Original Articles

Prevalence of disability in Tamil Nadu, India

BANUREKHA VELAYUTHAM, BOOPATHI KANGUSAMY, SANJAY MEHENDALE

ABSTRACT

Background. Information on disability is essential for the government to formulate policies, allocate adequate resources and implement appropriate programmes. We aimed to estimate the prevalence of disability and describe the types of disability by gender, age and geographical regions in Tamil Nadu, India.

Methods. We analysed the 2011 Census cross-sectional survey data of Tamil Nadu. Age-adjusted disability rates and disability rates per 100 000 population were calculated.

Results. There were 1 179 963 disabled individuals in Tamil Nadu in 2011, a disability rate of 1635 per 100 000 population. Disability in movement, hearing and sight individually accounted for 24%, 19% and 11% of the total disability, respectively. Sixteen districts had disability rates above the state average. As age advanced, disability rates increased; the highest disability rate of 2533 per 100 000 was among people aged 60 years and above. The disability rates were higher in males compared to females (1819 *v.* 1451 per 100 000). Rural areas had higher disability areas compared to urban (1670 *v.* 1599 per 100 000). Currently married, working populations and literate populations had lower disability rates. Disability rate in the Scheduled Castes was higher at 1763 per 100 000 compared to the Scheduled Tribes and other social groups. Multiple disability was high in the age groups 0–19 years and 60 years and above.

Conclusion. Physical or mental disability was observed in 1.6% of the population of Tamil Nadu. Research is warranted to identify underlying causes and interventions to reduce the burden of disability in the state.

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INTRODUCTION

Disability is an umbrella term for impairments, activity limitations and participation restrictions.[1] Based on the 2010 global population estimates, about 15% of the world's population is estimated to live with some form of disability.[2] The Global Burden of Disease Report has estimated that around 975 million (19.4%) persons aged ≥15 years live with some disability with nearly 190 million (3.8%) having 'severe disability' such as quadriplegia, severe depression or blindness.[3] In India, information on physical and mental disability is collected during the census once every 10 years and during periodic surveys by the National Sample Survey Office (NSSO).

Each state in India according to the Constitution has the responsibility, within the limits of its economic capacity and development, to make effective provision for securing the right to work, education and public assistance in case of unemployment, old age, sickness and disablement.[4] Moreover, people with disabilities suffer undue hardships and they continue to be marginalized, discriminated and abused.[4] It is essential that access to affordable healthcare and rehabilitation be offered to persons with disability. The state of Tamil Nadu has a better healthcare system, which is reflected in its better performance in key health indicators compared to other states.[5] There is a need to quantify the burden of disability since this information is essential for the government to formulate policies, allocate adequate resources and implement appropriate intervention programmes for persons with disability.

According to the 2011 Census of India, 1 in every 50 Indian citizens (2.2%) is either physically or mentally disabled.[6] We aimed to measure the prevalence of disability and describe types of disability in Tamil Nadu based on the Census 2011 data. We also estimated the distribution of disabilities by gender, age and geographical regions.

METHODS

The Census in India is conducted once every 10 years. The 2011 Census questionnaire had three questions pertaining to disability which captured information on (i) presence of mental or physical disability (Yes 1, No 2); (ii) disability type (seeing 1, hearing 2, speech 3, movement 4, mental retardation 5, mental illness 6, any other 7, multiple 8); and (iii) the nature of disabilities (maximum of 3) in people in whom the response to the second question was 'multiple disability'.[7]

The procedure for enumeration of disability in the census survey and definitions used for various types of disability are outlined in the *Manual on Disability Statistics*.[7]

Data analysis

Disability rates per 100 000 population were calculated. The 2011 data from C20 Table pertaining to Tamil Nadu was used for the numerator which consisted of the number of disabled persons by type of disability, age, gender and type of residence (rural/urban).[8]

