Prevalence and causes of musculoskeletal impairment in Mahabubnagar District, Telangana State, India: Results of a population based survey

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Abstract

Background

Comparable epidemiological data on musculoskeletal impairments (MSI) is lacking. This study aimed to estimate the prevalence and causes of MSI in Telangana State, India.

Method

A population-based survey used probability proportionate to size and compact segment sampling to select fifty-one clusters of 80 individuals (all ages). Participants were screened using seven questions and any participant who screened positive underwent standardised examination by a physiotherapist for MSI presence, severity and diagnosis. Data were also collected on vision and hearing impairment, depression and self-reported difficulties with physical functioning.

Results

The prevalence of MSI was 19.6% (95%CI: 16.7 - 22.8%) and this increased with age. The majority (81%) of MSI was classified as mild, 11% as moderate and 7% as severe. Over half (57%) of MSI diagnoses were acquired non-traumatic causes, with degenerative joint disease being the most common. There was a high unmet need for physiotherapy services (3% attended vs 40% recommended). One fifth (21%) of MSI cases also had at least one of vision (10%) or hearing (11%) impairment or depression (3%)

Conclusions

MSI is common among persons living in Mahabubnagar District, particularly older adults. These estimates can inform public health initiatives for the planning of health and rehabilitation services.

Keywords: prevalence, musculoskeletal impairment, India, survey, disability,

Introduction

Musculoskeletal impairments (MSI) are a diverse group of conditions that can affect muscles, bones and joints, and are the leading contributor to global years lived with disability (1). It is well recognised that persons with disabilities are more likely to be exposed to determinants of poor health such as poverty, unemployment (2), social exclusion (3) and discrimination (4) compared to the rest of the population. Interventions are therefore needed both to treat MSI as well as to improve participation of people with MSI. Accurate data are needed to inform appropriate interventions and services (5), however measurement of functioning and disability has been limited by lack of consistent definitions and survey tools (4), particularly with respect to MSI.

Assessing disability through self-reported functional limitations, as is used in the Washington Group (WG) Questions, is rapid and low cost. However, these methods are not designed to estimate the total number of people with disabilities who could benefit from specific health or rehabilitation interventions (5). Surveys using objective standardized clinical screening criteria to generate reliable and comparable estimates of prevalence, cause and severity of MSI are lacking because they rely on trained clinical specialists for assessment (6). These data are needed to understand and address the health and rehabilitation service needs of persons with MSI. The Rapid Assessment of Musculoskeletal Impairment (RAM) (6) is such a clinical screening tool developed to estimate prevalence and causes of MSI. Using a two step-process it includes screening questions to assess self-reported difficulties with the musculoskeletal system followed by a clinician-led examination. This survey tool has been used in surveys in Rwanda (7) and Cameroon (8),however, to date, such surveys have not been conducted in Asia and data on MSI is lacking in India.

Information is also lacking on the extent to which people with MSI also experience other impairments (e.g. hearing or vision). This information may be important to inform the planning of accessible and inclusive health and rehabilitation services. Another key gap is that the relationship between self-reported limitations in physical functioning (e.g. reported level of difficulty walking), which are relatively widely available, and the fewer data that report clinically assessed MSI is not well understood. Understanding this is important for informing and interpreting data from different assessment approaches in population surveys.

This study aims to estimate the prevalence and causes of MSI in Telangana State, India, through an all aged population-based survey. We also explore the relationship between self-reported functional limitations and clinically assessed MSI and between MSI and other impairments.

Materials and Methods

Survey population and sampling

This study was undertaken in Mahabubnagar District, Telangana State in 2014 as part of a survey on disability that also collected data on vision, hearing and musculoskeletal impairment, depression and self-reported functional limitations (9). The required sample size was calculated to be 4,056 based on an expected MSI prevalence of 4% (7, 10), precision of 20%, 95% confidence, a design effect of 1.5 and 20% non-response.

We used the 2011 census data for the sampling frame. A two-stage sampling procedure was used. First, 51 clusters of 80 individuals (all ages) were selected using probability proportionate to size sampling. Second, within clusters, households were selected through compact segment sampling. Maps were divided into segments of approximately 80 people and one segment was randomly selected. The enumerators visited all households sequentially in that segment until 80 people were included (although for logistical reasons, 4,125 people were enumerated).

