Indian Journal of
GERONTOLOGY

(a quarterly journal devoted to research on ageing)

Vol. 38 No. 2, 2024

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Indian Journal of Gerontology

(A quarterly journal devoted to research on ageing)

PEER REVIEWED JOURNAL
ISSN : 0971-4189
Approved by UGC – (CARE List Group B – Science, 121)

SUBSCRIPTION RATES
Annual Subscription
US $ 80.00 (Including Postage)
UK £ 50.00 (Including Postage)
₹ 1000.00 Libraries in India

Subscriptions are for Calendar year only
Claims for missing issues can be made within two months of publication of the issue.

Financial Assistance Received from :
ICSSR, New Delhi

Printed in India at :
Aalekh Publishers
M.I. Road, Jaipur

Typeset by :
Rajeev Kumawat
Jaipur

NEWS & VIEWS

SCOPE OF THE JOURNAL

Indian Journal of Gerontology (ISSN : 0971-4189) is a peer-reviewed and UGC Approved Journal, and is indexed by - the Indian Ctation Index, Google Scholar, CNKI Scholar, EBSCO Discovery, and UGC Group 1. Started in the year 1969, is the first in India, and 18th in the world. It publishes papers related to the Biological aspects of Human ageing, animal ageing, and ageing of plants. It also publishes papers on geriatrics, geriatric nursing, and geriatric physiotherapy (Clinical aspects). The social aspects of ageing cover, Sociology, Social work, Anthropology, Psychology, Economics, Demography, and other Social Sciences.

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Declaration

1.	Title of the Newspaper	Indian Journal of Gerontology
2.	Registration Number	R.N. 17985/69; ISSN 0971-4189
3.	Language	English
4.	Periodicity of its Publication	Quarterly
5.	Subscription	Annual Subscription US $ 80.00 (postage extra) UK £ 50.00 (postage extra) ₹ 1000.00 Libraries in India Free for Members
6.	Publisher's Name	Indian Gerontological Association C-207, Manu Marg, Tilak Nagar Jaipur - 302004 Tel. & Fax: 0141-2621693 e-mail: gerontoindia@gmail.com www.gerontologyindia.com
7.	Printers Name	Aalekh Publishers M.I. Road, Jaipur, India
8.	Editor's Name	Dr. K.L. Sharma Nationality: Indian
9.	Place of Publication	C-207, Manu Marg, Tilak Nagar Jaipur - 302004

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YOU ARE INVITED TO JOIN US

We are Working to Protect the Rights and Social Welfare of the Elderly

Indian Gerontological Association (Registration No 212/ 1968) is an independent grassroots non-profit organization based in Jaipur (Rajasthan). Our efforts **empower** and **support** the underprivileged elderly in rural and urban communities.

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- Counselling and Helping elderly to Relieve Psychological Stress and Depression
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Indian Journal of Gerontology
2024, Vol. 38, No. 2, pp. 141-155
ISSN : 0971-4189, UGC No. – List B, Science –121

Depression, Loneliness, and Cognitive Functioning in Elderly Widows of Goa

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ABSTRACT

This study aimed to measure levels of depression, loneliness, and cognitive functioning of 53 widows, age range 60 - 85 years, selected using purposive sampling.The selection criteria for participants are twofold: above 05 years of widowhood status and residential status.The geriatric depression scale (GDS), loneliness scale, and Mini-Mental State Examination (MMSE) were used to collect data using face-to-face interaction with the participants of the study and responses were recorded. Statistics of mean, SD, F test, and Pearson's correlation were used for the analysis of data. The findings revealed that depression and loneliness scores do not exhibit statistically significant differences in residential status. However, cognitive functioning scores differ significantly. The participants in Homestay demonstrated higher cognitive functioning compared to others in private/public-ownedstays (df 2,50; F = 19.283; P< 0.01). When considering age groups, statistically significant differences were not observed in depression, loneliness,and cognitive

functioning across the three age groups (61-70 years, 71-80 years, and 81 years & above). It is important to note that overall scale scores were suggestive of depression, moderate levels of loneliness, and mild cognitive impairment among the elderly widowed participants.Pearson's correlation between depression and loneliness scores revealed a significant positive relationship ($r = 0.643$, $p < .01$) whereas for cognitive functioning with depression and loneliness, the relationship was negative but not significant.Study results provide valuable insights into the interplay of residential settings, age, and psychological well-being among widowed women. This study underscores the significance of a holistic approach in developing tailored interventions and offers practical implications for healthcare providers and policymakers.

Keywords: Elderly widows, Depression, Loneliness, Cognitive functioning, Residential status

Widowhood in old age is the most distressful life transition due to its influence on health and well-being (Agrawal & Arokiasamy, 2009; Aniruddha, 2013; Zhenmei Zhang, *et al.,* 2021; Jiang, *et al.,* 2023;). Although traditional Indian culture values interdependence, mutual support, and filial piety. India is witnessing dramatic changes characterised by a decline in extended families, an increase in nuclear homes, and an erosion of filial piety. According to the Longitudinal Ageing study of India (GOI, 2016; LASI: IIPS,2020), elderly people experience a change in living arrangements due to migration for education, employment, marriage, death of spouse/children, and family conflict.Goa is experiencing a large surge in migration and the elderly are left behind. The number of senior citizen homes and the admit rate of elderly inmates is on the rise.

Depression engenders emotional distress and exacerbates physical health issues, leading to decreased functional abilities and overall diminished well-being. Loneliness is defined as the discrepancy

between the desired and the actual quality and quantity of social relationships that a person has (Smith, *et al.,* 2020). Lonely people have shown an increased risk of several detrimental health outcomes: worse cardiovascular health (Valtorta, *et al.,* 2016; Hakulinen, *et al.,* 2018;), depressive symptoms (Cacioppo,*et al.,* 2006, Cacioppo, J.T & Caciopp, S. 2018), reduced quality of life and well-being (Holt-Lunstad, *et al.,* 2015), and a higher risk of early mortality (Elovainio, *et al.,* 2017) cognitive decline (Donovan, *et al.,* 2017), cognitive impairment (Lara, *et al.,* 2019), and dementia (Sutin, *et al.,* 2020; Elovainio,*et al.,* 2022; Li, *et al.,* 2023). On a positive note, a systematic review and meta-analysis of longitudinal cohort studies showed that social connectedness is associated with better cognitive outcomes in later life (Evans, *et al.,* 2019). A meta-analytic review by Holt-Lunstad, *et al.,* (2015) provides insights into the prevalence of loneliness and its impact on depression, identifying it as a potential risk factor for mortality. Donovan, *et al.,* (2017) study results highlight loneliness as a clinical marker of social and emotional distress that appears to be etiologically linked to depression and cognitive decline in older adults. Recent systematic review and meta-analysis state that older adults report more loneliness than young- and middle-aged adults (Surkalim, *et al.,* 2022) due to age-related stressors which include changes in social relationships due to spousal loss (Hawkley & Kocherginsky, 2018; Yang, 2019). Cachón-Alonso, *et al.,* (2023) found that feelings of loneliness predicted lower cognitive functioning among those aged 65 or older in a large cross-national European sample.

Loneliness is not an inevitable consequence of getting old (Bound-Alberti, 2019), and maintaining and forming social contacts can be important in terms of cognitive health. Cognitive decline is a significant concern for ageing individuals and their families. Shin, *et al.*, (2018) using longitudinal analysis of secondary data in the United States found that widowhood status accelerated cognitive decline over time among widowed older adults suggesting the need for extra support for those experiencing widowhood. Jain, *et al.,* (2022) used

data from the LASI(2017-19) to investigate widowhood disparity in cognitive health and found that cognitive scores for widowed women were on average lower compared to married women and this disparity increased with widowhood duration. Also, physical and mental health were found to mediate almost 30 percent of the total association between widowhood and cognition highlighting significant disadvantage in cognitive functioning among older widowed women in India.

The present study was planned to investigate the interplay of depression, loneliness, and cognitive decline in elderly widows in Goa and assess disparity by residential status and different age groups.

Method

Sample

53 elderly widows, ages varying from 60 to 85 years, were selected through purposive sampling technique from three residential settings: privately owned stay (n= 20), Public stay (n=13), Homestay (n=20) and were categorized into three age groups: 61-70 years (n= 22), 71-80 years (n= 18), and 81 years & above (n=13). All the participants completed 05 years criteria for widowhood status.

Tools Used

- The Geriatric Depression Scale Short form (GDS- 15) is ascreening tool to identify symptoms of depression in elderly adults. Originally developed by Yesavage, J.A., and colleagues in 1982. The GDS is a self-report instrument that uses a "yes/no" format. Scores for the GDS-15 range from 0 to 15: The higher the score, the more severe the depression is likely to be. (>5 Points: suggests depression and should be followed by a comprehensive assessment, $\geq$10 Points: almost always indicates depression, and <5 Points: depression not likely). The scale has been widely used in clinical trials and research studies involving the elderly and demonstrates adequate reliability and validity.

- De Jong Gierveld Loneliness Scale - (De Jong Gierveld and Van Tilburg 2006) a robust tool to measure the feelings of missing an intimate relationship (emotional loneliness) and missing a wider social network (social loneliness). It consists of 6 items, three positively worded and three negatively worded items, and the score range is from 0 – 6, evaluated as least lonely (0) to most lonely (6). The scale has reliability coefficients ranging from 0.70- 0.76 and good validity.
- Mini-Mental State Examination (MMSE) developed by Folstein, *et al.,* (1975) is an 11-11-questionmeasure, that assesses mental status in five areas of cognitive function: orientation, registration, attention and calculation, recall, and language. The maximum score is 30. A score of 0-17 is indicative of severe cognitive impairment, 18-23 is indicative of mild cognitive impairment and a score of 24 or higher is indicative of no cognitive impairment. The MMSE takes only 5-10 minutes to administer and is used as a screening tool for cognitive impairment in older, community-dwelling, hospitalized, and institutionalized adults. It has been validated and extensively used in both clinical practice and research.

Procedure

Necessary permissions were taken from authorities of privately owned (Mother Mary Haven - Saligao & Amazing Grace Home Monte-Guirim) and public-owned (Recolhimento de Serra-Provedoria- Panjim) senior citizen homes. The homestay participants were selected from neighbourhood villages closer in distance to the researcher. The participants were explained the research objectives in the local language of Konkani. The scales were administered in a conversational form individually and the recording of responses was done by the researcher herself. Each participant took 45 minutes to complete responding for data collection on selected scales. The data collection was an exhaustive exercise. The participants and authorities of senior citizen homes were thanked for their cooperation. The researcher involved a group of 8 volunteering students at the third-

year level of psychology honours class, for assistance in data collection and community outreach experience.

Statistical Analysis

Mean, SD, F test, and Pearson's correlation coefficient were employed for data analysis. A 3-way ANOVAwas used to assessscore differences on depression, loneliness, and cognitive decline concerning demographic factors of residential status and age groups. A correlational analysis was employed to obtain a correlational matrix among depression, loneliness, and cognitive decline.

Results

Table 1

Indicates the Mean, SD, F test & p-value for depression, loneliness, and cognitive functioning concerning residential categories- Private, Public & Homestay.

DEPRESSION

Residential area	***N***	***MEAN***	***SD***	***F test***	***P value***
Private owned	20	5.10	3.00		
Public owned	13	3.77	2.71	0.677 df.	0.513
Homestay	20	4.45	3.72	(2,50)	(ns)
Total	53	4.53	3.21		
LONELINESS					
Private owned	20	2.80	1.64		
Public owned	13	1.69	1.31	1.973 df.	0.150
Homestay	20	2.65	1.84	(2,50)	(ns)
Total	53	2.47	1.68		
COGNITIVE FUNCTIONING					
Private owned	20	20.05	5.74		
Public owned	13	15.92	5.40	19.283 df.	0.00**
Homestay	20	26.05	2.66	(2,50)	
Total	53	21.30	6.15		

** *Significant at 0.01 level (2-tailed)*

Table 1 indicates the 3-way Anova analysis results by residential status.

Concerning depression, the mean score is higher for private stays, followed by homestay and least for Public stays. A score of 5 & above on the depression scale suggests depression and should be followed by a comprehensive assessment whereas a score below 5 states depression is not likely. Hence, the results are indicative of higher levels of depression among elderly widows in Private-owned stay. However, the F test does not reveal statistically significant differences in Mean depression scores ($F(2,50) = 0.67$) among the 03 groups of residential status. The overall Mean score on depression shows a tendency towards suggestive depression among elderly widows irrespective of residential status.

Similarly, concerning loneliness, the mean score is higher for private stays, followed by homestay, and least for Public stays. The results are indicative of higher levels of Loneliness among elderly widows in Private-owned stay. However, the F test does not reveal statistically significant differences in Mean Loneliness scores ($F(2,50) = 1.937$) among the 03 groups of residential status. The overall Mean score on loneliness shows a tendency towards average levels of loneliness among elderly widows irrespective of residential status.

Concerning cognitive functioning, the mean score is highest for homestays, followed by privately ownedstays, and least for publicly owned stays. The results are indicative of severe cognitive impairment among elderly widows in public-owned stay, mild cognitive impairment among elderly widows in private-owned stay, and indications of no cognitive impairment for elderly widows in Homestay. It should be noted that lower scores are indicative of greater cognitive decline. The F test reveals statistically significant differences in Mean cognitive functioning scores ($F(2,50) = 19.283$) among the 03 groups of residential status at the significance level of 0.01. The overall Mean score on cognitive functioning is indicative of mild cognitive impairment among elderly widows irrespective of residential status.

Table 2

Indicates the Mean, SD, F test & p-value for depression, loneliness, and cognitive functioning with respect to age level categories: 61-70, 71 – 80 & above 80.

DEPRESSION

Age levels	*N*	*MEAN*	*SD*	*F test*	*P value*
61-70 years (Group 1)	22	3.86	3.58		
71 – 80 years (Group 2)	18	4.79	2.68	0.705df.	0.499
81 years & above (Group 3)	13	5	2.73	(2,50)	(ns)
Total	53	4.53	3.21		
LONELINESS					
61-70 years	22	2.45	1.68		
71 – 80 years	18	2.25	1.37	0.543df.	0.584
81 years & above	13	2.85	1.72	(2,50)	(ns)
Total	53	2.47	1.68		
COGNITIVE FUNCTIONING					
61-70 years	22	23.36	6.12		
71 – 80 years	18	19.92	5.78	2.171df.	0.125
81 years & above	13	19.85	5.98	(2,50)	(ns)
Total	53	21.30	6.15		

Table 2 indicates the 3-way Anova analysis results by age groups.

Concerning depression, the mean score is higher for Group 3, followed by Group 2,and least for Group 1. The results are indicative of higher levels of depression among elderly widows in group 3. However, the F test does not reveal statistically significant differences in Mean depression scores (F (2,50) = 0.705) among age groups. The overall Mean score on depression shows a tendency towards suggestive depression among elderly widows irrespective of age groups.

Concerning loneliness, the mean score is higher for group 3, followed by group 1, and least for group 2. The results are indicative

of higher levels of Loneliness among elderly widows in Group 3. However, the F test does not reveal statistically significant differences in Mean loneliness scores (F (2,50) = 0.543) among the 03 Age groups. The overall Mean score on loneliness shows a tendency towards average levels of loneliness among elderly widows irrespective of age groups considered in the study.

Concerning cognitive functioning, the mean score is highest for Group 1, followed by Groups 2 and 3. The results are indicative of mild cognitive impairment among elderly widows. The F test does not reveal statistically significant differences in Mean cognitive functioning scores (F (2,50) = 0.125) among the 03 Age groups. The overall Mean score on cognitive functioning is indicative of mild cognitive impairment among elderly widows irrespective of age group.

Table 3

Pearson's correlation coefficients between depression, loneliness, and cognitive functioning.

Variables	**N**	**Pearson Correlation**	**Sig. (2-tailed)**
Depression & Loneliness	53	0.643**	0.00
Depression & Cognitive Functioning	53	-0.03	0.83
Loneliness & Cognitive Functioning	53	-0.08	0.53

** *Significant at 0.01 level (2-tailed)*

Table 3 indicates correlational coefficients indicating associations between study variables. The relationship between depression and loneliness is positive, high, and statistically significant at 0.01 level of significance. However, the association between cognitive functioning with depression and loneliness was low, negative, and insignificant.

Discussion

The study results indicate statistically significant differences in cognitive functioning concerning residential status. Cognitive decline is highly influenced by residential status. This interesting finding highlights the importance of filial piety cultured for care and concern towards the

elderly in the family. Being in a home stay contributes to cognitive well-being. This implies that the protective home stay environment delays cognitive decline in elderly widows and saves the state and country from the financial and psychological burden of cognitive impairment among the elderly. Hence, socialization practices, child-rearing practices, and family values need to largely imbibe the culture of filial piety in attitude and behaviour towards the elderly as intergenerational gratitude-laden reciprocity and humaneness in action. An encultured expression of care and concern towards the elderly, especially the widowed, can help to sustain lower levels of cognitive decline. However, statistically significant differences are not observed in depression and loneliness concerning residential status. This indicates that the experience of depression and loneliness is independent of residential status and may be influenced by other individual factors like educational level, financial status, age, and duration of widowhood coupled with social factors such as family support, community engagement, friendships, cultural perceptions and restrictions for widowhood status, etc.

No significant differences were observed in loneliness, depression, and cognitive decline concerning age groups. This study helps to clear the stereotype that with the advancement in age, older people are more susceptible to depression and loneliness. This result makes us realize that age is just a number. Other significant factors that could play a role are social support, community engagement, active lifestyle, diet management, and interactive senior clubs. However, the decline in scores on cognitive functioning with advancement in age provides evidence for cognitive decline among elderly widows.

The study reveals a highly significant relationship between depression and loneliness supporting previous research studies done in Western and Asian countries. The results confirm that elderly widows who score high on depression will also show high scores on loneliness and vice versa. Widowhood is a difficult phase, and even more difficult for older women. The loss of an intimate relationship is itself painful. Financial dependence, physical dependence, emotional distress, cultural biases, and unsupportive children or family members can create spaces of emptiness for elderly widows paving avenues for experiencing depression and loneliness in the

absence of an intimate spouse. No significant associations were observed between cognitive functioning with depression and loneliness and the correlation was negative and very low. Hence these values cannot be used to provide conclusive explanations.

Overall, elderly widows, irrespective of residential status and age groups, show a tendency towards suggestive depression, moderate levels of loneliness, and mild cognitive impairment. This result proposes significant implications for families, caretakers, and policy makers. The elderly widows do need special attention and help in the process of building a new identity of widowhood less tainted with cultural stereotypes along with an understanding of challenging behavioural and psychological adjustments that come along with aging and widowhood. Providing family support, social support networks, recreation centres for the elderly, community engagement programs, wellbeing centres for diet management, exercise, yoga, meditation, reading spaces for the elderly, school/college-based visits and internships, setting up senior-buddy relationships through educational institutions can help to sustain continuing engagement and involvement for the elderly in general and widows in particular.

Significance of the study

- Very few studies have examined the interplay of depression, loneliness, and cognitive functioning among elderly widows in the context of India, which has one of the largest widowed populations, predominantly women, in the world. This study will contribute to the existing knowledge of gerontology.
- Widowhood is described as a cultural and gendered experience because the salience of different mechanisms linking widowhood to health may depend on local norms (Uhlenberg, 2009). This study explores important issues about elderly widows in the context of Goan culture.
- The study results have the potential to inform tailored interventions and strategies that can enhance the overall quality of life for elderly widowed women, ensuring that they can age with dignity, resilience, and a sense of connectedness.

- The research paper can serve as a valuable reference for studies on depression, loneliness, and cognitive functioning in elderly widowed women.

Further research

- Further studies are needed to understand the influence of individual factors and social factors in the experience of depression, loneliness, and cognitive functioning among elderly widows, such as personality traits, educational level, socioeconomic position, cultural values, family support, etc.
- There's a need for research on how technology can be harnessed to improve the quality of life for elderly widows, including telehealth, wearable devices, and assistive technologies.
- Many studies focus on ageing in developed countries, but there's a need for more research on the unique challenges and opportunities faced by elderly widowed populations in developing countries, where healthcare and social support systems may be less developed. Research is needed on strategies and policies that support the ability of older widowed adults to age in place, including accessible housing, transportation, and community services.

These suggestions highlight the diverse and evolving needs of the elderly population. Addressing these gaps can lead to more effective policies, interventions, and support systems that enhance healthy perceptions towards ageing and aged.

Acknowledgment : The author is grateful for the assistance in data collection given to him by a team of 08 students from the third-year BA Psychology Honours class.

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Indian Journal of Gerontology
2024, Vol. 38, No. 2, pp. 156-168
ISSN : 0971-4189, UGC No. – List B, Science –121

Emerging Health Challenges among Older People : Empirical Evidences from Rural Odisha

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ABSTRACT

Based on empirical evidence the paper provides an overview of the health profile of 100 older people,both male and female equal in numbers, ages varying from 60 years and above, living in rural Odisha, who were interviewed individually. The study's findings revealed that older people in rural settings suffer from a range of chronic diseases and disabilities. Several socio-economic issues, such as poor income, old age dependency, scarcity of reliable caregiver assistance, and healthcare costs, are found to be the major impediments to older individuals. Additionally, the current study focuses on policy implications to improve older people's health and well-being.

Keywords : Rural elderlies, Health, Challenges, Odisha, Economic status

The presence of multiple health issues is an imperative aspect of an older person's health, making treatment and

management more complex. Age-related health difficulties make it difficult for older adults to get involved in social activities and are considered to be the major factors in determining their quality of life. Other factors which may influence the health of older people include their economic status and living conditions. An older individual can be distinguished from a younger one by their physical degradation in later years.The magnitude of age-related mortality and disability is determined by such physical degradation.

Kumar,*et al.,* (2017) assessed chronic illness among the older population by using data from Building a Knowledge Base on Population Ageing in India (BKPAI). The study was conducted in different states like Kerala, Himachal Pradesh, Maharashtra, Odisha, Punjab, Tamil Nadu, and West Bengal. The findings show that arthritis affects 29 per cent of the older population, followed by hypertension (21 %), cataract affects (13 %), diabetes (10 %), asthma (7%) and heart disease affect (6 %). As people get older, the prevalence of these diseases rises.As per a report from the Government of India (2011) in both urban and rural areas, the occurrence of heart diseases was higher among older males and females. Patel,*et al.,* (2022) examined the occurrence of Non-Communicable Diseases(NCDs), such as heart disease, cardiovascular disease, diabetes, and cancer, among older women and highlighted that diabetes (7.30 %) and hypertension (30.38 %) are more common among older women. Older women, particularly in rural regions, are uninformed of their NCD morbidities and long-term effects as they are preoccupied with domestic activities and neglect their health. A report on the status of the elderly in Odisha, data obtained from the BKPAI survey was used to compile information on chronic ailments encountered by older adults in Odisha. The report shows that arthritis and hypertension are the most commonly reported chronic ailments, preceded by cataracts, diabetes, and asthma. Arthritis is shown to be more common among aged 80+ years, old women, and rural seniors. However,

hypertension is found to be more common among 60 to 80 years of urban age (UNFPA, 2014). Banjare & Pradhan (2014) in their study on socioeconomic inequalities in the prevalence of multimorbidity among rural elderly in Bargarh, Odisha, found that multimorbidity affects 57 percent of rural old people. Arthritis, chronic obstructive pulmonary disease (COPD), high blood pressure, and cataracts are the most common ailments among older people in rural settings. Ghosh & Singh, (2014) state that diseases and worsening of health are inextricably linked to the process of chronological ageing. Unhealthy lifestyles, such as alcohol consumption and smoking, also increase mortality and cardiovascular diseases among older adults (Mutharayappa & Bhatt, 2008). Apart from chronic illnesses, the prevalence of disability, such as low vision, hearing impairment, locomotor (difficulty in walking), and mental illness among the older population is on the rise (Rao,*et al.,* 2015). The incidence of disability in later life has a substantial impact on older people's everyday lives as well as the responsibility of caring for them. According to a report from GoI (2011), locomotor disability is the most common impairment among older people, followed by hearing and vision impairment. In comparison to urban areas, rural areas have a slightly larger proportion of disabled older people. In Odisha, the prevalence of disability among older adults is 26.3 per cent (Government of Odisha, 2016). The existing literature highlights that older people undergo a range of enduring medical conditions that necessitate comprehensive geriatric care.