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The denominator was obtained from C-14 five-year age group data by residence and sex from Census 2011. This table provides information on the number of people in Tamil Nadu as well as in districts in various age groups (5 yearly) starting from 0–4 years, up to 75–79 years and 85+ years. In addition, information on residence (rural/urban) and gender was used.[9] The following tables from Census 2011 were used to calculate disability rates related to literacy level, marital status, work status and social group: PCA-33, DDW-3300C-02-fer3-MDDS, DISAB03-0000, DDW-0000C-21, DDW-0000C-23, DISAB04SC-0000, DISAB04ST-0000.[10]

Age-adjusted disability rates calculated by the direct standardization method were used for comparison and ranking of the districts with respect to each type of disability. The 2011 population of Tamil Nadu with the following age intervals: 0–4 years, 5–9 years, 10–19 years, 20–29 years, 30–39 years, 40–49 years, 50–59 years, 60–69 years, 70–79 years, 80+ years, and age not stated was used as the standard population for calculating the age-adjusted disability rates. The data were analysed using Microsoft Excel windows 2007.

RESULTS

There were 1 179 963 individuals with disability in Tamil Nadu in 2011 accounting for a disability rate of 1635 per 100 000 population (1.6%; 2011 population of Tamil Nadu: 72 147 030). The disability in movement, hearing and seeing was most predominant with rates of 398, 305 and 177 per 100 000, respectively. Disability rates in mental retardation, multiple disability, speech and mental illness were 140, 129, 111 and 46, respectively. Disability in movement, hearing and seeing individually accounted for 24%, 19% and 11% of the total disability burden. In addition, mental retardation, multiple disability, disability in speech and mental illness constituted 9%, 8%, 7% and 3% of the total disability, respectively. The remaining about 20% of disability was due to other causes.

Disability rates in districts of Tamil Nadu

Of the 32 districts, age-standardized disability rates in 16 districts were above the state average of 1635 per 100 000 population and ranged from 2071 to 1652 per 100 000 population (Table I and Fig. 1). Thiruvarur, Thiruvallur and Ariyalur districts had the highest disability rates of 2071, 2028 and 1991 per 100 000 population, respectively. Salem and Karur districts had the lowest rates of 1247 and 1294 per 100 000 population, respectively.

Disability in seeing, hearing, movement and speech was highest in Thiruvarur (238 per 100 000), Chennai (501 per 100 000), Thoothukkudi (512 per 100 000) and Perambalur (198 per 100 000), respectively (Table I). Mental retardation (183 per

TABLE I. Age-standardized disability rates per 100 000 according to type of disability in districts of Tamil Nadu, 2011

District	Disability rate per 100 000							
	Seeing	Hearing	Speech	Movement	Mental retardation	Mental illness	Multiple	Any other
Thiruvallur	204	499	97	358	132	36	135	566
Chennai	226	**501**	86	298	119	57	103	539
Kancheepuram	186	341	93	382	140	44	119	442
Vellore	167	261	116	407	138	42	136	309
Tiruvanamalai	186	249	137	403	136	36	134	278
Viluppuram	190	312	121	480	120	36	131	337
Salem	137	180	96	390	115	33	107	189
Namakkal	174	253	101	447	131	34	114	228
Erode	161	246	111	408	133	49	139	261
Nilgiris	152	208	85	343	139	42	117	268
Dindigul	139	327	133	335	129	38	115	304
Karur	143	170	113	408	130	43	129	157
Tiruchirappalli	162	196	109	407	162	47	128	263
Perambalur	190	368	**198**	393	146	37	136	371
Ariyalur	231	357	192	496	148	43	**171**	354
Cuddalore	220	372	101	362	137	32	119	310
Nagapattinam	200	258	114	471	**183**	69	167	283
Thiruvarur	**238**	446	149	486	162	61	160	369
Thanjavur	148	225	107	414	166	58	139	248
Pudukkottai	164	217	124	386	150	53	156	277
Sivaganga	177	342	120	447	168	52	163	327
Madurai	181	275	100	380	144	42	108	316
Theni	148	317	155	411	145	40	129	333
Virudhunagar	148	223	118	428	150	43	141	235
Ramanathapuram	186	349	124	390	160	49	134	342
Thoothukkudi	212	303	115	**512**	172	76	141	262
Tirunelveli	169	272	109	477	170	60	135	280
Kanniyakumari	145	295	106	454	178	**86**	153	447
Dharmapuri	203	269	136	507	127	38	156	279
Krishnagiri	172	270	126	416	115	30	116	313
Coimbatore	168	352	92	288	124	38	102	324
Tiruppur	123	245	94	310	108	39	119	300
Overall	177	305	111	398	140	46	129	330