Demographic details recorded included the name, age, sex and contact details of each household member. Household members were informed about the survey and invited to attend a clinic at a central location over the following two days. If an eligible person did not attend, the enumerators visited their home at least twice to encourage attendance. The survey team visited any eligible person who was unable to travel (e.g. due to mobility impairment) at their home at the end of the second day.

Screening for musculoskeletal impairment

The RAM survey was used to identify persons with mild, moderate or severe MSI that impact functioning (6). The RAM methodology comprises a two-stage approach: a self-reported screening tool followed by clinical assessment. The original RAM included 5 initial screening questions to assess MSI: a) difficulty using the musculoskeletal system (3 items), b) use of mobility aids (1 item) and c) whether the participant considered any body part to be missing or misshapen (1 item). We added an additional question on chronic back pain based on our experience in a previous study, which indicated the screening questions were not picking up people experiencing long-term debilitating back pain (8).

A physiotherapist examined any participant with a positive response to at least one screening question. The examination included a standardised observation of activities to assess functioning (e.g. walking, putting on a jacket) and examination of the affected area. Diagnoses categories for MSI included congenital, traumatic, infective, neurological, or

acquired non-traumatic non-infective. The physiotherapist assigned a specific diagnosis within these categories with a maximum of two diagnoses per case. Aetiology was recorded where the timing and cause of the impairment was known. Based on these interviews and examinations, the participant was categorised by the physiotherapist as having mild, moderate or severe MSI in respect to the musculoskeletal system's ability to function. Lastly, participants were asked about treatment or rehabilitation that they had received for their impairment and physiotherapists made referral recommendations with consideration to the available services.

Screening for vision, hearing impairment and depression
Visual acuity (VA) was assessed using a tumbling 'E' chart with 6/18 and 6/60 size optotypes for participants aged >5 years. Vision Impairment was defined as presenting VA < 6/18 in the better eye. For children aged <2 years, vision was assessed using the fix and follow method. For children aged 2-4 years, the child was asked to count or copy the number of fingers held up by a vision screener at 6 meters. Children who failed these tests were classified as having vision impairment.

Initial hearing screening was conducted through an otoacoustic emissions (OAE) hearing test. Participants who failed this test in both ears or for whom an OAE reading could not be taken underwent Pure Tone Audiometry (PTA) screening. Hearing was measured at 1KHz, 2 KHz, 4 KHz, 0.5KHz and again at 1KHz to ensure consistency of response and the average reading for each ear across the 4 frequencies was recorded. Children <4 years underwent OAE testing only. Hearing impairment was categorised as >41db (adults aged >18 years) or >35db (children ≤18 years).

Depression was assessed using the Patient Health Questionnaire (PhQ-9) among participants aged >17 years only. This tool includes three self-reported screening questions with an additional 6 questions asked if the initial screen is positive. Depression was categorised as having a score of 20 and above (11).

Self-reported functional difficulty
The WG extended set (adult or child version) (12, 13) was used to screen participants for self-reported functional limitations. This includes a question on mobility which asks, for children: "Compared with children of the same age, does [name] have difficulty walking?" and for adults: "Do you have difficulty walking or climbing steps?" These questions are answered with a four-point response scale ("no difficulty", "some difficulty", "a lot of difficulty" or "cannot do at all"). The primary caregiver was interviewed as a proxy for children under the age of eight.

Training

The survey was undertaken by three teams who underwent seven days of training. Each team consisted of two enumerators, two interviewers, one physiotherapist, one ophthalmic officer. There was also one ENT doctor who circulated between the three teams. We assessed the inter-observer variation for the determination of MSI cause and severity to ensure it was of an acceptable standard (i.e. Kappa ≥0.6).

Data analysis

Data were analysed using STATA 14.0 (StataCorp LP, College Station, Texas). The cluster sampling design was accounted for in the prevalence estimate. We compared clinical measures of MSI to self-reported mobility difficulties through estimations of sensitivity, specificity and positive and negative predictive values. We estimated two predictive values, based on varying definitions of mobility difficulties.

