. The majority of participants had no formal education, with only 7.6% having achieved higher secondary education. The majority were Hindu, with 73.0% being from this group. The caste distribution was divided into the Other Backward Class (OBC), General/Other, Scheduled Caste, and Scheduled Tribe. 16.3% of participants used tobacco, while 17.0% consumed alcohol. BMI classifications showed that 46.7% fell within the normal weight range, while 20.5% were underweight, 16.6% were overweight, and 16.1% were obese. The majority of participants were married, with 42.0% still in employment. The study highlights the importance of education and health behaviors in older individuals.

**Table 2: Prevalence of Preventive Health Check-up Utilization**

The study found that preventive health check-up utilization among older adults is low, with only 9.5% reporting having undergone one. Urban residents (11.2%) had higher preventive service use than rural residents (8.4%). Individuals with higher secondary education (15.3%) had a higher likelihood of using check-ups compared to those without formal education (6.7%). Married individuals (10.5%) were more likely to undergo check-ups compared to widowed, separated, or divorced individuals (8.1%).

**Table 3: Association Between Preventive Health Check-up and Nutritional Status**

The study investigates the connection between nutritional status and the use of preventive health check-ups among older adults. It found a significant relationship between Body Mass Index (BMI) and the utilization of preventive services. Specifically, underweight older adults were less likely to seek preventive check-ups compared to those with normal weight (17.2% vs. 20.9%), while obese individuals showed a slightly higher likelihood of utilizing these services compared to non-obese individuals (17.4% vs. 16.0%). These results suggest that better nutritional status may be linked with higher health-seeking behavior among older adults.

**Table 4**

The results of the multivariable logistic regression analysis assessing the predictors of preventive health check-up utilization. Educational attainment, marital status, caste, and alcohol consumption were significant predictors. Participants with higher secondary education or above had 1.53 times higher odds of undergoing preventive check-ups (95% CI: 1.25–1.88, p < 0.001) compared to those with no education. Similarly, currently married older adults were more likely to utilize preventive services (OR = 1.15, 95% CI: 1.03–1.28, p = 0.012). Respondents belonging to the General caste had higher odds of check-up utilization (OR = 1.17, p = 0.037) compared with Scheduled Castes or Tribes. In contrast, alcohol users were less likely to attend preventive check-ups (OR = 0.82, 95% CI: 0.72–0.94, p = 0.005). Urban residence showed a borderline association with higher odds of preventive service use (OR = 1.11, 95% CI: 1.00–1.24, p = 0.052). However, age, sex, and tobacco use were not significantly associated with preventive health check-up utilization.

**Discussion:**

* This study looked at how many older adults in India use preventive health check-ups and what factors affect their use. Using data from the LASI survey, we found that only 9.49% of adults aged 60 and above had a preventive check-up. This low rate is considered because older adults face many health problems, like chronic diseases and undernutrition. Encouraging early detection through routine check-ups is important for healthy ageing.
* One major finding was the difference between rural and urban areas. Urban residents were much more likely to go for check-ups, likely because of better access to hospitals, transport, and health knowledge. Education also played a big role — those with higher education used services more, showing that awareness and understanding are key to preventive care. Those with no schooling were the least likely to use check-ups.
* Policy and programme implications:
  + Strengthening outreach through NPHCE
  + Integrate routine preventive assessments for older audlts into AB-HWCs such as screening for chronic diseases, nutrition, basic diagnostics, improve health education and referral
  + Need to improve the interventions that reduce the financial hardship so that preventive services become accessible to all older adult without risk of financial hardship (SDG 3.8)
  + Develop outreach and IEC (information, education, communication) materials in local languages, involve community leaders and family caregivers and follow-up
  + Strengthen referral pathways between HWCs, NPHCE geriatric services, and higher-level facilities so screening leads to timely care

* Social and cultural factors also influenced check-up use. People from General caste groups used services more than Scheduled Castes and Tribes. Muslims were less likely to go for check-ups compared to Hindus, which may reflect cultural, financial, or system-level barriers. These differences show that promoting equal access to healthcare across communities is still a challenge.
* The findings of this study clearly show that very few older adults in India are using preventive health check-ups. It also shows that factors like where people live, their education level, religion, caste, and whether they have family support strongly affect their access to health services. These differences lead to long-standing inequalities in the healthcare system.
* Also, the study found that people who went for check-ups were less likely to be underweight. This suggests that regular check-ups can help catch and manage problems like poor nutrition or chronic diseases early. Based on these results, there is a strong need to create health programs that are inclusive, community-based—so more older adults in India can benefit from preventive health services.
* This study has certain limitations such as self-reported responses that may not always be accurate, and has limited information about the preventive health check-ups reported by participants.

