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Prevalence of disabilities and non-communicable diseases in an elderly population in the Telangana state, India: a population-based cross-sectional study

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ABSTRACT

Objectives To assess the prevalence of disabilities (vision, hearing, mobility, cognitive, self-care and communication) and non-communicable diseases (NCDs) among the elderly population in two districts in Telangana, India.

Design Population-based cross-sectional study using a cluster random sampling method to select the study clusters.

Setting Elderly population in Khammam and Warangal districts were recruited. Detailed interviews were conducted by trained community health workers. Personal and demographic information such as age, gender, level of education and a self-report of NCDs was collected. The Washington Disability Questionnaire was administered to assess the presence of disabilities.

Participants 1821 participants aged ≥60 years, 54.5% were women, and 73.3% had no education.

Primary outcome measure Prevalence of disabilities and NCDs.

Results Overall, the prevalence of at least disability was 20.3% (95% CI 16.3 to 24.9). The prevalence of self-reported disabilities were: seeing (5.9%; 95% CI 4.4 to 7.8), mobility (12.8%; 95% CI 9.7 to 16.8), hearing (3.6%; 95% CI 2.7 to 4.8), cognition (4.8%; 95% CI 3.5 to 6.7), self-care (3.3%; 95% CI 2.3 to 4.7) and communication (1.8%; 95% CI 1.2 to 2.6). Overall, the prevalence of at least one NCD was 34.2% (95% CI 30.9 to 37.7). Hypertension was the most common systemic condition (25.4%; 95% CI 22.4 to 28.7), followed by diabetes (9.0%; 95% CI 7.3 to 11.0), and body pains (muscle-skeletal) (9.9%; 95% CI 8.1 to 12.2).

Conclusion Every fifth elderly person in the districts of Khammam and Warangal in Telangana had at least one self-reported disability. Besides, a third of the elderly had at least one NCD. There is a definite need to develop comprehensive public health strategies to address disabilities and NCDs in Telangana.

INTRODUCTION

According to the WHO estimates, 15% of the global population is disabled.[1] In the 2011 census, the prevalence of disability was reported as 5.1% in the elderly population in India.[2] It had a higher prevalence in rural areas and older age groups.[2] Movement and

Strengths and limitations of this study

► Provided insights on the prevalence of disabilities and non-communicable diseases in the elderly population in two districts where recent data are not available.

► Successfully used rapid assessment method designed for eye health to assess the prevalence of disabilities and non-communicable diseases in the population.

► As a low-cost rapid assessment study method was used, it will be possible to repeat the study at regular intervals to assess the temporal trends over time.

► Disabilities were assessed using 'self-report' using the Washington Disability Questionnaire.

► The data from this study can be used for healthcare planning in the state.

vision impairment individually accounted for 25% of total disabilities followed by disability-related to hearing which was 19%.[2] However, the more recent paper compared the census estimates with the prevalence found in household-level surveys and found a significant variation in the prevalence estimates of the disabilities using these two approaches.[3] People with disabilities are vulnerable and face several attitudinal, physical and financial barriers to access healthcare.[4]

Globally, non-communicable diseases (NCDs) are a cause of death in over 41.5 million and contributes to over 73% of the mortality.[5] Over half of the population in the older age group suffer from at least one chronic condition in India.[6] NCDs are common among the elderly as reported from the first wave of the WHO Study on global AGEing (SAGE) studies conducted in India during 2007–2010.[6] A more recent study revealed that about 44% of older individuals have at least one NCD.[7] Hypertension, diabetes and heart disease are seen in 14%,

9% and 8.1%, respectively in India.[8] One-third of those aged 50 years and older had hypertension in India in the SAGE study.[9]

Disabilities and NCDs are more common in the elderly (60 years and older) population in India.[2 6 9 10] These adversely affect the quality of their lives and lead to an increase in medical care needed. As per the 2011 census, the elderly constituted 8.2% of the population of India. However, the proportion of elderly is expected to increase to 20% by the year 2050.[11] With this increase in the proportion of the elderly in India, the number of people having disabilities and NCDs is also expected to rise.

