Original Research

The Indonesian Journal of Public Health
Vol 18. No. 1 April 2023
p- ISSN 1829-7005 e- ISSN 2540-8836

LOCOMOTOR DISABILITY AMONG ADULT POPULATION OF A NORTH INDIAN DISTRICT: A CROSS SECTIONAL STUDY

[1]Shankul Jain, [2]Najam Khalique, [3]Sameena Ahmad, [4*]Mohd Najmul Aqib Khan, [5]Mohd Maroof, [6]Mohammad Salman Shah

[1]Medical officer, Civil Hospital, Ganj Basoda, Bhopal, Madhya Pardesh, India
[2]Professor, Department of Community Medicine, J.N. Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh, India
[3]Senior Resident, Department of Community Medicine, J.N. Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh, India
[4*]Assistant professor, Department of Community Medicine, Government Medical College, Haldwani, Uttarakhand, India
[5]Assistant professor, Department of Community Medicine, Rani Durgavati Medical College, Banda, Uttar Pradesh, India
[6]AssistantProfessor, Department of Community Medicine, J.N. Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh, India
[*]Corresponding author: Dr. Mohd. Najmul Aqib Khan,
Email: drmnaqib@gmail.com

ABSTRACT:

Introduction: Disability, which has been deemed as a significant public health problem in our country, in any form, be it correctable or not, tends to hamper the day to day life of the affected person. It affects their personal as well as professional life to a great extent, and creates a lack of confidence and difficulty in social interactions. To assess the burden of locomotor disability, its socio-demographic correlates, and suggest measures to improve the life of people with disability**. Methods**: It was a cross-sectional study, conducted in areas under the rural and urban health training centers, using a pretested and validated questionnaire along with appropriate examination of the involved system. A total of 900 individuals were included. The study duration was July 2017 to June 2018. The collected data were analyzed using SPSS 20.0. **Results**: The total prevalence of disability (of any type) contributed to 13.6% while locomotor disability was found to be 4.44% in the study population. Significant association of locomotor disability was observed with age, gender, marital status and occupation ($p < 0.05$). **Conclusion**: Availability and accessibility of rehabilitation centers at the peripheral areas, along with creating community awareness towards it, may prove to be a step in the right direction to alleviate the discomfort of the people living with disability.

Keywords: disability, locomotor, adults, rehabilitation, people with disability

INTRODUCTION

Disability is any limitation or inability, to execute a desired activity, in a way or within the range, considered normal for the human beings, resulting from impairment. In other words, disability is loss of functional capacity due to impairment of ant body part while impairment alarms the physical aspects of health. Being handicapped on the other hand takes into account social and cultural effects of either impairment or disability (Barbotte et al., 2001). The International Classification of Functioning, Disability and Health developed by the WHO in 2000, considers health and disability in a continuum and that every human being can experience some degree of disability during his lifetime (WHO, 2002). A Multi-Country Survey Study during 2000 and 2001 and the World Health Survey Program in 2002 and 2003, have used ICF to assess

Cite this as: Jain, S., Khalique, N., Ahmad, S., Khan, M.N.A., Maroof,M & Shah, M.S, (2023). Locomotor Disability Among Adult Population Of A North Indian District: A Cross Sectional Study. The Indonesian Journal Of Public Health, 18(1), 11-20. https://doi.org/10.20473/ijph.v18i1.2023.11-20

health status of the general population in a total of seventy-one countries. Bedirhan Üstün *et al.,* 2001).

As per the worldwide statistics on disability, third world countries like India are facing a significant public health concern with the prevailing estimates of disability in the country. It also typically exhibits iceberg phenomenon of disease as mild to moderate degrees of disability, generally, remain unrecognized by the healthcare delivery system at initial levels. The World Health Survey, reported, that, in adult population of age 18 years and above, the average disability prevalence was 15.6% (WHO, 2012). The Global Burden of Disease Survey also estimated 190 million (3.8%) people with severe disability. Over a billion people (about 15% of the world's population), including children, were estimated to be living with disability. In the light of the above facts, the WHO has taken a note of the problem and has included disability, as a concern for the Sustainable Development Goals (SDGs) to be achieved by 2030. The SDG 10 also entails emphasizing upon the social, economic and political inclusion of persons with disabilities (Griggs et al., 2013)**.**

There are few studies which have shown the prevalence of disability among a wider age group comprising of old as well as young adults. Most of the studies, included in literature have been conducted in older age groups (>50years) only and also fewer studies have endeavored to find out an association, if any, between individual disabilities and the socio-demographic profile of the population. The present study thus, aimed to estimate the prevalence of locomotor disability in the adult population and to document the socio-demographic correlates of locomotor disability.

