Prevalence of disability and its association with sociodemographic factors and quality of life in a rural adult population of northern India

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ABSTRACT

Background. Globally, around 1 billion persons are disabled as per the WHO report on disability in 2011. The bio-psycho-social model of disability was developed by the WHO as the International Classification of Functioning, Disability and Health. We studied the prevalence of disability and its association with sociodemographic factors and quality of life among adults in a rural area.

Methods. We did a community-based, cross-sectional study among 418 randomly selected adult participants aged 18 years and above in a rural area of Ballabgarh, Haryana. Participants were interviewed by administering WHO Disability Assessment Schedule 2.0 (WHODAS 2.0) for assessing disability and WHO Quality of Life-BREF (WHOQOL-BREF) scale for assessing quality of life. Multivariate analyses were done for the predictors of disability. Correlation was applied to find the association between disability and quality of life.

Results. The prevalence of disability was 7.7% (95% confidence interval [CI]: 5.3%–10.6%) based on the cut-off > 40 summary score. More women (10.9%) than men (4.1%) were disabled (p = 0.009). Being ≥60 years of age was independently associated with disability (adjusted odds ratio 12.3; 95% CI 4.45–33.97). The mean (SD) of the WHOQOL-BREF health-related quality of life (HRQOL) summary score was 67.6 (11.6) and the median was 66.43. HRQOL summary scores decreased as age increased. There was a negative correlation between summary scores of WHODAS 2.0 and WHOQOL-BREF (r –0.57, $p < 0.001$).

Conclusion. Prevalence of disability was higher than the estimate given by Census 2011. The elderly and women experience more disability. As age increases, quality of life decreases. Increase in the level of disability decreases the quality of life.

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INTRODUCTION

Disability is complex, dynamic and multidimensional. Almost everyone will be temporarily or permanently impaired at some point in life, and those who survive to old age will experience increasing difficulties in functioning.[1] Worldwide, around 1 billion persons were disabled as per the WHO Report on Disability in 2011.[1] In India, Census 2011 determined the prevalence of disability[2] as 2.21%—2.24% in rural and 2.17% in urban areas. The National Sample Survey Organization (NSSO) disability survey done in 2002 estimated the prevalence of disability as 1.8%.[3] The World Report on Disability estimated the prevalence of disability in India to be 24.9%. Various studies done in India have estimated the prevalence of disability from 2.02%[4] to 64%.[5] This wide variation may be due to different definitions and tools used for measuring disability, essentially following the medical model. They have been based on various criteria of ascertaining abnormality or pathological conditions of persons. In the absence of a conceptual framework based on the social model, no standardization for evaluating disability across methods has been achieved.

In the medical model, individuals with certain physical, intellectual, psychological and mental impairments are considered disabled.[6] In contrast, in the social model, the focus is on society, which imposes undue restrictions on the behaviour of persons with impairment.[7] In this, disability does not lie in individuals, but in the interaction between individuals and the society.

To overcome the problem of defining disability in a single dimension, WHO developed the International Classification of Functioning, Disability and Health (ICF) with a multi-dimensional approach.[8] The ICF classifies functioning and disability associated with health conditions. It provides a standard language and framework for the description of disability and health-related conditions. It strives towards establishing a common language for measuring functioning, disability and health.

The ICF defines disability as an umbrella term for impairments, activity limitations and participation restrictions, referring to the negative aspects of the interaction between an individual (with a health condition) and that individual's contextual factors (environmental and personal factors).[9]

Quality of life (QoL) is a multidimensional concept that usually includes subjective evaluations of both positive and negative aspects of life. QoL has a meaning for nearly everyone, and every academic discipline, individual and group can define it differently.[10] However, measuring it is a challenge. Although health is an important domain of overall QoL, there are other

domains as well—for instance, jobs, housing, schools, neighbourhood, etc. Aspects of culture, values and spirituality are also key aspects of overall QoL that add to the complexity of its measurement.

