Extended Abstract

Does educational attainment improve cognitive functioning of older tribal population in India?

Introduction

In India, there is a significant population of tribal people, comprising more than 104 million individuals, which amounts to one-third of the global tribal population and they makeup approximately 8.6% of India's total population. Among various mental health issues, extensive research has been conducted on the prevalence of depressive symptoms within these populations (Rashmi et al., 2022; Sindhu et al., 2022; Singh et al., 2013). However, cognitive functioning is another integral part of mental health, which is still unexplored in tribal populations. Cognitive decline is considered a natural consequence of aging, but research has shown that various socioeconomic factors, such as education, can alter it (Lee et al., 2003, 2006; Lenehan et al., 2015; Seblova et al., 2020). This research study investigates the differences in cognitive functioning among tribal and non-tribal older populations in India. The results of this research have the potential to provide valuable insights for crafting targeted interventions and policies that seek to improve cognitive well-being and overall quality of life for older tribal individuals in India.

Data and Method

We used data from the first wave of the Longitudinal Ageing Study in India (LASI), 2017-18. The initial sample in the LASI included 66,606 individuals aged 45 years and over. We excluded participants with missing values on any variable of interest.

Assessment of the cognitive functioning: Adopting the Health and Retirement Study (HRS) cognition module, the LASI collected information on measured cognition in various domains – including memory, orientation, executive functioning, and arithmetic.

Covariates: We have included various explanatory variables such as individual, lifestyle, and household factors in the analysis. The individual factors were age groups, sex, an education level, working status, and marital status. The lifestyle factors were level of physical activity, social activity, religiosity, sleep quality, smoking tobacco, chewing tobacco, and alcohol use. The household factors included wealth index, place of residence, and religion and region.

Statistical approach: We used descriptive and bivariate analysis to identify variation in health of tribal and non-tribal older Indian adults. We used linear regression analysis to see the association between the cognitive functioning and caste (tribal and non-tribal) of the older population. Furthermore, to understand what characteristics contributes to the difference of cognitive functioning between tribal and non-tribal older adults, we used decomposition analysis.

Results

The analytical sample consists of 62,322 older adults, including 11,390 (18.3%) tribal and 50,932 (81.7%) non-tribal (i.e., General, OBC, and SC groups) individuals. The sample population have similar age and sex distribution in tribal and non-tribal groups. A higher

proportion of individuals in the tribal group were uneducated than in the non-tribal group (54.3% vs. 45.5% respectively). The level of social activities, religiosity, and sleep quality were found be higher among in the tribal groups than in the non-tribal groups.

Table 1: Prevalence of chronic conditions among tribal and non-tribal populations, LASI, India 2017-18

Chronic conditions	Non-tribal	Tribal	Total	Diff.
	%	%	%	%
Hypertension	41.3	34.3	40.7	7.0
Diabetes	13.0	4.7	12.3	8.3
Cancer	0.7	0.3	0.6	0.4
Chronic lung disease	6.5	4.2	6.3	2.3
Chronic heart disease	4.0	1.2	3.8	2.8
Stroke	1.8	1.1	1.7	0.7
Arthritis	16.3	10.1	15.8	6.2
Neurological disease	2.4	1.5	2.3	0.9
High cholesterol	2.4	0.6	2.2	1.8
Cognitive impairment	9.1	21.5	10.2	-12.4
Have depressive symptoms (>=4)	28.4	25.8	28.1	2.6
Have major depressive symptoms (>=4)	8.2	4.5	7.8	3.7

Table 1 presents the social group differences in chronic conditions. Results suggest a higher prevalence in most of the self-reported morbidities among non-tribal older adults. However, the difference is highest in cognitive impairment, which is “low cognitive functioning”. The tribals have 12.4 percent lower cognitive functioning then compared to non-tribal older adults.

The linear regression estimates for cognitive functioning (0-41) among older adults by their background characteristics. The tribal group had significantly lower chance of having better cognitive functioning in reference to individuals in the non-tribal group [Coef.: -1.33; CI: -1.63,-1.04]. Older adults with higher age, female sex, and not currently married were less likely to have cognitive functioning than their counterparts. Education level was highly positively associated with better cognitive functioning. Further, older adults who lived in urban areas and higher wealth index were likely to do better in cognitive functioning.

Table 2: Overall decomposition of differential in cognitive function among ST and non-ST older adults in India 2017–18

Component	Coef.	95% CI	Percent
Explained Difference (E)	-2.731***	(-2.98,-2.49)	77.53
Unexplained Difference (C)	-0.792***	(-1.13,-0.45)	22.47
Raw Difference (R)	-3.523***	(-3.74,-3.30)	

Note: a) Coef. – Coefficient, and CI - Confidence Intervals
b) *if p<.05, **if p<.01, and ***if p<.001

In **Table 2**, results from the multivariate decomposition analysis are shown. It depicts how much various individual, lifestyle, and household factors contributed to the differentials of cognitive functioning. Specifically, 77.5 percent of the caste-based difference could be

explained by the differences in distributions of characteristics (Coef.: -2.73; $p< 0.001$). When controlling for the differences in characteristics, the gap in cognitive function would be reduced by 39 percent if tribals had similar educational attainment as the non-tribal older adults and by 8 percent if they lived in urban rather than rural areas.

Discussion and Conclusion

This study, while assessing the factors contributing to the differences in tribal and non-tribal older adults, found that differences in the educational status among tribal and non-tribal older adults as a major contributor to this gap in cognitive functioning. Education is essential in cognitive development, providing individuals with skills, knowledge, and intellectual stimulation. The observations are consistent with the existing literature, which consistently emphasizes the crucial link between education and cognitive functioning across diverse populations (Falch & Sandgren Massih, 2011; González et al., 2013; Lövdén et al., 2020; Song, 2022). Addressing this educational disparity becomes vital for reducing the cognitive gap and promoting cognitive equality among tribal and non-tribal populations.

The participation in the social activities is the second most contributor in the cognitive differences in tribal and non-tribal older adults. Tribal older adults in India often engage in close-knit, traditional social activities, deeply rooted in their culture and connection to nature. In contrast, non-tribal older adults experience more diverse, urban-centric interactions, reflecting modernized lifestyles and varied social engagements within the broader society. The current study has some limitations like in a population with a huge proportion of illiterate people, the assessment of cognitive functioning with multiple domains might be subject to a measurement error. Finally, the present study was cross-sectional; thus, a causal relationship between the variables cannot be inferred. However, further research with longitudinal designs and a comprehensive understanding of the underlying mechanisms are essential for developing effective strategies to improve cognitive health and well-being in older populations.

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