METHODS

This community-based cross-sectional study was conducted in the field practice areas of the urban and rural health centers, Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh. The study was done among the adult population of 20 to 60 years of age, registered under Urban Health Training Center (UHTC) and Rural Health Training Center (RHTC). RHTC and UHTC, respectively, provide health services to six villages and four urban areas. Period of this study was from July 2017 to June 2018. Households were taken as sampling units while individuals were taken as study units.

Sample size for the study was calculated on the basis of disability prevalence rate of 15.6%, reported by the WHO (WHO, 2012)**,** Using a precision of 5% and 95% confidence interval, with a prevalence of 15.6% and relative error of 16%, the sample size was calculated to be 816. Along with non-response rate of 10%, the final sample size was calculated to be 898, rounded off to 900. To draw sample size, systematic random sampling with probability proportionate to size (PPS) was used. Number of families were recruited after taking into account the fact that 50% population belongs to the desired age group (*Aligarh District Population Census 2011 Uttar Pradesh literacy sex ratio and density.*, 2011). Every k^{th} household was visited and all the individuals between 20 to 60 years of age, willing to participate and had given written consent, were interviewed and screened by a pre-tested questionnaire, and examined afterwards.

Questionnaire had patient profile (baseline information regarding age, sex, religion, educational status, marital status, occupation, type of family and social class (Modified B.G. Prasad), and detailed history. Examination assessment of the set disabilities was done using appropriate clinical instruments suitably and recorded in pretested and pre-validated questionnaire. A pilot study was done on 10% of sample size and required changes were made in the

questionnaire as per the response elicited, to make it more comprehensible.

Definitions

Disability: A person with restrictions or lack of abilities to perform an activity in the manner or within the range considered normal for a human being was treated as having disability. Examples of disabilities include difficulty seeing, speaking or hearing; difficulty moving or climbing stairs; difficulty grasping, reaching, bathing, eating, toileting (United Nations, 2013).

Locomotor disability is defined as a person with either loss or absence or inactivity of whole or part of hand or leg or both due to amputation, paralysis, deformity or dysfunction of joints which affected his/her "normal ability to move self or objects" or with physical deformities in the body (other than limbs), regardless of whether the same caused loss or lack of normal movement of body such as, hunchback, deformed spine, etc. (MOSPI, 2012). Dwarfs and persons with stiff neck of permanent nature who generally did not have difficulty in the normal movement of body and limbs were also treated as disabled.

Data were entered and managed in SPSS-20 (Statistical Package of Social Science). For descriptive statistics: frequency, percentage, proportion, mean and standard deviation, graphs and cross tabs were used to present study results. Qualitative data were further analyzed utilizing statistical tests of significance, viz Chi-square test, Fisher's exact test along with further quantitative analysis using Student t-Test and computation of frequency, mean, median and proportion along with standard deviation using the statistical software. p value <0.05 was considered significant.

The proposal of this study has been revised, approved, and has received ethical clearance by the Institutional Ethics Committee of Faculty of Medicine, AMU, Aligarh with approval number 651 / FM/ 17.7.2017. Informed verbal consent was taken from each subject before interview. The nature and purpose of the survey were explained to them and confidentiality of all the participants was assured. Interviews were conducted in a non-hostile and non-judgmental manner. Local cultural values and ideas were respected. Appropriate health education and personalized counseling were provided to all the respondents. Prompt referral was also employed if any participant was found to be afflicted with serious disability and warranted specialist attention.

RESULTS

Profile of study population

The major proportion of the study population was in the 20-30 years age group (42.8%) while least number of individuals (13%) were of the 51-60 years age group. Females were in the majority in all the age groups. Around 80.3% of the subjects were married and it was seen that most of the widowed/divorced participants in this study were females, while both sexes were found to have equal distribution in never married population. Most of the study participants were illiterate (45.4%) and only 21.3% and 18.7% of subjects completed their primary and high school education, respectively. At the time of study, a large proportion (68.8%) of the study population was found to be unemployed/dependent and of them mostly were females (47.1%), who were supporting their families as homemakers. Almost half of the study population belonged to the socioeconomic class IV (50.1%)(Table 1).

Table 1. Socio-demographic profile of study population.