Population-based epidemiological data are vital for planning healthcare and rehabilitation strategies to address NCDs and disabilities. Regional studies provide information that can be used for district-level planning. Rapid assessment methods have been used commonly in the domain of eye health for over the last two decades.[12] As these methods can be applied using limited resources in a short time, they are used as tools for planning and monitoring of eye care services.[12] Over 300 rapid assessment studies were conducted world over in the last two decades and they form an important element in estimating the global burden of vision loss.[13] There has been a recommendation to include the assessment of disabilities in these rapid assessment studies.[13] We included the assessment of disabilities and NCDs in our rapid assessment study conducted in two large districts in the state of Telangana in India.

The state of Telangana in South India was separated from Andhra Pradesh as the new 29th state of India in 2014. This newly formed state comprises 10 districts and has a population of 35.2 million people as per the 2011 census. The total population of the two districts Khammam and Warangal is estimated at 6.3 million. About 10% of the population is estimated to be in the elderly age group. This research aimed to determine the prevalence of self-reported disabilities and NCDs such as hypertension, diabetes and heart disease in the elderly population in two large districts in the south Indian state of Telangana.

METHODS

The Washington Group developed a short set of questions for use in censuses and population surveys to provide comparable data across studies and regions.[14 15]

The study protocol was piggy-backed on a population-based cross-sectional study that was conducted to assess the burden of visual impairment using the Rapid Assessment of Visual Impairment (RAVI) methodology.[16–18] The study protocol, sampling method and the results have been reported in our previous publications.[16–18] In brief, a multi-stage cluster random methodology was used to select the study clusters. The compact segment sampling method was used to enlist the households in each cluster. In each study cluster, 50 people were enumerated and

all those who were available were recruited. Detailed interviews were conducted by trained community health workers. Personal and demographic information such as age, gender, level of education (years of education) and a self-report of NCDs (diabetes, hypertension and heart disease) and current medication for these conditions were recorded.

From the Washington Disability Questionnaire (WDQ) the following questions regarding disabilities were asked in the local language (Telugu): (1) do you have difficulty seeing, even if wearing glasses? (2) do you have difficulty hearing, even if using a hearing aid? (3) do you have difficulty walking or climbing steps? (4) do you have difficulty remembering or concentrating? (5) do you have difficulty (with self-care such as) washing all over or dressing? (6) using your usual (customary) language, do you have difficulty communicating, for example, understanding or being understood? Each of these questions had four options based on severity, such as (1) not at all (2) some difficulty (3) a lot difficulty and (4) cannot do at all. Based on responses of the subjects, 'not at all' and 'some difficulty' were considered as no disability, and 'a lot difficulty' and 'cannot do at all' were considered as having a disability.

Data management

Data were analysed using the design-based analysis to account for the cluster sampling design using sampling weights. The statistical significance was assessed at the conventional level of p value less than 0.05 (two-tailed). Design based, multiple logistic regression was used to assess the association between disabilities and NCDs and other sociodemographic variables. The adjusted OR with 95% CIs were presented. A similar analysis was also done for any NCDs. Data analysis was conducted using Stata Statistical Software for Windows, V.14 (StataCorp).

Patient and public involvement

Patients and other members of the public were not involved in the study.

RESULTS

Demographic characteristics

Overall, 5357 people aged 40 years and older were examined as a part of the RAVI study.[16–18] This cohort included 1958 elderly participants of whom 1821 (93%) responded to the WDQ and the systemic health questionnaire. Of the 1821 participants, 54.5% (n=993) were women, 73.3% (n=1335) had no education and 42.6% (n=776) were from Khammam district. The mean age of the participants was 68.7 years (SD: 7.1 years; range: 60–102 years) (table 1).

