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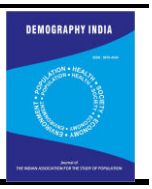

From Impairment to Impact: Economic Consequences of Locomotor Disability in India

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Abstract

Background: Individuals and societies grappling with disability condition experience disproportionate challenges related to health, economic and sustainable development prospects. In developing countries, scientific evidence related to accessing health care and related health care burden among persons with disability is scarce including India. To examine the burden of locomotor disability in India and measure its associated financial burden using nationwide sample survey data.

Methods: This study utilized nationally representative data from Persons with disabilities survey in India under the National Sample Survey, 76th round which covered 1,18,152 households involving 5,76,569 individuals of whom 55,977 reported locomotor disabilities. Descriptive statistics, bivariate analysis, and binary logistic regression models were employed to understand the socio-economic and demographic heterogeneities of locomotor disability, and the related economic burden in India.

Results: The results show that the prevalence of locomotor disability was 12 /1000 person. Around, 8.7 percent of the household's monthly consumption expenditure was spent on locomotor disability related health care. Result shows that almost one fifth (20.6%) of the households faced catastrophic health expenditure due to health care treatment for locomotor disability based on 10% thresholds. About 6.7 percent of the households slipped below poverty line due to locomotor disability health care expenditure.

Conclusion: There persists marked socioeconomic differentials in the healthcare expenditure for locomotor disability. Provision of high quality and affordable health care for treatment of locomotor disability is key to ensure timely diagnosis and treatment and improve the quality of life of the afflicted population.

Keywords

Catastrophic Health Expenditure, Economic Burden, Income loss, locomotor disability, NSS.

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Introduction

Globally, more than one billion people continue to suffer with some form of disabilities, with close to half of them are unable to afford their health care cost, and more than three-fourth of them reside in the low-and middle-income countries(*World Report on Disability*, n.d.). Disability condition is construed as both a human right issue and a development challenge, as individuals with disabilities navigate an array of discrimination, stigma, violence, neglect, prejudice and exclusion in their everyday lives. This translate into access to limited opportunities for educational attainment, extensive barriers/hurdles for seeking health care treatment (owing to financial hardships and indifferent attitude of health care professionals), and lack of livelihood/employment opportunities for earning a decent living(*World Report on Disability*, n.d.). These deprivations present a vicious cycle of poverty, poor-health, unemployment and exclusion among the persons with disabilities in the developing countries(*WHO Policy on Disability*, n.d.). Furthermore, the rising burden of the non-communicable diseases and increasing share of the proportion of elderly population indicates that the number of persons with disability in further likely to increase in the future. These developments pose critical challenges before the global community to integrate the inclusion of disabled population as per the United Nations clarion call for addressing and enacting the Sustainable Development Goals framework 2016-2030(*The-Sustainable-Development-Goals-Report-2019.Pdf*, n.d.). At least five out of 17 SDGs are directly relevant to the inclusion of disabilities relevant concern into SDG plan of actions at the national and sub-national levels. For instance, the SDG-4 focusses on guaranteeing equal and accessible education by building inclusive learning environments and providing the needed assistance for persons with disabilities. Whereas, the SDG-8 emphasize upon promoting inclusive growth, full and productive employment allowing persons with disabilities to fully access the job market. In addition, SDG-10 seeks to emphasize the social, economic and political inclusion of persons with disabilities. Furthermore, SDG-11 focuses on creating accessible cities and water resources, affordable, accessible and sustainable transport systems, providing universal access to safe, inclusive, accessible and green public spaces(*The-Sustainable-Development-Goals-Report-2019.Pdf*, n.d.). On the other hand, SDG-17 underlines the importance of data collection and monitoring of the SDGs, emphasizing on the data disaggregated by disability status.

Recent evidence suggests that most people with disabilities do not have equal access to health care, education, employment opportunities and, do not receive the disability-related services that they require, and experience exclusion from everyday life activities. Locomotor disability" means disability of the bones, joints or muscles leading to substantial restriction of the movement of the limbs or any form of cerebral palsy. Worldwide, 15-20 percent population suffers from disability and nearby 650 million people living with any type of disabilities in the world (*World Report on Disability*, n.d.). According to the census 2011 of India, 2.21% (26.8 million) population are disabled. A recent countrywide survey on disability in India shows that the nearly 2.2% population have suffered any form of disability in India (*NSS Report No. 583*, n.d.).

Environmental factors, such as safe water and sanitation, nutrition, poverty, working conditions, climate, and access to health care also affect health. WHO Commission on Social Determinants of Health has argued that inequality is a major cause of poor health, and hence of disability (*World Report on Disability*,

n.d.). Disability and poverty have a bidirectional link, disability may increase the risk of poverty, and poverty may increase the risk of disability(*On Amartya Sen and The Idea of Justice | Ethics & International Affairs | Cambridge Core*, n.d.) . The onset of disability more likely may lead people with disabilities and their families to experience economic and social disadvantage than those without disability including adverse impact on education, employment, earnings and increased expenditures related to disability(Jenkins & Rigg, 2004; *NSS Report No. 583*, n.d.).

A study done by Mitra et al, 2009(Mitra et al., 2009) highlighted the socioeconomic disparities among person living with disability in developing countries and indicate that a very small section of the persons with disabilities (PWD) get any government support in India(*Disability Estimates in India | Economic and Political Weekly*, 2006). Another study also shows the socioeconomic and regional inequalities in prevalence of disability in India(Bora & Saikia, 2015). High out of pocket expenditure on locomotor disability may impact overall household consumption expenditure if any one of the members suffered from disability(Lee et al., 2016). This study pursues to fill this gap by using recent national representative cross-sectional NSS 76th survey data on the theme 'Persons with Disabilities in India Survey. In this study, we examined the prevalence of locomotor disability and its impact on household's economic burden by selected socioeconomic background of persons who were suffering/suffered due to locomotor disability during survey period in India.