Characteristic	Frequency (N)	Percentage (%)
Age group (in years)		
20-30	385	42.7
31-40	230	25.6
41-50	168	18.7
51-60	117	13.0
Gender		
Male	344	38.2
Female	556	61.8
Residence		
Urban	372	41.3
Rural	528	58.7
Marital status		
Married	723	80.4
Unmarried	130	14.4
Widowed/ divorced	47	5.2
Occupation		
Housewife	424	47.2
Student	57	6.3
Employed	281	31.2
Unemployed	138	15.3
Socioeconomic class (Modified B.G. Prasad)		
I	43	4.8
II	136	15.1
III	202	22.4
IV	451	50.1
V	68	7.6
Total	**900**	**100.0**

*****Modified BG Prasad classification 2016

Prevalence and Causes of Locomotor Disability

Prevalence of locomotor disability in the present study was found to be 4.4% (40/900) against any type of disability, which was encountered in 13.6% (122/900) of the study population. Among the important causes of locomotor disability, poliomyelitis or its sequelae accounted for the foremost etiology (27.5%) in the study population. Age related degenerative conditions like osteoarthritis, kyphoscoliosis, osteoporosis and. osteomalacia, etc., were detected in 22.5% of the population. Etiologies like traumatic loss of limb, post traumatic paralysis, limb loss due to denervation, others like post- injection palsy and stroke leading to different grades of limb paralysis and last but not the least congenital causes accounted for other prevalent causes of locomotor disability in that order (Figure 1).

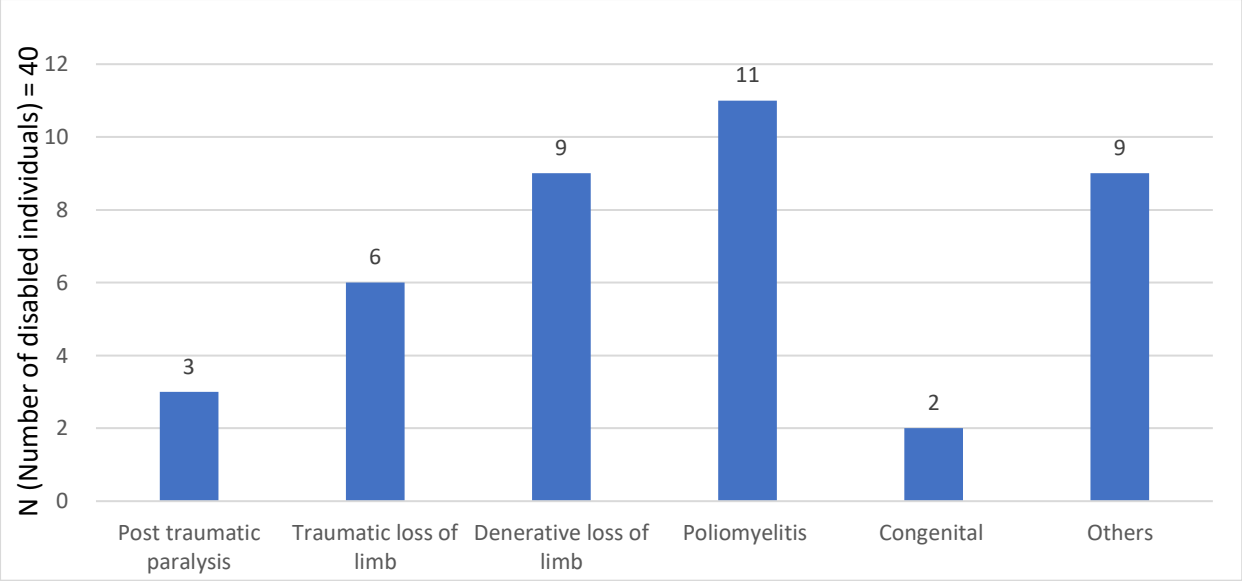

Figure 1. Causes of locomotor disability in the study population

One or both lower limbs were affected in 37.5% of the individuals with locomotor disability. One upper limb alone was disabled in 12.5% individuals. One upper and one lower limb were involved by disability in 10% of those having locomotor disability. Activities of daily living are bound to be adversely affected in the wake of any locomotor disability(ies). Of these, transfer of the afflicted individual from one decubitus to another or from their residence to treatment centre was most adversely affected. Self-dressing, use of toilet and bathing were similarly impacted to cause inconvenience in that order. Bathing and continence issues, though less commonly found to be affected in the study, were also important limitations in their own right (Table 2).