Ethics

Ethical Approval was granted by Public Health Foundation of India Institutional Ethics Committee, Government of India Health Ministry Screening Committee and The London School of Hygiene & Tropical Medicine. Informed written or finger printed consent was obtained from all participants. For children <18 years a caregiver was required to provide written/finger print consent and to remain present throughout the screening as per national requirements.

Results

4,125 people were enumerated and 3,574 were screened for MSI (response rate 87%). Of those who did not participate, 540 (13.1%) were unavailable and 11 (0.3%) refused. The majority (82%) of individuals who refused were male. There was a similar distribution of males (48%) and females (52%) in the sample. The sample population was similar in terms of age and gender distribution to the estimates from the 2011 census for Andhra Pradesh (Table 1).

Table 1 Age and gender distribution of district (census) and study sample population

Age group	Males		Females		Total	
	District* N (%)	Study sample N (%)	District* N (%)	Study sample N (%)	District* N (%)	Study sample N (%)
0-9	6,996,285 (16%)	365 (21%)	6,592,912 (17%)	345 (18%)	13,589,197 (17%)	710 (19%)
10-19	8,405,191 (19%)	353 (21%)	7,890,151 (20%)	320 (17%)	16,295,342 (20%)	673 (19%)
20-29	7,865,584 (19%)	277 (16%)	8,065,546 (19%)	356 (19%)	15,931,130 (19%)	633 (18%)
30-39	6,498,919 (16%)	214 (13%)	6,592,791 (15%)	284 (15%)	13,091,710 (15%)	498 (14%)
40-49	5,169,031 (12%)	185 (11%)	4,887,711(12%)	207 (11%)	10,056,742 (12%)	392 (11%)
50-59	3,213,122 (8%)	143 (8%)	3,353,862 (8%)	173 (9%)	6,566,984 (8%)	316 (9%)
60-69	2,520,124 (7%)	116 (7%)	2,847,567 (6%)	118 (6%)	5,367,691 (6%)	234 (7%)
70-79	1,060,217 (3%)	42 (2%)	1,096,130 (3%)	46 (2%)	2,156,347 (3%)	88 (2%)
80+	325,987 (1%)	13 (1%)	428,216 (1%)	17 (1%)	754,203 (1%)	30 (1%)
Total	42,054,460 (50%)	**1,708 (48%)**	41,754,886 (50%)	**1,866 (52%)**	83,809,346 (100%)	**3,574**

* Census 2011 data at Andhra Pradesh State Level

Prevalence of MSI

In total, 699 participants of the 3574 screened were identified as having an MSI, giving an all-age prevalence of 19.6% (95% CI: 16.7–22.8%) (Table 2). The prevalence of MSI was higher among women (21.8%, 18.5–25.5%) than among men (17.1%, 14.2–20.4%). Prevalence of MSI increased dramatically with age, from approximately 3% in children and younger adults to 51.9% of adults over 50 years (95% CI: 44.7–59.1%). Just over 80% of MSI cases were classified as mild (prevalence: 16.1%; 95% CI 13.3–19.2%), and the remainder were moderate MSI (prevalence 2.2%; 95% CI 1.8–2.8%) or severe (1.3%; 0.9–1.8%) (Table 2).

Table 2- Prevalence of MSI by age, gender and impairment severity

	Total		0-17 years		18 – 49 years		50+ years		Male		Female	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Any MSI	699	19.6 (16.7 – 22.8)	36	2.9 (2.0 - 4.4)	316	18.8 (15.0 – 23.3)	347	51.9 (44.7 – 59.1)	292	17.1 (14.2 – 20.4)	407	21.8 (18.5 – 25.5)
Mild	574	16.1 (13.3 – 19.2)	18	1.5 (0.8 0 2.6)	292	17.4 (13.8 – 21.7)	264	39.5 (32.8 – 46.7)	229	13.4 (10.7 – 16.6)	345	18.5 (15.3 – 22.2)
Moderate	80	2.2 (1.8-2.8)	11	0.9 (0.5-1.6)	16	1.0 (0.6-1.5)	53	7.9 (5.8-10.7)	41	2.4 (1.8-3.2)	39	2.1 (1.5-2.9)
Severe	45	1.3 (0.9-1.8)	7	0.6 (0.3-1.2)	8	0.5 (0.2-1.0)	30	4.5 (2.9-6.9)	22	1.3 (0.8-2.1)	23	1.2 (0.7-1.9)

Extrapolating these findings, we estimate that there are a total of 196 000 (95% CI: 167 000–228 000) people per million population with an MSI in this setting; 10 730 (95% CI: 7400–16 300) children aged 0–17 years, 88 400 (95% CI: 70 500–11 000) adults aged 18–50 years and 83 000 (95% CI: 72 000–95 000) adults >50 years.