Data and methodology

Data sources

The present study utilised cross-sectional secondary data from 76th round of the National Sample Survey (NSS) on the theme 'Persons with Disabilities in India Survey' which was conducted during July-December 2018. The NSS is a national representative population-based large-scale survey and findings of NSS were commonly used for policy makers and researcher.

Sampling design and sample size

The NSS 76th round survey adopted a stratified two stage sampling design for selecting the respondent using Census 2011 as a sampling frame. The survey covered whole states and union territories of India (NSS 76th, 2018). The NSS 76th round covered 1,18,152 households and 576,569 individuals. Present study covers of a total 55,977 individuals who reported locomotor disability during survey and among them 50,337 were sought the treatment for locomotor disability.

Outcome indicators

Out-of-pocket expenditure

The NSS 76th round survey provided the both the medical expenditure (surgery, equipment, hospitalization, etc.) and non-medical expenditure (transport, lodging, food, etc.) for infrequent expenditure during last 365 days preceding the survey period and usual monthly expenditure (excluding those covered infrequent expenditure during last 365 days**)**. This study used yearly out of pocket expenditure, monthly out of pocket expenditure using standard methods(Kastor & Mohanty, 2018; Saikia et al., 2016; Yadav et al., 2019).

Burden of income loss due to locomotor disability

This study examined the Out-of-Pocket Spending Burden as a percentage of out-of-pocket expenditure on the total household's

consumption expenditure which used in several previous study(Mitra et al., 2009; Sahoo & Madheswaran, 2014).

$$\text{Burden of income loss due to locomotor disability} = \frac{\text{Health Care Expenditure on locomotor disability}}{\text{Households Consumption Expenditure}} * 100$$

Households Monthly Consumption Expenditure

This study used monthly household's consumption expenditure a proxy variable for household income which was used in numerous past studies(Joe & Rajpal, 2018; Kastor & Mohanty, 2018; Sangar et al., 2019) and it is a chosen measure because less chance of being underreported or overreported when compared to income(Kastor & Mohanty, 2018). Based on data given in the NSS 76th round this study calculated the monthly consumer expenditure by

$$Average\ Monthly\ Consumption\ Expenditure = \frac{A + B + C\ \frac{D}{12}}{\text{Total households}}$$

Where A= usual consumer expenditure in a month for household purposes out of purchase, B=imputed value of usual consumption in a month from home grown stock, C= imputed value of usual consumption in a month from wages in kind, free collection, gifts, etc, and D= expenditure on purchase of household durables during last 365 days.

Measuring catastrophic health expenditure (CHE)

A household faced the catastrophic health expenditure if OOPE on healthcare exceed α% threshold of household's total consumption expenditure (HCE)(Kwesiga et al., 2015). Several previous studies have used CHE as 10% threshold(Berki, 1986; Kumar et al., 2015; Russell, 2004; Somkotra & Lagrada, 2009; van Doorslaer et al., 2007; Wagstaff & Doorslaer, 2003; Xu et al., 2007).

This study measures the CHE by two approaches as defined below(Kumar et al., 2015; Wagstaff & Doorslaer, 2003).

First Approach

$$CHE = 1\ if\ \frac{\text{OOPE}}{\text{HCE}} > \alpha_i\ and\ CHE = 0\ if\ \frac{\text{OOPE}}{\text{HCE}} \leq \alpha_i,\ where\ i = 0.1, 0.2 \ldots$$

A household considered to face CHE if out of pocket expenditure (OOPE) exceed 10% and 20% threshold of household's total consumption expenditure (HCE).

Second Approach

$$CHE = 1\ if\ \frac{\text{OOPE}}{\text{PHCE}} > \alpha_j\ otherwise\ CHE = 0\ and\ CHE = 1\ if\ \frac{\text{OOPE}}{2 * \text{PHCE}} \leq \alpha_j\ otherwise\ CHE = 0\ where\ j = 1, 2 \ldots$$

A household considered to face CHE if average out of pocket expenditure (OOPE) exceeds per capita household consumption expenditure (PHCE) of one ($\alpha_j = 1$) and two ($\alpha_j = 2$) household members (17).

Measuring Poverty impact due to locomotor disability health care expenditure

The poverty impact was measured using poverty head count ratio. For calculating the poverty line, this study used per capita household monthly expenditure at INR 972 in rural, and INR 1407 in urban as recommendation by the Rangarajan committee which was based on the 2012 data(Raveendran, 2016).Further, the amount was converted with average amount of September and October 2018 prices with inflation adjustments using the consumer price index because the survey time was July to December 2018(Bajwala et al.,

2019).The poverty impact calculated by following formula:

$$Poverty\ head\ count\ (PHC_i) = 1\ if\ HCE_i \geq PL_i \& (HCE_i - OOPE_i) < PL_i$$

$$Otherwise\ 0,\ where,\ HCE_i\ is\ monthly\ consumption\ expenditure\ of\ i^{th} household$$

The poverty head count ratio (PHCR) is a percentage of households who falls below poverty line due to OOPE(Kumar et al., 2015; Somkotra & Lagrada, 2009; van Doorslaer et al., 2007).

$$Poverty\ head\ count\ ratio(PHCR) = \frac{\sum_{i=1}^{N} \text{HH Impoverishment}_i}{\text{Total households (N)}} \times 100$$

The percentage deficit from the poverty line of those households that have become poor due to OOPE is quantified using poverty gap, and the poverty gap ratio measures the percentage deficit from the poverty line of households that have become poor due to OOPE as a proportion of all the households in the population(Kumar et al., 2015; Raveendran, 2016; van Doorslaer et al., 2007).

$$Povery\ gap\ (PG_i) = \text{HH Impoverishment}_i \times \{PL_i - (HCE_i - OOPE_i)\}/PL_i$$

$$Poverty\ gap\ ratio\ (PGR) = \frac{1}{Total\ HH\ (N)} \sum_{i=1}^{N} Poverty\ gap_i \times 100$$

Socioeconomic explanatory variables

To study the socioeconomic disadvantage associated with the economic burden of households due to locomotor disability the present study included a number of explanatory variables such as age, sex, education, marital status, religion, caste, living arrangement, economic status, Relation to head of the household and place of residence based on previous studies and data availability in data set(Mcdonald et al., n.d.).