Table 2. Extent of locomotor disability and affected activities in the study population

Extent	**Frequency (n/N)**	**Percentage (%)**
One upper limb	5/40	12.5
One upper and one lower limb	4/40	10.0
One lower limb	15/40	37.5
Both lower limb	15/40	37.5
All four limbs	1/40	2.5
Activities affected*		
Feeding	8/40	20.0
Bathing	21/40	52.5
Transfer	30/40	75.0
Dressing	28/40	70.0
Toilet	20/40	50.0
Continence	6/40	15.0

***Multiple activities were affected in the individuals*

Of the majority of the disabilities studied, 52.5% were non-progressive (traumatic loss of limb and poliomyelitis) in their natural history of disease. However,

32.5% of the afflicted population had a progressively deteriorating course of illness (degenerative). Six out of 40 affected individuals were found to have an improving course in their illnesses with or without treatment (Table 3). In the context of health seeking behavior, in the form of treatment sought for the type(s) of disability, medication was employed as the sole means of treatment in 60% (n=22) locomotor disabled patients followed by surgery in 12 study participants. However, four individuals could not seek or afford any modality of treatment (Table 3).

Table 3. Course of illness causing existing locomotor disability

Illness	Improving	Non- progressive	Deteriorating
Congenital	0	2	0
Post-traumatic paralysis	0	3	0
Traumatic loss of limb	1	4	1
Degenerative (arthritis, Kyphoscoliosis, etc.)	0	0	9
Poliomyelitis	0	11	0
Post-injection palsy	0	1	1
Cardiovascular accident leading to paralysis	1	0	0
Others	4	1	1
Total (N=40)	**6**	**22**	**12**

On a positive import, the families of the afflicted individuals with locomotor disability in the study population were largely supportive as far as monetary keeping of the special arrangements for the affected ones was concerned. Almost a third of the afflicted population had otherwise supportive caregivers, and they were found to lend mental, financial and materialistic support to their disabled family members. Despite the fact that that depression, apathy, self-pity and mood instability were also common in these individuals (n=14), an encouraging 50% individuals were finding solace in appropriate recreational and physical activities in concordance with the extent of disability. However, a pretty low number of disabled study participants were found to be benefited by government aid, in the form of pension for the indexed individual (n=2) and also locomotor aids were afforded by a very small proportion as well (Table 4).

Table 4. Social, financial and family support determinants among population afflicted with locomotor disability

Determinants	Present N(%)	Absent N(%)	Total N(%)
Depression or mood instability due to illness	14(35.0)	26(65.0)	40(100)
Arrangements made by family	37(92.5)	3(7.5)	40(100)
Monetary support from family members	36(90.0)	4(10.0)	40(100)

Determinants	**Present N(%)**	**Absent N(%)**	**Total N(%)**
Supportive attitude of caregiver toward disabled person	37(92.5)	3(7.5)	40(100)
Self-perception of illness	33(82.5)	7(17.5)	40(100)
Involved in recreational and physical activities	20(50.0)	20(50.0)	40(100)
Use of government aid or pension	2(5.0)	38(95.0)	40(100)
Use of locomotor aids	8(20.0)	32(80.0)	40(100)

Locomotor disability appeared to be significantly more in the oldest age group of the study population ($p<0.001$) and also among males compared to females ($p<0.05$). Among urban and rural populations, the proportions of locomotor disability were comparable at 4.8 and 4.2% respectively ($p>0.05$). Widowed/divorced individuals were found to be significantly more disabled at 12.8% followed by unmarried and married individuals ($p<0.05$). Locomotor disability was also found to be largely associated with unemployment ($p<0.001$) and lower socioeconomic class as well ($p<0.05$) (Table5).

Table 5. Association of locomotor disability with socio-demographic variables

Variables	**Locomotor disability (N= 40)**	
	Present N(%)	**Absent N (%)**
Age in years		
21-30	11 (2.9)	374 (97.1)
31-40	9 (3.9)	221 (96.1)
41-50	6 (3.6)	162 (76.4)
51-60	14 (12)	103 (88)
χ^2= 18.323, df=3, p <0.001		
Gender		
Male	23 (6.7)	221(93.3)
Female	17 (3.1)	539(96.9)
χ^2= 6.588, df=1, p= 0.01		
Residence		
Urban	18(4.8)	354(95.2)
Rural	22 (4.2)	506 (95.8)
χ^2= 0.232., df=1, p= 0.630		
Marital status		
Married	24(3.3)	699(96.7)
Unmarried	10(7.7)	120(92.3)
Widowed/ divorced	6(12.8)	41(87.2)
χ^2= 11.047, df=2, p= 0.001		
Occupation		