The disability per se may not decrease the disabled individual's QoL. Self-perception of their disability, their ability to cope up with the disability and the social and environmental factors they live in mainly determine their QoL. Two persons with the same disability may have a different QoL based on their self-perception of disability and social and environmental factors they live in.[11] Hence, it is essential to study the association between disability and QoL.

With the above in mind, we studied the prevalence of disability and its association with sociodemographic factors and QoL among adults in a rural area.

METHODS

Study design and site

This cross-sectional, community-based study was conducted at the Comprehensive Rural Health Services Project, Ballabgarh, Faridabad district, Haryana.[12]

Inclusion and exclusion criteria

All adults aged 18 years and above and residing in this area for at least the past 6 months were included in the study. Participants who were not at home despite 2 visits were excluded from the study.

Study tools

To study the prevalence of disability, the WHO Disability Assessment Schedule 2.0 (WHODAS 2.0) 36-item interviewer version was used.[13] This was translated and validated in Hindi. WHODAS 2.0 has been developed to reflect the concept of ICF. Overall test–retest reliability of the scale is 0.94. This is a cross-culturally applicable, reliable and valid tool for measuring disability. It consists of 6 domains—cognition, mobility, self-care, getting along, life activities and participation. Reliability of each of these 6 domains ranges from 0.86 to 0.92. India is a signatory to the development process of WHODAS 2.0; hence, it was important to use this tool to generate internationally comparable information on disability. For the assessment of QoL, the WHO QoL-BREF (WHOQoL-BREF) scale was used.[11] It has 26 items taken from WHOQoL-100. It places importance on the perception of individuals to their QoL. It consists of 4 domains—physical health, psychological health, social relationships and environmental health. It is a cross-culturally applicable, valid and reliable assessment tool for QoL.

Sample size and sampling strategy

Prevalence of disability was assumed to be 50% due to lack of literature using WHODAS 2.0 for prevalence studies in India. With an absolute precision of 5%, and considering 10% non-response rate, the estimated sample size was 450. After obtaining the sampling frame of adults aged ≥18 years from the Health Management Information System, simple random sampling was done. House-to-house visits were made to all the 450 participants identified in the sample. In case a participant was not found at home despite 2 visits, she or he was excluded from the study. Each participant was interviewed by administering the WHODAS 2.0 followed by WHOQOL-BREF in Hindi. For a single participant, on an average, it took 30 minutes to complete the survey.

Statistical analysis

Data were entered in EpiInfo software version 7. For calculating the summary scores, methods enumerated in the manual[13] for WHODAS 2.0 were used. Each of the 36-item scores was re-coded. After re-coding, these scores were summed up in each domain, followed by summing up of all 6 domains. The obtained summary score was converted into a metric scale ranging from 0 to 100, where 0 was no disability and 100 was full disability. The range of scores derived from the WHODAS 2.0 was continuous. Hence, to divide the participants into 'disabled' and 'not disabled' groups, a threshold of >40 was used.[1] Participants whose summary score was above 40 were considered disabled. Prevalence of disability was reported as proportion with 95% confidence interval (95% CI). Multivariate logistic regression analysis was done to examine the association of sociodemographic factors with disability. Strength of association was reported as odds ratios. Mean (standard deviation [SD]) was reported for continuous variables.

For QoL, WHOQOL-BREF 26-item scores were summed up after necessary re-coding.[14,15] The obtained summary score was converted into a metric scale ranging from 0 to 100, where 0 was poor QoL and 100 was good QoL. Linear regression analysis between summary score of WHODAS 2.0 and WHOQOL-BREF was done to examine the association between them. These analyses were carried out using STATA software version 11.0.

Ethical clearance

The study was approved by the Ethics Committee of the All India Institute of Medical Sciences, New Delhi. All participants were informed about the purpose of the study and were provided with an information sheet in Hindi. Written informed consent was obtained from all participants. Participants found to have any health problem were provided appropriate guidance or referral.