Statistical Methods

Statistical analysis, namely descriptive, bivariate and multivariate, was performed to meet the objectives of the study. Descriptive analysis was carried out to describe background characteristics of persons who were reported locomotor disability while bivariate analyses were carried out to access the burden of income loss due to health care expenditure on locomotor disability, CHE and poverty impact on households by selected socioeconomics characteristics. Binary logistic regression analysis was carried out to examine the effect of selected socioeconomics characteristics on CHE and poverty impact. The Sampling weights with clustering were taken care with SVY command(Korn & Graubard, 1990). All expenditures are reported in Indian Rupees.

Results

Sample description of people who suffered from locomotor disability

Table 1 shows prevalence and the selected socioeconomic and demographic characteristics of those persons who reported any type of locomotor disability during the survey period. Around 70 percent of the population suffering from locomotor disability were more than 35 years of age. Among respondents with locomotor disability, majority were males (59%) than females. More than 40 percent of the respondents with locomotor disability were illiterate, and three-fourth were neither working nor available for work. Large proportions of disabled persons were Hindus (82%), 12 percent were Muslims and 5 percent belonged to other religion category. Locomotor disability was found to be higher among respondents who were currently married (57%), and were staying in rural areas (72%).

Table 1 Prevalence and percentage distribution of Person with locomotor disability by selected socioeconomic and demographic characteristics

Background Characteristics	Locomotor disability		
	Sample Distribution		Prevalence/1000 person
	N	%	
Age (in years)			
0-14	5032	8.1	3.8
15-35	12877	22.2	7.3
36-59	18754	33.5	15.4
60 and above	19314	36.1	49.2
Gender			
Male	33374	58.7	14.0
Female	22596	41.2	10.6
Education			
Illiterate	22670	42.7	19.8
Up to Primary	13813	23.4	9.9
Middle	7169	12.2	11.1
Secondary and above	12325	21.6	8.8
Marital Status			
Never married	14287	23.2	6.4
Currently married	31270	57.2	14.2
Others	10420	19.5	44.6
Work status			
Self-employed	7785	14.1	67.1
Regular wage/salaried employee	2367	4.2	79.1
Casual labour	2718	5.1	57.3
Not working but seeking work	595	1.0	65.1
Neither working nor available for work	42697	75.4	0.9
Relation to head of the household			
Self/ Spouse of head	32374	59.3	17.7
Married Child and spouse of child	3249	5.8	6.4
Unmarried Child	10801	17.6	6.5
Grand Child	1296	2.1	2.9
Others family members and relatives	8256	15.0	37.3
Religion			
Hindu	44894	82.1	12.6
Muslim	7458	12.3	10.6
Others	3625	5.5	13.7
Social group			
SC/ST	16712	29.8	13.0
OBC	24219	43.2	12.1
Others	15046	26.8	12.1
MPCE quintile			
Poorest	7653	15.1	11.8
Poorer	10259	19.0	12.4
Middle	10717	19.0	12.8
Richer	12613	21.9	12.8
Richest	14735	24.7	12.1
Living arrangements			
Living with spouse and other household members	25763	47.0	49.0
Living with spouse only	4597	8.5	8.9
Living without spouse but with parents, children, other relatives, non-relatives	23640	40.6	42.4
Living alone	1959	3.6	3.8
Place of residence			
Rural	38250	72.0	12.8
Urban	17727	28.0	11.4
Total	**55977**	**100.0**	**12.4**

Table 2 Average OOPE Expenditure and Burden of income loss due to locomotor disability by selected socioeconomic and demographic characteristics