Socio-Economic Determinants to the Health of Older People

During later years, older adults rely heavily on their family and offspring for care (Banjare,*et al.,* 2017; Thinley, 2021). Several ancient Indian literary works and epics depict older parents as important members of the family. However, in recent years, family support for older people's care has been dwindling. The drop in the preference for intergenerational co-residence has been attributed to increased urbanisation and modernity. As a result of these

changes, older people face several physical, psychological, and economic issues (Singh,*et al.,* 2016). Older adults who live alone used to have a higher risk of health-related issues, chronic illness, and functional restraint (Kumar & Kumar, 2019). Intergenerational relationships have a crucial role in our social identity. Improved generational relationships may help to maintain a healthy ageing process (Tyagi & Paltasingh , 2017). Using data from the Human Development Survey in 2004-05, Samanta,*et al.,* (2015) examined the relationship between multigenerational household settings and the health of older individuals in India. The findings of the study highlight that older people in multigenerational households have the lowest rates of short-term sickness. In contrast, older people who live with their spouse only experience diminishing health. Increased poverty and financial hardship are also likely to lessen traditional family care and support. The financial uncertainty of older individuals is another key factor related to old age. Thinley (2021) stated that most older people are unable to support themselves at a later age due to declining physical and mental health as well as a lack of access to social security. Globally, only one out of every five people over the age of 65 has an old age pension. According to MOSPI (2021), the old age financial dependence ratio has increased from 10.9 per cent in 1961 to 14.2 per cent in 2011 and is expected to rise to 20.1 per cent in 2031. However, the ratio of old age dependency in rural and urban areas differs significantly. According to the 2011 Census, the rural and urban dependency ratios were 15.1 and 12.4, respectively. As a result of this growing financial insecurity, untreated chronic disease and malnutrition have become frequent in old age. Accessibility and utilisation of healthcare treatment are both seen as crucial components in enhancing the overall health and well-being of older people.Older adults have higher challenges to access and utilisation of healthcare facilities than other groups due to a variety of factors ranging from their physical health to disability and psychological ailment (Bastani,*et al.,* 2021). According to Sahoo,*et al.,* (2021), a significant proportion of older

individuals were not making use of the availability of healthcare services. Income disparity in healthcare usage is common among India's senior citizens. The sources of income, the financial status of the family, decision-making in the family, cost of medical care, distance to the nearest health facilities, and living alone were the factors mainly correlated with health-seeking behaviour among the elderly (Adhikari & Rijal, 2014).

Objectives

The objectives of this study were to explore the health status, utilisation of healthcare services, and the challenges confronted by them in accessing healthcare services by the older people living in rural areas of Odisha.

Methodology

Sampling

A purposive sampling technique was used to select the households where people of different generations, including older people, were living together. A total of 100 older people (60 years of age and above) including both males (50) and females (50) were selected for the present study. The study participants were chosen from two villages -Palaspur and Baghadia under the Marshaghai block of Kendrapara district, Odisha.

Tools Used

The data was gathered by using an interview schedule and observation. The interview schedule comprised both closed and open-ended questions. To know about various health conditions among older people and associated socio-economic issues, both quantitative and qualitative methods were used. Quantitative analysis is presented through bi-variate and multi-variate tables for interpretation. The observation method and in-depth interview technique were used to generate qualitative information such as the living conditions of older people, and some specific challenges confronted by them.All the selected elderly were interviewed individually.

Findings and Discussion

Self-Reported Health Condition of Older People

A person's overall assessment of their health is reflected in their perceived health status. Numerous studies looked into how different factors and self-reported health status were related. It is regarded as a reliable predictor of healthcare utilisation and mortality (Axon *et al.*, 2022). In the present study, the older people were asked to rate their current health on a five-point scale: *Very good, good, average, poor, and very poor.* The responses are presented in the table 1.

Table 1

Older people's self-reported health status

Self-reported health condition	**Male N=50**	**Female N=50**	**Total N=100**
Very good	3(6%)	2(4%)	5(5%)
Good	3(6%)	5(10%)	8(8%)
Average	17(34%)	15(30%)	32(32%)
Poor	20(40%)	20(40%)	40(40%)
Very poor	7(14%)	8(16%)	15(15%)

Source-Primary data from the field (Figure in parentheses indicate percentage)

The table 1 illustrate that a noteworthy share of older people (40 per cent) has a poor health condition. In comparison to older males, the females were experiencing very poor health conditions.

Chronic Ailments among Study Participants

Multiple morbidities (the co-existence of two or more diseases) are becoming more common among older people as life expectancy increases (Arokiasamy, *et al.,* 2015). In the present study, the types of health complications studied among older people comprise arthritis, diabetes, asthma, hypertension, cataracts, heart disease, and other chronic conditions (kidney problems, paralysis, skin disease).

Table 2
Chronic ailments among the study participant

Chronic ailments	Male N=50	Female N=50	Total N=100
Arthritis	15(30%)	14(28%)	29(29%)
Diabetes	9(18%)	5(10%)	14(14%)
Asthma	7(14%)	7(14%)	14(14%)
Hypertension	20(40%)	20(40%)	40(40%)
Cataract	17(34%)	11(22%)	28(28%)
Heart disease	Nil	2(4%)	2(2%)
Other chronic diseases	3(6%)	3(6%)	6(6%)

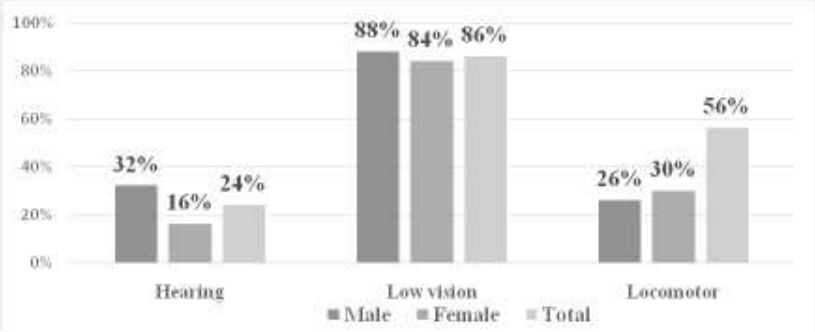
Source-Primary data from the field (Figure in parentheses indicate percentage)

Table 2 reveals that a larger percentage of older people (40 %) were suffering from hypertension, followed by Arthritis (29%), cataracts (28 %), and Diabetes (14%). Hypertension was found to be more common among both male and female older people.

Prevalence of Disability among Study Participants

Disability has a profound impact on older people's physical and mental health. Age-related impairment and disability require extra care and attention. The present study estimates the prevalence of disabilities among select rural elderly (Figure 1).

Figure 1
Percentage of disability among Study Participants



Source-Primary data from the field
Note: (N = 100, Male = 50 & Female = 50 in each case)

As per Figure 1, the majority of the older people (86 per cent) were visually impaired having low vision, followed by (56 per cent) who had locomotor problems (difficulty in walking). Female older people were more functionally disabled than the male aged. People with disabilities are frequently excluded from numerous socio-cultural activities, due to their incapacity to participate in these activities (James & Goli, 2021). Functional impairment includes difficulties in doing everyday fundamental self-care tasks, such as bathing, toileting, dressing, and moving from chair to bed, which increases reliance on others (Kumar, *et al.*, 2018). The findings of the present study illustrate that (17 per cent) of older people depended upon their children and spouse for daily functions like brushing, eating, using the toilet, and walking.

Access, Utilisation in availing Healthcare Services

Planning for promoting better health outcomes requires information about the accessibility and utilisation of health care services and awareness of the constraints can help with resource allocation and interventions to increase service coverage.

Table 3

Health-care access and constraints faced by the study participants

Mode of treatment	**Male N=50**	**Female N=50**	**Total N=100**
Allopathic	47(94%)	46(92%)	93(93%)
Homeopathic	1(2%)	1(2%)	2(2%)
Ayurvedic	2(4%)	3(6%)	5(5%)
Place of Treatment			
Govt. Hospital	40(80%)	37(74%)	77(77%)
Private Hospital	7(14%)	8(16%)	15(15%)
Clinic	3(6%)	5(10%)	8(8%)
Financial support for hospital expenses			
Self	26(52%)	Nil	26(26%)
Spouse	Nil	8(16%)	8(8%)
Children	42(84%)	42(84%)	84(84%)

Source-Primary data from the field (Figure in parentheses indicate percentage)

Table 3 reveals that the majority of the elderly population (93 per cent) takes recourse to allopathic medication to treat their health issues. A substantial proportion of older people were accessing Govt. hospitals for treatment. In regards to hospital expenses male older people were depending on their children and female elderly were depending on both their spouse and children. All the older people indicated that there was no primary healthcare centre (PHC) in these villages. The older people were getting health care facilities in the Community Health Centre (CHC), situated at Block Headquarters, which is 10 km away from these villages.

Challenges in accessing Healthcare Services

Findings from the study by Yadav, *et al.,* (2014) revealed a strong correlation between work, the frequency of chronic diseases and disabilities, and medical treatment for older people. Older people (60 years and above) with severe prolonged ailments and infirmities are not participating in regular paid work. They were also limited in their ability to spend on medical bills due to budgetary constraints.

Table 4

Constraints faced by the study participants in availing healthcare

Types of Constraints	**Male N=50**	**Female N=50**	**Total N=100**
Financial	43(86%)	45(90%)	88(88)
Lack of Care	19(38%)	14(28%)	33(33%)
Lack of support from family member	6(12%)	3(6%)	9(9%)
Distance of health care institution	6(12%)	4(8%)	10(10%)
Unavailability of drugs	2(4%)	2(4%)	4(4%)

Source-Primary data from the field (Figure in parentheses indicate percentage)

Table 4 shows that an overwhelming percentage of older people (88 per cent) were facing financial constraints to availing health care services. Modern medical facilities and treatment are more exorbitant and only accessible to financially well-off families. However, families who are struggling financially find it challenging to provide adequate

care for older people. The younger generation considers spending on their older parents' health to be a waste of money. The older people who are financially reliant are miserably abandoned, and their health issues go largely unaddressed, as a result of rising shift in our socio-cultural beliefs.

Conclusion

From the findings, it has been revealed that older adults in rural areas suffer from a variety of chronic illnesses and disabilities. Hypertension is the most frequent chronic condition among rural older people. Visual disability (low vision) is found higher among rural seniors. Older people are more inclined to a higher rate of morbidity, which necessitates the need of specialist care. Older people are ignorant of the many early health screenings that can help them avoid morbidity, and their health-seeking behaviour is also limited. The main issues are lack of personal income, dependency, and loneliness lack of reliable caregiver support and healthcare expenditures are also important restraints in obtaining healthcare. In long-term care, family members, particularly the son and spouse, give the required financial assistance. The levels of social isolation and loneliness, as well as a sense of insecurity, are extremely high. Neglect and indifference toward older people are other major challenges faced by seniors. Ageing is a normal and unavoidable procedure, physical strength deteriorates as one gets older, especially if health care is neglected. Senior citizens require proper health care in their later years. The poor health conditions of older people in rural societies are largely due to economic insecurity and a lack of medical services. Even though family is the primary basis of support, there is little financial independence among older people. The Financial dependency proportion among older women is considerably larger. So, their need should be addressed first, as they are more vulnerable and are often left behind. The government must ensure some significant provisions under ageing and well-being programmes/policies as the ageing population continues to grow. Firstly, healthy ageing is achieved through the improved healthcare programme and specialised geriatric care at primary healthcare facilities in both urban and rural

locations. Second, by bolstering old-age pensions, which will assist them in securing financial security in later life.Apart from that, to encounter the inclusive care requirements and challenges of India's ageing population, an accessible and flexible system is required. Adopting a right-based approach, policies must be focused on removing all types of structural and material barriers to healthy ageing.

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Indian Journal of Gerontology
2024, Vol. 38, No. 1, pp. 169-183
ISSN : 0971-4189, UGC No. – List B, Science –121

A Study of Hypertension and Associated Factors among Elderly Male Population of Dantan-Medinipur, (West Bengal)

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ABSTRACT

The present cross-sectional study aimed to understand the influence of different factors related to hypertension among 300 male elderly people, ages varying from 60 years and above, living in Chak Ismailpur Gram Panchayat, Datan1, block of Paschim Medinipur district in West Bengal. Data were collected using interview schedule. Appropriate anthropometric measurements were collected using standard procedure. Appropriate statistical tests were used to test the significant differences among the respondents. The findings of this study revealed overall hypertension stage-1 and stage-2 were 60.3 per cent and 26.3 per cent of participants respectively. Nutritional status, family history of hypertension, smoking habits,and sleeping duration were significantly associated with hypertension. Anthropometric variables including Hip

Circumference (HC), Waist Circumference (WC), Body Mass Index (BMI), Waist-Hip Ratio (WHR), and weight were positively correlated (statistically significantly) with Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP). It is evident from the result of this study that hypertension is a serious concern among elderly people and anthropometry is a very good indicator of hypertension.

Keywords : Blood pressure, Nutritional status, Anthropometry, Hypertension, Rural

With the change in lifestyle and food habits hypertension has become a common health problem globally. Hypertension is a high-risk factor for many other diseases, especially cardiovascular diseases (Shah and Afzal, 2013). With the increased age the chance of getting hypertension also increases. It is caused due to irregular lifestyle, chronic conditions like kidney or hormonal problems, diabetes, high cholesterol, smoking, etc. (Cheong,*et al.,* 2015). Symptoms of hypertension include chest pain, early morning headaches, nosebleeds, ear buzzing, irregular heartbeat, muscle tremors, tiredness, and vision changes (Shukuri,*et al.,* 2019).

Body mass index (BMI) and hypertension are significantly positively associated with elderly people (Hazarika,*et al.,* 2003; Manimunda,*et al.,* 2011; Kaur, 2012; Asayama,*et al.,* 2013; Alam,*et al.,* 2015; Ramesh and Stanly, 2017; Reddy,*et al.,* 2018). Hypertension is associated with many lifestyle and food habits and many other factors such as age (Boshuizen,*et al.,* 1998; Hazarika,*et al.,* 2003; Manimunda, *et al.,* 2011; Kamble, *et al.,* 2012; Kaur, 2012; Pratim,*et al.,* 2012; Asayama,*et al.,* 2013; Barman,*et al.,* 2014; Alam,*et al.,* 2015; Ramesh and Stanly, 2017; Reddy,*et al.,* 2018; Mbouemboue and Ngoufack, 2019), sex (Hazarika, et al. 2003; Manimunda, *et al*. 2011; Alam,*et al.,* 2015; Reddy,*et al.,* 2018; Mbouemboue and Ngoufack, 2019), family history

(Mbouemboue and Ngoufack, 2019), smoking (Alam,*et al.,* 2015; Reddy,*et al.,* 2018), tobacco consumption (Manimunda,*et al.,* 2011), alcohol consumption (Hazarika,*et al.,* 2003; Manimunda,*et al.,* 2011; Alam,*et al.,* 2015; Reddy,*et al.,* 2018), physical activity (Alam,*et a.,* 2015; Ramesh and Stanly, 2017; Reddy,*et al.,* 2018). Systolic and diastolic blood pressure increase when BMI is high (Reddy,*et al.,*2018). The prevalence of hypertension is more prevalent in urban areas than in rural (Datta, *et al.,* 2012). So, the health condition of the aging population is more vulnerable in society. Roy and Roy, (2022), found more prevalence of malnutrition and imbalance in health and well-being among the elderly population.

This study was conducted on the elderly male populationof Dantan -1 block, PaschimMedinipurdistrict in West Bengal. This study focused on blood pressure and associated factors of elderly people.

Objectives of the study

- To examine the blood pressure and hypertension condition among the elderly male population of Datan I, PaschimMedinipur, West Bengal, India
- To understand the influence of different anthropometric and lifestyle factors on the hypertension of the study population

Method

The study area of the present study was6no. ChakIsmailpur Gram Panchayat, Dantan -1 Block of PaschimMedinipur district in West Bengal, India. The study was conducted during the first half of 2022. Five villages (Solpota, BhetiyaDakshin, ChakIsmailpur, Janadighi, Matiberua) were selected from the mentioned gram panchayat for this study. Only male elderly People were selected for this study. Both block and village were selected through purposive sampling techniques. A total number of 300 individuals were selected for this study using the total enumeration technique.The sample size is calculated by

$$n = \frac{NZ^2p(1-p)}{d^2(N-1) + Z^2\,p(1-p)}$$

where: n = Sample size; Z = Standard normal deviation with 95% confidence interval i.e., 1.96; d = (allowable error) = 5% = 0.05; N = Total population = 624 (total estimated elderly population in the study area); p = Expected Proportion = 0.50. The minimum sample size was calculated following the above formula as 239.

Only males and above 60 year aged people were selected for the study. People who were unable to give a response were excluded from this study. Appropriate anthropometric measurements were collected following the standard procedure (Lohmann,*et al.,* 1988). Socio-demographic data were collected through a semi-structured schedule and interviews. The collected data were entered into Statistical Software of Social Science (SPSS version 16). For statistical analysis, p value 0.05 or less was considered statistically significant for this study. The classifications of blood pressure of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines were used in the study (Whelton, *et al.,* 2018; CDC, 2023) Table 1. BMI was classified into four categories according to the global database BMI Index, World Health Organization (WHO, 2006) guidelines.

Table 1

Blood Pressure (BP) (CDC 2023)

Categories of BP

BP Category	**SBP** (mm Hg)	**DBP** (mm Hg)
Normal	<120 and	<80
Elevated	120–129 and	<80
Hypertension Stage 1	130–139 and/or	80–89
Hypertension Stage 2	≥140 and/or	≥90

Results

Table 2 shows the socioeconomic status of the elderly population. Age was categorized into three categories; youngest old (60-69 years), middle old (70-79 years), and oldest old (80 years

& above). Most of the elderly people found in the study area belong to the youngest old category (79.33%), and fewer individuals in the middle old (19.33) category were found in the area. The oldest old individuals were rare in the area and only 4 persons belonged to this

Table 2

Socio-Economic status of elderly population

Age group-wise distribution		
	n	**(%)**
60 - 69	238	79.33
70 – 79	58	19.33
80 & above	4	1.33
Educational status		
Illiterate	60	20
Primary	66	22
Secondary	137	45.7
HS & above	37	12.3
House Types		
Kaccha	152	50.7
Pucca	130	43.3
Semi-Pucca	18	6
Occupation status		
Self-employment	97	32.3
Agriculture	128	42.7
unemployment	75	25.7
Family income (Monthly in Rs.)		
Below 10000	147	49.0
10001 – 20000	79	26.3
20001 – 30000	37	12.3
Above 30000	37	12.3

category among all the participants (300 individuals). The educational status of most of the participants was poor. Among the participants 20 percent were illiterate. Most of them had a primary (22%) or secondary (45.7%) level of education and only 12.3 percentage participants had secondary or upper educational qualifications. Most participants lived in kacchahouses (50.7%), but many of them also lived in pucca houses (43.3%) and a few of them lived in semi-pucca houses (6%). The occupation of most of the participants was agriculture (42.7%), followed by self-employment (32.3%), and unemployment (25.7%). Monthly income had been categorized into four groups as follows 49 percent the elderly earned less than 10000 Rs., followed by 26.3% between 10001 Rs. to 20000 Rs., 12.3 percent 20001 Rs. to 30000 Rs. and 12.3 percent more than 30000.

Table 3

Distribution of elderly participants according to blood pressure categories

Categories of Blood Pressure					
Systolic blood pressure	**n**	**%**	**Diastolic blood pressure**	**n**	**%**
Normal (<120)	23	7.67	Normal (<80)	65	21.67
Elevated (120-129)	62	20.67	Hypertension-stage 1 (80-89)	176	58.67
Hypertension-stage 1 (130-139)	147	49	Hypertension-stage 2 (≥90)	59	19.66
Hypertension-stage 2 (≥ 140)	68	22.66	—	—	—
Hypertension					
Normal (Elevated included)	40	13.3	= DBP <80 and SBP<129		
Hypertension-stage 1	181	60.3	= DBP 80-89 and SBP 130-139		
Hypertension-stage 2	79	26.3	= DBP ≥90 and SBP ≥140		

Table 3 shows that 7.67 percent and 21.67 percent of participants have normal SBP (<120mmHg) and DBP (<80mmHg). 20.67 per cent have SBP between 120-129mmHg which is elevated. 49 percent of participants have SBP between 130-139mmHg and 58.67 percent of

participants have DBP between 80-89 mmHgi.e., hypertension stage-1. 22.66 percent of participants have SBP and 19.66 percent of participants have DBP between more than 140 mmHg and more than 90 mmHg i.e., hypertension stage-2. Participants are categorized into 3 groups – normal, hypertension stage 1 and hypertension stage 2. Blood pressure less than 120/80 mmHg had been defined as normal, another group defined blood pressure above 130/80 and 140/90 into the hypertension stage-1 and stage-2 category. 13.3 percent of participants are 'normal' category and 60.3 percent and 26.3 percent fall under the 'hypertension stage-1 and stage-2 categories.

Table 4

Relationship of hypertension with socio-demographic variables

Socio-economic status		***Hypertension category***						
		Normal		***Hypertension Satge-1***		***Hypertension Satge-2***		***÷2***
		n	***%***	***n***	***%***	***n***	***%***	
Age (years)	60 – 69	28	11.8	143	60.1	67	28.2	3.827
	70 – 79	11	19.0	36	62.1	11	19.0	
	80 & above	1	25.0	2	50.0	1	25.0	
Education	Illiterate	7	11.7	39	65.0	14	23.3	5.201
	Primary	10	15.2	36	54.5	20	30.3	
	Secondary	21	15.3	84	61.3	32	23.4	
	H.S.+	2	5.4	22	59.5	13	35.1	
Family income (monthly)	< 10000	23	15.6	90	61.2	34	23.1	2.828
	10001-20000	9	11.4	47	59.5	23	29.1	
	20001-30000	5	13.5	21	56.8	11	29.7	
	> 30000	3	8.1	23	62.2	11	29.7	
Occupation	Self-employment	13	13.4	53	54.6	31	32.0	5.374
	Agriculture	19	14.8	75	58.6	34	26.6	
	Unemployment	8	10.7	53	70.7	14	18.7	

*pd"0.05

Table 4 represents the relationship between hypertension and socio-demographic variables. Hypertension stage 1was highly prevalent (62.1%) among the middle-old (70-79 years) and hypertension stage 2 was more prevalent (28.2) among the youngest old (60-69 years). Most normal category participants (25.0%)

belonged to the 80 years and above age group. Age group-wise hypertension was not significant (p<0.430). High hypertension stage-1 (65.0%) was found among illiterate participants. Hypertension stage 2was highly prevalent (35.1%) who had higher secondary and above education. Most of the secondary educated participants had normal blood pressure (15.3%). Hypertension was not statistically significantly associated with education (p<0.518). Hypertension stage-1 was more prevalent (62.2%) who had a monthly income of more than 30000 Rs. And stage-2 was more prevalent (29.7%) who had monthly income between 20001-30000 and more than 30000 Rs. Hypertension was not statistically significantly associated with Monthly income (p<0.830). High hypertension stage 1(70.7%) was found among the unemployed and agriculturists were found more in the normal range (14.8%). Hypertension was not statistically significantly associated with occupation (p<0.251).

Table 5

Relationship of hypertension with associated factors

Associated factors		***Hypertension category***						
		Normal		***Hypertension Satge-1***		***Hypertension Satge-2***		***÷2***
		n	***%***	***n***	***%***	***n***	***%***	
BMI	Underweight	4	66.7	2	33.3	0	0	98.208*
	Normal	36	13.7	177	67.6	49	18.7	
	Overweight	0	0	2	6.2	30	93.8	
Family history	Yes	4	5.6	24	33.3	44	61.1	59.258*
	No	36	15.8	157	68.9	35	15.4	
Fast food eating	Yes	15	13.5	61	55.0	35	31.5	2.657
	No	25	13.2	120	63.5	44	23.3	
Smoking habit	Regular	9	7.6	70	59.3	39	33.1	8.116*
	No or irregular	31	17.0	111	61.0	40	22.0	
Sleeping duration	<6 hours	0	0	3	33.3	6	66.7	12.542*
	6 – 7 hours	10	17.2	36	62.1	12	20.7	
	7 – 8 hours	19	13.5	91	64.5	31	22.0	
	>8 hours	11	12.0	51	55.4	30	32.6	
Physical exercise	Yes	13	12.7	62	60.8	27	26.5	0.046
	No	27	13.6	119	60.1	52	26.3	

*pd"0.05

Table 5 represents the association between hypertension and some associated factors among the study population. Hypertension stage 2 (93.8%) was more prevalent among the overweight elderly persons. Hypertension was statistically significantly associated with BMI ($p<0.000$). Elderly persons with a positive family history of hypertension had high hypertension stage 2 (61.1%). Hypertension was strongly associated with a family history of hypertension ($p<0.000$). Fast food consumption and hypertension are not significantly associated in the study population ($p<0.265$). Hypertension stage 2 (33.1%) was found more among regular smokers. Among people who sleep less than 6 hours, 66.7 per cent were more hypertensive. Similarly, hypertension stage-1 (62.1%, 64.5%, and 55.4%) was found among those who sleep 6 to 7 hours, 7 to 8 hours, and more than 8 hours. Sleeping duration was statistically associated with hypertension ($p<0.051$). In this study, hypertension was not statistically associated with physical exercise ($p<0.977$). Table 6 shows the correlation between blood pressure (systolic and diastolic) and some important anthropometric indicators. The result shows that all the anthropometric variables have a statistically significant correlation with both systolic and diastolic blood pressure.