RESULTS

Of the 450 randomly selected participants, 2 had died and 5 were not staying in the area for a long time. Of the remaining 443 persons, 25 could not be contacted even after 2 visits. Thus, the response rate was 94.4%. Of the 418 participants who were interviewed, there were 197 (47.1%) men and 221 (52.9%) women. Mean (SD) age of the participants was 37.4 (15.5) years and 235 (56.2%) were in the 18–35 years age group. The number of elderly participants (aged ≥60 years) was 47 (11.2%), illiterates were 105 (25.1%) and 91 (21.8%) had completed high school. The majority of participants were currently married (333, 79.7%). One hundred and sixty-six (39.7%) participants were home-makers and 114 (27.3%) were self-employed (Table I).

The prevalence of disability was estimated to be 7.7% (95% CI 5.3%–10.6%) based on the cut-off >40 summary score. More women (10.9%) were disabled than men (4.1%; p=0.009). Almost 46.8% of the elderly were disabled compared to 2.7% of those in the age group of 18–59 years (p<0.001). Prevalence of disability among illiterate participants was 20.9% compared to 3.2% in literate participants. There were less disabled (6%) among the married participants compared to unmarried (14.1%) participants and 13.7% of the unemployed participants were disabled (Table II).

Logistic regression analysis with independent variables such as age, sex, marital status, education and employment showed that age ≥60 years was independently associated with disability (adjusted odds ratio [AOR] 12.3, 95% CI 4.45–33.97; Table III). Even though sociodemographic factors such as sex, marital status, educational level and occupation were found to be significantly

TABLE I. Distribution of participants by sociodemographic characteristics

Characteristic	Men (*n*=197)	Women (*n*=221)	Total (*n*=418)
Age group (years)			
18–35	116 (58.9)	119 (53.9)	235 (56.2)
36–50	53 (26.9)	45 (20.4)	98 (23.4)
51–59	16 (8.1)	22 (10)	38 (9.1)
≥60	12 (6.1)	35 (15.8)	47 (11.2)
Educational level			
Illiterate	22 (11.2)	83 (37.6)	105 (25.1)
Primary	14 (7.1)	32 (14.5)	46 (11)
Middle	28 (14.2)	25 (11.3)	53 (12.7)
High	52 (26.4)	39 (17.7)	91 (21.8)
Secondary	45 (22.8)	23 (10.4)	68 (16.3)
Graduate	36 (18.3)	19 (8.6)	55 (13.2)
Marital status			
Never married	42 (21.3)	18 (8.1)	60 (14.4)
Currently married	153 (77.7)	180 (81.5)	333 (79.7)
Divorced	0	4 (1.8)	4 (1)
Widowed	2 (1)	19 (8.6)	21 (5)
Occupation			
Paid work	36 (18.3)	5 (2.3)	41 (9.8)
Self-employed	102 (51.8)	12 (5.4)	114 (27.3)
Non-paid work	1 (0.5)	4 (1.8)	5 (1.2)
Student	26 (13.2)	13 (5.9)	39 (9.3)
Home-maker	7 (3.6)	159 (72)	166 (39.7)
Retired	6 (3.1)	0	6 (1.4)
Unemployed health reasons	2 (1)	2 (0.9)	4 (1)
Unemployed other reasons	9 (4.6)	3 (1.4)	12 (2.9)
Old age (other)	8 (4.1)	23 (10.4)	31 (7.4)

Figures in parentheses are percentages

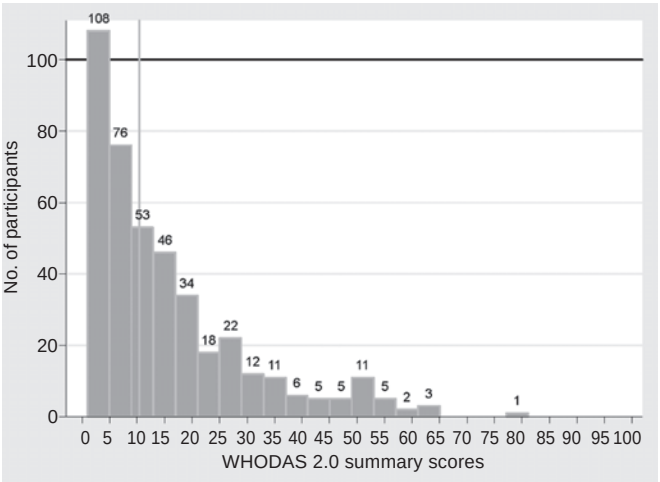

FIG 1. Distribution of WHO Disability Assessment Schedule 2.0 summary scores

associated in the crude model, they became non-significant in the multivariable model.