Background Characteristics	Infrequent expenditure last 365 days (INR)			Usual monthly expenditure (INR)			Total OOPE Monthly			Monthly Consumption Expenditure	Health care burden
	Medical expenditure	*Nonmedical expenditure*	*OOPE*	*Medical expenditure*	*Nonmedical expenditure*	*OOPE*	*Medical expenditure*	*Nonmedical expenditure*	*OOPE*	*HCE*	
Age (in years)											
0-14	9991	1512	11503	1037	234	1271	1870	360	2230	11119	20.1
15-35	27944	2342	30286	1153	294	1447	3482	489	3971	11068	35.9
36-59	13103	1519	14622	1299	276	1575	2391	403	2794	12036	23.2
60 and above	9102	1080	10182	1287	237	1524	2045	327	2372	12707	18.7
Gender											
Male	15382	1608	16990	1300	271	1571	2581	405	2986	11696	25.5
Female	9292	1138	10430	1214	239	1453	1989	333	2322	12790	18.2
Education											
Illiterate	8297	1038	9335	1016	204	1220	1708	290	1998	10613	18.8
Up to Primary	9897	1362	11259	1156	254	1410	1981	368	2349	11446	20.5
Middle	14782	1684	16466	1360	300	1660	2592	441	3033	12652	24.0
Secondary and above	23251	2017	25268	1838	346	2184	3775	514	4289	16185	26.5
Marital Status											
Never married	12650	1714	14364	1200	281	1481	2255	424	2679	11513	23.3
Currently married	14360	1486	15846	1312	264	1576	2509	387	2896	12409	23.3
Others	7926	961	8887	1164	222	1386	1824	302	2126	12101	17.6
Work status											
Self-employed	8826	1138	9964	983	219	1202	1718	314	2032	10769	18.9
Regular wage/salaried employee	45857	2062	47919	1305	300	1604	5126	471	5598	13553	41.3
Casual labour	4638	664	5301	788	184	972	1174	240	1414	8547	16.5
Not working but seeking work	22343	2588	24931	1865	442	2307	3726	658	4384	11605	37.8
Neither working nor available for work	11685	1396	13081	1292	258	1550	2266	374	2640	12395	21.3
Relation to head of the household											
Self/ Spouse of head	12702	1332	14034	1267	249	1516	2326	360	2686	11759	22.8
Married Child and spouse of child	22053	2313	24366	1532	359	1891	3370	552	3922	14519	27.0
Unmarried Child	12697	1740	14437	1140	274	1414	2198	419	2617	10744	24.4
Grand Child	12407	1920	14327	1152	286	1438	2186	446	2632	13657	19.3
Others family members and relatives	10028	1158	11186	1263	248	1511	2099	345	2444	14135	17.3
Religion											
Hindu	12732	1408	14140	1237	253	1490	2298	371	2669	11726	22.8
Muslim	11145	1295	12440	1369	259	1628	2298	367	2665	12592	21.2
Others	12581	1337	13918	1312	272	1584	2361	384	2745	15939	17.2
Social group											
SC/ST	9656	1204	10860	938	198	1136	1743	299	2042	9590	21.3
OBC	10972	1338	12310	1210	250	1460	2124	362	2486	11049	22.5
Others	16550	1584	18134	1558	305	1863	2937	437	3374	15552	21.7
MPCE quintile											
Poorest	6041	818	6859	669	148	817	1172	216	1388	4249	32.7
Poorer	14593	1350	15943	911	190	1101	2127	303	2430	7498	32.4
Middle	10962	1472	12434	1134	255	1389	2048	377	2425	10263	23.6
Richer	13122	1489	14611	1420	287	1707	2513	411	2924	14167	20.6
Richest	17929	1839	19768	2198	406	2604	3693	559	4252	25301	16.8
Living arrangements											
Living with spouse and other household members	15673	1561	17234	1332	267	1599	2638	397	3035	13567	22.4
Living with spouse only	9335	1112	10447	1248	250	1498	2026	342	2368	7293	32.5
Living without spouse but with parents, children, other relatives, non-relatives	10136	1317	11453	1218	255	1473	2063	364	2427	12571	19.3
Living alone	3151	523	3674	691	113	804	954	156	1110	3850	28.8
Place of residence											
Rural	11647	1335	12982	1048	235	1283	2018	346	2364	9525	24.8
Urban	14103	1483	15586	1637	292	1929	2812	416	3228	16980	19.0
Total	**12531**	**1388**	**13919**	**1260**	**256**	**1516**	**2304**	**371**	**2675**	**12208**	**21.9**

Source: Based on the author computation from Persons with Disabilities in India Survey, NSS, 2018.

Notes: *Health Care Burden = [Average monthly out of pocket expenditure (in ₹) /Monthly Consumption Expenditure (MCE in (in ₹)] *100*

Burden of income loss due to locomotor disability

Table 2 shows the average yearly and monthly health care expenditure, proportion of OOPE on health care of total household consumption expenditure and the estimated health care burden by socio-economic and demographic characteristics for locomotor disability. Overall, 22 percent of the household's monthly consumption expenditure was spent for treatment of locomotor disability and further, it showed a huge difference in health care expenditure among different socioeconomic groups. Comparatively, large amount of money was spent for locomotor disability treatment for people who were 15-35 years of age, males, educated upto secondary school, belonged to other caste group, belonged to rich families and residing in urban areas. The total out of pocket expenditure of household due to locomotor disability was 2675 INR. OOPE for locomotor disability related health care was higher for males, those who had secondary and above schooling, currently married, employed as a regular wage/salaried employee, who belonged to Other religious group, and higher standard of living. States like Assam (5.5%), Jharkhand (6.5%) and Kerala (7.6%) reported lower health care burden, whereas, States like Bihar, Himachal Pradesh, and Jammu and Kashmir reported high health care burden (37.6%, 48.5% and 33.9% respectively) (Table 2 and Table S1).

Exposure to Catastrophic Health Expenditure

Table 3 shows the households who faced the CHE due to health care expenditure on locomotor disability using two approaches, first if OOPE exceeded 10% and 20% of the total household's consumption expenditure and second when the average OOPE on healthcare exceeded per capita household consumption expenditure (PHCE) of one and two household members. About 57.1%, and 34.1% of the households enforced to CHE due to treatment care of locomotor disability based on 10% and 20% thresholds respectively while 29.7% of the household's health care expenditure exceeded PHCE of one household member, and in 13.1% households of two household members due to treatment care expenditure on locomotor disability.

To find the association between the socioeconomic characteristics and CHE (10% thresholds), a multivariable logistic regression was run, where the dependent variable is binary in nature. Results indicate that age, sex, educational status, marital status, relation to head of the household and place of residence were significantly associated with CHE. Respondents in 0-14 years of age were more likely to face CHE as compared to their counterparts. The odds of female households to be pushed to CHE was more as compared to those of males. The likelihood of households facing CHE was more where respondents were educated as compared to those who were illiterate. The odds of incurring CHE for locomotor disability were significantly higher for Other Backward Classes and Others social groups. The likelihood of CHE due to locomotor disability was four times higher among respondents who were living alone [OR 3.85; 95% CI 3.04-4.88] and two times higher among respondents living with spouse only [OR 2.34; 95% CI 2.11-2.58]. Further, odds of incurring CHE were significantly lower among households residing in urban areas [OR 0.85; 95% 0.81-0.90].