Table 6

Co-relation between Blood pressure and some anthropometric variables and indices

Anthropometric Variables	***Systolic Blood Pressure***		***Diastolic Blood Pressure***	
	r	***p-value***	***r***	***p-value***
Hip Circumference	0.137	0.018	0.158	0.006
WaistCircumference	0.191	0.001	0.236	0.000
BMI	0.308	0.000	0.339	0.000
WHR	0.217	0.000	0.298	0.000
Weight	0.179	0.002	0.206	0.000
Systolic Blood Pressure	0.772	0.000	N. A.	N.A.
Diastolic Blood Pressure	N.A.	N.A.	0.772	0.000

Discussion

In many developed and developing countries, hypertension is a serious health problem among elderly people (Gijón-Conde, *et al.,* 2015; Li, *et al.,* 2018). Many chronic degenerative diseases including cardiovascular diseases, metabolic, nutritional, and musculoskeletal diseases were more prevalent among elderly people (Gopinathan, *et al.,* 2023). Even in developed countries like Germany, health gaps are observed in the awareness and treatment of hypertension among older people. Highly educated people had more awareness of their blood pressure compared to low educated people (Muli, *et al.,* 2020). In low- and middle-income countries the disparity is even higher. In Bangladesh, increasing mortality is a cause of hypertension. Heart diseases, diabetes, overweight, and smoking were risk factors for hypertension (Paul, *et al.,* 2021).

This study found overall hypertension stage-1(above 130/80 mmHg) and stage-2 (above 140/90 mmHg) were 60.3 per cent and 26.3 per cent of participants. Middle old people had more hypertension stage-1 (62.1%) than other elderly people. The age group of the participants has no significant association with hypertension. A similar result was found in another study (Cheong, *et al.,* 2015). But other studies showed blood pressure increases with age (Barman, *et al.,* 2014; Alam, *et al.,* 2015; Mbouemboue and Ngoufack, 2019). The results showed hypertension was not associated with educational status in the present study population. Here it is very important to consider the fact that the overall educational status in the study population is not very good and higher educated people are rare in the population. So the educational gap and knowledge difference may not be very high and it needs further research for clarification. Other studies found education level was associated with hypertension (Hazarika, *et al.,* 2003; Cheong, *et al.,* 2015).

Nutritional status and hypertension were strongly associated according to the result of the study ($\div 2 = 98.208$; $P < 0.05$). The BMI of the participants has a positive correlation with both systolic and diastolic blood pressure.Many other studies also suggested similar results in different populations and parts of India like among ex-servicemen and in Chennai (Ramesh and Stanly, 2017), Chhattisgarh

(Alam, *et al.,* 2015), Assam (Hazarika, *et al.,* 2003). The result of the present study also found that anthropometric variables including hip circumference, waist circumference, BMI, Waist-hip ratio, and weight were positively correlated with systolic and diastolic blood pressure. Similarly, other studies found waist and hip circumference, waist-hip ratio, and weight were significantly associated with blood pressure (Hazarika, *et al.,*2003; Reddy, *et al.,* 2018).

In this study, a family history of hypertension was found statistically significantly associated with hypertension. Mbouemboue and Ngoufack (2019) found similar results in their study. Regular smokers were more hypertensive than irregular o rex-smokers. Previous studies analysed smoking was inversely associated with hypertension (Alam, *et al.,* 2015; Reddy, *et al.,* 2018). Though, other studies found a strong association between physical activity and hypertension (Alam, *et al.,* 2015; Yazawa, *et al.,* 2016; Ramesh and Stanly, 2017; Hanif, *et al.,* 2021), but hypertension has no significant association with physical activity among the present study participants. The cause of these differences may be the residential and lifestyle habits of the participants. Where in many areas elderly people don't even go outside every day but the present study participants spend most of their time in outside activities. Smoking habits also have a statistically significant relationship with hypertension ($\div 2=8.116$; $p<0.05$) of the participants. A greater percentage of smokers have hypertension compared to their counterparts. Sleep is most valuable for good health. Poor sleep increases the risk of different physical and mental health problems. Sleeping habits of the participants have a statistically significant relationship with hypertension among the study participants ($\div 2=12.542$; $p<0.05$). Though few studies reported no significant relation between hypertension and sleeping habits (Reddy, *et al.,*2018) most studies suggest a significant association.

Conclusion

This study concludes that anthropometry is a very inexpensive and effective indicator of hypertension. Most anthropometric variables have a significant positive correlation with systolic and diastolic blood pressure. This study also found that the nutritional status, sleeping

habits, smoking habits, and family history of the participants have significant associations with the hypertension status of the participants. Many of the study participants have hypertension stage II while most of them have hypertension stage I. As the prevalence of hypertension is very high among the elderly participants, it is very important to implement necessary actions to manage hypertension situation for a better life for the elderly individuals. Further, in-depth studies are necessary to better understand the overall hypertension scenario among the elderly population.

Acknowledgment : The authors are very much thankful to the participants for voluntarily participating in this study. They are also very grateful to the Department of Anthropology, Vidyasagar University for providing instruments and other support.

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Indian Journal of Gerontology
2024, Vol. 38, No. 2, pp. 184-198
ISSN : 0971-4189, UGC No. – List B, Science –121

Relationship between Social Connectedness and Well-being in Elderly

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ABSTRACT

The present study explored the relationship between social connectedness and well-being in 52 elderly, both male (N=29) and female(N=23) in the age range of 60 to 81 years. Social Connectedness Scale–Revised and Psychological Well-Being Scale were administered individually. Results revealed that smartphone use among the elderly significantly increased their social connectedness. Male older adults reported significantly more social connectedness and psychological well-being than females. It was found that social connectedness makes a significant contribution to predicting the psychological well-being of older adults.

Keywords : Social connectedness, Psychological Well-being, Elderly

Ageing is usually associated with declining economic resources, declining cognitive ability, deteriorating physical health, and weakening social support. These changes in life circumstances suggest that ageing might be related to declining well-being among the elderly (Li, *et al.,* 2013). Social connectedness is the key to subjective well-being and healthy aging in older adults. The connection with family members, friends, and relatives is important for elderly people as they reach the last stage of their life.

Social Connectedness

All humans have an innate need to belong, and to form at least a few meaningful and close relationships (Baumeister & Leary, 1995). Social connectedness refers to a person's subjective awareness of interpersonal closeness with others (O'Rourke,*et al.,*2018). It is characterized as a sense of the self about the world (Lee & Robbins, 2000) which permits individuals to feel human among humans (Lee & Robbins, 1995). The feeling of closeness is a significant element contributing to an individual's belongingness and is affected by the social distance from others (Lee & Robbins, 2000). Social connectedness is regarded as a basic human need (Lee & Robbins, 1995; Townsend & McWhirter, 2005). Social connectedness incorporates social and emotional components. The social component refers to relationships with others such as social networks, social support, and social ties (Ashida & Heaney, 2008; Hendrickson, *et al.,*2011), whereas the emotional component refers to feelings and senses including satisfaction from the relations with others and sense of togetherness (Boutelle,*et al.,* 2009).

Social connectedness increases access to the psychological and material resources that buffer against stress. Social support is a key aspect of these resources and acts as protection against the damaging effects of stress. It is also associated with more functional, or adaptive, coping styles (Cohen & Wills,1985). Feeling connected enhances both physical and psychological well-being (Lee & Robbins, 1998). Studies have reported that higher levels of social connectedness are related to psychological health, social competency (Williams & Galliher, 2006), increased levels of self-esteem (Lee & Robbins, 2000; Lee,*et al.,* 2001), and healthier stress-coping (Ensel, 1986). Social connections play a beneficial role in maintaining psychological well-being (Kawachi & Berkman, 2001).

In today's, world smartphones have dramatically changed our daily lives and have become an indispensable part of daily life. It has turned into a means to get connected with our friends and family members. Smartphone use and acceptance have increased in older

adults. Ageing typically results in a reduction in social interactions due to health issues, retirement from active occupation, reduced role in the family, and reduced mobility. Social networks tend to reduce in size as people age (Klinenberg, 2016). Older adults' ongoing integration through social networks has been suggested as the key to successful ageing (Cornwell,*et al.,* 2008) Smartphones are means to enhance social connectedness among older adults.

Psychological Wellbeing in the Elderly

Well-being refers to optimal functioning and experience (Ryan & Deci 2001). Psychological well-being refers to the subjective feeling of contentment, sense of achievement, happiness, satisfaction with life's experiences and role in work, utility, belongingness without undue distress and dissatisfaction, etc. Psychological well-being is important as it influences overall life happiness, satisfaction and contentment. Obtaining that level of well-being means a person is satisfied with his life and has a positive view of himself and his overall situation.

Psychological well-being is an important criterion for successful ageing (Depp & Jeste, 2006; George, 2010). Subjective well-being is related to health and longevity (Diener & Chan, 2011). Studies have revealed contradictory findings. Well-being has been found to remain relatively stable during late adulthood until shortly before death, when it drops precipitously (Gerstorf, *et al.,* 2010; Kovalenko & Spivak (2018). They have revealed that low level of psychological well-being is common in the elderly.

Social Connectedness and Psychological Well-being among Elderly

Social connectedness is an important element of well-being. Socially well-connected people and communities are happier and healthier and are better able to take charge of their lives and find solutions to the problems they are facing. Several Studies have found a clear link between social connectedness and the PWB of older people. For instance, strong relationships with families and friends have been found to improve mental and physical health (Aschbrenner, *et al.,* 2011). Moreover, supportive relationships have been linked

to the provision of emotional security. Absence of a supportive relationship, individuals experience loneliness and social isolation leads to poor psychological well-being.

A sense of social connectedness is related to higher levels of well-being in older adults (Litwin, 2001; Fiori, *et al.,* 2006). Studies also indicate positive relationships that lead to feelingsbuffered against stressful life events (Cohen & Wills, 1985) and gaining better coping capacity (Julawong, 2009). Older people with integrated social support networks are generally less depressed and report greater well-being (Wenger,1997). Social connectedness is often proposed as the key to enabling older people to age 'successfully' (World Health Organization, 2015). Social connectedness is signalled as a positive alternative to adapting to social circumstances and remaining socially active in later life (Cornwell,*et al.,* 2008).

Thus, the objective of the present study was to explore the relationship between social connectedness and well-being in the elderly. The study also examined whether gender difference and smartphone use affects the social connectedness and well-being of older adults. The following hypotheses were tested in the present study:

i. There will be no significant difference in the psychological well-being of male and female older adults
ii. There will be no significant difference in the social connectedness of male and female older adults.
iii. Smartphone use will significantly affect the social connectedness of older adults
iv. Social connectedness will be significantly positively related to psychological well-being in the elderly

METHOD

Sample

The study was conducted on 52 elderly people aged 60 years and above (29 male, average age 69.59 years, 23 female, average age 69.39 years). Their age ranged from 60 to 81 years with an average age of 69.5 years. Sample was selected from the urban areas of Delhi by using purposive sampling method. Out of 52 elderly, 22

were married, 28 were widows and 2 were unmarried. Among the sample, 27 older adults were using smartphones while 25 didn't use smartphones.

Tools used

Social Connectedness Scale – Revised (SCS-R; Lee *et al.*, 2001) measures a psychological sense of belonging, or how individuals cognitively construe interpersonal closeness with others in their social world. The scale is comprised of 20 items set on a six-point Likert scale (1 = Strongly Agree, 6 = Strongly Disagree), with ten positive and ten negative questions. Answers to the 10 negative questions were reversed and scored, and there are no subscales. Scores are summated and range from 20 to 120, with higher scores indicating greater levels of social connectedness. The SCS-R has good internal reliability (r = .91) and test-retest correlations (r = .96). Permission from the authors was taken for the use of this scale.

Psychological Well-Being Scale (PWBS-SDCP, Sisodia & Choudhary, 2012) consists of 50 statements to measure five aspects of well-being i.e. Satisfaction, Efficiency, Sociability, Mental Health and Interpersonal Relations. 10 items are there to measure each aspect of well-being. The responses are scored on a 5-point scale with options strongly agree, agree, undecided, disagree and strongly disagree. The reliability of the test was determined by test-retest and internal consistency method. The test-retest reliability was 0.87 and the consistency value for the scale was 0.90. The scale has high content validity. The scale was validated against the external criteria and the coefficient obtained was 0.94.

Statistical Analysis

The data gathered from the sample was organized, tabulated, and entered into SPSS. Mean and standard deviation were calculated for both the social connectedness scale and the psychological well-being scale and its subscales. The t-test was calculated to assess the effect of gender and smartphone use on the Social connectedness

and psychological well-being of older adults. The association between social connectedness and psychological wellbeing was calculated by Pearson Correlation. Regression analysis was performed to predict psychological well-being. All statistical analyses were performed by using SPSS version 20.0.

Result

The mean on the overall psychological well-being of the elderly was 151.67 (SD=57.20). Male participants scored higher (M=168.21, SE=9.15) than the female participants (M=130.82, SE=12.64), and the difference between the two groups was significant, t (50) = 2.45, p=0.018). The data was further analysed in terms of different aspects of Psychological Well-being and the results are shown in Fig. 1. The result revealed a significant effect of gender on Satisfaction, F(1,50) = 5.69, p = 0.021; Efficiency, F(1,50) = 5.08, p = 0.029; Sociability, F(1,50) = 6.71, p = 0.013; Mental Health, F(1,50) = 5.07, p = 0.029 and Interpersonal Relations, F(1,50) = 6.28, p = 0.016.

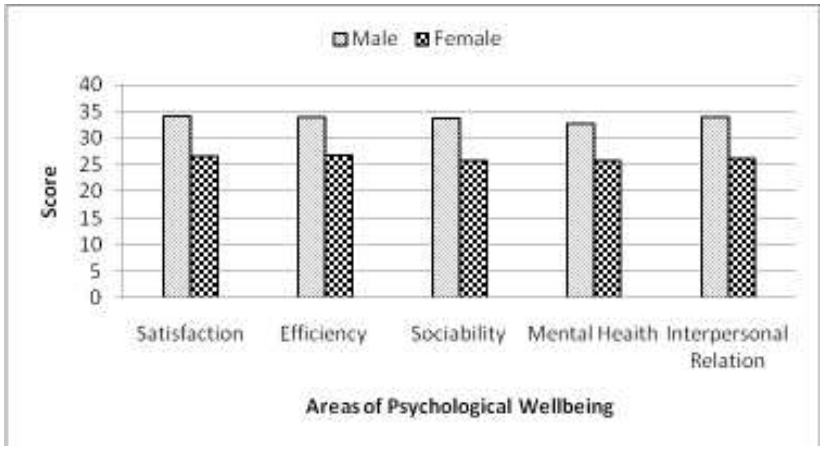

Fig.1 : Gender differences in different areas of Psychological Well-being

Results revealed that male elderly participants reported greater social connectivity (M=76.48, SE=3.8) as compared to females

(M=60.52, SE=4.0). The difference between males and females was significant, t (50) = 2.87, p=0.006). The effect of Smartphone use among male and female elderly on social connectedness and Psychological Well-being was also assessed. Results revealed that smartphone use was associated with greater social connectedness in both males (M=80.00, SD=23.45) and females (M=67.00, SD=8.59) as compared to those male (M=70.73, SD=13.42) and females (M=56.36, SD=23.05) not using smartphones. The effect of smartphone use on Social connectedness was found to be significant, F (1,50)=5.23, p=0.026. However, the effect of smartphone use on the Psychological well-being of the elderly was not significant, F (1,50)= 67, p=0.20.The results are shown in Table 1

Table 1

Mean and standard deviation (in parenthesis) on Social Connectedness and Psychological well-being as a function of smartphone use

Smartphone use	SCS	PWB	N
Yes	75.67(20.52)	161.48(55.79)	27
No	62.68(20.39)	141.08(57.93)	25

***Association between* Social connectedness and Psychological Well-being**

The relationship between Social connectedness and Psychological Well-being was calculated using Pearson 'r'. The result is shown in Table 2. Results showed a significant positive correlation (r = 0.497, p=0.00) between Social connectedness and Psychological Well-being. Significant positive correlation was obtained between Social connectedness and different areas of Psychological Wellbeing scale i.e. Satisfaction (r = 0.503, p=0.00), Efficiency (r = 0.468, p=0.00), Sociability (r = 0.478, p=0.00), Mental Health (r = 0.487, p=0.00) and Interpersonal Relations (r = 0.478, p=0.00). Similarly, a significant positive correlation was obtained between the different areas of the Psychological well-being scale. The results are shown in Table 2.

Table 2

Correlation (Pearson r) between Social connectedness and Psychological Well-being and its different areas

	Social connectedness	Satisfaction	Efficiency	Sociability	Mental Health	Interpersonal Relations	Psychological Wellbeing
Social connectedness	*1*	*0.503*	*0.468*	*0.478*	*0.487*	*0.497*	*0.497*
Satisfaction		*1*	*0.957*	*0.961*	*0.939*	*0.945*	*0.981*
Efficiency			*1*	*0.952*	*0.939*	*0.954*	*0.980*
Sociability				*1*	*0.938*	*0.958*	*0.982*
Mental Health					*1*	*0.954*	*0.973*
Interpersonal Relations						*1*	*0.982*
Psychological Wellbeing							*1*

** Significant at the 0.01 level*

The data was further analysed to predict the role of social connectedness in predicting Psychological well-being. A simple regression analysis was carried out. Since there is only one predictor in the model the value of R i.e. 0.497 represents the correlation between social connectedness and Psychological well-being. The prediction model was statistically significant F (1, 51) = 16.386, p=0.000, and accounted for approximately 24.7per cent of the variance of Psychological well-being (R^2 = 0.247, Adjusted R^2 = 0.232). This means that 75.3per cent of the variance in the Psychological well-being of the elderly cannot be explained by social connectedness. Therefore, there must be other variables that have influence on the Psychological well-being of the elderly. The model summary of the analysis is shown in Table 3.

Table 3

Model Summary of simple regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.497[a]	.247	.232	50.14

a. Predictors: (Constant), Social connectedness

The psychological well-being of the elderly can be predicted by social connectedness. The raw and standardized regression coefficients of the predictors are shown in Table 4. Social connectedness makes a significant contribution ($p<0.001$) to predicting the psychological well-being of older adults. Our model predicts that if social connectedness is increased by 1 unit Psychological well-being will increase by 1.335 units.

Table 4

Coefficient output from simple regression analysis

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	58.998	23.927		2.466	.017
Social Connectedness	1.335	.330	.497	4.048	.000

a. Dependent Variable: Psychological Wellbeing

Discussion

Psychological well-being in the Elderly

Population ageing is a worldwide phenomenon. Old age is often accompanied by more illness, disability, and dependency on care and support. However, gerontologists are emphasizing the importance of positive scenarios in later life. Active and Successful ageing models have been developed (Blazer, 2006). Constant efforts are made to identify the social factors to fulfill the goals of these models. Psychological well-being is an important criterion for successful ageing (Depp & Jeste, 2006; George, 2010). Low levels of psychological well-being are common in the elderly (Kovalenko & Spivak, 2018), and gender differences in well-being are not clear. The results of the present study revealed that older adults reported moderate levels of overall psychological wellbeing and in different areas of psychological well-being. Although both males and females both reported moderate level of psychological well-being however male participants scored higher than female participants and the difference between the two groups was significant. Thus, we reject the first hypothesis i.e. there will be no significant difference in the psychological well-being of male and female older adults. However, previous results regarding whether men and women differ in terms of their well-being levels have been highly inconsistent (Batz &Tay, 2018)

Smartphone use and Social connectedness in Elderly

Social connectedness is considered a basic human need (Lee & Robbins, 1995; Townsend & McWhirter, 2005) and is an important element of wellbeing. Socially well-connected people are happier and healthier. The use of smartphones by elderly people can create opportunities for social connectedness and help them to alleviate social isolation and loneliness. The results of the present study revealed that smartphone use was associated with greater social connectedness in both males and females as compared to those not using smartphones. Results also revealed that male elderly participants reported greater social connectivity as compared to females. The difference between males and females was significant, therefore we reject our second hypothesis i.e. there will be no significant difference in the psychological well-being of male and female older adults. The effect of smartphone use on Social connectedness was also found to be significant. Thus we accept our third hypothesis i.e. Smartphone use will significantly affect the social connectedness of older adults

Social connectedness and Psychological Well-being

Frequent social connectivity is associated with better psychological well-being and physical health (Umberson & Montez, 2010). Empirical evidence suggests an association between the degree of social connection and positive health outcomes (Tanskanen & Anttila, 2016), i.e. the more social connection, the greater the impact on health and well-being.

Previous studies have reported a clear link between social connectedness and the PWB of older people.The results of the present study indicated significant positive correlation between Social connectedness and Psychological Well-being. A significant positive correlation was also obtained between Social connectedness and different areas of the Psychological Well-being scale i.e. Satisfaction, efficiency, sociability, mental health and interpersonal relations. This finding is consistent with the previous study by Cho (2015) who reported that smartphone use is positively and significantly related to

life satisfaction which is an important component of well-being. Results further indicated the significant role of social connectedness in predicting the psychological well-being of the elderly. Hence, we accept the fourth hypothesis i.e. social connectedness will be significantly positively related to psychological well-being in the elderly, and can conclude that social connectedness makes a significant contribution to predicting the psychological well-being of older adults.

Conclusion

Within the context of rapid population ageing, the importance of a positive and successful ageing model has been recognized as a way to live successfully in old age. Smartphones have become an integral part of life and their use and acceptance among the elderly population are also increasing. Smartphones have become one of the important means to connect with people. Social connectedness may be a route through which well-being can be promoted. Maintaining social connections can positively impact their mental, emotional and physical health. Regular social interaction can reduce feelings of loneliness, depression and anxiety while promoting cognitive functioning. The results of the present study revealed that smartphone use among the elderly significantly increased their social connectedness. Male older adults reported significantly more social connectedness and psychological well-being than females. Social connectedness makes a significant contribution to predicting the psychological well-being of older adults. Thus, maintaining relationships with friends and family can contribute significantly to the overall quality of life of older adults.

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Indian Journal of Gerontology
2024, Vol. 38, No. 2, pp. 199-211
ISSN : 0971-4189, UGC No. – List B, Science –121

The Relationship between Major Chronic Diseases and Functional Limitations among Older Adults in Kerala

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ABSTRACT

The objective of this study was to explore the prevalence of different chronic morbidities and functional limitations and assess the association between chronic morbidity and functional limitations among older adults in Kerala. The data used for this study was sourced from the "Longitudinal Ageing Study in India" (LASI), the largest longitudinal ageing study globally and a pioneering initiative in India, providing valuable data. The information was collected from all the States and Union Territories across India during 2017–2018, with a total of 72,265 participants aged 45 and above.For this particular study, only data from Kerala state was used for bivariate and multivariate analysis. The findings revealed that 35 per cent of the elderly participants had diabetes, 12 per cent had heart diseases, over half of them had hypertension, and approximately 28 per cent suffered from Arthritis disease. Moreover, around 25 per cent of the respondents had at least one functional disability, and

41.5 per cent experienced some physical disability.The multivariate analysis confirmed the bivariate results, indicating that older individuals with chronic illnesses faced a significantly higher risk of functional disabilities. Regular assessments of the health status of the elderly population and a focus on providing necessary preventive and curative measures are crucial policy objectives to ensure the well-being of older individuals.

Keywords : Chronic illnesses, Functional disabilities, Well-being, Older individuals

Disability during old age is considered a societal occurrence influenced by various factors such as physical and mental well-being, socioeconomic status, cultural norms, and environmental circumstances. With the growing elderly population, the number of older individuals experiencing disabilities is also expected to rise. Multimorbidity has a more pronounced impact on functional limitations in older age groups (Klijs,*et al.,* 2011).