The mean (SD) WHODAS 2.0 summary score was 15.2 (14.3) and the median was 10.4 with a non-normal distribution (Fig. 1). Women had higher mean (SD) summary 18.2 (15.2) and domain scores (Fig. 2, Table IV). The mean summary scores increased with the age of the participants and decreased with an increase in their educational level. Divorced participants had the highest mean (SD) summary scores 45.3 (13.8). Participants who were

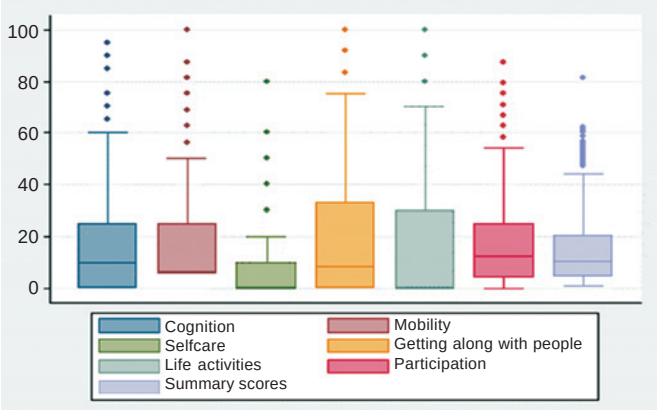

FIG 2. Distribution of WHO Disability Assessment Schedule 2.0 domain and summary scores

TABLE II. Distribution of disability by sociodemographic characteristics

Characteristic	Total (*n*=418)	Disabled (*n*=32)	p value
Sex			
Male	197	8 (4.1)	0.009
Female	221	24 (10.9)	
Age group (years)			
18–59	371	10 (2.7)	<0.001
≥60	47	22 (46.8)	
Educational level			
Illiterate	105	22 (20.9)	<0.001
Literate	313	10 (3.2)	
Marital status			
Unmarried/widowed	85	12 (14.1)	0.012
Married	333	20 (6.0)	
Occupation			
Employed	199	2 (1)	<0.001
Unemployed	219	30 (13.7)	

Figures in parentheses are percentages

involved in paid work (9.5) and students (8.4) had low mean summary scores.

The mean (SD) of the WHOQOL-BREF health-related quality of life (HRQOL) summary score was 67.6 (11.6) and the median was 66.43 (Fig. 3). The median summary score was highest (75) in the social relationship domain of WHOQOL-BREF (Fig. 4). Women were found to have lower mean (64.2) scores in overall HRQOL summary scores and in domain scores (Table V). HRQOL summary scores decreased as age increased. Never married adults had the highest mean (71.1) HRQOL summary scores. Illiterate participants had the lowest mean (61.5) HRQOL summary scores. A negative correlation was found between summary scores of WHODAS 2.0 and WHOQOL-BREF (r –0.57, p<0.001; Fig. 5). Linear regression model for association of disability with QoL found that QoL decreased as disability increased (β=–0.5, p<0.001, 95% CI –0.53 to –0.40).

DISCUSSION

The reported prevalence of disability in India by Census 2011[2] and NSSO[3] 2002 were 2.2% and 1.8%, respectively while it was 7.7% in our study, which is higher because of inclusion of social and contextual factors influencing the level of disability. Among

TABLE III. Crude and multivariable logistic regression models of factors associated with disability