Variables	**Locomotor disability (N= 40)**	
	Present N(%)	**Absent N (%)**
Student	2 (3.5)	55 (96.5)
Housewife	11 (2.6)	413 (97.4)
Employed	8 (2.8)	273 (97.2)
Unemployed	19 (13.8)	119 (86.2)
χ^2= 33.471, df=3, p<0.001		
Socioeconomic status (Modified BG Prasad classification 2016)		
I	1 (2.3)	42 (97.7)
II	7 (5.1)	129 (94.9)
III	4 (2)	198 (96)
IV	20 (4.4)	431 (95.6)
V	8 (11.8)	60 (88.2)
χ^2= 12.081, df=4, p= 0.017		

DISCUSSION

In the present study, the prevalence of locomotor disability was observed to be 4.4%. In contrast to our study, others reported locomotor disability prevalence of 1.7% in a large sample population of 4000 individuals (Suganthi and Kandaswamy, 2015) while a prevalence of 11.3% was reported by Ahmad et al. (2017) in their National Health and Morbidity survey.(A) However, comparable to our study, Padhyegurjar and Padhyegurjar (2011) reported a prevalence of 5.59% in urban slums of Mumbai.

As far as finding the causes of locomotor disability is concerned, poliomyelitis or its sequelae accounted for the foremost etiology (27.5%) among the disabled individuals and age-related degenerative conditions like osteoarthritis, kyphoscoliosis, osteoporosis and osteomalacia, etc., accounted for another 22.5% of disability. Suganthi and Kandaswamy (2015), in their cross-sectional study, found congenital, residual paralysis (18.9%) and stroke (16.2%) arthritis (degenerative disease) accounted for the leading causes of locomotor disability while the National Sample Survey Organization reported polio as the leading cause of locomotor disability followed by injuries other than burns (NSSO, 2003). Another study conducted back in 2002, also reported poliomyelitis as the leading cause of disability (Kar, 2002). However, the pattern of locomotor disability found in our study was to an extent disparate from what other researchers observed in rural areas of Burdwan (Kar, 2002), where one lower limb and both lower limbs were afflicted by disability by 53.3% and 14.4%, respectively. The could be due to difference, in their employed operational definitions, and in other determinants like variations in health seeking behavior and government aid facilities could also account for the difference. Also, this study has been conducted in the areas registered under the rural and urban health centers, so, their healthcare needs have been catered to the best possible extent for several years.

Locomotor disability was comparatively more in the age group 51 years and above (12%), and almost comparable in the age groups of 31-40 and 41-50 years. The youngest age group (20-30 years) in the study population was the least afflicted one. Similar pattern was observed in other study where disability prevalence per 1000 was highest in same age group as in our study (Suganthi and

Kandaswamy, 2015). Borker et al. (2008) and Padhyegurjar and Padhyegurjar (2011) also reported similar substantial association between age and locomotor disability. It's a well-known fact that musculoskeletal weakness as well as osteoporosis and other degenerative conditions associated with old age may favor the higher prevalence of locomotor disability in older age groups as well as the association with age that surfaced in the present study.

In this study, males were found to be affected more than females, i.e. 3.1%, with the concerned disability, and the difference proved to be significant as well. Likewise, other researchers also observed higher prevalence of locomotor disability in males as compared to females ($p<0.05$) ((Osman and Rampal, 1989; Suganthi and Kandaswamy, 2015),). However, higher proportion of disability in females (71.22%) was reported by Padhyegurjar and Padhyegurjar (2011).Prevalence of locomotor disability in our study was found to be higher in widowed/divorced individuals (12.8%) followed by that among unmarried (7.7%) and married individuals (3.3%).

Borker et al. (2008) found a significant association between occupation and prevalence of disability. Likewise, this study also found significant association of the concerned disability with nature of employment, as a majority of the individuals with locomotor disability were found to be unemployed when included in the study. Similar association was also reported by de Andrade et al. (2015) in their study. In the lowest socioeconomic class, the locomotor disability was found to be significantly higher (11.8%). Similar observations were reported by other researchers, where they found parallel association between the two variables (Padhyegurjar and Padhyegurjar, 2011). As far as difference between urban and rural populations is concerned, the proportions of locomotor disability were comparable at 4.8% and 4.2%, respectively. ($p>0.05$).