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**Table 1: Table 1. Sociodemographic characteristics of older adults in LASI Wave 1 (n = 31,902)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Category** | **Frequency (n)** | **Percent (%)** |
| **Sex** | Male | 15,340 | 48.08% |
|  | Female | 16,562 | 51.92% |
| **Age group** | 60–69 | 19,211 | 60.22% |
|  | 70–79 | 9,250 | 29.00% |
|  | 80+ | 3,441 | 10.79% |
| **Place of residence** | Rural | 21,085 | 66.09% |
|  | Urban | 10,817 | 33.91% |
| **Education level** | No education / Less than Primary (0) | 17,191 | 53.89% |
|  | Primary / Middle school | 2,252 | 7.06% |
|  | Matric / Secondary | 2,388 | 7.49% |
|  | Higher Secondary and above | 2,423 | 7.60% |
|  | Missing / Unspecified | 7,648 | 23.97% |
| **Marital Status** | Currently married | 20,212 | 63.36 |
|  | Widowed/Separated/Divorced/Others | 11,690 | 36.64 |
| **Religion** | Hindu | 23,292 | 73.01% |
|  | Muslim | 3,731 | 11.70% |
|  | Christian | 3,194 | 10.01% |
|  | Others | 1,685 | 5.28% |
| **Caste category** | Scheduled Caste (SC) | 5,157 | 16.17% |
|  | Scheduled Tribe (ST) | 5,334 | 16.72% |
|  | Other Backward Class (OBC) | 12,137 | 38.04% |
|  | General/Other | 9,274 | 29.07% |
| **BMI category** | Underweight | 6,552 | 20.54% |
|  | Normal | 14,907 | 46.73% |
|  | Overweight | 5,296 | 16.60% |
|  | Obese | 5,147 | 16.13% |
| **Working status** | Not Working | 18,488 | 57.95% |
|  | Working | 13,414 | 42.05% |
| **Current tobacco use** | No | 26,689 | 83.66% |
|  | Yes | 5,213 | 16.34% |
| **Alcohol use** | No | 26,475 | 82.99% |
|  | Yes | 5,427 | 17.01% |
| **BMI category** | Underweight | 6,552 | 20.54% |
|  | Normal | 14,907 | 46.73% |
|  | Overweight | 5,296 | 16.60% |
|  | Obese | 5,147 | 16.13% |

**Table 2. Distribution of preventive health check-up utilization among older adults (n = 31,902)**

|  |  |  |
| --- | --- | --- |
| **Preventive Check-up** | **Frequency** | **Percent** |
| No | 28,875 | 90.51% |
| Yes | 3,027 | 9.49% |
| Total | 31,902 | 100.00% |

**Table 3. Distribution of preventive health check-up utilization by nutritional status (BMI category) among older adults (n = 31,902)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Categories** | **Preventive health check-up (%)** | | **Chi-square** | **p-value** |
|  |  | **Yes** | **No** |  |  |
| **Malnutrition** | Not Underweight | 82.76% | 79.12% | 22.22 | <0.001 |
|  | Underweight | 17.24% | 20.88% |  |  |
| **Obesity** | Not Obese | 82.56% | 84% | 4.24 | 0.04 |
|  | Obese | 17.44% | 16% |  |  |

**Table 4. Multivariable logistic regression showing predictors of preventive health check-up utilization among older adults (n = 31,902)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Category | Odds Ratio (OR) | 95% Confidence Interval (CI) | p-value |
| Gender | Male (reference) | 1.00 |  |  |
|  | Female | 1.05 | (0.94, 1.18) | 0.413 |
| Age | <70 years (reference) | 1.00 |  |  |
|  | 70–79 years | 1.11 | (1.00, 1.23) | 0.056 |
|  | 80+ years | 1.01 | (0.86, 1.18) | 0.931 |
| Place of residence | Rural (reference) | 1.00 |  |  |
|  | Urban | 1.11 | (1.00, 1.24) | 0.052 |
| Education level | Illiterate (reference) | 1.00 |  |  |
|  | Primary/Middle | 1.14 | (0.94, 1.39) | 0.193 |
|  | Matric/Secondary | 0.96 | (0.77, 1.19) | 0.704 |
|  | Higher Secondary+ | 1.53 | (1.25, 1.88) | <0.001 |
| Marital status | Widowed/Divorced (reference) | 1.00 |  |  |
|  | Currently married | 1.15 | (1.03, 1.28) | 0.012 |
| Religion | Hindu (reference) | 1.00 |  |  |
|  | Muslim | 0.87 | (0.74, 1.02) | 0.087 |
|  | Christian | 0.96 | (0.81, 1.14) | 0.629 |
|  | Others | 1.15 | (0.93, 1.41) | 0.199 |
| Caste category | SC/ST (reference) | 1.00 |  |  |
|  | OBC | 1.04 | (0.92, 1.17) | 0.507 |
|  | General/Other | 0.75 | (0.57, 0.98) | 0.037 |
| Current smoking | No (reference) | 1.00 |  |  |
|  | Yes | 1.12 | (0.99, 1.28) | 0.076 |
| Alcohol use | No (reference) | 1.00 |  |  |
|  | Yes | 0.82 | (0.72, 0.94) | 0.005 |
| Obesity | Non-obese (reference) | 1.00 |  |  |
|  | Obese | 1.08 | (0.96, 1.23) | 0.209 |

**Footnotes:**  
Ref = Reference category.  
Reference categories: Age group (60–69 years); Place of residence (Rural); Gender (Male); Education (No education); Marital status (Widowed/Separated/Divorced/Others); Religion (Hindu); Caste (SC/ST); Current smoking (No); Alcohol use (No); Obesity (Not obese).  
OR = Odds Ratio; CI = Confidence Interval. Indicate statistical significance (p < 0.05).