Functional status refers to an individual's ability to perform daily activities necessary for meeting basic needs, fulfilling usual roles, and maintaining health and well-being. The loss of functional status is associated with an increased risk of institutionalization, falls, and mortality (Dolai and Chakrabarty, 2013). Disability, as defined by the International Classification of Functioning, Disability and Health (WHO, 2002), involves impairment, activity limitation, and participation restrictions in interactions with the world. Maintaining functional independence is crucial for healthy aging in later life (WHO, 2015). However, disability becomes a significant challenge, particularly with increased morbidity and vulnerability in advanced age, to the extent that some elderly individuals are unable to perform basic and/or instrumental activities of daily living (Kartar & Mohanty, 2016). Indian older adults with multiple chronic diseases were

found to be six times more likely to experience difficulties with activities of daily living (Arokiasamy,*et al.,* 2010), and the associations between chronic diseases and functional limitations vary based on gender (Raina,*et al.,* 2020). Marital status, living arrangements, socioeconomic status, and educational level of the elderly have strong bearings on the ability to perform the IADL (Anjana and Chacko, 2015).

Morbidity significantly influences the physical functioning and psychological well-being of elderly individuals. However, there is a lack of comprehensive studies on the wide range of disabilities among the elderly population in Kerala. While Arthritis has received considerable attention concerning disease and disability, other chronic illnesses and co-morbidities have been relatively overlooked. Extensive research is still required to fully understand the complex relationship between morbidity and disability in the elderly, as it remains an area of uncertainty. Therefore, it is essential to comprehend the impact of chronic diseases on disability among the elderly, as the insights gained will be invaluable in shaping policies and implementing programs that promote the well-being of older individuals and effectively manage chronic illnesses. The objective of this study was to explore the prevalence of different chronic morbidities and functional limitations and assess the association between chronic morbidity and functional limitations among older adults in Kerala.

Method

This study utilized data from the Longitudinal Ageing Study in India (LASI) wave-1, conducted during 2017–18. LASI is a nationally representative cross-sectional study specifically designed to examine the situation of the older population in India. The data collection process spanned all states and union territories across the country, involving a substantial number of participants. A total of 72,265 individuals from over 61,000 households took part in this study, making it highly comprehensive and diverse.

LASI is intended to be conducted every two years for the next 25 years, making it the world's most extensive longitudinal ageing study and India's first of its kind. The study involved household and individual interviews, physical measurements, and biomarker data collection from individuals aged 45 and above, as well as their spouses, regardless of age. For the present study, a sample of 1209 people aged above 60 years in Kerala was selected to further investigate the research objectives.

Variables

The variables used in this study were primarily identified through an in-depth literature review, focusing on factors that hold social significance and have the potential to influence the physical and functional well-being of elderly individuals. These variables can be categorized into two groups: outcome variables and predictor variables.

Outcome variables

Functional disability in this study was assessed based on respondents' need for assistance with activities of daily living (ADL) and instrumental activities of daily living (IADL). For ADL, participants were asked about difficulties with tasks such as dressing, walking across the room, bathing, eating, getting in or out of bed, and using the toilet. Those who reported limitations in at least one of these activities were considered to have a functional disability.

Similarly, for IADL, respondents were asked about difficulties in activities expected to last more than three months, including preparing a hot meal, grocery shopping, making telephone calls, taking medications, doing household or gardening work, managing finances (such as bill payments and expense tracking), and navigating unfamiliar places. Individuals who reported limitations in at least one of these activities were also considered to have a functional disability. Therefore, respondents with limitations in both ADL and IADL were categorized as having a functional disability.

Predictor variables

In this study, the primary predictor variables included major chronic morbidities such as Diabetes (Yes/No), Heart Disease (Yes/No), Hypertension (Yes/No), and Arthritis (Yes/No), along with personal habits such as smoking and alcohol consumption.

Additionally, the analysis considered several other variables, including the age of the respondent categorized into three groups (60-69, 70-79, 80+), Place of Residence (Rural/Urban), Marital Status (Currently married/Widowed/Separated/Never married), an Education level (No Schooling/Upto 7th class/8th class to 10th class/Higher Studies), Religion(Hindu/Muslim/Christian), Caste (SC/ST/OBC), MPCE Quintile (Poorest/Poorer/Middle/Richer/Richest), and Living Arrangement (Living with Spouse/Alone/Living with all others).

Statistical Analysis

Descriptive statistics and bivariate analyses were conducted to examine the variations in selected chronic morbidities and physical and functional disability among the elderly based on socio-economic and demographic factors. The bivariate analyses aimed to estimate the associations between physical and functional disability and various risk factors, including chronic morbidities.

To assess the effect of chronic morbidities, socio-economic, and demographic variables on physical and functional disability, binary logistic regression was employed. Binary logistic regression was chosen due to the dichotomous nature of the outcome variables, categorized as "no" and "yes" (coded as 0 and 1, respectively).

The basic form of the logistic function is represented as Logit (P) = ln [P/(1-P)] = Z, where P denotes the probability of the occurrence of an event, and Z is a vector of parameters b0, b1, b2, ..., bk, along with predictor variables x1, x2, x3, ..., xk. If Y is the response variable, where Y=1 signifies the occurrence of the event, then p represents the probability of Y=1. Equation (1) posits that

the probability of the event's occurrence is influenced by a set of predictor variables, indicated by the logistic regression coefficients b0, b1, b2, ..., bk. The equation can be expressed as P = exp(Z) / (1 + exp(Z)) (Equation 2).

In this context, the quantity P/(1-P) is referred to as the odds, and consequently, ln(P/(1-P)) is termed the log odds or logit of P. The coefficients b0, b1, b2, ..., bk are estimated using the maximum likelihood method.

Findings

The prevalence of major chronic diseases among the elderly was as follows:

Hypertension was observed in 52 per cent of the elderly, diabetes in 35 per cent , arthritis in 27 per cent , and heart disease in 12 per cent (Table 1). The prevalence of these diseases showed a gradual increase with advancing age. In urban areas, diabetes and heart disease were more prevalent among the elderly, while arthritis and hypertension were more common in rural areas. Widowed, separated, and never-married elderly individuals exhibited higher rates of arthritis and hypertension, while currently, married individuals reported slightly higher percentages of diabetes and heart disease.

Table 1

Prevalence of Major chronic diseases among the older adults by background characteristics, Kerala

	Diabetes	Heart Disease	Hyper-tension	Bone/ Joint (Arthritis)	N
Age Group					
60-69	32.6	10.7	48.2	24.9	680
70-79	41.6	14.1	58.7	33.6	375
80+	33.1	14.3	53.2	26.6	154
Place of Residence					
Rural	32.8	11.6	53.3	30.6	640
Urban	38.5	13.0	5.8	24.6	569

Marital Status					
Currently married	35.8	12.8	49.9	23.5	780
Widowed/separated/ never married etc	35.0	11.2	56.2	35.7	429
Education					
No Schooling	30.2	7.4	49.2	30.7	189
Upto 7th class	32.1	14.1	52.0	27.6	560
8th class to 10th class	41.8	10.4	54.0	29.9	335
Higher Studies	41.9	16.1	51.6	18.5	124
Religion					
Hindu	32.4	11.1	48.7	26.7	700
Muslim	38.6	11.7	52.9	27.8	223
Christian	40.6	15.4	59.8	30.4	286
Caste					
SC	25.6	11.5	48.7	25.6	78
ST	25.0	0.0	40.0	10.0	20
OBC	37.0	12.5	52.3	27.7	622
Non SC/ST/OBC	35.6	12.5	53.0	29.0	489
MPCE Quintile					
Poorest	30.0	10.6	47.9	32.7	217
Poorer	29.6	9.2	47.5	20.4	240
Middle	35.2	12.0	53.7	25.9	216
Richer	40.1	14.9	53.3	26.0	242
Richest	40.8	13.9	56.8	33.0	294
Living Arrangement					
Living with Spouse/ Alone	39.2	13.9	54.0	25.1	367
Living with all others	33.8	11.5	51.3	29.0	842
Total	**35.5**	**12.2**	**52.1**	**27.8**	**1209**

Elderly individuals with 10 or more years of schooling had a higher prevalence of diabetes and hypertension compared to those with no schooling or fewer years of education. Among different religious groups, Christians had a higher prevalence of all selected chronic diseases than others. Elderly individuals from non-SC/ST/

OBC categories had a higher incidence of chronic diseases compared to their counterparts.

Regarding economic status, all chronic diseases were more prevalent in the richest group. Diabetes was more common among the elderly living alone or with their spouse, while the other diseases were more prevalent among those living with other family members.

Prevalence of functional disability among the elderly

Table 2
Prevalence of Functional limitations (Activity Daily Living (ADL) and Instrumental Activity Daily Living (IADL)) among older adults in Kerala

	ADL 1+		IADL 1+		
Age Group					
60-69	16.6	64.253 (.000)	30.3	98.664 (.000)	680
70-79	30.4		50.1		375
80+	44.8		70.1		154
Place of Residence					
Rural	24.7	.031 (.861)	43.1	1.439 (.230)	640
Urban	24.3		39.7		569
Marital Status					
Currently married	18.6	41.292 (.000)	32.1	81.199 (.000)	780
Widowed/separated/ never married etc.	35.2		58.7		429
Education					
No Schooling	32.3	26.844 (.000)	57.7	79.222 (.000)	189
Upto 7th class	28.0		48.5		560
8th class to 10th class	19.1		29.3		335
Higher Studies	11.3		18.5		124
Religion					
Hindu	24.1	1.850 (.397)	40.0	6.920 (.031)	700
Muslim	27.8		49.3		223
Christian	22.7		39.2		286

Caste					
SC	23.1	1.461 (.691)	38.5	84.707 (.000)	78
ST	20.0		55.0		20
OBC	25.9		43.7		622
Non SC/ST/OBC	23.1		38.7		489
MPCE Quintile					
Poorest	26.7	1.620 (.805)	47.9	66.662 (.001)	217
Poorer	22.9		36.3		240
Middle	22.7		41.2		216
Richer	26.0		42.6		242
Richest	24.1		40.5		294
Living Arrangement					
Living with Spouse/ Alone	18.8	9.202 (.002)	32.2	19.051 (.000)	367
Living with all others	27.0		45.6		842
Diabetes					
No	22.9	2.799 (.001)	38.7	77.188 (.002)	780
Yes	27.3		46.6		429
Heart Disease					
No	23.0	10.350 (.001)	40.0	8.683 (.003)	1061
Yes	35.1		52.7		148
Hypertension					
No	20.6	9.284 (.002)	37.1	8.815 (.003)	579
Yes	28.1		45.6		630
Arthritis					
No	17.6	79.552 (.000)	35.3	50.394 (.000)	873
Yes	42.3		57.7		336
Smoke					
Yes	24.0	.049 (.825)	40.2	.354 (.552)	341
No	24.7		42.1		868
Alcohol					
Yes	19.9	33.395 (.000)	32.8	9.473 (.002)	241
No	25.6		43.7		968
Total	**24.5**		**41.5**		**1209**

Within the elderly population, approximately 24 per cent experience physical disability, while 41 per cent face varying degrees of functional disabilities (Table 2). Elderly individuals with at least one chronic disease are more likely to report functional disability compared to those without any chronic disease.

Specifically, elders with Arthritis have a higher likelihood of experiencing functional disability (42 per cent and 57 per cent) in comparison to those without arthritis (35 per cent and 17 per cent), respectively. This pattern remains consistent regardless of the presence of chronic illness, and the results are statistically significant at the 1 per cent level of significance.

The percentage of functional disability is higher among the elderly aged 80 years and above (70 per cent and 44 per cent), those residing in rural areas (43 per cent and 24 per cent), the widowed/separated/never married group (32 per cent and 18 per cent), and those living with other family members (45 per cent and 27 per cent), compared to their respective counterparts.

Elderly individuals with no formal education exhibit a higher prevalence of functional disability compared to those who have completed some years of schooling. Among religious groups, Muslims have a higher percentage of functional disability (27 per cent and 49 per cent).

Furthermore, around 26 per cent of the elderly from the OBC category have at least one functional disability, while 55 per cent of the elderly from the ST category have at least one functional disability. MPCE Quintile and functional disability show a negative association: elderly persons with MPCE Quintile in the poorer category are more likely to experience at least one functional disability compared to their counterparts in higher MPCE Quintiles.

Association between major chronic diseases and disabilities among the elderly

Table 3

Results of Logistic regression analysis and C.I. of Functional limitations (ADL, IADL) among older adults in Kerala.

	ADL 1+			IADL 1+		
Diseases		C.I.			C.I.	
Diabetes		L	U		L	U
No(R)	1.000			1.000		
Yes	1.146	.843	1.558	1.440*	1.088	1.906
Heart Disease						
No(R)	1.000			1.000		
Yes	1.940**	1.283	2.933	1.806**	1.212	2.692
Hypertension						
No(R)	1.000			1.000		
Yes	1.152	.852	1.1557	1.109	.846	1.454
Arthritis						
No(R)	1.000			1.000		
Yes	3.358***	2.490	4.528	2.460***	1.848	3.276
Risk factors						
Smoke						
No(R)	1.000			1.000		
Yes	.967	.658	1.421	.960	.677	1.363
Alcohol						
No(R)	1.000			1.000		

This study employed two models to explore the relationship between chronic diseases and other socioeconomic and demographic characteristics with functional disability. According to socio-economic and demographic predictors, the likelihood of experiencing any functional disability was significantly higher among the elderly who had chronic diseases. Specifically, heart disease and arthritis were found to have a significant association with functional disability in both Model 1 and Model 2.

Moreover, the chance of any functional disability was higher among the elderly aged 80 years and above. Regarding marital status, widowed/separated or never married elderly individuals had

a higher likelihood of functional disability. Additionally, when considering the education status of the elderly, higher education was associated with a lower chance of functional disability compared to the reference category. On the other hand, the chances of functional disability were higher among elderly individuals living with other family members compared to their respective counterparts.

Conclusion

The elderly population bears a substantial burden of chronic diseases and functional disability, with variations influenced by socio-economic and demographic factors. The prevalence of functional disability is notably associated with the presence of chronic diseases in this age group. Given the high prevalence of chronic diseases and the increasing elderly population, this study emphasizes the critical need for strengthening healthcare services specifically tailored to address their unique needs.

Prioritizing regular health assessments and ensuring access to essential preventive and curative measures should be at the forefront of policy initiatives aimed at promoting the well-being of the elderly population. By proactively addressing their health challenges, we can work towards fostering a healthier and more resilient elderly community.

Limitations

The study's cross-sectional design poses limitations in establishing causal relationships among the examined factors. As a result, we cannot determine causality between chronic diseases, functional disability, and other socio-economic and demographic variables.

Furthermore, relying on self-reporting of chronic diseases may introduce variations and potentially underestimate or overestimate the actual prevalence of chronic morbidity among the elderly population.

Another limitation stems from the unavailability of data on certain factors, such as nutrition, which could potentially influence the causation of disability but were not included in our analysis.

As with any study, these limitations should be considered when interpreting the findings, and future research with more robust designs and comprehensive data collection may further enhance our understanding of the associations between chronic diseases and functional disability in the elderly.

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Indian Journal of Gerontology
2024, Vol. 38, No. 2, pp. 212-224
ISSN : 0971-4189, UGC No. – List B, Science –121

Factors Influencing Decision-Making of Geriatric Population in the Selection of Dental Office Type- A Cross-Sectional Study

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ABSTRACT

The purpose of this study was to determine the factors affecting the choice of dental office type among senior citizens of Chennai city. A cross-sectional survey was conducted in the dental OPD of a tertiary hospital through face-to-face interviews among 250 patients aged ”60 years, selected through convenient sampling. The study instrument consisted of open items to understand the elder's dental perspectives, expectations, and experiences. It comprised questions regarding socio-demographic profile, duration of previous dental visit along with the purpose, the type of dental setup they preferred, and the reasons for opting so. Data was

collected and analysed statistically using SPSS. The findings of the study revealed that all the respondents preferred tertiary hospitals to private and governmental units. Reasons for opting so were determined to be the affordability of treatment fee, satisfaction level primarily as a consequence of the skills or competency of the care provider, fulfillment in the expectation of clean ambiance, availability of holistic care services, and provision of service by considerate staffs at proximity. Based on the present findings, it may be concluded that the financial status of geriatric patients governs their selection of dental care setting.

Keywords : Patient preference, Dental care, Quality Improvement, Patient satisfaction, Dental setting, Oral health care provider.

The oral disease burden is on the rise in developing countries where two-thirds of the world's elderly live when compared to developed nations as fee for service mode is more common than in the latter.

Oral health care in India is delivered by establishments of the Government through organizations, exclusively or as a wing in medical colleges, as units at district hospitals or community and primary health centres. It is also most commonly provided by the private sector at dispensaries or hospitals while the indigenous system such as AYUSH also offers ancillary care. Most of the 3/4th healthcare delivery system is being taken over by the private sector. A house-to-house survey conducted among 300 aged people found that about 90 percent of participants utilized dental care from this segment. Indians still suffer from a multitude of preventable and treatable oral health problems that could be easily avoided by simple as well as cost-effective (Kumar, *et al,* 2013). Oral health care is a neglected sector as the situation in the Indian setting is that an individual reaches a dentist as a last option and not as a first reaction at times of dental problems.

Extensive morbidity leads to the widespread prevalence of oral diseases. The prevalence of dental caries, periodontitis, and

edentulousness is increased while xerostomia, ill-fitting dentures, and soft tissue lesions are common in senior citizens. Limited numbers of papers based on standardized methods of recording data on the prevalence of geriatric oral diseases are available and hence even though it is difficult to draw trend analysis,existing kinds of literaturesuggests that this segment of the population has poor oral health with high unmet needs (Cohen, *et al.,*2011; Balaji, 2017).

Oral health service planning to meet the unmet needs of this large segment remains an all-time challenge. Appropriate data availability regarding the duration, purpose of dental visit, factors influencing the decision-making in the selection of dental setting type and their expectations from such facilities including the barriers all of which prevent them from expressing felt needs and from utilizing oral health services is the need of the hour as an understanding of these determinants is pivotal for effective oral health care delivery.

There are certain demographic features such as age, socioeconomic class, and racial origin affecting cultural oral health beliefs that influence the attitude towards oral care which vary across geographical locations all of which play a crucial role in planning a region-specific oral health care delivery system for acceptability (Cohen, *et al.,* 2011).

Improvisation in the quality of health care delivery as an outcome of successful strategic evaluation with the help of information collected through patient surveys is proven in earlier studies and systems based solely on policymakers'opinions without consideration of the population's wants, differences, and attitudes of individuals belonging to the community are not victorious in reality (Al-Abri, R., & Al-Balushi, A., (2014). Hence the exploration of patient preferences is the need of the hour to implement appropriate quality management with focus.

Therefore, this study was carried out to determine the factors affecting the geriatric population of Chennai city with dental treatment needs in choosing their dental setting.

Method

Sample

250 elderly persons, residents of Chennai city, ages varying from 60 years and above were selected by convenient sampling method. Only those respondents who were willing to participate voluntarily, and knew at least the regional language (Tamil) or English or Telugu were selected in this study. The purpose of the study was explained to them, and were assured of their privacy and confidentiality following which written consent was obtained.

The respondents were administered a questionnaire individually.

The first part of the study tool included socio-demographic variables such as age, gender, educational level, income, etc. The second part included queries regarding the duration of their last dental visit along with the purpose and factors determining their decision to choose a dental setting. The questionnaire was framed so that it comprised open-ended questions to permit the research participant's expression without any restrictions.

Content analysis of their responses was performed which yielded inferences that helped to understand their perspectives all of which were crucial for achieving the objectives of the study. To learn the geriatric dental patients'preference for dental unit setup type along with the reasons why they would opt for so, the collected data were coded in Microsoft Excel and transferred to SPSS version 26 for statistical analysis. Frequencies were used for the description of thesocio-demographic characteristics of the respondents and factors leading the elderly in the choice of dental care provider. The data was calculated using G-Power Software Version 3.1 with values considered from reference research done by Kumar, *et al.,*(2013). For the present study, the effect size was 0.30, the alpha error probability was 0.05, the power was 0.80, and the degrees of freedom were 24.

This cross-sectional study was approved by the Institutional Ethics Committee of Sri Ramachandra Institute of Higher Education and Research, Pour, Chennai (EC-NI/22/DEC/85/135), andwas

conducted at the reputed tertiary dental hospital for a period of about four months from February to May 2023.

Results

The majority of the study subjects 173(69.2%) were aged between 60-69 years among the entire geriatric population and a higher proportion of respondents 238 (95.2%) are married. Among the 250 patients who visited the tertiary dental care unit, 146 (58.4%) were males. About 241(96.4%) out of a total of 250 (100%) have had a dental visit in the past.

Out of thetotal 250 surveyed subjects. 208 (83%) elderly individuals were economically dependent on others. 146(58.4%) of them were retired while 62(25%) were unemployed throughout their career. Only 42 (17%) of the study participants received a source of income, and the majority of them, 25(10%) were self-employedand had their firms, while 7(6.8%) were presently employed in the private sector or other establishments. Their monthly income varied from a minimum of Rs.1000/ (53%) to a maximum of Rs.50,000 /(only 3.2%). The remaining respondents were in between the ranges of income. Their education level also varies from primary level (10.4%) to P.G. level (5.2%), and 11.6 percent did not have formal education, and the majority of them (50%) had secondary level education.

Figure 1 : Pie Chart Depicting the Frequency Distribution of Study Subject Based Upon the Number of Reasons Expressed for Opting for Tertiary Dental Set-Up

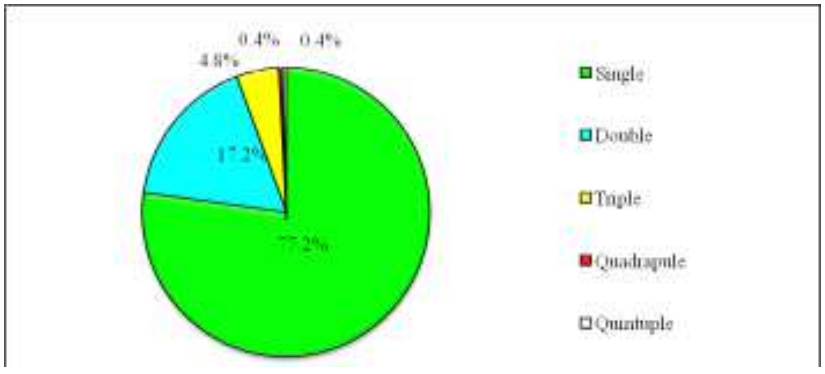

Figure 2 : Pie Chart Depicting the Frequency Distribution of Study SubjectsBased Upon Their Single Most Reason for Opting for Tertiary Dental Set-Up

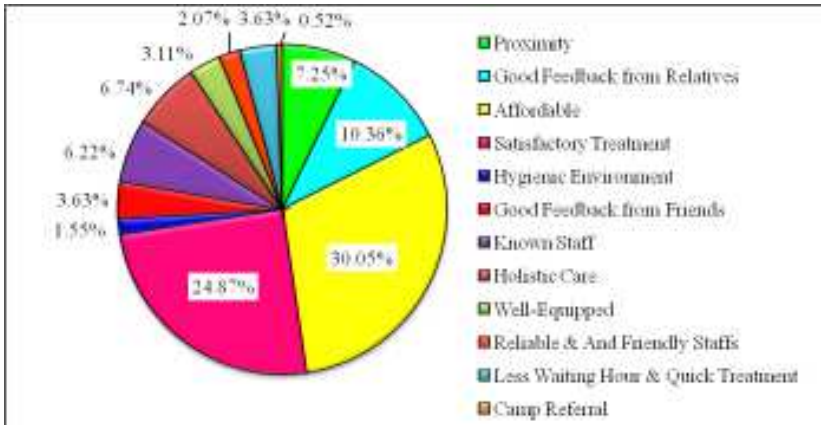

Figure 2 shows that the majority of the study participants 58(30.05%) out of a total of 250(100%) geriatric participants opted for tertiary hospital set-up because the treatment charges are more affordable than the private sector. This pie chart also shows that the second common reason as perceived by 48(24.87%) is being receivers of satisfactory dental treatment precededby 20(10.36%) visiting such a set-up after good feedback from relatives. It is evident from the figure that about 14(7.25%) selected tertiary centre as it is located close to their residence while the reason is the provision of holistic care and presence of a known working individual 13 (6.74%) and 12(6.22%) study participants respectively. It is also inferred from the above figure that 3.63% of the study participants preferred the feedback of friends and the provision of oral health services at a quick pace in comparison to governmental and private dental units.Tertiary centres being well equipped, maintained hygienic with reliable and friendly staff are also the basis for choice by about 6(3.11%), 3(1.55%),and 4(2.07%) subjects respectively.