CONCLUSION

From the study, it can be concluded that disability is a significant health concern in the study population. The majority of the causes of disability in all physical domains were potentially preventable and, therefore, it's high time to call for long and short-term targeted interventions. Education, employment and overall socioeconomic status of the community were important determinants of disability and, therefore, need to be taken care of appropriately. As the older population is more at risk, healthcare interventions and programs should address the felt needs as priority. Factors that lead to poor awareness and decreased healthcare utilization, as we found in our study population, should be probed with wider dimensions. We also need more robust attempts to study the efficacy of community-based rehabilitation programs, with focus on felt and received needs. Individuals with multiple disabilities, require multidisciplinary care and provision of all essentially desired services at one point, in order to achieve holistic healthcare.

Community awareness regarding avoidable disability and also about the available government schemes, benefits and programs for the disabled population, should be increased. Measures to ensure vocational rehabilitation for the disabled, suited to individual capacity, should be instituted at different government level health facilities with strong political will. And last, more studies should be conducted in future to assess the extent and impact of disability upon the individuals and their families.

Limitations

The study cannot be taken as completely representative of the urban and rural areas of Aligarh district as the sample size was relatively small. Also, ours being a retrospective study, the complete extent of

disability in an individual could not be assessed, especially for etiologies where the normal history was progressive. Important variables like the effect of disability on families and response of affected families to such disability could not be studied for time and logistic constraints. Mental health, which is an important component of disability, could not be studied.

REFERENCES

Ahmad, N. A. *et al.* (2017) 'Prevalence and determinants of disability among adults in Malaysia: Results from the National Health and Morbidity Survey (NHMS) 2015', *BMC Public Health*, 17(1), p. 756. https://doi.org/10.1186/s12889-017-4793-7

Aligarh District Population Census 2011 Uttar Pradesh literacy sex ratio and density. (2011).

De Andrade, K. R. C. *et al.* (2015) 'Functional disability of adults in Brazil: Prevalence and associated factors', *Revista de Saude Publica*, 49, p. 89. https://doi.org/10.1590/S0034-8910.2015049005945

Barbotte, E. *et al.* (2001) 'Prevalence of impairments, disabilities, handicaps and quality of life in the general population: A review of recent literature', *Bulletin of the World Health Organization*, pp. 1047–1055. doi: 10.1590/S0042-96862001001100008.

Bedirhan Üstün, T. *et al.* (2001) *WHO Multi-country Survey Study on Health and Responsiveness 2000-2001*.

Borker, S. *et al.* (2008) 'Study of Prevalence and Types of Disabilities at Rural Health Centre Mandur – A Community Based Cross Sectional House to House Study in Rural Goa', 19(2), pp. 56–60.

Griggs, D. *et al.* (2013) 'Policy: Sustainable development goals for people and planet', *Nature*. Nature, pp. 305–307. doi: 10.1038/495305a.

Kar, N. (2002) 'Pattern and Causes of Rural Based Locomotor Disabled', *IJPMR*, 13(April 2002), pp. 24–27.

MOSPI (2012) 'Concepts and Definitions', in *Manual on Disabilty Statistics*. Ministry of Statistics and Programme Implementation, Government of India.

NSSO (2003) 'Disabled Persons in India NSS 58tthh round (July – December 2002) NationalNational Sample Survey Organisation Ministry of Statistics and Programme Implementation Government of India', *Report No. 485 (58/26/1)*.

Osman, A. and Rampal, K. G. (1989) 'A study of locomotor disabilities in a Malay community in Kuala Selangor.', *The Medical journal of Malaysia*, 44(1), pp. 69–74.

Padhyegurjar, S. B. and Padhyegurjar, M. S. (2011) 'Cross-Sectional Study of Locomotor Disabilities in Urban Slum Area of Mumbai', *Community Medicine*, 2(3), pp. 492–493.

Suganthi, S. and Kandaswamy, M. (2015) 'Prevalence and Pattern of Locomotor Disability in Rural Puducherry', *International Journal of Current Research and Review*, 7(21), pp. 50–53.

United Nations (2013) *UN Enable : First 50 Years : Chapter II - What is a disability?* common Language for Functioning, Disability and Health: ICF The International Classification of Functioning, Disability and Health', *WHO/EIP/GPE/CAS/01.3*.

WHO (2012) *World report on disability*. https://doi.org/10.1111/j.1741-1130.2011.00320.x