Age of impairment

Among children with MSI, 33% were born with their condition and 25% acquired the impairment before they were 5 years. Among adults aged 18–50 years with MSI, the majority (65%) acquired their impairment during their adult years (i.e.>17 years) and only 2% were born with the impairment. Among adults aged>50 years, 95% developed their impairment after the age of 40 years.

Diagnoses

There were a total of 741 diagnoses for 699 participants with MSI (Table 3). Of the 741 MSI diagnosis just over half (n=424, 57%) were acquired non-traumatic causes, with degenerative joint disease being the most common individual diagnosis. Nearly one-third (n=235, 32%) of MSI diagnoses were acquired trauma, 9% (n=63) were neurological, 2% (n=12) were due to infection and 1% (n=7) was congenital.

Table 3. MSI diagnoses in survey and extrapolated to total population of India

Diagnosis	Number	Total in category N (%)	Extrapolated total number of diagnostic category to nearest 1,000 (95%CI)
A. Congenital		7 (1%)	2,198,000 (1,803,000-2,657,000)
Polydactyly	1		
Congenital hand deformity	1		
Congenital absence of all/part of upper limb	2		
Congenital abnormality of upper limb	1		
Cleft lip	2		
B. Infection		12 (2%)	4,395,000 (3,605,000-5,318,000)
Joint Infection	8		
n/soft tissue infection/wound	4		
C. Acquired traumatic		235 (32%)	70,319 (57,683,000-85,087,000)
Burn contracture	5		
Fracture non union	2		
Fracture malunion	29		
Spinal/head Injury	9		
Post traumatic joint stiffness	8		
Muscle problem	167		
Peripheral nerve problem	3		
Amputation	7		
Other	5		
D. Neurological		63 (9%)	19,778,000 (16,223,000-23,931,000)

Epilepsy	17		
Developmental delay	2		
Cerebral palsy	5		
Paraplegia	3		
Hemiplegia	6		
Quadriplegia	1		
Polio	14		
Other neurological	15		
E. Acquired non-traumatic Degenerative joint disease	291	424 (57%)	125,257,000 (102,747,000-151,561,000)
Non-infective non traumatic joint disease	9		
Bow legs	3		
Knock knees	1		
Spinal pain limiting spine function	55		
TB/spine infection	1		
Limb pain limiting function	36		
Other acquired non-traumatic	28		
Total diagnoses		741	221, 947,000 (182,061,000-268,556,000)