Table 1

Reasons for Opting Tertiary Dental Set-Up (N=250)

Dual Options Chosen?	***n***	***(%)***
Good feedback from relatives and proximity	1	2.3%
Satisfactory treatment and proximity	2	4.65%
Holistic care and proximity	3	6.98%
Less waiting hours & quick treatment and proximity	1	2.3%
Satisfactory treatment and good feedback from relatives	3	7.0%
Hygienic environment and good feedback from relatives	1	2.3%
Proximity and affordable	1	2.3%
Satisfactory treatment and affordable	8	18.6%
Hygienic environment and affordable	2	5.0%
Well-equipped and affordable	1	2.3%
Well-equipped and satisfactory treatment	1	2.3%
Known staff and satisfactory treatment	1	2.3%
Less waiting hours & quick treatment and satisfactory treatment	2	4.65%
Well-equipped reliable and friendly staff	1	2.3%
Holistic care and reliable and friendly staff	1	2.3%
Satisfactory treatment, reliable and friendly staff	1	2.3%
Affordable reliable and friendly staff	1	2.3%
Holistic care and good feedback from friends	1	2.3%
Less waiting hours, quick treatment, and good feedback from friends	1	2.3%
Holistic care and well-equipped	1	2.3%
Hygienic environment and satisfactory treatment	6	13.95%
Holistic care and satisfactory treatment	3	6.98%

Table 1 depicts dual responses of study participants regarding the reason for opting for tertiary setup up reveals that the provision

of satisfactory treatment at affordable cost is the primary grounds for selection while the hygienic ambiance of the hospital and offering of comprehensive health services under one roof is also other factors considered by the majority of the interviewed elderly participants.

Figure 3 : Pie Chart Showing the Frequency Distribution of Study Subject Based Upon Their TripleResponse on Reasons for Opting Tertiary Dental Set-Up

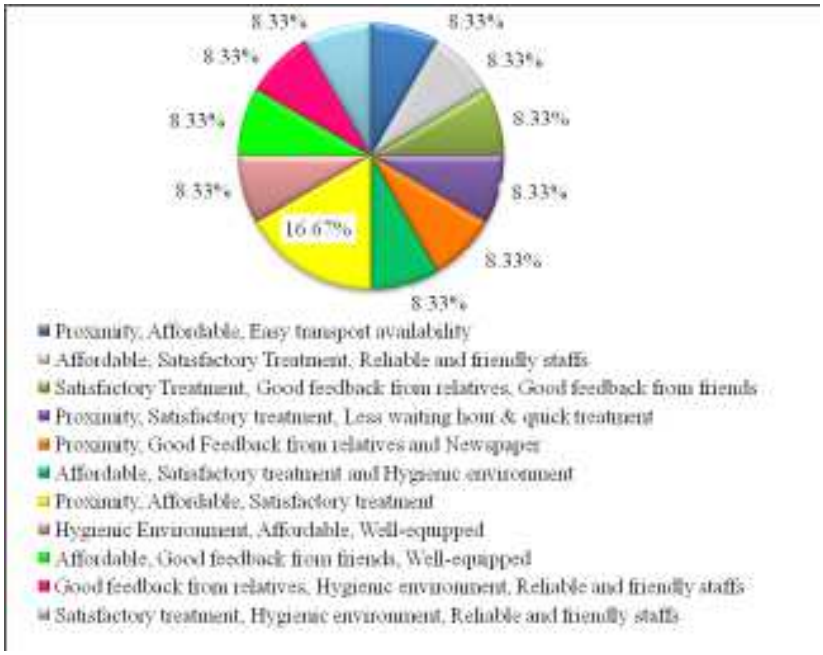

Figure 3 infers that out of all the triple responses received from study subjects regarding reasons for the choice of dental unit, the most important factors were the location of the hospital being situated in proximity and the offer of satisfactory dental services at affordable treatment fees charges.

Figure 4 : Pie Chart Showing the Frequency Distribution of the Quadruple Reason for Opting for Tertiary Dental Set-Up as Reported by a Study Participant

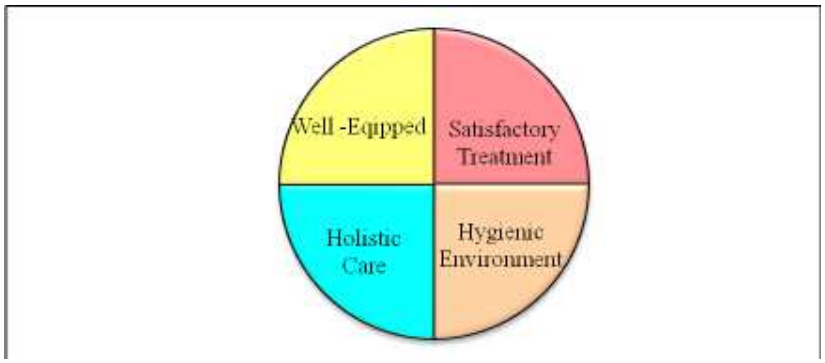

Figure 4showing the quadruple response of the surveyed subjects on the factors that led to the choice of tertiary dental set-up to undergo treatment reveals that its facilities, cleanliness, and wide range of services with prioritization of patient satisfaction plays a crucial role in decision-making of the elderly patient.

Figure 5 : Pie Chart Showing the Frequency Distribution of the Quintuple Reason for Opting for Tertiary Dental Set-Up as Reported by a Study Participant

Figure 5 showing the quintuple responses of the surveyed subjects on the reasons for the choice of tertiary dental set-up reveals that the provision of satisfactory comprehensive dental procedures at a comparatively quicker pace in comparison to other types of dental offices set up by reliable staff with a friendly approach in a sanitized environment plays an influential role in its preference

Discussion

It is imperative to know the factors governing geriatric patients' choice of dental setting so that universal health coverage can be achieved through the provision of equitable care.

Different factors are valued by our surveyed elders when choosing a dental setting. It is to be noted surprisingly that all the elders who have taken up this survey have reported that they prefer tertiary hospitals to undergo dental treatment which proves that the structure, processes, and outcomes of the organization chosen as the study site functions favourable to their expectation level.

A majority of the study participants have completed education only up to secondary schooling level, and are retired indicative of a lack of income source, it is obvious that they are financially dependent and hence the foremost reason for opting so could be the fact this is the only tertiary dental hospital in the city offering preventive and curative services at free of cost and rehabilitative treatments at affordable costs in a comprehensive set up exclusively for the elderly segment. This finding is consistent with the study done by Moshkelgosha,*et al.,*(2014) in which high tariff was considered a discouraging factor in reaching a particular dental setting by more than half of the participants (54.75%). This result also coincides with another study done by Dande, R.,*et al.,* (2019)which determined that 81.12 per centof participants also considered that the cost of the treatment fee charged played an important role in choosing a dental setting.

Apart from satisfaction from the treatment experience taking into account the competency of the dentist, recommendations from family members 20(10.36%) and friends 7(3.63%) are also considered by the elders, and these results confirm that word of mouth remains the best passive yet strong dental marketing mechanism which is also proven in research by Ungureanu, and Mocean, F., (2015).

Having discovered that 14(7.25%) and 13(6.74%) of our interviewed survey participants opted for tertiary dental hospital due to proximity and comprehensiveness respectively, the former factor

is found to be contrasting to the findings of another such study while the latter result is in concordance with the study by Iqbal,*et al.,*(2014), and Sharmila,*et al.,*(2021).

Another important finding of the study to be taken into consideration while oral health care service planning is carried out is that even though 48(24.87%) geriatric dental patients have reported that they felt satisfied with the treatment provided at this centre which is the identified as the second reason influencing their decision making of dental setting, majority of the participants 74(29.6%) have visited a dentist before two and less than five years when a regular dental check-up is generally recommended once in every six months and these results highlight that oral health educators should emphasize the adoption of preventive strategies which are simple and cost-effective encouraging effective health promotion through placing people's health in people's hands.

Conclusion

The primaryfactor that is considered significant by the elderly population when selecting a dental setting is the treatment fee and their expectation includes the provision of quick comprehensive service in a hygienic set-up in proximity by reliable competent staff approaching in a friendly manner. Referrals from kin and kin were considered very important by many as well. This study has also provided insights into the oral health care-seeking behaviour of elders understanding their perspectives and concerns.

Recommendation

It is the need of the hour that tertiary dental health care centres which are the most commonly opted by the elderly population well supported by both the State as well as Central Governments, voluntary organizations, and establishment of public-private partnerships through a memorandum of understanding so that at least pain management procedures for the aged individuals belonging to below poverty line could be provided at free of cost so that their quality of life remains unimpaired.

The results of this study signify that inter-personal, communication and negotiation skills clubbed with the leadership quality of the dentist play a crucial role in bringing about geriatric patient satisfaction necessitating the provision of training in geriatric dentistry for budding dental graduates to meet the unmet treatment demand for this rapidly growing segment of the population who deserve care to curb the menace of oral disease burden.

Limitation

Some of the inherent inadequacies leading to a lack of generalization of the results could be the study site being a unique tertiary centre first of its kind in the city where certain services are provided free of cost for elders just as the primary health centres which is usually the first point of contact in the country's health care delivery system due to which the results could be influenced impacting its generalization.

Future Scope : To overcome the drawbacks, comparative futuristic studies involving all the levels of the oral health care delivery system with varied service financing patterns are recommended and could pave the way for a suitable geriatric oral health delivery system in place with equitable distribution to enhance the quality of life of our society's senior citizens.

Acknowledgment : This study is a part of the doctoral thesis for which assistance is provided by Founder-Chancellor Shri N.P.V Ramasamy Udayar Research Fellowship. We would like to extend gratitude to the Dean of the institution, Department heads of Prosthodontics, Periodontics, Public Health Dentistry, Conservative and Endodontics for permission to carry out the study, and all the elders for their invaluable time and cooperation in participation.

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Indian Journal of Gerontology
2024, Vol. 38, No. 2, pp. 225-243
ISSN : 0971-4189, UGC No. – List B, Science –121

Association between Psychological Disorders and Treatment-seeking Behavior among Older Adults in India

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ABSTRACT

The study investigates the associated factors with psychological disorders and treatment-seeking behavior among older adults in India. The dataset used in this study is the Longitudinal Ageing Study in India (LASI) Wave 1 during the year 2017 – 2018. Descriptive statistics was used in this study to present the preliminary results. Further, the Heckman probit model selection model was employed to fulfill the research objectives. The results revealed that the oldest old category (75 years and above) has a higher percentage of psychological disorder (3.60%) and their treatment seeking is 23.43 percent. It was found that older adults(60-74 years) who belong to the urban area, live alone,are more educated, belong to a scheduled caste,currently don't work, have 1+ADL and 1+IADL impairments possess a higher percentage of psychological disorders. It was also found that older adults who belong to the oldest old groups are less likely

to seek treatment for psychological disorders.The findings of the present study urge that greater attention be paid to detecting and preventing late-life psychological disorders, particularly among those who are at greater risk.

Keywords : Psychological Disorder, Treatment-seeking, Heckman probit model, Longitudinal Aging Study in India (LASI)

With the growing proportion of older adults in low- and middle-income countries, and increase in the psychological disorders worldwide, a larger proportion of the population living with psychological disorders is found in these countries (Kar,*et al.,* 2018). However, poor social and economic conditions adversely affect the health conditions of older adults at a disadvantageous position and make them more susceptible to developing mental disorders (Rajkumar,*et al.,* 2009). Psychological disorders contribute more and are the leading cause of the disease burden in seven South Asian countries. The study further revealed that 12.2 per cent of older individuals are living with mental disorders (Ranjan & Asthana, 2017). Similarly, Kiely, *et al.,* (2019) reported the prevalence rates of mental disorders that ranged from 8.9 per cent to 61.2 per cent in India. On the contrary, older adults with psychological disorders face societal stigma and they hardly seek treatment for mental disorders.

Dao, *et al.,* in the year (2018) carried out research on the risk factors associated with mental illnesses and found that demographic factors such as female sex, low education, and lower wealth quintile are significantly associated with mental illnesses, especially among the older population. The study also revealed that mental disorders increase with the advancement of age. Blazer, D. G. in the year (2006) found in his research that older adults are better at regulating their emotions than younger adults. Older adults are better at emotional regulation than younger adults. Moreover, studies found that living with family, engagement in social activities, and community involvement play a significant role in the maintenance of better mental health status for older individuals (Srivastava,*et al.,* 2021a). Several research studies

also found that older adults, living with low socioeconomic status, and with limited social, psychological, and financial resources for coping with stress experience higher levels of psychological distress and low subjective well-being (Srivastava,*et al.,* 2021b)

However, older adults and the oldest old age groups were less likely to seek treatment for psychological disorders in India and other countries (Petry, 2002; Crabb 2006; Tharayil, 2013). The behavior to seek treatment is also determined by different socioeconomic factors such as sex, social support, and other important indicators (Ayalon,*et al.,* 2007). The increase in the prevalence of chronic diseases is associated with the increase in the perception of seeking medical treatment for mental health care services (Mackenzie,*et al.,* 2008). Several studies determine the urban place of residence, accessibility, and household wealth status as important factors associated with treatment-seeking behavior among older adults in India (Bharti, *et al.,* 2021).

Method

The present study utilizes data from the first wave of the nationally representative survey "LongitudinalAgeing Study in India" (LASI, WAVE-I, 2017–2018) conducted under the stewardship of the Ministry of Health and Family Welfare, Government of India, coordinated by the International Institute for Population Sciences(IIPS), Mumbai. This survey adopts a multistage stratified area probability cluster sampling design and a three-stage and four-stage sampling design used in rural and urban areas respectively. The first stage was a selection of sub-districts (Tehsils/Talukas), and then a selection of villages in rural areas and wards in urban areas in the selected sub-districts. In the third stage, a fixed number of households (i.e. 32) were selected from each selected village in a rural area while Census Enumeration Block (CEB) was randomly selected in each urban ward then a fixed numberof households (i.e. 35) were selected from each CEB in Urban areas.

LASI provides information for Indian states and union territories on demographics, household economic status, chronic health conditions, symptoms-based health conditions, functional health, mental

health (cognition and depression), and other components of older adults in India. In our present study, an individual file was used for this study. As part of the ethics protocols, individual and household informed consent forms were used in the survey. Consent for blood samples collection and storage and proxy consent were also taken and participants were provided referral letters and biomarker report cards if their health measurements were outside the normal range.

Descriptive statistics along with bivariate analysis was used to understand the percentage distribution of psychological disorders and treatment rate among the study population. Appropriate sampling weight was applied while carrying out univariate and bivariate analysis to compensate for unequal selection probabilities at various levels of selection and to compensate for non-response.

The Heckman model is based on the assumption that errors are normally distributed. The model takes care of the endogeneity, i.e. the coefficient, and produces an unbiased estimate of the selected sample. The Heckman model comprises of two separate equations–one equation that focuses on the selection part of the equation, and another one is the outcome equation which is the main equation that links the different covariates with the outcome. One focuses on selection into the sample (outcome being observed–the sample selection equation), and the main equation links the covariates of interest to the outcome. The two Heckman equations for two responses can be described as:

yi* (the outcome)

and SI (the selection propensity variable) can be stated as follows:

$Yi = xi\hat{a} + \mu i$

$Si = zi\tilde{a} + \tilde{o}i$

In general, xi is a subpart of z which means that all the explanatory variables that are considered for predicting the main outcome also consider the variables in a selection s. μ and õ are errors that the Heckman probit assumes to be normally distributed. However, it is the â coefficient that defines the parameter of interest. The main idea of the Heckman model is that it seems theoretically rather likely that

the unmeasured factors in both equations would be described by the residuals. However, when selection is made into the main sample, the expected values of the outcome are given by:

$$E(Y|z,\tilde{o}) = x\hat{a}+E(\mu|\tilde{o})$$

Consistent predictions are obtained by the maximum likelihood estimation techniques of the first stage and the main outcome equation with the expected value of the selection equation residuals.

Variable Description

Outcome Variable

In the context of our research study, we focused on two critical outcome variables. The first variable examined whether respondents had received a diagnosis of neurological or psychiatric problems. To assess this, we asked participants the question, "Which type of neurological or psychiatric problem(s) have you been diagnosed with?" The responses were categorized into four options: depression, Alzheimer's disease or dementia, psychiatric problems such as unipolar/ bipolar disorder or schizophrenia, and neurological problems like neuropathy, convulsions, migraines, or Parkinson's. The variable was then coded as "yes" if the respondent had been diagnosed with any of these conditions and "no" if they had not.

The second outcome variable delved into treatment-seeking behavior. We inquired whether respondents were currently undergoing any psychiatric or psychological treatment or therapy for their diagnosed condition. The answers to this question were categorized as "no" or "yes." These outcome variables were instrumental in our research, shedding light on the prevalence of neurological and psychiatric issues within our study population and providing insights into individuals' proactive efforts to seek treatment for their conditions. Through the analysis of these variables, we aimed to draw meaningful conclusions and formulate recommendations aligned with the objectives of our study.

Explanatory Variables

In our research study, we have systematically categorized many factors into three overarching domains: individual, health, and household

factors, which we believe will play a crucial role in our statistical analysis. Among individual factors, we have stratified age into three distinct groups: older adults (45–59 years), older adults (60–74 years), and oldest old (75 and above years). Furthermore, we have delineated the respondents by sex, educational status, living arrangement, marital status, working status, distance from health facilities, and social participation.

Health factors encompass a wide array of considerations, including life satisfaction, smoking status, drinking frequency, BMI, depressive symptoms, religiosity, social engagement, self-rated health, difficulties in Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL), as well as psychological distress. These health variables have been meticulously categorized to facilitate meaningful analysis, ranging from levels of life satisfaction to the presence or absence of difficulties in daily living activities.

Finally, in the household category, we have assessed the monthly per capita consumption expenditure (MPCE) quintile, religion, caste, and place of residence (rural or urban). These factors, rich in diversity and relevance, will form the basis of our statistical approach, which may encompass a variety of techniques such as chi-squared tests, logistic regression, ANOVA, or other suitable methods. The study uncover the relationship between these factors and our previously defined outcome variables related to neurological and psychiatric disorders and treatment-seeking behaviors.

Results

Table 1 represents the percentage distribution of psychological disorders and treatment-seeking behavior by selected background characteristics. Older individuals belonging to the oldest-old category have a high percentage of psychological disorder (3.6 percent) and treatment seeking (23.43 percent), while older adults in the age group 60-75 years report 2.32 per cent psychological disorder and 34 per cent seeking treatment. Males and females report almost the same prevalence of psychological disorders while males report a higher percentage of treatment-seeking (43.58%) than females (29.35%). Similarly, rural and urban older adults report almost similar prevalence

of psychological disorders (2.24%) and (2.49%) respectively but a high variability is observed in seeking treatment (31.24 %) for rural and (45.17%) for urban areas.

Older adults living alone have a higher prevalence of psychological disorders but older adults living with family have a higher percentage of seeking treatment (39.85 %). Higher educated (10-12 educated) older adults have a higher percentage of psychological disorders but low in seeking treatment. Older adults who are currently married have a low prevalence of psychological disorders but a higher percentage of seeking treatment (39.95%). Older adults who are currently not working have a higher prevalence of psychological disorders (2.95%) and a higher prevalence of seeking treatment (36.64%).

Older adults having more than one difficulty in ADL have a high prevalence of psychological disorder (6.82%) while only one difficulty in ADL report (2.82%). However, the number of older adults seeking treatment is lower for those who have more than one difficulty in ADL. Similarly, older adults having more than one difficulty in IADL have a high prevalence of psychological disorder (4.12%) and seek treatment (30.31%) which is lower than older adults with having one difficulty in IADL (43.76%). Older adults with mobility impairment have 3.06% of psychological disorders and those seeking treatment are (33.01%).

Concerning tobacco and alcohol consumption, older adults who smoke and consume alcohol have 2.39 per cent and 2.75 per cent psychological disorders while those who seek treatment are 33.78per cent and 40.02per cent respectively. Older adults who have low BMI have a higher prevalence of psychological disorders (3.01%) than obese (1.88%). However, obese older adults have higher treatment-seeking (44.95%) than low BMI adults (30.93%). Interestingly, older adults having low social engagement have a higher prevalence of psychological disorders (2.54%) than their other counterparts. Older adults who self-report their health as poor report a higher prevalence of psychological disorders (5.86%) and a low percentage of seeking treatment (39.11%).

Similarly, older adults who are at risk of depression (2.78%) and are dissatisfied in life (2.4%) have a higher prevalence of psychological disorders than their other counterparts. The number of adults seeking treatment is lower for people at risk of depression (35.42%) and higher for dissatisfied individuals(41.64%). Older adults who possess high religiosity have a high prevalence of psychological disorders but a low percentage of seeking treatment (28.62%).

Table 2 illustrates the heck-probit coefficients for psychological disorders and treatment-seeking behavior among older adults in India. Older adults belonging to the oldest old category are 0.05 times less likely to have psychological disorders but the coefficients are not statistically significant. Similarly, females and older adults living in urban areas have a low prevalence of psychological disorders compared with males and older adults living in rural areas. Higher-educated older adults are 0.45 times more likely to have psychological disorders than non-educated individuals. Older adults who belong to scheduled tribes are 0.11 times more likely to have psychological disorders than older adults who belong to scheduled castes. Older adults who are currently working are 0.73 times less likely to have psychological disorders than older adults who are currently not working. Older adults who consume alcohol are 0.06 times more likely to have psychological disorders than those adults who do not consume alcohol.

The selection part of the model represents that older adults belonging to the oldest-old category are 0.33 times less likely to seek treatment than older adults of the age group 45-59 years. Similarly, older adults who reside in urban areas are 0.12 times more likely to seek treatment than older adults living in rural areas. Similarly, older adults who are primarily educated are 0.15 times and middle educated 0.27 times more likely to seek treatment for psychological disorders than older adults who are non-educated. Older adults who belong to other marital status groups are 0.73 times more likely to seek treatment for psychological disordersthan older adults who are currently married. Similarly, older adults who are currently working are 0.11 times less likely to seek treatment than those older adults

who are currently not working. Older adults who have more than 1 ADL difficulty are 0.23 times more likely to see treatment than older adults with no difficulty in ADL. Similarly, older adults who have 1+IADL difficulty are 0.39 times more likely to seek treatment for psychological disordersthan those who have no difficulty in IADL. Similarly, older adults who are mobility impaired are 0.16 times more likely to be cognitively impaired than those older adults who are not mobility impaired. Interestingly older adults who have poor self-rated health are 0.57 times more likely to seek treatment for psychological disorders than those who have very good self-rated health. Older adults who have medium religiosity are 0.12 times more likely to seek treatment for psychological disorders than those who have low religiosity.

Table 1

Percentage distribution of psychological disorders and treatment rate by selected background characteristics.