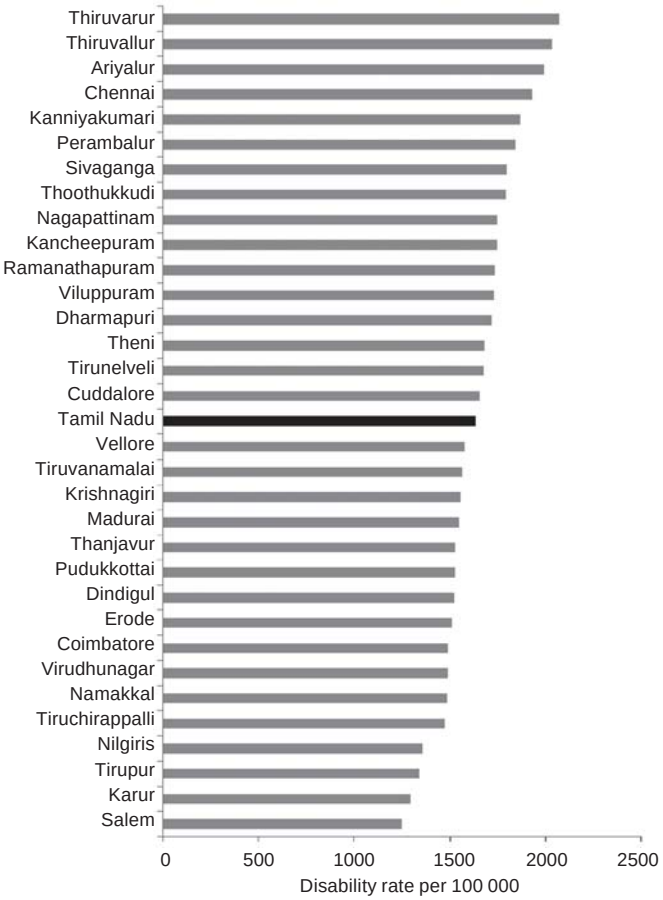

FIG 1. Age-standardized disability rates per 100 000 in the districts of Tamil Nadu, 2011

100 000) and mental illness (86 per 100 000) were high in Nagapattinam and Kanniyakumari, respectively. Ariyalur had a high multiple disability rate (171 per 100 000; Table I).

Disability rates by demographic variables

Disability rates increased as age advanced with the highest rate of 2533 per 100 000 among people aged 60 years and above (Table II). The disability rates were higher in males and in rural areas (Table II). The disability rates in males and females in the rural areas of India were 1857 *v.* 1482 per 100 000, respectively compared to 1779 *v.* 1418 per 100 000 in the urban areas. The disability rate among the Scheduled Castes was higher (1763 per 100 000) compared to the Scheduled Tribes and other social groups. Higher disability rates were also observed among illiterates (2285 per 100 000), non-working (1879 per 100 000) and widowed, separated and divorced (2448 per 100 000) people (Table II). Analysis of disabilities by age (categorized as 0–19 years, 20–39 years, 40–59 years, and 60 years and above), gender and type of residence (urban/rural) showed that disability rates were higher in rural areas and there was a male preponderance in disability rates in both rural and urban areas across different age groups.

Types of disability by age, gender and residence

Disability rates associated with movement, hearing and seeing increased as age advanced with rates of 714, 607 and 444 per 100 000, respectively in the age group 60 years and above (Table III). Mental retardation decreased with advancing age and was highest with 183 per 100 000 in the age group 0–19 years. Mental illness was high in the age group 40–59 years with a disability rate of 79 per 100 000. Disability in speech was high among the 20–39-year-olds and decreased thereafter. Multiple disabilities were more common in extremes of age with rates of 141 and 155 per 100 000 in the age groups 0–19 years and ≥60 years, respectively.