Diagnoses varied by age (Figure 1). The prevalence of neurological diagnoses was similar in all age groups (Table 3). There was a proportional increase in trauma related MSI with age from 1% among 0–17 years, 7% among 17–49 years and 15% the >50 years age group. The proportion of acquired non-traumatic diagnoses also increased substantially with age so that 35% among people aged>50 years were acquired non-traumatic.
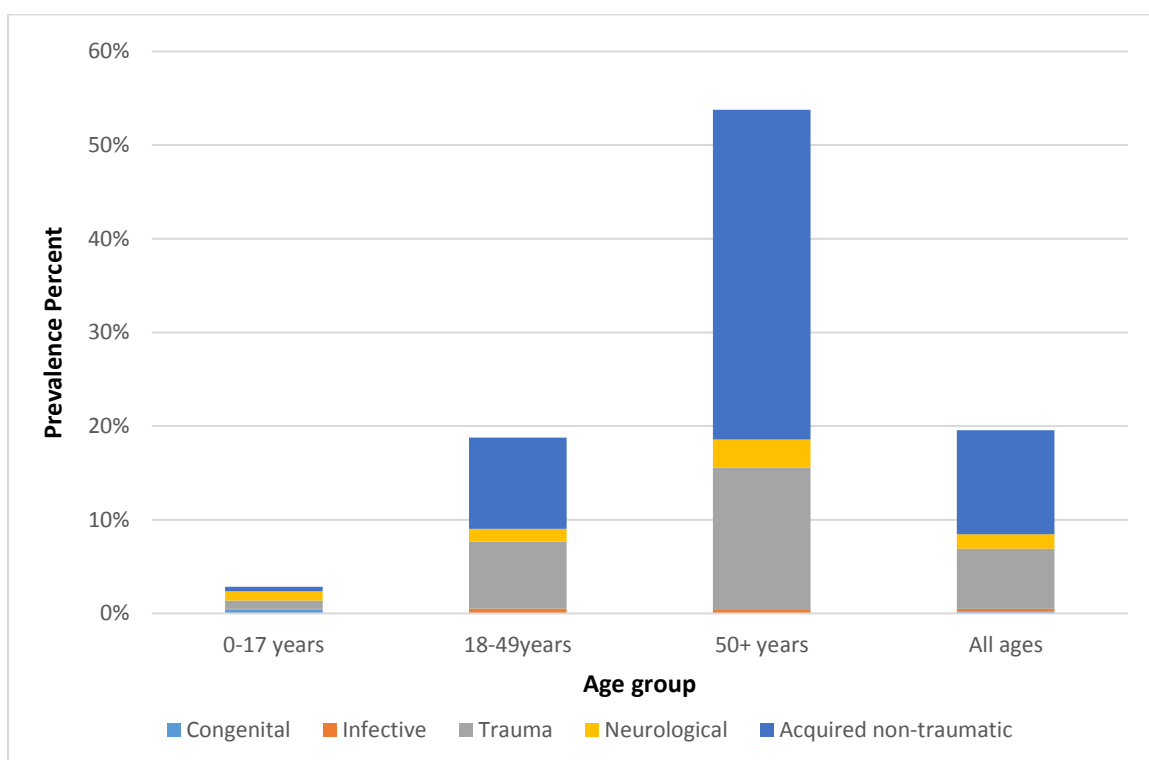

Figure 1. Prevalence and diagnostic categories of MSI by age group

Aetiology

Of the 699 participants with MSI two-thirds (n=450, 64%) was attributed to ageing (n=140, 20%) or work/lifestyle (n=310, 44%), 12% (n=84) was due to trauma (road traffic accidents, n=36; violence, n=9; self-harm, n=3; and other, n=36), and 4% (n=25) to congenital conditions. Other rarer aetiologies included genetic (n=9, 1%), infection (n=21, 3%), developmental (n=14, 2%) and iatrogenic (n=2, 0.3%).

Among the 36 children, the majority of MSI included congenital (n=12, 33%), other accidents (n=7, 19%) and developmental (n=6, 17%). Among 316 adults aged 18–49 the leading aetiology was work/lifestyle (n=215, 68%) and among the 347 older adults (>50 years), 40% (n=139), was attributed to ageing and 32% (n=111) to work/lifestyle.

Previous treatment

The most commonly reported previous treatment or intervention received among people with MSI was medication (64%) followed by surgery (4%), mobility aids (3%) and physiotherapy (3%) (Table 4). Overall, 13% of people with MSI reported they had not previously received any medical or rehabilitation services for their condition.

Table 4 Treatment for individuals with musculoskeletal impairment

	Treatment previously received		Treatment recommended	
	N	%	N	%
None	91	13%	86	12%
Medication	449	64%	344	49%
Plaster/Splintage	1	0%	2	0%
Physiotherapy	23	3%	281	40%
Special Seating	0	0%	1	0%
Mobility aid	21	3%	16	2%
Orthosis/appliance/ Prosthesis	3	0.4%	4	1%
Wheelchair	2	0%	2	0%
Surgery	25	4%	21	3%
Traditional medicine	16	2%	0	0%

Recommended treatment

Medical or rehabilitation services were recommended for the majority (88%) of people with MSI in the survey. Medication was the most commonly recommended intervention (49%) followed by physiotherapy (40%), surgery (3%), and mobility aids (2%).

The primary reason given by participants for not seeking further treatment for MSI was inability to afford treatment (41%), whilst 20% felt treatment was not necessary because of adequate function and 15% felt treatment wasn't needed because of the older age.