	Psychological disorder %	Treatment %	Sample
Age			
Older adults (45-59yrs)	2.04	42.34	32401
Older adults (60-74yrs)	2.32	34.05	25120
Oldest old (75yrs & above)	3.60	23.43	6982
Sex			
Male	2.34	43.58	29546
Female	2.30	29.35	34956
Sector			
Rural	2.24	31.24	44306
Urban	2.49	45.17	20196
Living arrangements			
Living alone	2.91	9.48	2381
Living with family	2.22	39.85	46854
Living with others	2.51	30.05	15268

Educational level			
Not educated	2.30	33.36	39660
Primary educated	2.69	43.65	7816
Middle educated	2.53	37.83	5435
10-12 educated	2.63	44.87	7945
12+educated	2.88	29.22	3645
Marital status			
Currently married	2.21	39.95	47486
Widowed/separated	2.58	23.57	15328
Others	2.94	49.30	1688
Religion			
Hindu	2.29	34.40	53014
Muslims	2.25	37.47	7259
Others	2.75	49.62	4229
Caste category			
Scheduled caste	2.44	32.86	12399
Scheduled tribe	1.46	33.88	5536
Others	2.38	36.91	46567
Work status			
Currently not working	2.95	36.64	34354
Currently working	1.59	34.39	30148
Wealth quintile			
Poorest	1.90	22.12	13477
Poorer	2.29	42.89	13674
Middle	2.21	37.49	13134
Richer	2.65	43.67	12585
Richest	2.58	30.15	11632
ADL			
No ADL	1.79	39.38	53962
1 ADL	2.82	36.87	4729
1+ADL	6.82	27.01	5759
IADL			
No IADL	1.48	40.01	40696

1 IADL	2.82	43.76	6745
1+ IADL	4.12	30.31	17008
Mobility Impaired			
Not impaired	1.45	43.14	29809
Impaired	3.06	33.01	34641
Smoking status			
Currently not smoking	2.77	46.41	2594
Currently smoking	2.39	33.78	9164
Drink frequency			
Not drank	2.24	35.02	54716
drinking	2.75	40.02	9734
BMI			
Normal	2.11	34.66	30076
Low	3.01	30.93	10886
Obese	1.88	44.95	17193
Social Engagement			
Low	2.54	33.46	23797
Medium	2.11	38.36	20948
High	2.27	36.86	19705
Self-rated health			
Very good ®	1.05	29.19	24251
Good	1.92	34.98	28327
Poor	5.86	39.11	11871
Depressive Symptoms			
Normal	2.15	36.41	47359
At risk	2.78	35.42	15421
Life satisfaction			
Dissatisfied	2.40	41.64	14272
Neutral	2.17	25.3	3961
Satisfied	2.29	35.23	44497
Religiosity			
Low	1.97	39.46	31695
Medium	2.49	37.17	19431
High	2.92	28.62	11626

Table 2
Heckman probit model estimates for psychological disorders and treatment-seeking behavior among older adults

	Outcome part		Selection part	
	Coefficient	**C. Interval**	**Coefficient**	**C. Interval**
Age				
Older adults (45-59yrs)®				
Older adults(60-74yrs)	-0.18	-0.59-0.24	-0.09	-0.23-0.05
Oldest old(75yrs&above)	-0.05	-0.84-0.75	-0.33**	-0.56–0.11
Sex				
Male ®				
Female	-0.07	-0.59-0.44	0.15	-0.05-0.34
Sector				
Rural ®				
Urban	-0.06	-0.45-0.34	0.12	-0.01-0.26
Living arrangements				
Living alone ®				
Living with family	0.19	-1.65-2.03	0.15	-0.44-0.74
Living with others	0.21	-0.79-1.21	-0.20	-0.60-0.20
Educational level				
Not educated ®				
Primary educated	-0.24	-0.76-0.28	0.15	-0.01-0.32
Middle educated	-0.28	-0.86-0.30	0.27**	0.09-0.45
10-12 educated	-0.17	-0.78-0.45	0.10	-0.11-0.32
12+educated	0.45	-0.71-1.60	0.14	-0.18-0.46
Marital status				
Currently married ®				
Widowed/separated	-0.58	-2.54-1.38	0.03	-0.54-0.6
Others	-0.17	-2.17-1.83	0.73**	0.14-1.33
Religion				
Hindu ®				
Muslims	-0.22	-0.82-0.37	-0.07	-0.25-0.11
Others	-0.95*	-1.71—0.2	-0.06	-0.29-0.16

Caste category				
Scheduled caste ®				
Scheduled tribe	0.11	-0.58-0.8	0.01	-0.23-0.23
Others	0.38	-0.13-0.88	0.07	-0.08-0.22
Work status				
Currently not working ®				
Currently working	-0.73***	-1.25—0.21	-0.11	-0.25-0.03
Wealth quintile				
Poorest ®				
Poorer	0.14	-0.49-0.78	0.13	-0.07-0.33
Middle	0.21	-0.44-0.86	0.19	-0.01-0.38
Richer	0.47	-0.2-1.13	0.18	-0.01-0.37
Richest	-0.07	-0.75-0.60	0.10	-0.11-0.30
ADL				
No ADL ®				
1 ADL	0.17	-0.45-0.78	0.05	-0.17-0.26
1+ADL	-0.35	-0.9-0.21	0.23**	0.04-0.42
IADL				
No IADL ®				
1 IADL	-0.13	-0.69-0.43	0.24***	0.06-0.42
1+ IADL	-0.39	-0.94-0.17	0.39***	0.23-0.56
Mobility Impaired				
Not impaired ®				
Impaired	-0.38*	-0.81-0.05	0.16**	0.01-0.31
Smoking status				
Currently not smoking ®				
Currently smoking	-0.30	-0.71-0.1	0.03	-0.1-0.16
Drink frequency				
Not drank ®				
Drinking	0.06	-0.35-0.48	0.04	-0.09-0.17
BMI				
Normal ®				
Low	-0.58	-1.11—0.05	-0.10	-0.25-0.06
Obese	0.15	-0.26-0.56	-0.10	-0.24-0.03

Depression				
Normal ®				
At risk	0.14	-0.29-0.56	0.03	-0.09-0.16
Religiosity				
Low®				
Medium	-0.25	-0.67-0.16	0.12	-0.01-0.25
High	-0.15	-0.63-0.34	0.10	-0.06-0.26
Self- rated health				
Very good ®				
Good			0.20**	0.04-0.35
Poor			0.57***	0.4-0.74
Life satisfaction				
Dissatisfied ®				
Neutral			0.04	-0.19-0.27
Satisfied			-0.05	-0.19-0.08
Social Engagement				
Low ®				
Medium			0.12	-0.03-0.27
High			0.12	-0.05-0.28
Constant	1.45	-1.53-4.43	-2.94	-3.62—2.26
/Arth rho			-0.38	-1.32-0.57
rho			-0.36	-0.87-0.51

*p<0.1, **p<0.05, ***p<0.01

Discussion

The present study of the determinants of psychiatric disorders and their treatment seeking using country-representative survey data shows that 2.8 percent of older adults were suffering from psychiatric disorders and 41.3 per cent of them chose to seek treatment. Oldest-old participants have the highest prevalence of psychiatric disorders, and this is consistent with previous research that showed the increased prevalence of psychiatric disorders among older adults by increasing age.

Also, the lower prevalence of psychiatric disorders in our study might have led to a lack of power or type-2 error which results in underestimation of the particular association. Furthermore, the study

showed that older adults who are actively working are less likely to suffer from psychiatric disorders than those who ever worked but currently not working or retired; earlier studies also point out that being unemployed or retired has a devastating impact on mental well-being in old age (Srivastava,*et al.,* 2021a). Previous research also suggests that a lack of proper financial savings and assets is why older adults prefer to stay in their occupations. In addition, regarding economic status, the current analysis revealed that older adults from the poorest wealth quintile were less likely to suffer from psychiatric disorders than the richest older adults. Another important finding of our study is that older individuals living in urban areas are more likely to suffer from psychiatric disorders than their rural counterparts. Still, some studies point out that rural resident older adults are at increased risk of psychiatric disorders than urban older adults. However, this can vary by the context and the region. In developing countries, this association was not strongly observed. Further research is required to concentrate on covering this variation.

High life satisfaction and good SRH reduce psychiatric disorders among older adults (Srivastava, *et al.*, 2021b). Thus, according to our study, people with low life satisfaction and poor SRH were more likely to suffer from psychiatric disorders. In a broader sense, fruitful ageing covers components such as life satisfaction, physical health, and quality of life. When it comes to functional health, older adults with difficulty in ADL and IADL had a higher risk of suffering from psychiatric disorders, and this is similar to the findings of earlier studies (Srivastava, *et al*., 2021a). It is also evident from the research that older adults who have higher psychological distress are substantially more likely to suffer from psychiatric disorders indicating that as evidence suggests, the distress symptoms should be considered as screening for recognizing psychiatric morbidity among the older population.

Numerous studies have consistently demonstrated a decline in healthcare-seeking behavior with advancing age. In the context of this study, it was observed that seeking treatment for psychiatric disorders significantly decreases within the oldest-old group compared to their younger counterparts. This highlights the persisting stigma associated with having a mental disorder in old age, which acts as a deterrent to seeking mental health services. Furthermore, the analysis revealed a

significant gender disparity, with older women being notably less inclined to seek treatment for psychiatric disorders compared to older men. Additionally, the study found a correlation between living arrangements and treatment-seeking behavior among older adults. Even after accounting for the accessibility of healthcare services, older individuals from the most economically disadvantaged backgrounds were less likely to seek treatment for psychiatric disorders than those from more affluent households. The heightened likelihood of seeking treatment among older adults residing in remote areas, although adjusted for accessibility, may be attributed to the increased costs and affordability concerns associated with these services. This particular aspect warrants further in-depth investigation to better understand the underlying factors at play.

This study possesses several notable strengths, primarily stemming from its utilization of data sourced from a comprehensive, nationally representative sample of individuals. This approach greatly enhances the external validity and generalizability of the study's findings, as it encompasses a diverse and extensive older population. However, it is imperative to acknowledge certain limitations within the current study. Firstly, the study's cross-sectional design means that it cannot definitively establish causal relationships based on its findings. The subsequent follow-up wave 2 of the LASI data promises to provide valuable insights into the prevalence of psychiatric disorders and the various patterns of treatment-seeking behavior within the aging population. Additionally, it's essential to recognize that the identification of psychiatric disorders in this study relied on self-reported data and was measured by considering any of the neurological or psychiatric issues listed in the survey. Future research endeavors should delve deeper into understanding the impact of other potential risk factors for specific mental health conditions such as depression, Alzheimer's disease, dementia, Parkinson's disease, and so forth. Moreover, investigating the differential patterns of treatment-seeking behavior for these specific illnesses among older adults in India would be an invaluable area of exploration for subsequent studies**.**

Conclusion

The study's results highlight the importance of addressing late-life psychiatric disorders, especially among individuals at higher risk.

Notably, factors like being male, having a history of employment but currently not working, and reporting low life satisfaction are associated with an increased likelihood of these disorders. Similarly, poor self-rated health, difficulties in daily activities, higher psychological distress, belonging to a higher wealth bracket, and residing in rural areas are all linked to a greater vulnerability to late-life psychiatric disorders. Furthermore, the study reveals that older adults in the oldest age group, women, those living with others, and individuals in the lowest wealth bracket and lower caste groups are less inclined to seek mental treatment when required. These findings stress the need for accessible mental health services in primary care settings, targeted strategies to mitigate risk factors, and endeavors to encourage older individuals, especially those from disadvantaged socioeconomic backgrounds, to seek mental health treatment. Additionally, the study calls for further research into geriatric mental health services and underscores the importance of framing late-life psychiatric disorders as treatable social issues to raise awareness about seeking treatment for age-related mental health problems.

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Indian Journal of Gerontology
2024, Vol. 38, No. 2, pp. 243-270
ISSN : 0971-4189, UGC No. – List B, Science –121

Genetic Association of CAPN10 SNP63 Polymorphism with Type 2 Diabetes Mellitus, One of the Greatest Maladies of Old Age : A Meta-Analysis

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ABSTRACT

The present study was undertaken to understand the association of SNP 63(rs5030952) of the CAPN 10 gene with the condition. All statistical tests based on PRISMA and PROSPERO were performed on R studio (4.2.3). The pooled odds ratio (OR) estimates did not reveal any significant association between polymorphism at the SNP 63 locus of the CAPN 10 gene and T2DM under both the Common Effects Model (CEM) and Random Effects Model (REM). Further, subgroup analysis also did not reveal any significant OR implying that the SNP 63 polymorphism does not exhibit different effects in different ethnic groups. Therefore, it is concluded that polymorphism at the SNP63 locus of the CAPN 10 gene alone has no role to play in the etiology of T2DM.

Keywords: Ageing, T2DM, CAPN 10 gene, SNP polymorphisms, SNP 63, Case-control association studies, Meta-analysis

Type 2 diabetes mellitus (T2DM), usually occurring in adults is a common metabolic disorder, accounting for 90 per cent of all cases of diabetes (Guyton & Hall, 2008). There is an increasing burden of type 2 diabetes mellitus (T2DM) with 1 in 11 people globally currently diagnosed with the condition (Khan,*et al.,* 2019).

T2DM is characterized by insulin resistance which may be an upshot of ageing, obesity, lifestyle, etc. While on one hand, factors such as obesity, lifestyle, over-eating and physical inactivity may contribute to a raised glucose level and resistance to insulin, population genetic studies have demonstrated that the genetic make of an individual might also be behind the etiology of T2DM (Meigs,*et al.,* 2000). Therefore, both environmental and genetic factors and their interactions might fuel the development of type 2 diabetes mellitus.

Ageing is a complex biological process influenced by both environmental and genetic factors and age has been accorded as the greatest risk factor for T2DM. Older adults (defined as those aged >65 years) now constitute nearly half of all adults diagnosed with T2DM. The occurrence of co-morbidities, make the situation worse with the management getting tougher.

Understanding the genetic architecture ofT2DM might give substantial insights into unexplored terrains such as how genes might determine the susceptibility ofT2DM or influence the age of onset or severity of T2DM. Therefore, there has always been keen interest in understanding the genetics of T2DM.

Recent studies have suggested that polymorphisms at the calpain-10 (CAPN10) gene is associated with insulin resistance and later T2DM (Buraczynska,*et al.*, 2013; Fullerton,*et al.*, 2002; Horikawa,*et al.,* 2000; Tsuchiya,*et al.,* 2006). There are 15 calpain genes in the human genome coding for members of the calpain family of proteins. The CAPN10 gene is located on chromosome 2q37.3. This gene consists of 15 exons and produces a 672 amino acid protein

(Horikawa,*et al.*, 2000). The gene is known to be involved in insulin receptor regulation and adipocyte differentiation (Patel & Lane, 1999). It affects insulin secretion and action as well as liver glucose synthesis(Lynn,*et al.*, 2002).

Polymorphisms at four SNPs located in the intronic regions of the CAPN10 genehave been strongly associated with T2DM. They are SNP-43 (rs3792267), SNP-44 (rs2975760), SNP-63 (rs5030952) and In-Del19 (rs3842570). Since these SNPs are located in the intronic region they do not alter the structure of protein. However, they may alter the gene expression (Horikawa,*et al.*, 2000). However, the results are conflicting and the strengths of polymorphisms at these intronic loci are ambiguous.

With the aim of understanding the role of each of these SNPs in the etiology of T2DM, the authors planned to do a meta-analysis and systematic review of case-control studies involving these SNPs taking each locus at a time.

In view of this, the present work aims at unearthing the association of CAPN 10 SNP63 (C/T polymorphism with T2DM through a meta-analysis of all case-control studies done so far.

Methods

The present meta-analysis was carried out following the Preferred Reporting Items for Systematic Reviews and Meta-analyses PRISMA and the published PROSPERO research protocol (Moher,*et al.*, 2010; Sarhangi,*et al.*, 2020).

Eligibility criteria

The following inclusion and exclusion criteria were used while screening:

Inclusion criteria

- Case–control studies conducted on any human population.
- Case: individuals with T2DM, Controls: Individuals without T2DM.

- Allele or genotype frequencies of SNP 63 polymorphism of both case and control groups clearly mentioned and sufficient for the calculation of odds ratios (ORs) with the corresponding 95 per cent confidence intervals (CIs)
- Published in English.
- Full texts available.
- In case of short communication and brief genetic report sufficient data available.

Exclusion Criteria

- Reviews, meta-analysis, letters, editorial, comments, and conference abstracts.
- Family based association studies.
- *In vitro, ex vivo* or animal studies
- Studies lacking sufficient data on allele frequencies or data through which the respective genotypic frequencies could not be calculated.
- Studies with CAPN 10 SNP63 polymorphism included as a part of haplotype frequencies
- Duplicate publications and redundant studies of duplicated data.

Search strategy

The databases PubMed, Scopus and Web of Science have been searched for relevant literature using keywords "Type 2 Diabetes Mellitus" OR "insulin independent diabetes mellitus" OR "Noninsulin-Dependent Diabetes Mellitus" and "CAPN10" OR "Calpain 10" bullion operators till15th February 2024.

Screening of literature

In the first step duplicate articles were excluded. In the second step articles were screened manually by going through the titles and abstracts of the articles by two groups independently at the same

time. This was followed by both groups sitting together and comparing their excluded and included articles. Disagreements were resolved through discussions. In the third step each included article was read individually to ensure that the articles follow all the inclusion criteria. Finally, the list of papers to be included for the meta-analysis was prepared.

Data extraction

Two researchers extracted the following data from the selected studies for the meta-analysis:

a. First author's name and year of publication
b. Region and ethnicity of participants
c. The number of cases and controls of the participants in the study
d. Genotyping method used in the study
e. Data on genotypic frequencies of CAPN 10 SNP 63 polymorphism of both cases and controls.

Two other researchers re-checked the data

Quality assessment

The Newcastle–Ottawa Scale (NOS) was used to assess the quality of all the included studies (Stang, 2010). The NOS scale weighs studies based on selection and comparability between cases and controls. The NOS has a score range of zero to nine. Studies with a rating of 7–9 were presumed to be of high quality, 4–6 as moderate quality, 4 or less was classified as low-quality studies.

Quality assessment was conducted by two researchers independently. Any disagreement was sorted out by discussions between the two and if it still persisted, a third researcher got involved to arrive at a consensus.

Statistical analysis

The analysis was performed by using R Studio (4.2.3). 'C' allele was considered as the major allele as it is the more common allele in

the population while 'T' was considered as minor allele. Different genotypic combinations involving TT, TC and CC need to be checked in case and control to understand the involvement of the locus with T2DM. Hence, to compare the SNP-63 (rs5030952) polymorphism and T2DM odds ratio was calculated at 95 per cent confidence interval (CI) in the seven genetic models namely allele model, homozygote model, heterozygote model, additive model, dominant model, recessive model and co-dominant model (Thakkinstian,*et al.*, 2005).

a) Allele model (T vs. T+C)
b) Homozygote model (TT vs. TT +CC),
c) Heterozygote model (TC vs. CC+TC),
d) Additive model (TT vs. TT+TC),
e) Dominant model (TT+TC vs. TT+TC+CC),
f) Recessive model (TT vs. TT+TC+CC), and
g) Co-dominant model (TC vs. TT+TC+CC)

Assessment of heterogeneity

The Cochrane Q-test index was used to detect the heterogeneity present between the results of the primary studies. The I-square index (I^2) determined the degree of heterogeneity in meta-analysis (Higgins, 2003).

Calculation of Odds Ratio

Both Common Effects Model (CEM) and Random Effects Model (REM) were used to calculate the pooled OR estimate (Riley,*et al.*, 2011) using Mantel-Haenszel method and Inverse variance method respectively.

Subgroup analysis

Ancestry and ethnicity areimportant parameters in meta-analysis of case control studies thus subgroup analysis was done by ancestry categories, to get precise results. Ethnicity/ancestry was categorized as European, African descent, Mexican and Hispanic, East Asian,

Middle Eastern and South Asian. This was according to the classification of Morales *et al.*, 2018.

Publication bias

Begg's Funnel Plot was used to visualise publication bias in meta-analysis. In case of publication bias, Egger's test was carried out to check funnel plot asymmetry (Egger,*et al.*, 1997).

Results

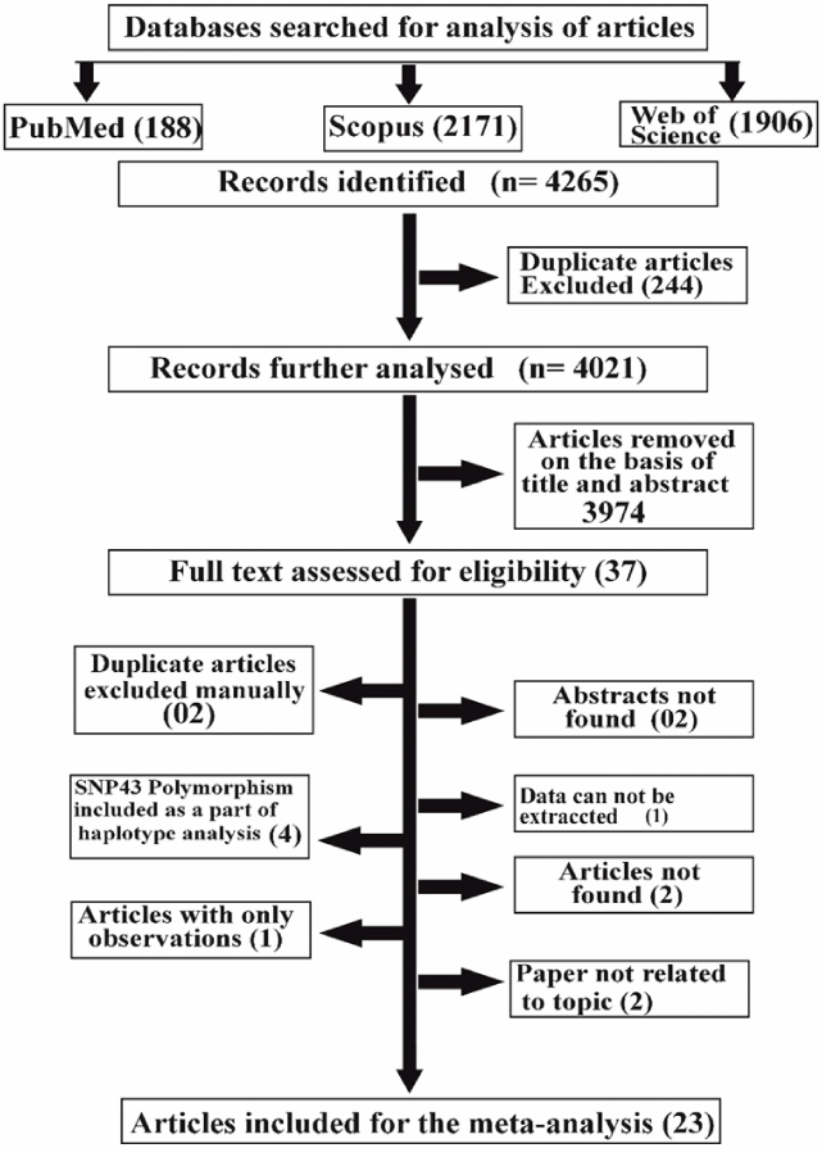
Included studies

The initial literature search in the databases mentioned gave 4,265 hits (188 from PubMed, 2171 from Scopus and 1906 from Web of Science). 244 duplicate articles were excluded. The 4021 articles left were further manually screened by going through the titles and abstracts. This lead to the removal of 3984 articles. Thus, the authors were left with 37 papers. All the 37 papers were read by all the authors and during the scrutiny process 14 papers were excluded. Finally, 23 papers were included for the meta-analysis (Figure 1).

Sub-grouping based on ethnicity and genotyping method

Table 1 reveals the details from all 23 included studies, first author's names and year of publication, region where the study was conducted or ethnicity of participants, the number of cases and controls, genotyping method, and data on genotypic frequencies of CAPN 10 SNP 63 polymorphism of both cases and controls.

Out of the total 23 papers, 07 studies were on European populations, 03 studies on individuals of African descent, 02 studies on Mexicans and Hispanics, 05 on East-Asian populations, 03 on Middle-Eastern populations, and 03 on South Asianpopulations. The genotyping methods included PCR followed by restriction fragment length polymorphism (PCR-RFLP), Taqman assay, Sequenom Massarray platform, Pyrosequencing, real-time PCR etc. (Table 1).


Databases searched for analysis of articles
PubMed (188)
Scopus (2171)
Web of Science (1906)
Records identified (n= 4265)
Duplicate articles Excluded (244)
Records further analysed (n= 4021)
Articles removed on the basis of title and abstract 3974
Full text assessed for eligibility (37)
Duplicate articles excluded manually (02)
Abstracts not found (02)
SNP43 Polymorphism included as a part of haplotype analysis (4)
Data can not be extraccted (1)
Articles not found (2)
Articles with only observations (1)
Paper not related to topic (2)
Articles included for the meta-analysis (23)

NOS Scores

Each of the 23 studies included were given a Newcastle–Ottawa Scale (NOS). The scores ranged from 05-08 (Table 1).

Heterogeneity among studies

The I^2 values revealed no significant heterogeneities among studies under any of the models (Table 2).

Meta analysis results

Odds ratio estimates from pooled data involving all the 23 studies and their subgroup analysis (based on ethnicity) could not bring to light any significant association of SNP 63 polymorphism with T2DM in any of the models (Figures 2, 3, 4, 5, 6, 7, 8).

Publication bias

Visual inspection of asymmetry in Begg's funnel plots derived from each model, indicated some publication bias (Figure 9). However, Egger's regression analysis revealed no significant publication bias (Table 3).