TABLE II. Disability rates by basic demographic variables in Tamil Nadu, 2011

Demographic characteristic		Total population	Total disabled	Disability rate per 100 000
Age in years	0–19	23 261 295	278 294	1196
	20–39	24 727 305	413 517	1672
	40–59	16 581 867	296 352	1787
	≥60	7 509 758	190 254	2533
	Age not stated	66 805	1546	2314
Gender	Male	36 137 975	657 418	1819
	Female	36 009 055	522 545	1451
Location of residence	Rural	37 229 590	621 745	1670
	Urban	34 917 440	558 218	1599
Social groups	Scheduled Caste	14 438 445	254 486	1763
	Scheduled Tribe	794 697	11 535	1451
	Others	56 913 888	913 942	1606
Marital status	Never married	29 652 678	516 471	1742
	Currently married	37 415 737	539 146	1441
	Others (widowed, separated, divorced)	5 078 615	124 346	2448
Literacy level	Literate	51 837507	715 822	1381
	Illiterate	20 309 523	464 141	2285
Work status	Working	32 884 681	442 032	1344
	Non-working	39 262 349	737 931	1879

TABLE III. Differences in type of disability based on age groups

Type of disability	0–19 years (*n*=23 261 295)		20–39 years (*n*=24 727 305)		40–59 years (*n*=16 581 867)		60 years and above (*n*=7 509 758)		Not stated (*n*=66 805)	
	Total disabled	Per 100 000	Total disabled	Per 100 000	Total disabled	Per 100 000	Total disabled	Per 100 000	Total disabled	Per 100 000
Movement	37 169	160	114 144	462	82 151	495	53 602	714	175	262
Seeing	25 033	108	34 660	140	34 272	207	33 315	444	125	187
Hearing	51 313	221	65 869	266	57 201	345	45 590	607	268	401
Speech	24 173	104	30 409	123	18 100	109	7311	97	84	126
Mental retardation	42 509	183	38 975	158	15 331	92	3851	51	181	271
Mental illness	2317	10	13 169	53	13 141	79	4204	56	133	199
Multiple	32 914	141	31 139	126	17 045	103	11 608	155	90	135
Any other	62 866	270	85 152	344	59 111	356	30 773	410	490	733

Disability in movement, seeing, speech and multiple disabilities showed male and rural predominance across all age categories (Table IV and Fig. 2). Hearing-related disability was higher in urban areas across age groups 0–59 years and thereafter there was a rural predominance in those ≥60 years. Both genders had almost similar hearing-related disability rates across all age categories. Mental retardation was higher in males, had a rural predominance up to 39 years and after that was higher in urban areas. Mental illness was almost similar in rural and urban areas in all age groups except in those in the age group 20–39 years, which had a rural predominance (57 *v*. 49 per 100 000). Male predominance was observed in mental illness both in rural and urban areas up to 59 years of age with a female predominance thereafter.

DISCUSSION

We observed that about 1 in every 100 person in Tamil Nadu (1635 per 100 000 persons) is either physically or mentally disabled based on the data of Census 2011. This is similar to the analysis of 14 household surveys from 13 developing countries, which suggested that 1%–2% of the population have disabilities.[11] In the USA, overall 22.2% of adults reported any disability in 2013.[12] However, the prevalence rates for disability are not strictly comparable owing to the differences in the definition used. The percentage of disabled population to total population in Tamil Nadu (1.6%) is lower compared to other states and Union Territories.[6] The states of Jammu and Kashmir, Sikkim and Odisha had 2.9% disabled in their population.[6] Assam, Meghalaya and Mizoram had lower disabled population (<1.5%) compared to

TABLE IV. Disability rates by age, gender and location of residence (urban/rural) according to the type of disability in Tamil Nadu, 2011