Covariate	*n*	Disabled	Crude model			Multivariable model		
			Odds ratio	95% CI	p value	Odds ratio	95% CI	p value
Sex								
Male	197	8	Reference					
Female	221	24	2.88	1.26–6.57	0.012	0.75	0.23–2.38	0.621
Age group (years)								
18–59	235	10	Reference					
≥60	47	22	31.77	13.57–74.35	<0.001	12.3	4.45–33.97	<0.001
Marital status								
Married	85	12	Reference					
Unmarried	333	20	0.39	0.18–0.83	0.015	0.84	0.30–2.37	0.748
Educational level								
Illiterate	105	22	Reference					
Literate	313	10	0.12	0.06–0.27	<0.001	0.42	0.15–1.16	0.094
Occupation								
Employed	199	2	Reference					
Unemployed	219	30	15.63	3.68–66.33	<0.001	5.41	0.97–30.33	0.054

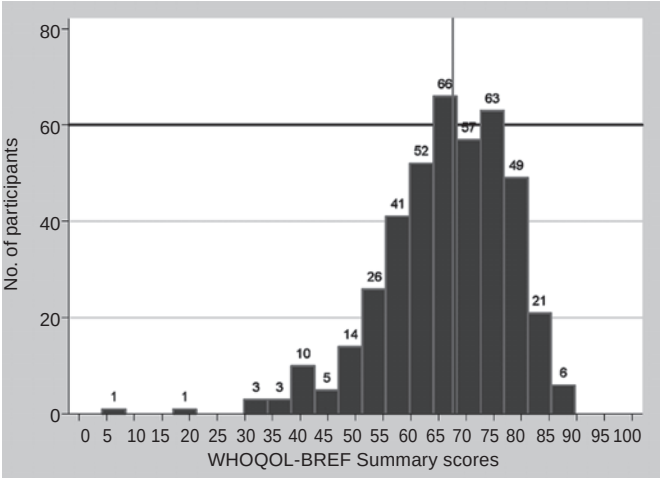

FIG 3. Distribution of WHO Quality of Life-BREF summary scores

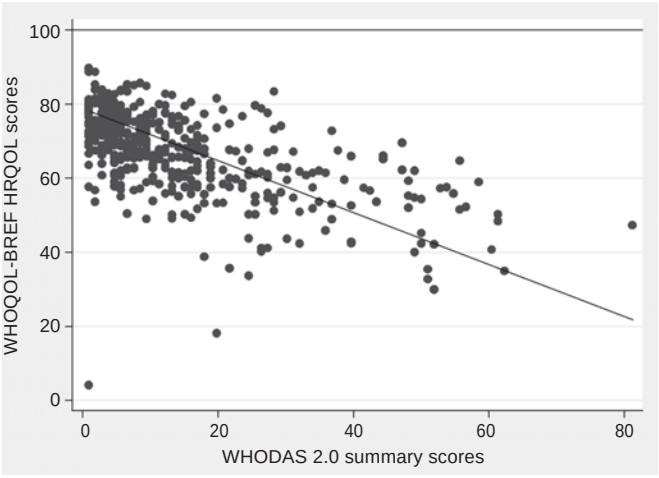

FIG 5. Correlation between WHO Disability Assessment Schedule 2.0 and WHO Quality of Life-BREF