Table 3

p value of Egger's test depicting publication bias under different genetic models

Genetic model	No of studies	Number		Test of publication bias
		Case	Control	P Egger
Allele model	23	18756	14280	0.0985
Homozygote model	22	6894	5351	0.2005
Heterozygote model	23	8733	6723	0.3555
Additive model	22	3129	2206	0.2227
Dominant model	23	9378	7140	0.2074
Recessive model	22	9378	7140	0.2252
Codominant model	23	9378	7140	0.4413

Table 1
Details of the study included in this meta-analysis (n=23)

First Author (Publication Year)	Regional Population	Subgroup	Sample size Case/Control	Genotyping method	Quality Score (NOS)
Tsai *et al.*, 2001	Samoans	European	172/96	PCR	6
Rasmussen *et al.*, 2002	Scandinavian Caucasians	European	409/200	PCR-RFLP	6
Malecki *et al.*, 2002	Polish Population	European	229/148	PCR	7
Fingerlin *et al.*, 2002	Finnish	European	110/112	Primer extension PCR	5
del Bosque-Plata *et al.*, 2004	Mexican population	Mexican and Hispanic	132/113	sequencing or PCR-RFLP	7
Y. Chen *et al.*, 2005	West African and African American	African Descent	682/280	PCR, Pyrosequencing	5
Wu *et al.*, 2005	Chinese	East Asian	168/104	MS-PCR, PCR-RFLP	6
Iwasaki *et al.*, 2005	Japan	East Asian	655/671	Taq Man-based PCR	7
Kang *et al.*, 2006	Korean	East Asian	454/236	MS-PCR	7
Einarsdottir *et al.*, 2006	Sweden	European	869/845	PCR	5
S. Chen *et al.*, 2007	Chinese	East Asian	493/553	PCR-RFLP	7
Demirci *et al.*, 2008	Turkish	Middle Eastern	133/78	PCR-RFLP	5
Zaharna *et al.*, 2010	Gaza	Middle Eastern	48/48	PCR-RFLP	5
Ezzidi *et al.*, 2010	Tunisian	Middle Eastern	917/748	PCR-RFLP	8

Alsaraj *et al.*, 2010	Irish	European	177/90	UK Gene Service (genotyping@geneservice.co.uk)	7
Adak *et al.*, 2010	Indian	South Asian	200/100	PCR-RFLP	7
Bodhini *et al.*, 2011	Indian	South Asian	649/794	PCR	6
Buraczynska *et al.*, 2013	Caucasians of polish origin	European	880/560	PCR	6
Danquah *et al.*, 2013	Ghana	African Descent	674/374	PCR-RFLP	7
Arslan *et al.*, 2014	Turkish	Middle Eastern	111/87	PCR-RFLP	6
Kommoju *et al.*, 2014	Indian	South Asian	758/621	Sequenommassarrayplatform	8
Picos-Cárdenas *et al.*, 2015	Mexican mestizos	Mexican and Hispanic	211/152	Real time PCR	5
Nam *et al.*, 2018	korean	East Asian	247/130	Taqman assay, Real time PCR	6

Table 2

Results of meta-analysis under different genetic models

Genetic model	No of studies	Number		Test of association OR (95% CI) CEM	Test of association OR (95% CI) REM	Test of heterogeneity	
		Case	Control			I^2 (%)	P_H
Allele model	23	18756	14280	0.96 (0.91; 1.02)	0.96 (0.89; 1.04)	22	0.17
Homozygote model	23	6894	5351	0.91 (0.77; 1.07)	0.89 (0.75; 1.04)	0	0.77
Heterozygote model	23	8733	6723	0.98 (0.91; 1.06)	0.98 (0.90; 1.06)	0	0.71
Additive model	23	3129	2206	0.90 (0.78; 1.05)	0.89 (0.77; 1.04)	0	0.94
Dominant model	23	9378	7140	0.97 (0.90; 1.05)	0.97 (0.89; 1.05)	3	0.41
Recessive model	23	9378	7140	0.90 (0.78; 1.04)	0.89 (0.77; 1.02)	0	0.81
Codominant model	23	9378	7140	1.00 (0.93; 1.08)	1.00 (0.92; 1.08)	0	0.71

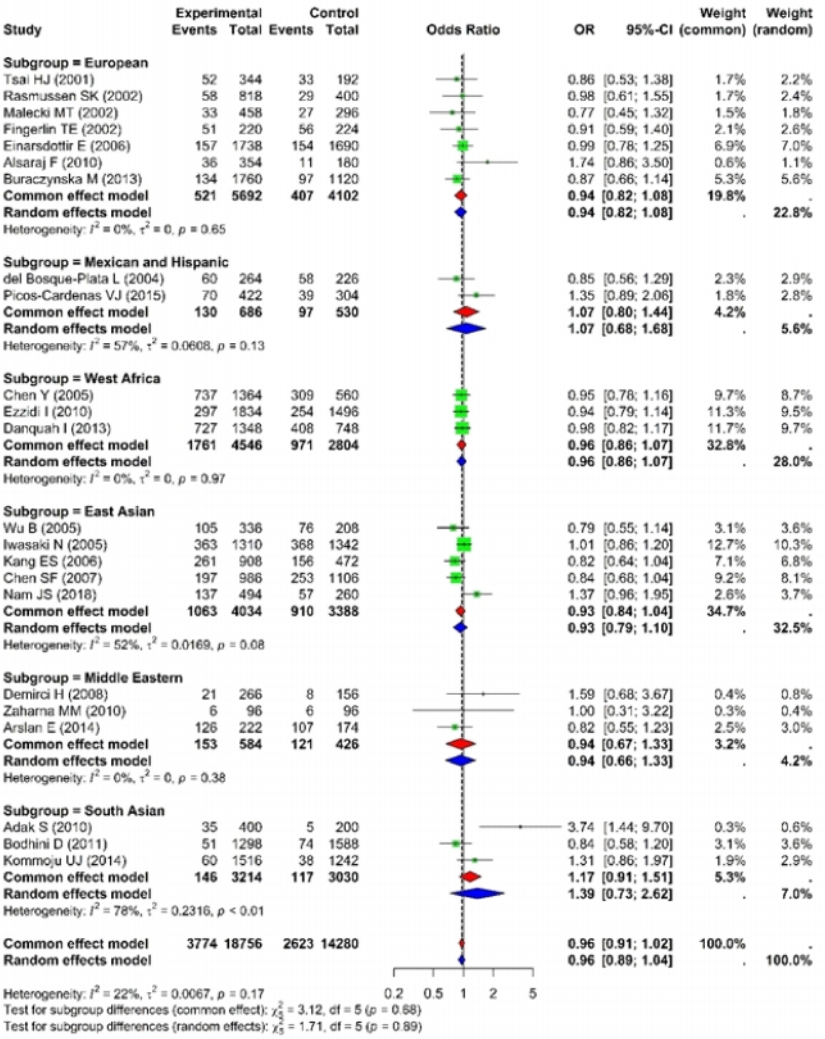


Fig 2 Forest plot depicting association of CAPN10 SNP 63 polymorphism with T2DM under allele model

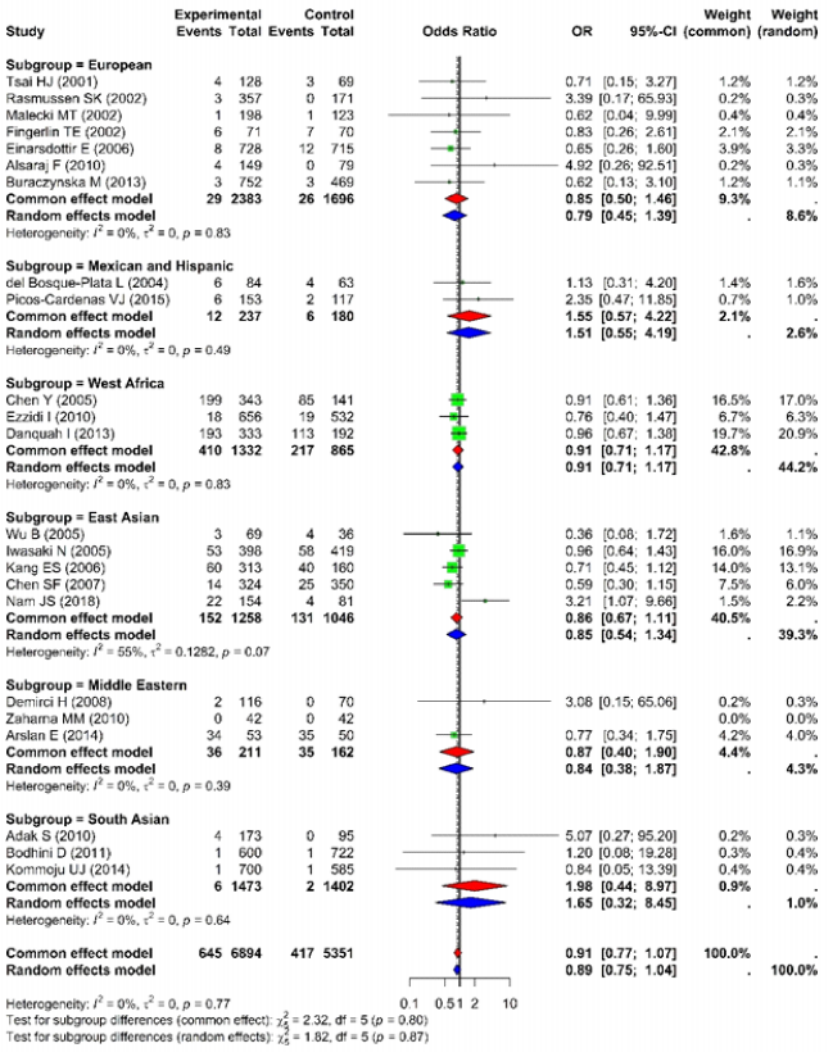


Fig 3 Forest plot depicting association of CAPN10 SNP 63 polymorphism with T2DM under *homozygote model*

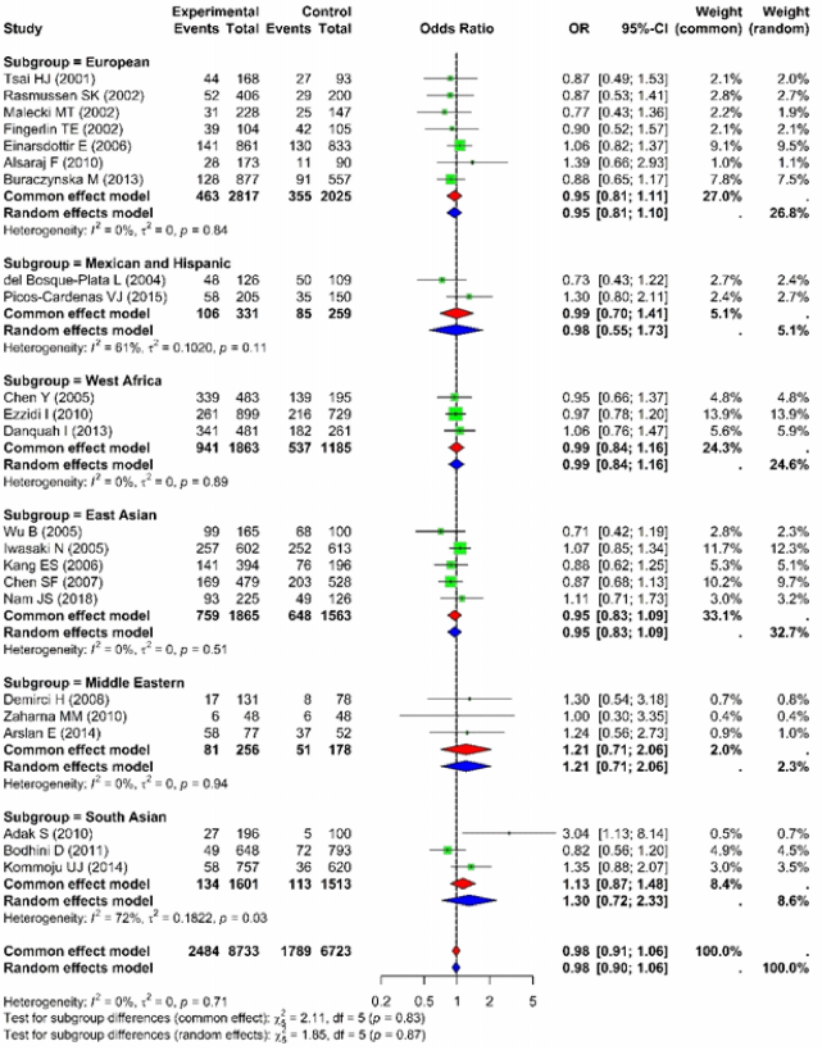


Fig 4 Forest plot depicting association of CAPN10 SNP 63 polymorphism with T2DM under heterozygote model

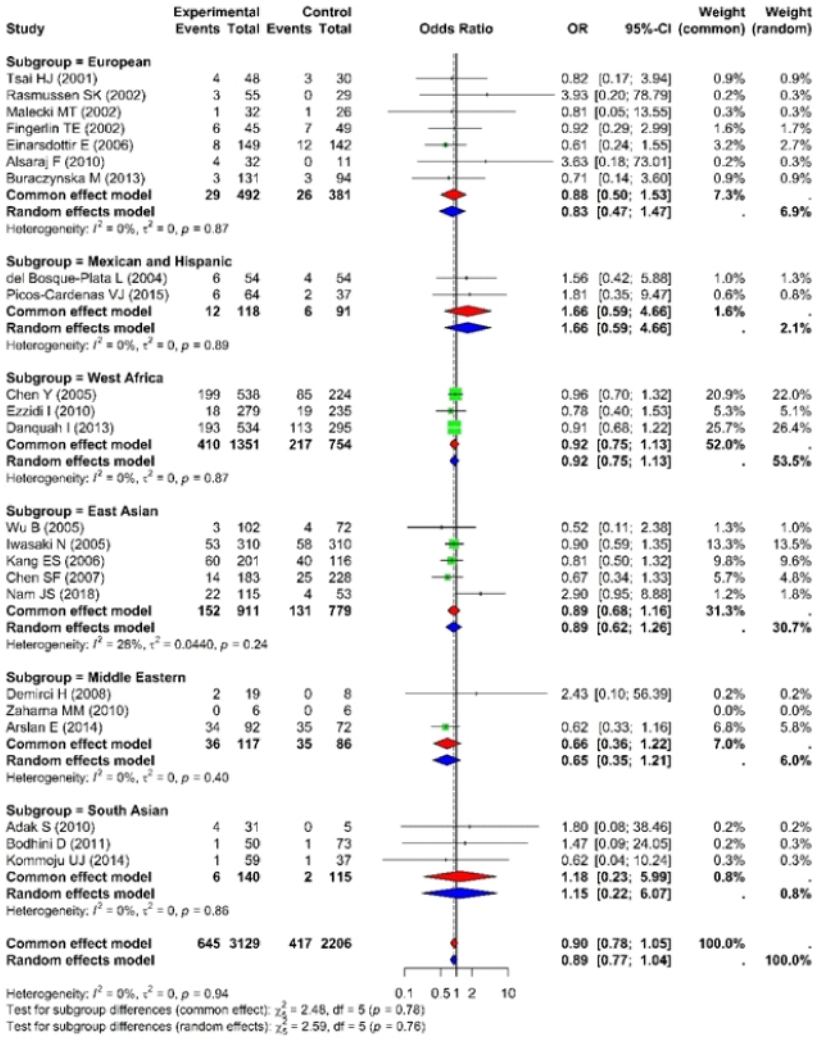


Fig 5 Forest plot depicting association of CAPN10 SNP 63 polymorphism with T2DM under additive model

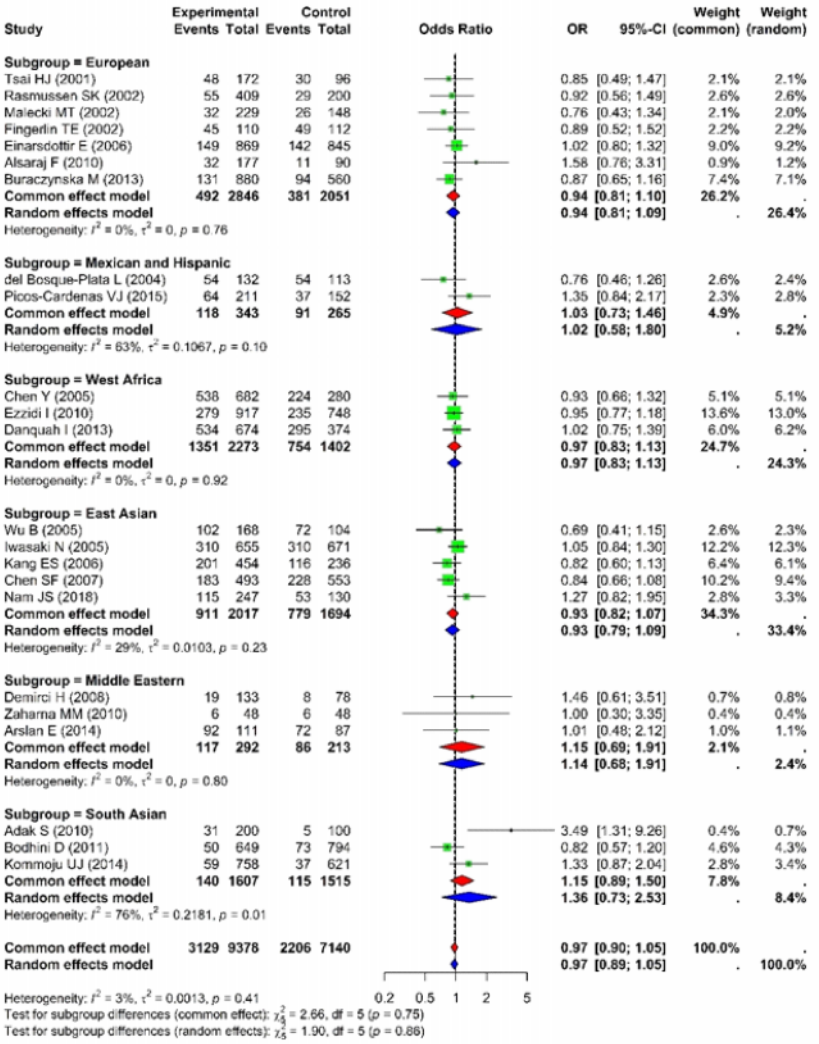


Fig 6 Forest plot depicting association of CAPN10 SNP 63 polymorphism with T2DM under dominant model

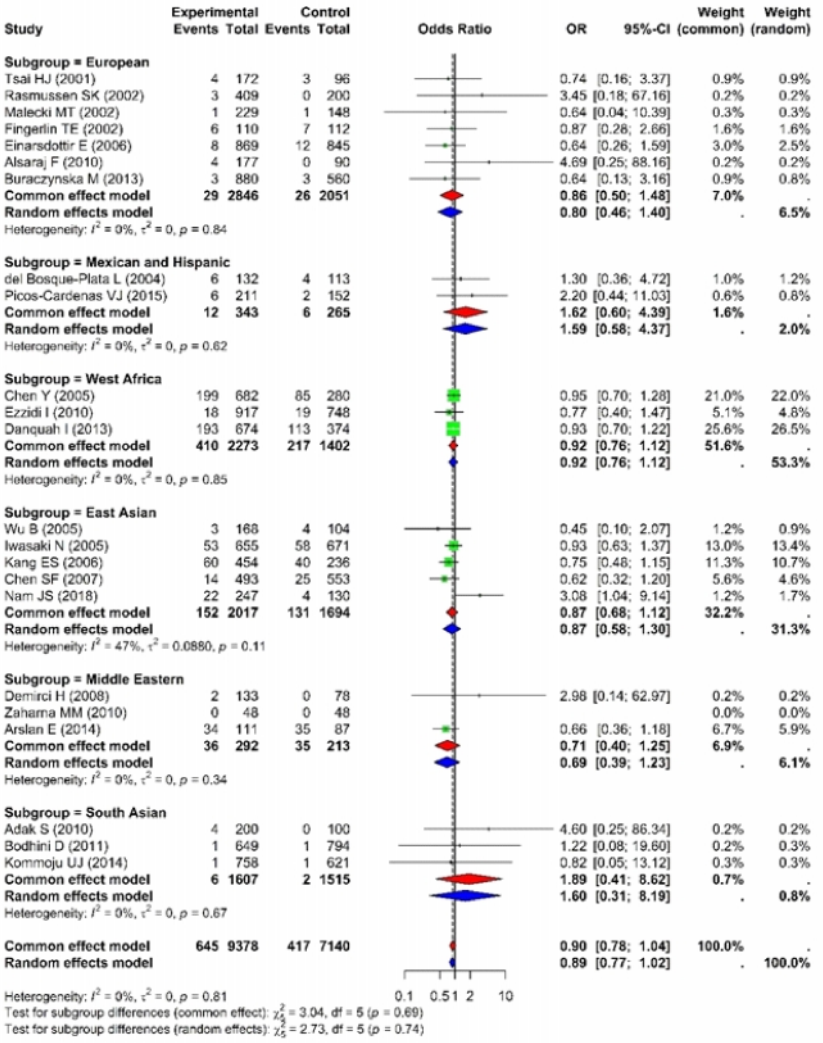


Fig 7 Forest plot depicting association of CAPN10 SNP 63 polymorphism with T2DM under recessive model

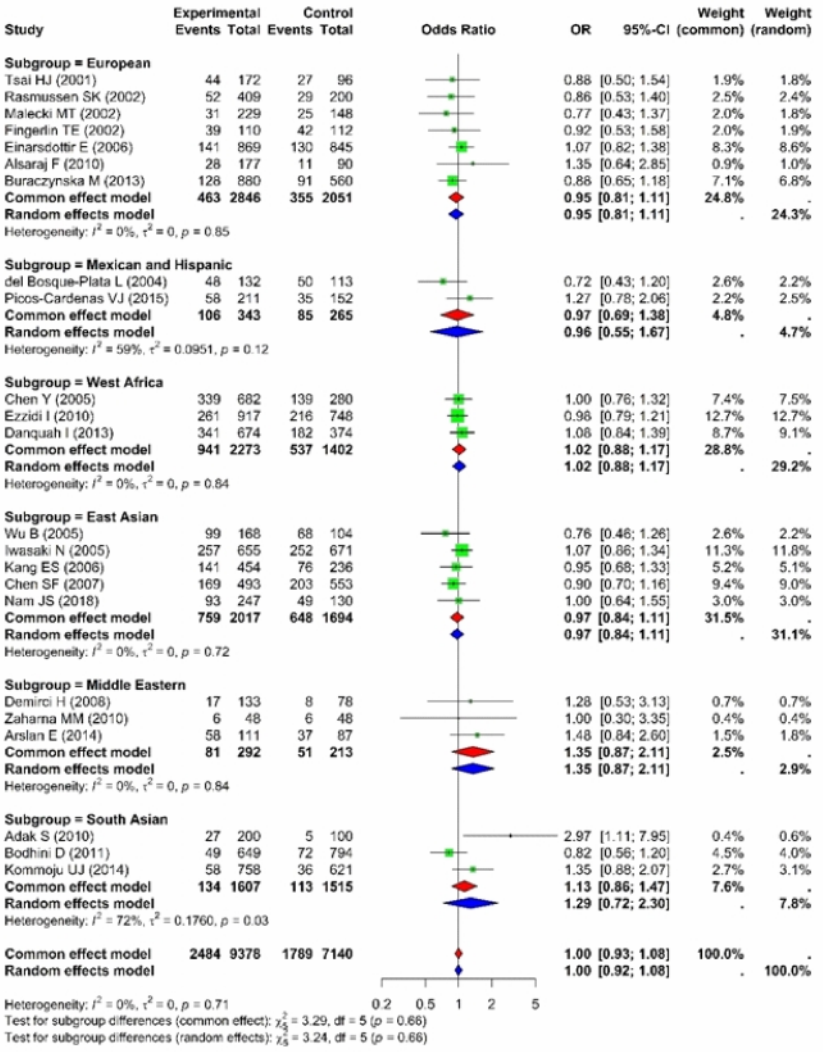


Fig 8 Forest plot depicting association of CAPN10 SNP 63 polymorphism with T2DM under codominant model

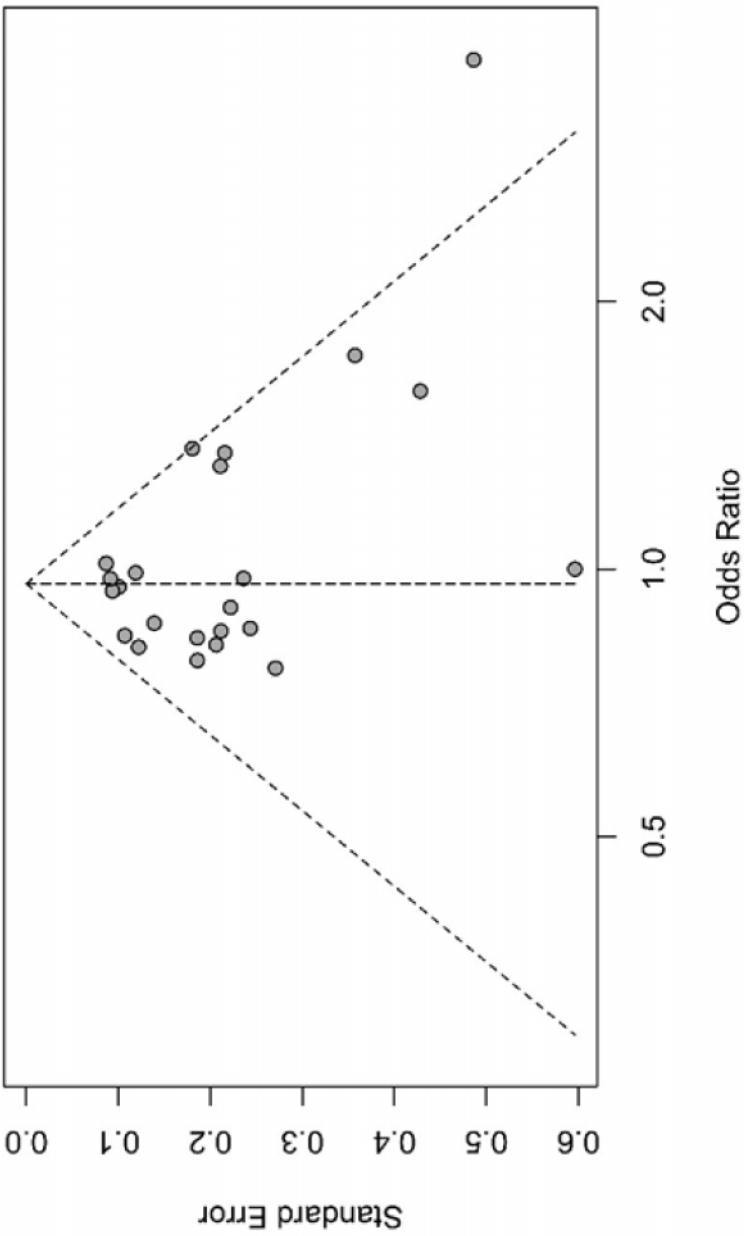


Fig 9 Funnel plot of allele model depicting publication bias

Discussion

Type 2 diabetes mellitus has emerged as a major menace in today's times especially as it is a challenge for the ageing population to manage the condition and deal with its complications. A lot of research is being carried out to unearth the varied factors, both genetic and non-genetic that might be implicated in T2DM. However, this can be challenging owing to the complicated web of interactions between the numerous genes thought to be involved and their interactions with the environment and other factors. Disentangling the web might seem impossible but there is a possibility of understanding the web by taking into account one thread at a time.