Type of disability	Site	Gender	0–19 years		20–39 years		40–59 years		≥60 years		Not stated	
			Total disabled	Per 100 000	Total disabled	Per 100 000	Total disabled	Per 100 000	Total disabled	Per 100 000	Total disabled	Per 100 000
Movement	Rural	Total	22 537	181	60 747	490	43 664	525	31 576	784	100	279
		Male	13 720	212	36 600	599	28 438	690	19 431	984	53	285
		Female	8817	147	24 147	384	15 226	363	12 145	591	47	272
	Urban	Total	14 632	135	53 397	433	38 487	466	22 026	633	75	243
		Male	8949	162	31 170	519	25 290	600	13 783	817	42	262
		Female	5683	108	22 227	352	13 197	326	8243	460	33	222
Seeing	Rural	Total	13 422	108	18 151	146	18 615	224	21 400	531	62	173
		Male	7337	114	9884	162	10 025	243	10 561	535	26	140
		Female	6085	102	8267	131	8590	204	10 839	527	36	209
	Urban	Total	11 611	107	16 509	134	15 657	190	11 915	342	63	204
		Male	6275	114	8867	148	8775	208	5955	353	39	243
		Female	5336	101	7642	121	6882	170	5960	332	24	161
Hearing	Rural	Total	24 549	197	30 200	244	27 795	334	24 979	620	98	273
		Male	12 865	199	14 787	242	13 751	333	12 283	622	53	285
		Female	11 684	195	15 413	245	14 044	335	12 696	618	45	261
	Urban	Total	26 764	248	35 669	289	29 406	356	20 611	592	170	550
		Male	13 547	245	17 475	291	14 939	354	10 110	599	69	430
		Female	13 217	250	18 194	288	14 467	358	10 501	586	101	679
Speech	Rural	Total	14 785	119	17 973	145	10 237	123	4113	102	52	145
		Male	8552	132	9550	156	5690	138	2337	118	27	145
		Female	6233	104	8423	134	4547	108	1776	86	25	145
	Urban	Total	9388	87	12 436	101	7863	95	3198	92	32	103
		Male	5386	97	6685	111	4472	106	1791	106	22	137
		Female	4002	76	5751	91	3391	84	1407	78	10	67
Mental retardation	Rural	Total	23 308	187	19 720	159	7418	89	1953	48	123	343
		Male	13 213	205	10 341	169	3902	95	1005	51	57	306
		Female	10 095	168	9379	149	3516	84	948	46	66	382
	Urban	Total	19 201	178	19 255	156	7913	96	1898	55	58	188
		Male	11 369	206	10 675	178	4326	103	931	55	35	218
		Female	7832	148	8580	136	3587	89	967	54	23	155
Mental illness	Rural	Total	1222	10	7080	57	6698	81	2240	56	104	290
		Male	697	11	3817	63	3421	83	1025	52	49	263
		Female	525	9	3263	52	3277	78	1215	59	55	319
	Urban	Total	1095	10	6089	49	6443	78	1964	56	29	94
		Male	643	12	3528	59	3595	85	913	54	19	118
		Female	452	9	2561	41	2848	70	1051	59	10	67
Multiple disabilities	Rural	Total	19 488	157	17 297	140	9094	109	7046	175	55	153
		Male	11 305	175	9744	160	5356	130	3823	194	33	177
		Female	8183	137	7553	120	3738	89	3223	157	22	127
	Urban	Total	13 426	124	13 842	112	7951	96	4562	131	35	113
		Male	7881	143	7611	127	4784	113	2543	151	16	100
		Female	5545	105	6231	99	3167	78	2019	113	19	128