Table 3 Percentage of households exposed to CHE and determinants of CHE by selected background characteristics

Background Characteristics	Percentage of households exposed to CHE				Determinants of CHE *at 10 % Threshold (At α=0.1)*		
	First approach		*Second approach*		Odds ratio	P-Value	95 % CI
	At α=0.1	At α=0.2	At α=1	At α=2			
Age (in years)							
0-14	58.4	34.6	36.0	16.1	1.000		
15-35	57.8	35.2	33.1	16.0	0.879	0.011	[0.797-0.970]
36-59	57.7	34.7	28.8	12.8	0.907	0.141	[0.797-1.032]
60 and above	56.1	33.0	27.4	11.5	0.762	0.000	[0.664-0.874]
Gender							
Male	59.6	36.7	32.5	15.3	1.000		
Female	54.2	31.0	26.6	10.7	0.800	0.000	[0.759-0.843]
Education							
Illiterate	55.2	31.7	28.4	12.1	1.000		
Up to Primary	57.0	33.6	29.1	12.3	1.040	0.192	[0.980-1.105]
Middle	59.9	34.5	30.6	13.7	1.198	0.000	[1.103-1.302]
Secondary and above	59.8	39.6	33.0	16.1	1.418	0.000	[1.318-1.527]
Marital Status							
Never married	57.0	33.3	32.1	14.1	1.000		
Currently married	59.3	36.5	31.5	14.5	1.972	0.000	[1.615-2.408]
Others	52.0	29.3	23.2	8.8	1.549	0.000	[1.330-1.805]
Work status							
Self-employed	49.5	28.6	23.9	10.0	1.000		
Regular wage/salaried employee	51.9	37.4	30.6	18.6	1.253	0.016	[1.042-1.507]
Casual labour	50.1	28.8	18.0	6.4	1.007	0.934	[0.847-1.196]
Not working but seeking work	48.1	30.3	30.4	11.7	1.410	0.039	[1.017-1.955]
Neither working nor available for work	58.2	34.7	30.6	13.4	1.773	0.000	[1.609-1.955]
Relation to head of the household							
Self/ Spouse of head	59.0	36.2	27.8	12.2	1.000		
Married Child and spouse of child	56.5	32.9	39.1	19.5	0.908	0.161	[0.794-1.039]
Unmarried Child	57.7	34.1	31.0	13.1	1.409	0.000	[1.205-1.647]
Grand Child	60.8	36.3	47.2	24.4	1.470	0.000	[1.211-1.784]
Others family members and relatives	49.7	29.8	28.7	12.1	0.946	0.203	[0.868-1.030]
Religion							
Hindu	58.0	35.4	30.4	13.5	1.000		
Muslim	54.0	31.9	31.7	13.9	0.928	0.034	[0.866-0.994]
Others	53.6	25.6	20.6	8.1	0.804	0.000	[0.739-0.875]
Social group							
SC/ST	55.8	32.3	28.7	12.6	1.000		
OBC	57.8	34.9	30.8	13.6	1.209	0.000	[1.136-1.287]
Others	57.2	34.3	29.1	12.9	1.217	0.000	[1.138-1.301]
MPCE quintile							
Poorest	62.3	35.8	39.3	19.0	1.000		
Poorer	59.9	37.9	36.7	17.9	0.921	0.114	[0.832-1.019]
Middle	58.3	35.3	33.0	15.1	0.840	0.000	[0.761-0.926]
Richer	57.3	34.3	30.1	12.6	0.775	0.000	[0.706-0.852]
Richest	53.7	31.2	22.1	8.8	0.659	0.000	[0.598-0.726]
Living Arrangements							
Living with spouse and other household members	56.0	32.9	34.0	16.2	1.000		
Living with spouse only	73.1	50.2	18.0	5.3	2.341	0.000	[2.119-2.587]
Living without spouse but with parents, children, other relatives, non-relatives	53.9	31.0	29.8	12.7	1.246	0.017	[1.040-1.493]
Living alone	75.6	48.9	4.4	0.5	3.853	0.000	[3.041-4.881]
Place of residence							
Rural	59.5	35.7	31.5	14.4	1.000		
Urban	52.8	31.1	26.6	10.8	0.859	0.000	[0.813-0.908]
Total	57.1	34.1	29.7	13.1			

Table 4 Households falling poverty line (poverty headcount ratio) and average deficit from the poverty line (poverty gap ratio) due to out-of-pocket health payments by selected background characteristics