Other impairments

Among the 699 participants identified with a MSI, 10% (70/699) had a moderate/severe vision impairment, 11% (77/699) had a moderate/severe hearing impairment and 3% (21/699) moderate or worse depression. A total of 21% (147/699) of people with a MSI also had at least one other impairment (hearing, vision, depression). This varied by age, with 8% children <18 years, 4% adults 18–49 years and 36% of adults>50 experiencing at least one other impairment. Restricting to those with moderate or severe MSI, 20% had vision impairment, 26% had hearing impairment, 13% were classified as having depression and overall 43% had at least one other impairment. Existence of other impairments was most common among older adults (60%).

Comparison of clinically measured MSI and self-reported difficulties with mobility

Of the 694 people with clinically assessed MSI (mild, moderate or severe) and WG responses in the domain of "walking/climbing", 447 reported 'some' or 'more' problem with mobility (sensitivity = 64%) using the WG questionnaire (Table 5).

Table 5: Relationship between clinically assessed impairment and self-reported difficulties with mobility

Clinically assessed MSI	Self-reported difficulties			
	None N (%)	Some N (%)	A lot N (%)	Extreme/ Cannot do N (%)
No MSI	2,459 (90%)	274 (10%)	8 (1%)	0
Mild	227 (40%)	307 (54%)	37 (6%)	0
Moderate	16 (20%)	19 (24%)	39 (49%)	6 (8%)
Severe	4 (9%)	8 (19%)	23 (53%)	8 (19%)
Any MSI*	247 (36%)	334 (48%)	99 (14%)	14 (2%)

*NB: WG data were missing for 19 people

Of the 2,741 people who did not have an MSI according to the clinical assessment, 2,459 reported no difficulty with mobility (specificity: 90%). Of the 2,712 who reported no difficulty, 2,459 also had no MSI (negative predictive value: 91%). Among the 729 who reported 'some' or 'more' difficulty, only 447 had a clinically assessed MSI (positive predictive value: 61%). If a narrower self-reported definition of 'a lot of difficulty' or greater is used, the sensitivity decreased to 16%, specificity increased to 100%, and positive and negative predictive values were 93% and 83% respectively.

Discussion

This all age population-based survey found a high prevalence of MSI in Mahabubnagar District India with nearly a fifth of the population affected. The majority (82%) of MSI cases were classified as mild, 11% as moderate and 7% as severe. The prevalence of MSI increased dramatically with age, from 3% in children to 51% among people aged >50 years. This is due to the increase in MSI from acquired non-traumatic causes (particularly degenerative joint diseases) and trauma occurring in this older age group. There is a large unmet need for rehabilitation and treatment.

Comparison to previous studies

There are limited data from India to compare our findings. Our estimates are considerably higher than the 2.2% prevalence of all disability estimated in the 2011 census (14). However, the census used a single question on self-reported disability ('Is this person mentally/physically disabled?) which is likely to lead to under-reporting of disability because of issues around stigma and self-identification of disability (5). The high prevalence of MSI among older adults aligns with a previous study in the city of Chandigarh which reported that 88% of elderly people (aged over 60 years) had minimal to severe disabilities (15). Data on MSI epidemiology specifically are lacking, but the high prevalence in our survey concurs with a study in southern India which found that 26% of adults (>15 years) reported musculoskeletal pain (16). Our prevalence estimates (19.6%) were higher than previous surveys using the RAM survey in Rwanda (5.2%)(7) and Cameroon (11.6%) (8), although the trend of rapidly increasing prevalence by age and distribution of causes were similar. The difference is driven primarily by a higher prevalence of mild MSI in India (16.1%) compared to Cameroon (8.2%) and Rwanda (2.4%). The prevalence for moderate/severe MSI in the three settings is comparable (India 3.5%, Cameroon 3.4%, Rwanda 2.8%). A reason for this may include the higher life expectancy in India (68.5 years versus 58.5 years in Cameroon and 60.1 years in Rwanda)(16) or the inclusion of a question on back pain in India, but not in the other settings.