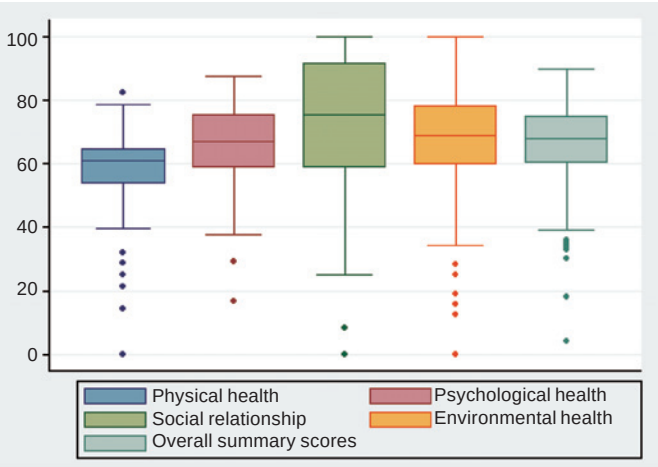

FIG 4. Distribution of WHO Quality of Life-BREF domain and overall scores

studies that used WHODAS 2.0, the prevalence of disability varies based on the cut-off used. Almázan-Isla *et al.*[16] conducted a community-based study among adults aged ≥50 years in Spain, which categorized disability into no disability (0%–4%), mild (5%–24%), moderate (25%–49%), severe (50%–95%) and extreme (96%–100%). In their study, the prevalence of disability was observed as 49.8% with the corresponding figures for mild, moderate, severe and extreme disability being 26.8%, 16.0%, 7.6% and 0.1%, respectively. Similarly, a study done by Virués-Ortegá *et al.*[17] and Rodríguez-Blázquez *et al.*[18] categorized disability in the same manner. In our study, the prevalence of disability among adults aged ≥60 years was 46.8% which is similar to disability prevalence (49.8%) reported by Almázan-Isla *et al*. A community-based study among elderly individuals aged ≥60 years in Pune using WHODAS 2.0 by Sinalkar *et al.*[19] estimated the prevalence of disability to be 70.4%. In their study, WHODAS 2.0 summary score >4 was considered disabled.

Marella *et al.*[20] conducted a community-based, cross-sectional study in Bogra district of Bangladesh and estimated the prevalence of disability to be 10.5% among adults aged ≥18 years. They used the Rapid Assessment of Disability (RAD) survey questionnaire.[21] The RAD questionnaire consists of 4 sections, namely, demographics, self-assessment of functioning, well-being and access to the community. The self-assessment of functioning

TABLE IV. Distribution of WHO Disability Assessment Schedule 2.0 mean scores with sociodemographic characteristics

Characteristic	Cognition Domain 1	Mobility Domain 2	Self-care Domain 3	Getting along Domain 4	Life activities Domain 5		Participation Domain 6	Summary score
					Household	Work		
Sex								
Male	13.4	15.4	2.8	22.7	11.1	8.3	15.9	11.8
Female	22.1	26.3	6.9	13.6	21.1	1.3	17.7	18.2
Age group (years)								
18–35	10.3	12.6	2.7	13.9	8.3	4.8	13.2	10.0
36–50	17.1	18.4	2.4	16.6	12.7	6.6	15.8	13.7
51–59	25.4	34.0	6.6	21.7	24.5	3.9	22.7	20.9
≥60	52.0	59.2	20.4	42.6	58.1	1.1	35.5	39.0
Educational level								
Illiterate	34.1	37.5	10.2	30.3	33.4	1.9	26.3	25.8
Primary	19.0	23.4	3.9	18.5	14.3	2.9	18.8	15.6
Middle	15.8	22.6	4.3	17.5	15.7	5.7	19.7	15.5
High	12.0	13.7	3.4	14.5	9.3	5.3	12.9	10.8
Secondary	10.4	11.4	2.3	9.8	7.2	7.1	11.2	9.2
Graduate	7.6	10.9	2.0	13.9	9.1	5.7	10.8	8.9
Marital status								
Never married	9.4	8.8	2.5	11.4	9.7	6.5	8.9	8.4
Currently married	17.1	20.8	4.3	18.1	14.7	4.5	17.3	14.7
Divorced	65.0	59.4	30.0	50.0	60.0	1.1	43.8	45.3
Widowed	47.1	55.1	19.0	38.1	52.9	1.1	34.7	36.2
Occupation								
Paid work	7.7	11.3	1.0	9.1	–	10.0	12.5	9.5
Self-employed	12.7	14.0	1.8	12.5	–	8.1	12.5	11.0
Non-paid work	19.0	23.8	2.0	16.7	–	26.0	19.2	16.0
Student	9.9	7.5	2.1	12.6	–	10.0	7.5	8.4
Home-maker	18.3	23.2	5.6	20.9	–	14.9	19.7	15.7
Retired	29.2	27.1	1.7	23.6	–	13.3	17.4	17.6
Unemployed health reasons	38.8	57.8	25.0	35.4	–	52.5	46.9	38.0
Unemployed other reasons	20.0	11.5	2.5	16.7	–	20.0	14.6	12.8
Old age (other)	53.4	63.7	22.3	44.6	–	63.9	36.8	41.2

section consists of 15 items related to functioning in 8 domains. The concept of disability in this study is based on the United Nations Convention on the Rights of Persons with Disability implying ICF. Srinivasan *et al*.[5] reported the prevalence of disability as 64% among community dwelling urban elderly from middle socioeconomic strata in Bengaluru, Karnataka. They measured the health-related disability using ICF checklist version 2.1a developed by the WHO.