	Poverty Impact due to health care expenditure		Determinants of becoming poor from non-poor due to health care expenditure		
Background Characteristics	Poverty head count ratio (%)	Poverty gap ratio (%)	Odds ratio	P-Value	95 % CI
Age (in years)					
0-14	19.2	6.2	1.000		
15-35	26.9	31.4	0.958	0.509	[0.845-1.086]
36-59	20.2	14.4	0.860	0.072	[0.730-1.013]
60 and above	18.8	9.4	0.665	0.000	[0.559-0.792]
Gender					
Male	22.1	16.9	1.000		
Female	18.0	9.3	0.839	0.000	[0.785-0.897]
Education					
Illiterate	20.4	10.1	1.000		
Up to Primary	19.1	8.7	0.967	0.392	[0.895-1.044]
Middle	20.6	15.1	1.084	0.127	[0.977-1.202]
Secondary and above	20.6	23.7	1.114	0.021	[1.016-1.221]
Marital Status					
Never married	20.4	10.9	1.000		
Currently married	20.9	15.7	2.011	0.000	[1.590-2.543]
Others	18.2	8.6	1.497	0.000	[1.221-1.835]
Work status					
Self-employed	11.9	1.5	1.000		
Regular wage/salaried employee	6.6	0.7	1.203	0.132	[0.945-1.530]
Casual labour	15.1	2.9	1.029	0.800	[0.820-1.292]
Not working but seeking work	7.9	0.3	1.354	0.155	[0.891-2.058]
Neither working nor available for work	12.0	4.8	1.467	0.000	[1.289-1.669]
Relation to head of the household					
Self/ Spouse of head	20.5	14.9	1.000		
Married Child and spouse of child	20.8	16.9	0.863	0.092	[0.728-1.024]
Unmarried Child	20.6	11.7	1.206	0.071	[0.984-1.478]
Grand Child	22.4	6.4	1.176	0.196	[0.919-1.507]
Others family members and relatives	18.3	8.0	0.964	0.538	[0.858-1.082]
Religion					
Hindu	21.0	14.2	1.000		
Muslim	22.2	9.9	1.024	0.582	[0.939-1.117]
Others	10.4	9.7	0.646	0.000	[0.571-0.730]
Social group					
SC/ST	19.8	11.0	1.000		
OBC	22.2	12.0	1.089	0.030	[1.008-1.178]
Others	17.9	16.4	0.944	0.186	[0.866-1.028]
MPCE quintile					
Poor	0.0	0.0	1.000		
Middle	37.9	15.5	2.907	0.000	[2.656-3.182]
Rich	30.1	23.0	1.250	0.000	[1.148-1.361]
Living Arrangements					
Living with spouse and other household members	20.1	14.3	1.000		
Living with spouse only	24.6	22.8	1.494	0.000	[1.340-1.667]
Living without spouse but with parents, children, other relatives, non-relatives	18.7	9.0	1.267	0.028	[1.025-1.566]
Living alone	24.2	16.0	2.153	0.000	[1.664-2.786]
Place of residence					
Rural	22.3	15.1	1.000		
Urban	16.3	10.0	0.755	0.000	[0.704-0.809]
Total	20.2	13.2			

Source: Based on the author computation from Persons with Disabilities in India Survey, NSS, 2018

Poverty impact due to healthcare expenditure on locomotor disability

Table 4 describes the households falling into poverty line (poverty headcount ratio) and average deficit from the poverty line (poverty gap ratio) due to OOP health payments for the treatment of locomotor disability. About 20.2% of the households fall below the poverty line due to treatment care expenditure for locomotor disability. Average percentage shortfall in income from the poverty line due to locomotor disability treatment care expenditure was 13.2% and further significant differentials in the poverty gap ratio were observed across different socioeconomic characteristics of the persons who were suffered/suffering from locomotor disability. Table 4 also presents the results of logistic regression for predicting the effect of different socioeconomic and demographic characteristics on impoverishment due to OOPE on health care. The odds of falling below the poverty line due to health care expenditure for locomotor disability was significantly higher for households where respondents were currently married (OR 2.011; 95% CI 1.590–2.543), divorced/separated (OR1.497; 95% CI 1.221–1.835), neither working nor available for work (OR 1.467; 95% CI1.289–1.669). As compared to poor households, those households which belonged to middle wealth quintile were 2.9 times and rich households were 1.2 times significantly more likely to fall below poverty line due to health care. The likelihood of falling below poverty line were significantly lower for household who were living with spouse and other household member, residing in urban areas, belonged to Other religious category, females and aged above 60 years as compared to their counterparts.

Discussion

The present study examined the household's economic burden due to treatment care expenditure among those persons who were suffering from locomotor disability in India during the survey period. This paper examines the economic burden of out-of-pocket expenditure (OOPE) on households of persons with locomotor disability based on data in the NSS 76th round. The definition of OOPE and healthcare burden is total medical and non-medical expenditure and share of healthcare expenditure in total household consumption expenditure respectively(Mitra et al., 2009; Ringel & Sturm, 2001; Sahoo & Madheswaran, 2014).

Findings from other studies suggest that being male, having health insurance, having a higher household income, and having a smaller household size were independently associated with higher OOP health expenditures while self-employed people were found to have lower OOP health expenditures. Adults with disability were significantly more likely to experience a high burden of OOP expenditure(Mitra et al., 2017). Study conducted in Vietnam(Nguyen et al., 2021) found strong association between OOP health expenditure and economic burden of healthcare. Similarly, another study focusing on children with disabilities found that high health expenditure and higher burden to households as compared to households with children without disabilities (Pham et al., 2013). Consistent with previous studies, other socioeconomic factors, including gender, household size, household income, employment status. Adults with disabilities were older, less likely to be employed, experienced worse education, and were poorer(*World Report on Disability*, n.d.).

It is important to highlight the fact that even after the introduction of government social health insurance schemes, there is high prevalence of catastrophic expenditure due to disability. Therefore, there is a need to tailor disability-specific insurance schemes designed for disabled people.

Overall, 57% and 34% of the households faced CHE for health care at the 10% threshold and 20% threshold, respectively, while 30% and 13% of the households had a catastrophic impact based on the modified approach of average per capita and average two capita monthly consumption expenditure, respectively. Our study results reveal that males, currently married/divorced/separated, respondents who were educated more than primary school, non-SC/ST, those who were living alone or with spouse only and rural households, have higher catastrophic burden and resultant impoverishment in India. Catastrophic expenditure was found to be highest for people who were staying alone at 10% thresholds (76%) for health care.