Disability

Overall, the prevalence of disability was 20.3% (95% CI 16.3 to 24.9). In terms of the number of disabilities, 12.1% reported one disability, 5.6% reported two disabilities and 2.7% reported three or more disabilities. The prevalence

Table 1 Characteristics of the study sample and the prevalence of disabilities and non-communicable diseases

	Total in the sample	At least one disability			At least one non-communicable disease		
	n	n	%	P value	n	%	P value
Age group (years)				<0.01			<0.01
60–69	1069	193	18.1		353	33	
70–79	559	124	22.2		202	36.1	
80 and above	193	59	30.6		90	46.6	
Gender				0.997			<0.01
Male	828	171	20.7		259	31.3	
Female	993	205	20.6		386	38.9	
Education				0.274			<0.01
No education	1335	284	21.3		444	33.3	
Any education	486	92	18.9		201	41.4	
District							
Khammam	776	140	18	0.018	213	27.4	<0.01
Warangal	1045	236	22.6		432	41.3	
Body mass index*							<0.01
Underweight/normal	1367	267	19.5	0.91	426	31.2	
Overweight/obese	399	79	19.8		190	47.6	

*Data not available on 55 participants.

of self-reported disabilities was: seeing (5.9%; 95% CI 4.4 to 7.8), mobility (12.8%; 95% CI 9.7 to 16.8), hearing (3.6%; 95% CI 2.7 to 4.8), cognition (4.8%; 95% CI 3.5 to 6.7), self-care (3.3%; 95% CI 2.3 to 4.7) and communication (1.8%; 95% CI 1.2 to 2.6) (table 2).

On multivariable analysis, the odds for disability were higher among 80 years and older age group (OR: 1.62; 95% CI 1.07 to 2.46). Gender, education level, district of residence and body mass index (BMI) were not associated with disability. Those with at least one NCD had a higher odds for disability (OR: 1.40; 95% CI 1.07 to 1.83) (table 3).

Non-communicable diseases

Overall, the prevalence of at least one NCD was 34.2% (95% CI 30.9 to 37.7). In terms of the number of NCDs,

Table 2 Prevalence of disabilities

	Prevalence (95% CI)
Washington disability categories	
WDQ1—seeing	5.9 (4.4 to 7.8)
WDQ2—hearing	3.6 (2.7 to 4.8)
WDQ3—mobility	12.8 (9.7 to 16.8)
WDQ4—cognition	4.8 (3.5 to 6.7)
WDQ5—self-care	3.3 (2.3 to 4.7)
WDQ6—communication	1.8 (1.1 to 2.6)
At least one disability	*20.3 (16.3 to 24.9)*

WDQ, Washington Disability Questionnaire.

27.0% reported one NCD, 6.7% reported two conditions and 0.5% had reported three or more conditions. Hypertension was the most common systemic condition (25.4%; 95% CI 22.4 to 28.7), followed by diabetes (9.0%; 95% CI 7.3 to 11.0), and body pains (muscle-skeletal) (9.9%; 95% CI 8.1 to 12.2) (table 4). In total, 33.8% of the participants using at least one medication for their NCDs.

On multivariable analysis, the presence of at least one systemic condition was associated with oldest age groups (OR: 1.80; 95% CI 1.26 to 2.56), female gender (OR: 1.62; 95% CI 1.32 to 1.98), any education (OR: 1.76; 95% CI 1.31 to 2.37) and among those elderly living in Warangal (OR: 1.91; 95% CI 1.38 to 2.65). The elderly who were overweight/obese had higher odds for NCD (OR: 1.89; 95% CI 1.45 to 2.46) compared with those with normal BMI or underweight. Those with at least one disability had higher odds for NCD (OR: 1.40; 95% CI 1.07 to 1.83) (table 5).

DISCUSSION

Every fifth elderly person in the districts of Khammam and Warangal in Telangana has at least one self-reported disability. As found in earlier studies including the 2011 census, mobility was the most common disability in the elderly population.[2] After poor mobility, vision impairment was the most common disability reported by the elderly participants. As vision plays an important role in our daily life, the impact of vision disability would be substantial. Some studies have reported on the impact of vision loss on quality of life and visual functioning in the

Table 3 Effect of age, gender, education status and the district of residence on the prevalence of any disability (multiple logistic regression analysis)

	Adjusted OR	95% CI	P value
Age group (years)			
60–69	Reference		
70–79	1.26	0.95 to 1.68	0.06
80 and above	1.62	1.07 to 2.46	0.02
Gender			
Male	Reference		
Female	0.92	0.72 to 1.17	0.5
Education			
No education	Reference		
Any education	0.87	0.59 to 1.27	0.47
District			
Khammam	Reference		
Warangal	1.28	0.71 to 2.28	0.4
BMI			
Underweight/normal	Reference		
Overweight/obese	1.01	0.71 to 1.41	0.97
At least one NCD			
No	Reference		
Yes	1.4	1.07 to 1.83	0.01

BMI, body mass index; NCD, non-communicable disease.