The studies mentioned above, which used WHODAS 2.0,[11–13] reported higher prevalence of disability among women. Our study also found higher prevalence of disability among women. Being an elderly (AOR 12.3, 95% CI 4.45–33.97) had a strong association with disability. A similar finding was reported by Leonardi *et al*.,[22] which is a community-based, cross-sectional study among adults aged ≥18 years in the Philippines.

The primary goal of all persons with disability is to enjoy and maintain a good QoL. People with disabilities often do not have the services, supports and personal relationships which they want and need to lead a full QoL in the community. They may encounter attitudinal, public policy, service system and other barriers that keep them away from attaining a good QoL.

Rajasi *et al*.[23] found the mean QoL score among elderly women in Kerala to be 69.7, which is almost similar to the mean score of 61.8 in our study. Women had low mean scores in all the domains of WHOQOL-BREF.

The strengths of our study are: it was community-based, the sample size was adequate and the coverage rate was high. This study was also based on the ICF framework approach. Our study has some limitations: this being a cross-sectional study, we could not establish temporality between disability and QoL. In addition, these findings are generalizable only to rural areas.

Conclusion

Prevalence of disability among adults residing in a rural community of district Faridabad, Haryana, was 7.7%. The elderly experience more disability. Increase in the level of disability decreases the QoL.

Conflicts of interest. None declared

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TABLE V. Distribution of WHO Quality of Life-BREF mean scores by sociodemographic characteristics

Characteristic	Physical health	Psychological health	Social relationships	Environmental health	Overall HRQOL
Sex					
Male	56.7	67.9	76.9	70.8	68.9
Female	59.9	65.6	69.9	64.7	64.2
Age group (years)					
18–35	59.0	68.5	76.9	70.3	69.0
36–50	58.7	66.5	78.1	68.2	66.6
51–59	54.4	62.5	73.0	59.5	60.3
≥60	56.5	61.8	64.9	59.4	58.4
Marital status					
Never married	60.4	68.3	82.6	72.9	71.1
Currently married	58.2	67.2	73.0	67.4	66.4
Divorced	44.6	51.0	43.8	48.4	47.0
Widowed	55.4	57.7	55.6	58.2	56.7
Education level					
Illiterate	56.7	63.3	63.9	62.0	61.5
Primary	56.8	67.0	76.1	67.7	66.9
Middle	57.6	66.3	67.3	62.7	63.5
High	57.9	67.0	75.9	69.3	67.5
Secondary	61.0	70.0	83.3	73.1	71.9
Graduate	59.9	68.9	77.3	73.3	69.9
Occupation					
Paid work	57.8	65.9	75.0	69.5	67.1
Self-employed	60.3	69.1	77.0	70.8	69.3
Non-paid work	60.7	65.8	80.0	67.5	68.5
Student	61.2	69.4	85.5	74.1	72.6
Home-maker	56.8	66.1	71.7	66.0	65.2
Retired	60.1	73.6	73.6	69.8	69.3
Unemployed health reasons	50.9	46.9	41.7	37.5	44.2
Unemployed other reasons	56.8	64.2	66.7	66.7	63.6
Old age (other)	55.5	61.3	54.8	57.4	57.3

HRQOL health-related quality of life

and Handicaps: A Manual of Classification Relating to the Consequences of Disease; Publication for Trial Purposes in Accordance with Resolution WHA29.35 for the Twenty-ninth World Health Assembly, May 1976; 1980. Available at *www.apps.who.int/iris/handle/10665/41003* (accessed on 8 May 2017).

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