In country like India, where healthcare is not provided free, people with disability have various health needs and are subject to higher risk of socioeconomic burden due to illness/disability. Studies suggest that after controlling for socio-economic and demographic characteristics, the impact of disability on OOP health care expenditure is large/high(Brinda et al., 2012; Mitra et al., 2009; Pumkam et al., 2013; Urquieta-Salomón et al., 2008). The OOP health care expenditure forces households to 'cut their consumption of other basic needs, trigger productive asset sales or high levels of debt, and lead to impoverishment'[34]. Studies indicate that households sacrifice their income and savings, sell assets, take high-interest loans, borrow money from family and friends or, withdraw children from schools to work to pay medical bills. As compared to people without disabilities, people with disability experience higher economic burden and are at increased risk of healthcare induced poverty.

Strengths and limitations of the study

The strength of this study is the national representative data on the theme of persons living with disability in India and therefore result of this study can be generalized the study followed all the standardized definitions and steps calculating the economic burden due to locomotor disability health care expenditure.

Despite the fact this study has several strengths, there are some limitations as well. First, recall bias is a major limitation of expenditure data. Second, we cannot make any causal inferences as our study is based on the cross-sectional survey data. Third, we do not have data on the OOP expenditure of households without disabled person/s, therefore, we cannot do a comparative analysis.

Conclusion

The present study presents compelling findings related to disproportionate burden of health care expenditure among people suffering from the locomotor disability in India. Our findings confirmed that owing to the substantial OOP health care expenditure, several households become impoverished and face insecure economics situations. It is becoming apparent that demographic and socioeconomic factors, including age, gender, place of residence, caste, and living arrangement, are key determinants of out-of-pocket health spending susceptibility among the locomotor-disabled people in India. Therefore, there is vital need for disability-specific health insurance policies to cater for the health care expenditure of socioeconomically weaker section of the population, men and those residing in the rural areas.

Program Implications

Findings from this study provide evidence for policies and economic support to people with disabilities to avoid medical impoverishment due to their health conditions. The growing burden of locomotor disability throughout the country demands urgent need for providing healthcare services to help the sufferers. The programs and policies to provide support to locomotor disability must function in a mission mode providing support to even the poor and educationally deprived households of the society.

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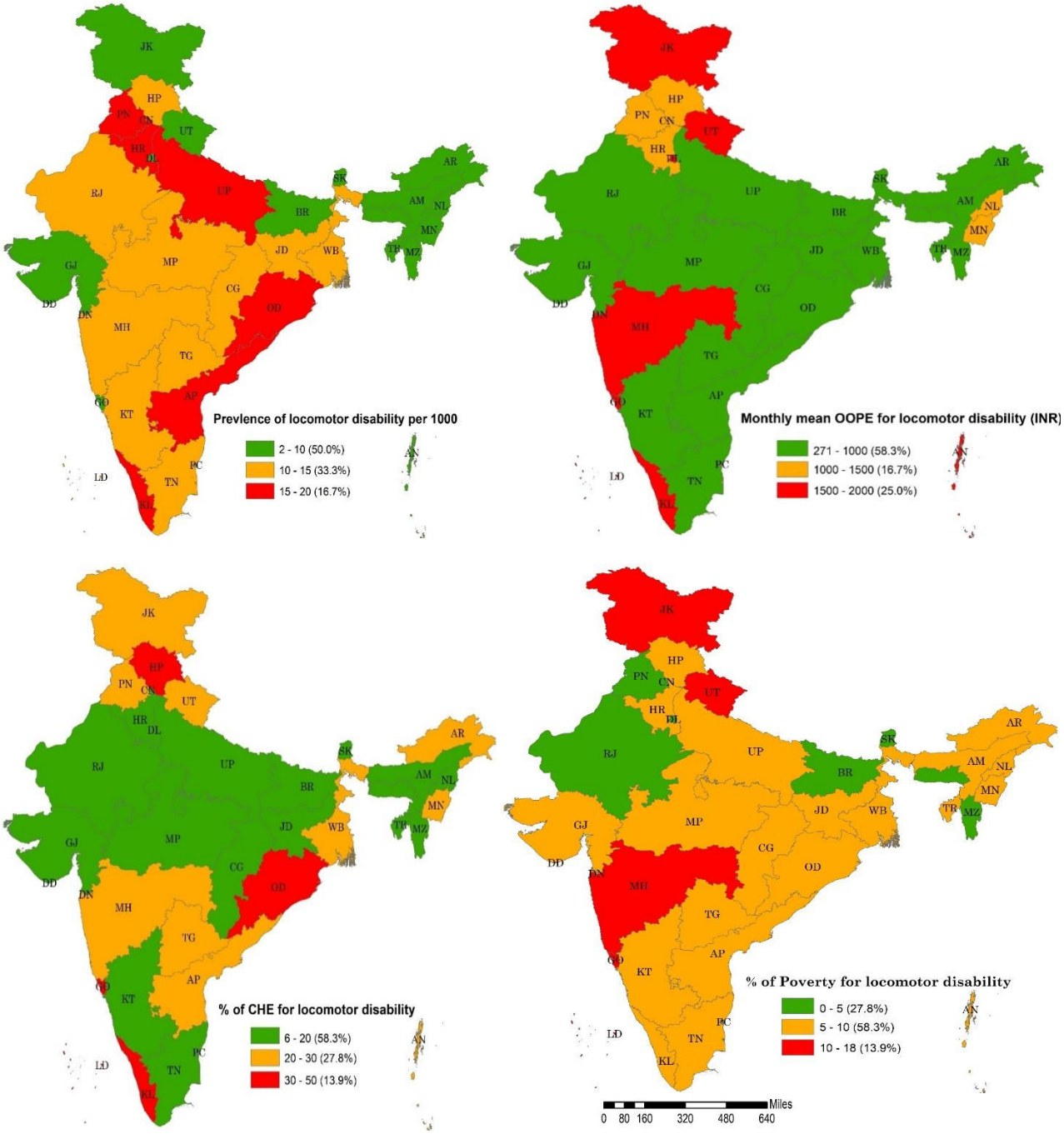