Treatment gap

Most people with MSI (87%) reported having received some kind of medical or rehabilitation services, however, this was most commonly medication (64%), which could include painkillers. The proportion that received physiotherapy was very low (3%) and yet this was recommended as an intervention for 40% of cases based on clinical examination. This treatment gap is similar to previous studies in India that demonstrated few persons with disabilities benefit from rehabilitation services (17) and providing rehabilitation services to the

unreached persons with disabilities living in rural areas and small towns is a challenge (18). The finding in our study that cost was the leading reason for not seeking services, aligns with research in Uttar Pradesh and Tamil Nadu states of India (19). These studies also found lack of services and transportation were key barriers to using health facilities. Additionally, there is a need to think beyond the provision of rehabilitation toward holistic inclusion of persons with disabilities. Participation of persons with disabilities may be encouraged through community-based rehabilitation (CBR) programmes in rural communities. For example, a three-year project in a disadvantaged community near Allahabad, India, resulted in many children with disabilities attending school for the first time, and more carers bringing their children with disabilities for vaccination and rehabilitation (20).

Relationship between clinically assessed and self-reported MSI
Previous surveys typically either assessed only self-reported limitations in physical functioning (e.g. difficulty with walking) or, a few, conduct clinical assessment of MSI. In this study we collected data using both approaches, which allowed us to explore the overlap between the populations identified by the two methods. Using self-report of 'some' or 'more' difficulty' with walking/climbing would result in 36% of mild or worse MSI not being identified. Using the narrower category of 'a lot of difficulty' (the definition commonly used in surveys for classifying people as having a disability (5) would miss 39% of the clinically confirmed cases with moderate or worse MSI or 86% with mild or worse MSI. Further, 61% of those who self-reported 'some' or 'more' difficulty were not classified as having an impairment. The discrepancies in population identified suggests that the two measurement approaches capture different aspects of disability. The RAM method uses self-report functioning questions to screen in the first stage and asks a greater number of specific questions on body function, as well as whether any body parts are considered misshapen. The WG questions focus on walking/climbing only and this may explain the difference. Using clinical assessment and self-report together in disability surveys may be helpful to identify the majority of people with disability (5), although a focus on clinical assessment may be optimal when planning need for physical rehabilitation services.

Recommendations
The data collected in this survey provide useful information to assist planning of rehabilitation services for persons with MSI in India, which cannot be produced through self-reported functional difficulties alone. This study estimates that 196,000 people per million population in India will experience MSI, that degenerative joint diseases are the leading cause and that the vast majority could benefit from some kind of medical or rehabilitation intervention. Production and supply for equipment (e.g. assistive devices) can be anticipated and the need

for services such as physiotherapy and surgery as well as equipment can be similarly estimated. For example, findings suggest that 44,390,000 people in India could benefit from Physiotherapy. This global gap in resources has been recognised by the World Health Organisation (WHO) with the Rehabilitation 2030: A Call for Action (21). As provision of rehabilitation grows as an international priority in order to meet the Universal Health Coverage targets, plans that account for the growth of non-communicable diseases and for an ageing population are required. Scale up of rehabilitation services and consideration of innovative methods to provide rehabilitation and other services, such as mobile tools for home exercise programmes (22) warrant further investigation. In addition, the survey data highlight that experiencing multiple impairments is common. This should be taken into account when planning services to ensure, for example, that physiotherapy services are fully accessible to those with vision or hearing impairments and that appropriate attention and support is given to the psychological well-being of people with physical impairments.

Strengths and limitations

This was an all-age population based survey that used robust sampling methodology to provide estimates of musculoskeletal impairment and rehabilitation needs. There are some study limitations. The study relied on a relatively simplified assessment that was conducted in the field rather than in clinical settings. Unlike vision or hearing which have objective tests, classifying the severity of MSI is in part down to the clinician's judgement and therefore some subjectivity in this assessment is unavoidable. We aimed to standardise this as much as possible with thorough training of the physiotherapists.

Conclusions

Nearly a fifth of people living in Mahabubnagar District have a musculoskeletal impairment and this is estimated to be moderate or severe for 3.5%. Among adults aged 50 years and above the prevalence was 51% and this was largely due to degenerative joint diseases. The findings suggest there is high unmet need for physiotherapy and other rehabilitation services among people with MSI.

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