Table 5 Effect of age, gender, education status and the district of residence on the prevalence of non-communicable diseases (multiple logistic regression analysis)

	Adjusted OR	95% CI	P value
Age group (years)			
60–69	Reference		
70–79	1.19	0.94 to 1.52	0.18
80 and above	1.80	1.26 to 2.56	<0.01
Gender			
Male	Reference		
Female	1.62	1.32 to 1.97	<0.01
Education			
No education	Reference		
Any education	1.76	1.31 to 2.37	<0.01
District			
Khammam	Reference		
Warangal	1.91	1.38 to 2.65	<0.01
BMI			
Underweight/normal	Reference		
Overweight/obese	1.89	1.45 to 2.47	<0.01
At least one disability			
No	Reference		
Yes	1.4	1.07 to 1.83	<0.01

BMI, body mass index.

elderly.[19–21] The prevalence of disability among elderly people has varied significantly across the studies in India. It ranges from 16.2% in West Bengal,[22] 20.6% in Tamil Nadu, 57% in Karnataka,[23] 67.1% in Maharashtra[24] and 87.5% in Haryana and Chandigarh.[25] A large regional variation in the prevalence of disability is reported from Uttar Pradesh where it ranged from 23.4%[26] to 53.6%[27] and from 20.6% to 68% in Tamil Nadu.[28]

Table 4 Prevalence of Non-Communicable Diseases (NCDs)

	Prevalence (95% CI)
Non-communicable diseases	
Hypertension	25.4 (22.4 to 28.7)
Diabetes	9.0 (7.3 to 11.0)
Heart disease	1.5 (0.9 to 2.4)
Gastric problem	2.2 (1.6 to 3.1)
Asthma	3.3 (2.2 to 4.7)
Thyroid issue	0.9 (0.5 to 1.4)
Musculoskeletal pains	9.9 (8.1 to 12.0)
At least one NCD	*35.4 (30.9 to 37.7)*

Venkatorao *et al* found vision disability to be higher followed by mobility in rural Tamil Nadu.[28] Another study from the same state reported that 57% of the elderly had a vision disability followed by joint pains and stiffness in 43.4% of the subjects.[8] The same study reported that hypertension, diabetes and heart disease were reported by 14%, 9% and 8.1%, respectively.[8] However, due to varying methods adopted by these studies, the direct comparison of the prevalence estimates across the studies is not possible.[3]

One out of every three elderly people in rural Telangana has at least one self-reported NCD. Hypertension is by far the most commonly reported health condition with every fourth elderly person affected by this condition followed by body pains (musculoskeletal) and diabetes. The high prevalence of mobility disability with a high prevalence of hypertension and diabetes pose serious challenges to healthcare providers. Both these NCDs similar to other non-communicable conditions need continuity of care. Availability of care as close as possible and as accessible as possible remain the main challenges that need to be overcome to address them.

We found a higher prevalence of NCDs in those who had any education while there was no statistically significant difference in the prevalence of disabilities. Those who are educated are more likely to seek healthcare and likely to get the diagnosis of NCDs and report it. Researchers

have reported a large difference in objective assessment and self-report of NCDs such as hypertension.[29] We also found that NCDs are more common in the Warangal district as compared with Khammam. This difference can be attributed to variability in healthcare availability and uptake in these districts. We have reported a higher prevalence of vision impairment in Warangal compared with Khammam district.[16]

Researchers have taken different approaches to understand disability which include the Barthel index for Instrumental Activities of Daily Living, the ICF (International Classification of Functioning, Disability and Health) framework[30 31] and the Rapid Assessment of Disability questionnaire.[32] Authors have also used the WHOQOL[33] and Short Form 36.[34] To address the constraints of our resources and to assess the burden of disability rapidly as a part of the larger eye health study, we used the WDQ approach as it was the most feasible option.