JK=Jammu and Kashmir. HP=Himachal Pradesh. PN=Punjab. HR=Haryana. UT=Uttarakhand. RJ=Rajasthan. UP=Uttar Pradesh. MP=Madhya Pradesh. AS=Assam. BR=Bihar. CH=Chhattisgarh. DL=Delhi. GJ=Gujarat. JH=Jharkhand. AP=Andhra Pradesh. KT=Karnataka. KL=Kerala. MH=Maharashtra. OD=Odisha. TN=Tamil Nadu. WB=West Bengal. TL=Telangana. CN=Chandigarh. GT=Gujarat. DD=Dadra and Nagar Haveli. AM=Assam. MN=Manipur. AR=Arunachal Pradesh. NL=Nagaland. MZ=Mizoram. TR=Tripura MH=Meghalaya. GO=Goa. PC=Pondicherry. SK=Sikkim. AN=Andaman and Nicobar Islands.

Figure 1 States wise variation in prevalence of locomotor disability, out of pocket expenditure, catastrophic health expenditure and poverty impact.

Table S1 Average OOPE Expenditure and Burden of income loss due to locomotor disability by selected socioeconomic and demographic characteristics.

Background Characteristics	Infrequent expenditure last 365 days (INR)			Usual monthly expenditure (INR)			Total OOPE Monthly			Monthly Consumption Expenditure	Health care burden (%)
	Medical expenditure	*Nonmedical expenditure*	*OOPE*	*Medical expenditure*	*Nonmedical expenditure*	*OOPE*	*Medical expenditure*	*Nonmedical expenditure*	*OOPE*	*HCE*	
Andaman and Nicobar Islands	10465	2089	12553	1504	412	1916	2376	586	2962	13288	22.3
Andhra Pradesh	11548	2922	14470	1637	472	2109	2599	715	3314	12230	27.1
Arunachal Pradesh	8615	902	9517	1074	198	1272	1791	273	2065	17926	11.5
Assam	366	1094	1460	1582	467	2049	1613	558	2171	39441	5.5
Bihar	26228	2510	28738	2585	484	3069	4771	693	5464	14513	37.6
Chandigarh	13027	1196	14223	1755	358	2113	2841	458	3298	21795	15.1
Chhattisgarh	12631	2780	15411	1794	438	2232	2846	670	3516	23922	14.7
Dadra and Nagar Haveli	20738	2772	23509	1481	361	1842	3209	592	3801	14887	25.5
Daman and Diu	10879	1318	12197	1357	241	1598	2263	351	2614	10406	25.1
Goa	5427	1030	6458	625	138	763	1077	224	1301	8259	15.8
Gujarat	6207	3682	9889	676	157	834	1193	464	1658	11725	14.1
Haryana	2835	1912	4748	505	801	1306	742	960	1702	9986	17.0
Himachal Pradesh	32629	5414	38043	2415	328	2743	5134	779	5913	12200	48.5
Jammu and Kashmir	17548	6971	24518	634	705	1340	2097	1286	3383	10001	33.9
Jharkhand	4420	1626	6046	910	224	1134	1279	360	1638	25393	6.5
Karnataka	9154	1851	11005	1123	265	1388	1886	419	2305	10498	21.9
Kerala	1954	1194	3148	447	196	643	610	296	905	11987	7.6
Lakshadweep	11707	1866	13574	1034	218	1252	2010	374	2383	10693	22.3
Madhya Pradesh	6999	1092	8091	1287	200	1488	1871	291	2162	11122	19.4
Maharashtra	13117	1288	14405	1003	198	1201	2096	305	2401	9983	24.1
Manipur	8536	1073	9609	871	180	1051	1582	270	1851	7273	25.4
Meghalaya	13164	1403	14567	1250	154	1404	2347	271	2618	9320	28.0
Mizoram	11069	1907	12975	1221	325	1547	2144	484	2628	10702	24.6
Nagaland	13882	1258	15140	1408	306	1714	2565	411	2976	14842	20.1
Delhi	17924	694	18618	876	138	1014	2370	196	2566	12179	21.1
Puducherry	2868	36	2904	2037	564	2601	2276	567	2843	10864	26.2
Punjab	23520	1522	25042	1325	276	1601	3285	403	3688	13219	27.9
Rajasthan	9418	1101	10520	1267	214	1481	2052	305	2358	10291	23.0
Sikkim	13880	1135	15016	1059	248	1307	2216	342	2558	12155	21.1
Tamil Nadu	7325	2190	9515	1943	610	2553	2554	792	3346	14310	23.4
Telangana	24206	8499	32705	1640	795	2435	3657	1503	5160	15942	32.4
Tripura	12435	1341	13775	1551	343	1894	2587	455	3042	13378	22.7
Uttar Pradesh	16533	1925	18458	948	265	1213	2326	426	2751	10982	25.1
Uttarakhand	14673	3815	18489	2450	572	3022	3673	890	4563	13216	34.5
West Bengal	19638	4312	23951	1047	414	1461	2684	773	3457	15634	22.1
Odisha	9565	820	10385	1471	217	1688	2268	286	2554	11932	21.4
India	**12531**	**1388**	**13919**	**1260**	**256**	**1516**	**2304**	**371**	**2675**	**12208**	**21.9**

Source: Based on the author computation from Persons with Disabilities in India Survey, NSS, 2018

Notes: *Health Care Burden = [Average monthly out of pocket expenditure (in ₹) /Monthly Consumption Expenditure (MCE in (in ₹)] *100*