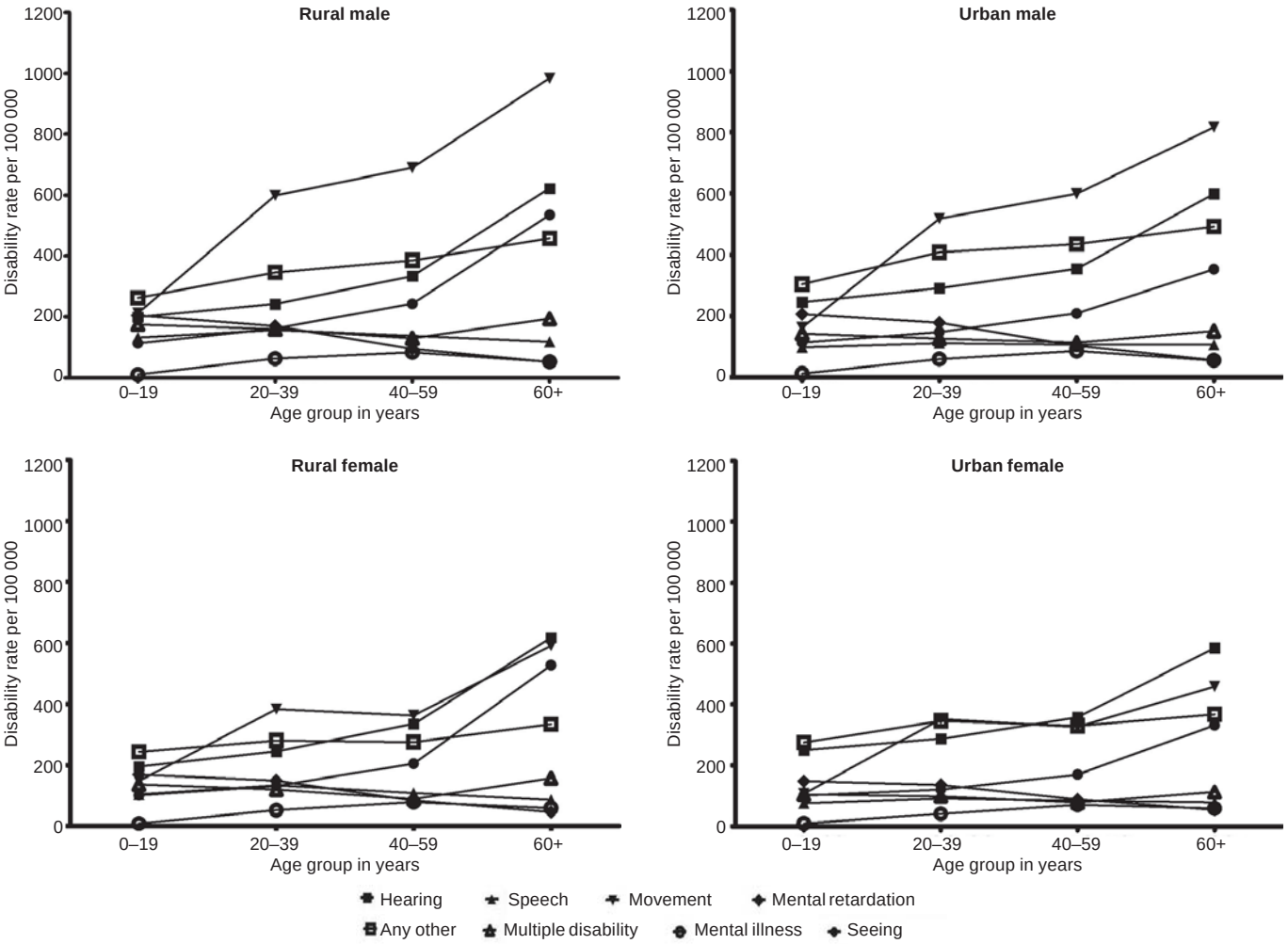

FIG 2. Disability rates by age, gender and location of residence (urban/rural) according to the type of disability in Tamil Nadu, 2011

Tamil Nadu.[6] The reason for Tamil Nadu to have a lower proportion of population with disability could be better healthcare facilities and access to healthcare compared to that of other states. However, this needs further exploration and research for varied disability rates across different states in India.