The present study was nested in a population-based study using the RAVI methodology to include disabilities and NCDs.[16 17] As the prevalence of disabilities is higher than the prevalence of visual impairment, the sample size was adequate to study disabilities. We recommend that the WDQ can be added to rapid assessment studies such as RAVI and the Rapid Assessment of Avoidable Blindness (RAAB) as it provides valuable insights on disabilities and provides a more comprehensive overview of the healthcare situation in the region. This recommendation was also made by earlier eye health researchers.[13] The questionnaire is simple and can be administered by community workers after a short training session. We also included a question on visual hallucinations which is a characteristic feature of Charles Bonnet Syndrome and published its prevalence for the first time in this population.[18] Also, NCDs such as diabetes and hypertension are closely related to eye health which makes it relevant for eye researchers and eye health planners to include self-reporting of NCDs and disabilities in eye health studies.

We used a population-representative sample and hence the results from our study can be extrapolated to the population in this region. The combined population of the two districts is 6.3 million which is about 5% of the state. Hence, we believe our results can be extrapolated to the state of Telangana. We believe more and more vision impairment surveys will include the assessment of disabilities and NCDs in their studies. By extrapolating our data to the entire elderly population of about 3.6 million in Telangana, it is estimated that at least 0.73 million elderly are likely to have at least one disability and over 1.23 million elderly may have at least one NCD.

As highlighted in a review article by Ramadass et al there are no standard methods of accessing disability, quality of life and activity limitations.[35] This impedes comparison across the studies. Definitions of other variables and analysis paradigm also add to the complexity. There is a definite need to use standard protocols to assess and report disabilities in community studies. There are some classic examples in the area of eye health where standard methods were adopted for assessing the prevalence and causes of vision loss. These low-cost rapid assessment methods (RAAB and RAVI) provide data that are directly comparable across regions and also across different time-periods to assess the trends.[12 36 37]

Strengths and limitations

The novelty of our study lies in the application of the disability questionnaire and NCDs questionnaire in a rapid assessment study. To our knowledge, ours is the first RAVI study in India to combine these questionnaires. The use of cluster random sampling methodology and the good response rate covering two large districts, are the strengths of our study. The self-report and questionnaire-based assessment of disability and NCDs instead of actual measurement remains the limitation of our study as routine health examinations are not common among rural elderly residents. For example, vision loss by self-report is likely to be much lower than that found in prevalence studies where actual visual acuity is measured. It is possible that only those with severe vision loss report 'unable to see' as a disability. The self-report is likely to be an underestimate of the actual prevalence. Despite this limitation, our study has provided valuable estimates of disability and systemic health situation in the two districts in Telangana in India which can be used by healthcare planners as a framework to provide rehabilitation and services in this region.

CONCLUSION

Elderly-friendly infrastructure and transportation facilities that take into cognizance the prevalent disabilities in the elderly especially mobility and vision loss, are relevant given the exponential rise in the elderly population in India. The overarching goal of 'Healthy Aging is Happy Aging' can be achieved only with a comprehensive public health approach. We reported a large burden of vision loss in the elderly in residential care in urban and rural locations in India.[38 39] Due to changing trends in living arrangements among the elderly, the number of homes for the aged is likely to increase in the coming years. Hence the health policy for the elderly should be comprehensive in terms of coverage and should also include people living in homes for the aged. Having ramps at public places, seating with an armrest and hand railings wherever possible, can be of immense help for the elderly with disabilities. People with disabilities face several challenges to access healthcare and this can adversely impact the management of NCDs such as hypertension and diabetes and can lead to unfavourable outcomes.[40] A checklist for the elderly-friendly healthcare facilities is validated and published.[41] The Government of India launched National Programme for Health Care of the Elderly in 2010 intending to create a new healthcare framework for the elderly to provide accessible, affordable and comprehensive care to them.[42] This also includes pension support for the elderly. The National Health Policy 2017 also aims for

universal and affordable healthcare for all.[43 44] However, much still needs to be done on the ground to realise the full potential of these initiatives.[4] There is a definite need for a comprehensive elderly centric holistic health programmes including strengthening of primary health-care to achieve the goal of universal health coverage and healthy ageing in elderly in India.

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