Keeping this in mind we ventured to explore the first gene implicated in T2DM i.e. CAPN10 and unearth its role in the disorder. We planned to pick up each locus with the CAPN 10gene individually and study its effect if any, in T2DM, through meta-analysis of the numerous studies done so far.

While we have found some association of a couple of SNPs of CAPN 10 gene with T2DM, polymorphism at SNP 63 was found to have no association with T2DM in any of the ethnic group considered.

Since T2DM is multifactorial, we did not expect a profound effect of one polymorphism of one gene. However, we wanted to check even for a minor effect and know how far the polymorphism might pose a risk or play a protective role in causing the condition. However, the ultimate physiological effect of this polymorphism was beyond the scope of this study.

Our future plan is to study the various haplotypes and diplotypic combinations involving the major SNPs of CAPN10 implicated in T2DM. In fact, there have been studies reporting the association of various haplotypes and diplotypic combinations with T2DM and metabolic syndrome(Adak,*et al.*, 2010; El-Far,*et al.*, 2022; Horikawa,*et al.*, 2000; Shima,*et al.*, 2003) and we plan to perform a meta-analysis to detect the possible effect of different SNP combinations in T2DM.

Acknowledgement : The authors would like to acknowledge the immense guidance and help provided by colleagues Dr. Shushovan

Banik and Dr. Atanu Banerjee, Asst. Professors at the University Department of Zoology, LN Mithila University, Darbhanga, India and Dr. Anupama, Asst. Prof. MRM College Darbhanga during each step of this meta-analysis. Further, help provided during data collection and analysis by Mr. Aman Kumar Jha, Ph. D. research scholar at IIT Kanpur, India and Mr. Suraj Kumar, research scholar at the University Department of Zoology, LN Mithila University is gratefully acknowledged. The authors are also grateful to Prof. A. N. Jha, Head, University Department of Zoology for hugely facilitating the meta-analysis work through provision of high speed internet facility.

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Indian Journal of Gerontology
2024, Vol. 38, No. 2, pp. 271-286
ISSN : 0971-4189, UGC No. – List B, Science –121

Amplifying the Voices of Tribal Elderly in the Ageing Research : Towards Decolonizing Indigenous Gerontology in India

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ABSTRACT

The paper advocates for a paradigm shift in indigenous gerontology, challenging the status quo and emphasizing the importance of de-colonizing knowledge production to capture the voices of tribal elders authentically. Through the adoption of culture-centric and participatory research methods, the proposed shift aims to empower tribal elders as active contributors rather than passive research subjects. The oversight in researching tribal elderly intersects with their under representation in reports and policies concerning older people. A transformative approach is imperative to integrate indigenous voices into India's pursuit of comprehensive and equitable senior welfare policies amidst population ageing.

Keywords : Tribal elderly, Ageing studies, Decolonizing methodologies, Indigenous gerontology

Realizing the multifaceted implications of an ageing society, the discourse on ageing in India has experienced significant growth in recent years. The National Action Plan for the Welfare of Senior Citizens (NAPSrC), Atal Vayo Abhyuday Yojna (an overarching scheme designed to consolidate all government-aided initiatives for the elderly), and the Longitudinal Ageing Study in India (LASI) collectively attest to the recent acknowledgment of the escalating significance of population ageing in India. However, the majority of these discussions and the resultant social welfare policies and services for older adults are predominantly shaped by the prevailing perspectives of mainstream societies.

Rao, Venkoba in 1979, highlighted how cultural context affects or contributes to the situations of the elderly in India. He suggested that the challenges facing the elderly and their responses require careful study in the context of a nation like India, which has strong roots in ancient culture (Rao, 1979). Nevertheless, over the years, the academic discourse on ageing in India seems to be largely ignorant of cultural identity. This academic negligence is mirrored in what we leave behind in our quest to be a part of the global pursuit of healthy ageing: the voices of the tribal elderly. Despite the burgeoning interest in ageing research, a critical void persists in the study of ageing among tribal elders in India.

Tribal Elderly in the Ageing Studies

The tribal population constitutes 8.6 per cent of the total population in India, with 705 indigenous groups officially recorded as Scheduled Tribes (STs). Notably, the tribal elderly population, aged 60 and above, comprises approximately 7,194,383 individuals, representing 6.9 per cent of the scheduled tribe population. This demographic, though numerically significant, constitutes only 6.9 per cent of the broader older population in India, which stands at 104 million (Registrar General and Census Commissioner of India, 2011). The scarcity of scholarly attention on indigenous gerontology in India has led to a noticeable void in the literature concerning this population of approximately 7 lakh tribal older adults.

In India, scholarly attention to the gerontological aspects of tribal communities has historically been limited, with only a handful of researchers delving into this area (Kakkoth, 2011). In the last century, works such as those by Behera, *et al.,* (1997) and Mukherjee (1997) offered insights into the health and societal rolesof tribal elders, particularly within communities like the Birhor and Bhuiyan tribes. However, comprehensive studies on the status and experiences of tribal elders during that period remain limited. Recent years have witnessed growing scholarly attention towards the well-being and circumstances of tribal elders.

Existing studies, although limited, primarily fall into clinical-epidemiological studies, anthropometric studies, and general socio-economic or health surveys. These studies predominantly document the health status of tribal elderly, covering topics such as the prevalence of chronic conditions, disability, functional limitations, nutritional status, and depression levels. Some studies also delve into healthcare accessibility and socio-economic conditions.

Drawing from the Census of India 2011, Nair & Thara (2019) reported that the tribal elderly in India exhibit below-average overall health index scores and a moderate level of active ageing with elderly women facing some disadvantages. Sinha,*et al.*, (2023), mining data from the World Health Organization's study on global ageing and adult health, pointed out that multimorbidity is equally prevalent amongtribal elderly in India. Interestingly, the most affluent group exhibited a higher likelihood of multimorbidity compared to the most deprived class. Sinha posited that this association might stem from the affluent group's ability to afford healthcare services, leading to better diagnosis, as the prevalence of multimorbidity was gauged through self-reported chronic conditions. Multimorbidity was found as highly prevalent also among tribal elder men in Odisha, with elder women exhibiting a higher prevalence of functional disability and psychological distress (Pradhan, 2021).

Studies have noted the high prevalence of cognitive impairment, depression, mental illness, morbidity, injurious falls, hypertension, malnutrition, and substance abuse through mostly small-scale, cross-sectional studies of tribal elderly from various tribal groups (Narendran,

et al., 2019; Ragubathy & Adikane, 2019; Reddy, K., *et al.*, 2020; Vimala & Phalke, 2020; Lahiri, *et al.*,2020). Contrary to the high prevalence of disability reported in studies among the tribal elderly of certain tribal groups (Kerketta, *et al.*, 2009; Katta, *et al.*, 2017; Jahangir & Mahata, 2019), the census of India and nationally representative surveys such as the National Sample Survey and LASI indicate a lower prevalence of disability among tribal older adults compared to non-tribal individuals (Kumari,*et al.*, 2023). The question of whether this is a statistical artifact resulting from under-diagnosis or under-reporting, or whether it reflects reality, remains a puzzle.

A similar issue arises in understanding cognitive impairment among tribal elderly individuals. Most studies claiming an elevated prevalence of cognitive impairment among tribal elderly populations rely on the Mini-Mental State Examination (MMSE) for assessment, in which educational levels can significantly impact test scores. This reliance on the MMSE becomes a questionable strategy for comprehending the cognitive abilities of tribal elders, as it is inherently biased towards individuals with formal education. Further emphasizing this point, Raina,*et al.*, (2016) assessed the prevalence of cognitive impairment in the tribal elderly population in Himachal Pradesh using a cognitive screening instrument specifically designed for this demographic, and their findings suggested a low prevalence of dementia among tribal populations.Dehury & Chatterjee (2018) put forth a significant claim that warrants consideration in this context. According to them, due to the challenges associated with obtaining high-quality data for monitoring health outcomes among vulnerable tribal populations, there often exist discrepancies between the collected data and the actual realities in the field.

A few studies have pointed out that existing services do not cater to the needs of tribal elders, where in most cases the 'needs' were decided by the researchers. According to Sethurajakumar & Venkatesh (2019), major issues faced by elderly tribes in India include poverty, reduced family support, poor housing, and forced displacement to urban areas. A significant number of Sumi tribal elders in Nagaland were found to delay necessary healthcare measures and refrain from seeking medical assistance due to financial constraints (Shohei & Srivastav., 2018).

Kumar (2017) concluded that government interventions had not significantly improved the socio-economic status of tribal elders in eastern Uttar Pradesh. Cherian (2020) criticized the lack of evidence regarding the coverage of nutritional programs for tribal elders in Kerala. The study drawing on data from the National Family Health Surveys (NFHS) and the Sample Registration Surveys spanning 1997-2000 to 2013-2016, found that Scheduled Castes and Scheduled Tribes consistently experienced significantly lower life expectancies compared to individuals from higher castes (Gupta & Sudharsanan, 2022).

Notably, the references to tribal elderly in the Longitudinal Ageing Studies of India (Wave 1) report are limited to the indication that tribal elderly experience a higher likelihood of discrimination, and that the utilization of public health facilities is more prevalent among tribal elderly than the older adults from other categories.

A critical void in the literature

While it is widely acknowledged that the ageing experience is culture-dependent and that etiquette, self-awareness, and perspectives regarding the ageing process vary across cultures, there is a noticeable lack of emphasis on culturally congruent ageing research in India.In the international literature focusing on indigenous elderly populations, qualitative approaches are commonly employed, enabling these elders to share their narratives and challenging non-indigenous researchers to appreciate values and worldviews distinct from their own. Recently, there has been a notable movement advocating for participatory and decolonizing research methods, seeking to empower indigenous elders by considering them as co-researchers. However, the qualitative evidence regarding tribal elderly individuals in India remains sparse.

Research on the tribal elder population in India is predominantly confined to cross-sectional quantitative assessments, primarily focusing on the health status within a positivist framework. While this data is crucial, these studies often examine ageing from a distance, emphasizing negative experiences and vulnerabilities through a Eurocentric lens.

As Bhukia (2021) pointed out, "the indigenous studies of India in general are not Adivasi-centric, Adivasis are just the object of

studies, not its subjects". As a result, in the sparse studies on tribal older adults, what we predominantly hear are the voices of bureaucrats, health specialists, and development planners, portraying tribal elders as weak, vulnerable, illiterate, dependent, and mere service receivers. This portrayal overlooks their strengths and resources, and, most importantly, neglects their voices expressing their reality. The resulting depiction of tribal elders could contribute to the stigmatization of this demographic group, potentially undervaluing indigenous experiences, traditional knowledge, and their unique worldviews. Of greater concern is the possibility that such depictions might justify the unethical treatment of indigenous elders, compromising their time and well-being in the pursuit of acceptable research.While it's important to clarify that researchers don't intentionally aim to cause harm through their studies, it's worth noting that the majority have received training in the positivist research paradigm. This paradigm, shaped by research methods rooted in the natural sciences since the early 20th century, is typically embraced by researchers until they face challenges to its assumptions or encounter alternative perspectives (Braun,*et al.*, 2014).

A few noteworthy attempts emanating from this alternative standpoint include geroanthropological studies by Kakkoth S., (2011), one exploring the unique ageing experiences of the Cholanaickan and the Aranadan, hunter-gatherer communities residing in the Nilambur Valley of Kerala, and a recent study on the tribal elders from the 'Malavettuvan' community in Kerala (Kakkoth, 2023). Aswathy (2017) employed an anthropological case study to reveal a noteworthy phenomenon within the Kattunayakan community of Kerala, shedding light on the 'club sandwich generation.' This term denotes the tribal elders belonging to the 'young-old' group, who assume the responsibility of caregiving for both their grandchildren and elderly parents, due to the migration of their children. Another notable work is by Juster Lyngdoh and Malathi Adusumalli, exploring the roles and construction of ageing among older persons in the Khasis community of Meghalaya, and the Jad Bhotiyas in Uttarakhand (Lyngdoh & Adusumalli, 2023). These studies stand out in the landscape of tribal

ageing research in India due to their dedication to capturing the voices and worldviews of tribal elders representing a departure from the Eurocentric lens typically applied to understanding tribal ageing.

A much-needed paradigm shift

Without acknowledging historical nuances and cultural archives from an indigenous worldview, the concept of ageing may not align with the lived experiences of tribal elders and could be perceived as an instrument of power knowledge for a captive mind. The sparse considerations in appropriately handling cultural diversity may be rooted in researchers' inclination toward modernist, ethnocentric paradigms, which often dictate the standards for acceptable knowledge and practices, contributing to intellectual colonization. The negative impact of Western positivist methodologies on indigenous communities, such as the devaluation and marginalization of their local knowledge, has led to calls for the integration of indigenous voices and practices in methodologies and epistemologies(Hart,*et al.,* 2017; Silan & Munkejord, 2023). In this context, the need for a paradigm shift in indigenous gerontology in India emphasizes the importance of adopting decolonizing methods and indigenizing knowledge production, acknowledging the distinctive perspectives and wisdom held by tribal elders.

The paradigm shift in indigenous gerontology in India necessitates a focus on three central considerations : representation, co-construction of knowledge, and authenticity of voice. It is crucial to recognize the diversity among tribal communities. The ageing research should encompass a broad spectrum of tribal identities, including particularly vulnerable tribal groups (PVTGs), de-notified, nomadic and semi-nomadic tribes, capturing the unique challenges and strengths within each tribal elder group. It is also essential to acknowledge that ageing is a heterogeneous process, requiring attention to both commonalities and variations.In an indigenous research paradigm, the epistemology of research revolves around the older adults, bearers,and conduits of indigenous knowledge,and through them, the knowledge is passed to the succeeding generation. The concept of co-construction of knowledge encourages tribal elders to act as co-researchers or participants rather than mere respondents. In this approach, methods such as participatory

action research (PAR), community-based participatory research (CBPR), and indigenous storytelling become crucial. Adopting a community-based participatory research approach involving tribal elders as active partners ensures that research questions, methodologies, and outcomes are co-created with the community, promoting mutual respect and shared ownership of knowledge. These methods allow indigenous people, including elders, to navigate their inquiry, ensuring that research echoes the voices of those involved and contributes to improving their lives. Research of this nature centres on indigenous values and employs an elder-centered methodology that encourages the engagement of older adults in meaningful, restorative, and culturally sensitive ways.

Grounded in the self-determination of indigenous elders, decolonizing approaches endorse indigenous leadership throughout the entire research process, encompassing conceptualization, implementation, interpretation, and dissemination of research findings. The authenticity of voice is another crucial factor, as researchers must approach the narratives of tribal elders with a reflective attitude, ensuring that interpretations are not influenced by preconceived notions about the tribal communities and that they avoid distorting them to reinforce existing stigmas or prioritize marketability over accuracy.

Another considerable approach to indigenous gerontology is the Two-Eyed Seeing framework of Bartlett,*et al.*, (2012), which emphasizes the effective integration of Indigenous and Western knowledge, fostering a harmonious coexistence of these two worldviews to achieve research excellence and benefit the participants.

There is an ongoing debate about whether research concerning indigenous matters should be conducted by individuals from the indigenous community or by outsiders. Ideally, an indigenous researcher, being familiar with indigenous cosmology, epistemology, and worldviews, would possess better access, understanding, rapport, and proficiency in tribal languages. They would be more effective in collaborating with indigenous elders. While it is agreed that indigenous scholars should play a key role in designing, leading, conducting, and communicating research on indigenous issues, it is also encouraged for any researcher genuinely interested in approaching ageing with a

clear indigenous ontological and epistemological understanding to collaborate with tribal elders. Additionally, it is important to promote collaboration between Indigenous and non-Indigenous scholars, practitioners, and activists. Non-indigenous researchers must critically examine their perspectives and epistemological positions, recognizing the corresponding responsibility to continually reflect, remain sensitive, and act responsibly (Gerharz, 2017).

Thus, unlike the usual approach, the transformative shift in indigenous gerontology advocates for a departure from Eurocentric research paradigms. Instead, it promotes collaborative, community-driven frameworks that actively incorporate the indigenous knowledge systems and worldviews of tribal elders. By prioritizing cultural authenticity, this shift challenges the hegemony of Western-centric methodologies.

Challenges in bringing out the voice

Ageing studies with tribal elders demand specific skills, knowledge, and competencies. Researchers must carefully consider their cultural competencies, possible methodological concerns, and administrative permission processes when needed. Adopting an epistemological framework grounded in a culture-centric lens is pivotal for capturing indigenous knowledge systems that shape ageing within tribal contexts, making the cultural competence of the researcher imperative. Understanding the rights of indigenous older adults, their historical trauma, and the existing oppression they may experience is crucial when working with them.

In addition, the prevalent reluctance of indigenous older adults to participate, rooted in historical instances of exploitation and skepticism towards the perceived lack of benefits, adds another layer of complexity. Overcoming this reluctance necessitates transparent and mutually beneficial partnerships, demonstrating that research is designed to contribute positively to the well-being and interests of the tribal aged. This approach helps bridge the gap between research objectives and community perceptions. Researchers bear a fundamental ethical responsibility to recognize and respect that the practices and knowledge of indigenous people

constitute their intellectual and cultural property. Researchers should refrain from exploiting or appropriating this knowledge for personal gain or the benefit of external entities.

In many tribal ageing studies and welfare services, individuals aged 60 and above are commonly considered elderly, reflecting the widely accepted onset of old age in India. However, given the often-shorter life expectancies in tribal communities compared to the mainstream population, a crucial question arises: What chronological age would be a fair consideration for defining the onset of old age among tribals? Another concern is the accurate recording of ages, as many tribal elders may not track their age in a manner consistent with mainstream practices. Is relying blindly on the year of birth documented in the Aadhar an appropriate strategy?

Behera,*et al.*, (1997) highlighted a methodological challenge they faced in their study of the aged in a tribal village of Orissa, pointing out the disparity between how a tribal group professes to treat its elders and the actual treatment and roles observed. The authors draw a connection to the concept of ritualistic deference (Lipman, 1970), which refers to the difference between what individuals claim to believe and the realistic assessment of their actions, implying that accurately documenting the true nature of the situation requires systematic and detailed fieldwork.

In states like Kerala, conducting research within tribal communities necessitates obtaining administrative permissions from government authorities, particularly the Scheduled Tribes Development Department. The process involves a strict examination of research proposals and tools by officials before granting permission to proceed with the study. While the submission of findings can contribute to evidence-based practice, the scrutiny of research proposals gives officials the authority to influence the selection of what should be studied and what not.

Way forward

Incorporating indigenous epistemologies of knowing and understanding ageing embraces the traditional knowledge systems and the collaboration oftribal elders and communities in the co-production of knowledge ensures that the research methodologies align with their

cultural perspectives. Thus, future research on tribal elders in India should prioritize a decolonizing approach and actively engage with qualitative studies to explorethe lived experiences and their perceptions of health, ageing, and old age. Instead of following a one-size-fits-all approach to older well-being, understanding the perceived needs of tribal elders, what they value in their old age, and their resources are crucial in designing efficient evidence-based practices with the tribal elders.

While old age is a cumulative effect of the experiences across the life course, the mere documentation of the health status of older adults fails to consider the significance of an individual's life history in their present well-being. Bringing a life-course approach into qualitative ageing studies or designing longitudinal studies could account for the experiences over time. This approach allows for a better understanding of the ageing trajectories considering both adversity and advantages and the cumulative effects of those in old age. Addressing the gap in the tribal ageing studies such as the construction of 'ageing in place', the role of indigenous healthcare practices in shaping the ageing experiences, intergenerational solidarity, andthe resiliency perspective of tribal elders could be vital in the progress of indigenous gerontology in India.

Future researchers have to be more careful in the development and validation of culturally appropriate data collection tools. The researchers who engage in quantitative ageing studies with the tribal aged should make sure that the instruments proposed for indigenous elders undergo careful translational procedures, validation and pre-testing with input from the experts who are familiar with the tribal community being studied. Prioritize ethical considerations in research and ensure informed consent by establishing clear communication channels to convey the purpose and process to the tribal elders. The researchers could also engage in disseminating research findings in accessible formats, promoting education, and fostering a sense of ownership among the tribal elderly over the research outcomes, making sure that the future tribal ageing studies are built with, rather than on, the tribal aged.

Conclusion

The oversight in researching tribal elderly intersects with their under representation in the reports and policies of older people. Published

reports on the elderly in India have failed to account for the situations of tribal elders, often adopting integrationist or assimilationist perspectives that categorize older individuals into a binary framework of rural and urban elderly, oversimplifying the nuanced realities and diverse experiences and additional vulnerabilities of tribal elderhood. For example, the 'India Ageing Report' by the United Nations Population Fund and the 'Elderly in India' reports by the Ministry of Statistics and Programme Implementation, Government of India, which serve as crucial national-level reports on the older population, consistently overlook the specific situations of tribal elders. Even within studies that acknowledge the existence of tribal elders as a separate entity, such as the Longitudinal Ageing Studies of India (LASI) report, the coverage remains superficial. The tribal elders in LASI are limited to mentions such as higher rates of discrimination among tribal elders and their increased reliance on public health facilities and failure to provide any deeper insights. Similarly, national policies and schemes designed to support the well-being of older people, such as the National Policy for Older Persons (NPOP) and the National Action Plan for Welfare of Senior Citizens (NAPSrC), lack specific provisions for tribal elders.Similarly, National-level tribal health and tribal development reports have predominantly focused on the well-being of children, youth, and women, with minimal attention to the status and specific needs of tribal elders.

A critical aspect that gerontologists must recognize is that, despite the best intentions, scientific findings can inadvertently perpetuate the disempowerment, stigmatization, and control of indigenous peoples. To mitigate these risks, future research in the field of indigenous gerontology necessitates a genuine partnership with indigenous elders, families, communities, and multiple stakeholders, adopting participatory and transformative research methods to ensure that the research process is inclusive, respectful, and sensitive to the unique cultural contexts of indigenous communities. The paradigm shift in researching tribal elderly in India necessitates a departure from colonial methods towards an approach that values indigenous perspectives, acknowledges historical contexts, and engages tribal elders as active participants in the co-creation of knowledge. This shift not only demands methodological changes but also emphasizes the importance of continuous reflection,

sensitivity, and responsibility in the research process. Promoting and cultivating more indigenous researchers, engaging them in indigenous gerontology, and encouraging the development of appropriate research processes can contribute to a better comprehension of the ageing process in tribal communities, the situations of the aged, and providing suitable support for them.

By actively involving indigenous communities, and embracing their perspectives, meanings, and indigenous epistemology, future research with tribal elders can transcend the limitations of a colonial lens and contribute to a better comprehension of indigenous elders in India. The ongoing commitment to this transformative approach is essential for the advancement of indigenous gerontology in India and, ultimately, to ensure that their voices are being heard and they are not left behind in India's pursuit of healthy ageing.

Acknowledgment : The author is grateful for the invaluable comments provided by the reviewers, which have significantly contributed to refining the paper.

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