The higher disability rates in rural areas compared to urban (1.6% *v.* 1.5%) in Tamil Nadu reflect the overall Indian scenario, which showed disability rates of 2.2% *v.* 2.1%.[6] It is possible that higher disability rates in rural areas are due to lack of adequate facilities and healthcare. In addition, geographical variation, i.e. urban or rural in the distribution of types of disability observed in our analysis needs to be explored further to generate evidence that would help in designing locally relevant interventions. The observation of male predominance in disabilities with 1.8% and 1.7% disability in rural and urban areas, respectively in this analysis is similar to that of higher disability rates in India among males which was 2.4% and 2.3% in rural and urban areas, respectively compared to that of females.[6] This highlights the need to address the gender and rural/urban angle in the disability burden through appropriate strategies for concerned groups.

Comparison of the prevalence of different types of disability observed in Tamil Nadu with that of India showed that disability in mental retardation to be higher in Tamil Nadu (140 *v.* 124 per 100 000).[8,9] The reasons for mental retardation documented in the 2002 NSSO survey of India were serious illness or head injury during childhood, pregnancy and birth-related effects and hereditary disorders.[13] Additional research is essential in mental retardation especially in districts such as Nagapattinam, Kanniyakumari, Thoothukkudi and Tirunelveli which had mental retardation rates beyond 170 per 100 000.

Old age, other illnesses and injury featured among the main reasons for movement, visual, hearing, speech disability in the country-wide NSSO survey 2002 on disability.[13] The other reasons identified in the survey according to the type of disability were poliomyelitis, cerebral palsy, leprosy, stroke, arthritis for movement-related disability; cataract, corneal opacity, glaucoma, eye diseases for visual disability; ear discharge; noise-induced hearing loss for disability related to hearing and voice disorder, paralysis, injury, mental retardation, mental illness, cleft palate/lip resulting in speech-related disability.[13] Understanding the causes of disability is important to plan appropriate preventive strategies and research is warranted in this area.

'Elderly' is defined as a person who is 60 years or more in age.[14] We observed the burden of disability to be high in the elderly in Tamil Nadu. This would probably increase since the proportion of the elderly (≥60 years) in India by 2026 is projected to be 12.17% of the overall population compared to 8.6% in 2011.[15] The observation of high burden of mental retardation, multiple disability

in the age group of 0–19 years (children) and movement, hearing-related disability between 20 and 59 years (economically productive age group) in our analysis is a matter of concern. Identification of factors and predictors of disability in these categories through research studies is critical.

Persons with disability could have been disadvantaged in getting educated, employed or married and this might be reflecting high disability rates in those sections of the population observed in our analysis. Lower educational attainment among adults with disabilities has been reported from developing countries.[11] In the USA, lower prevalence of disability was observed in adults with higher levels of education and among those employed.[12] A study from the Organization for Economic Co-operation and Development (OECD) in 27 countries reported that persons with disability have significantly lower levels of education and working-age persons with disabilities experience significant labour market disadvantage than working-age persons without disabilities.[16] The lives of disabled people are affected by poor health outcomes, lower educational achievements, less economic participation, high rates of poverty and increased dependency.[2] The Government of Tamil Nadu is responsive to the needs of the disabled and offers many schemes and scholarships for rehabilitation of the disabled. These include special education, training, reservation of jobs/seats in educational institutions, financial assistance, assistive devices and care centres.[17] However, a focus group multicentered study in India done in Chennai, Bengaluru and Delhi among persons with physical, mental and alcohol/drug-related disability has revealed problems pertaining to discrimination, poor awareness regarding social programmes and under-utilization of the available resources to be primarily related to stigmatization of individuals with specific disabilities.[18] The programme managers have to address the barriers to healthcare, rehabilitation, education, employment, support and assistance services and create enabling environments.[2] Rehabilitation builds human capacity and there should be emphasis on early intervention.[2] Integrating rehabilitation into primary and secondary healthcare settings can improve its availability. In addition, training programmes for capacity building of rehabilitation professionals are essential to ensure a continuum of care.[2] Access to assistive technologies has to be improved in terms of availability and affordability.

In India, the Chief Commissioner for Persons with Disabilities at the Centre and a Commissioner in each state are appointed to safeguard the rights of persons with disabilities.[19] In addition, the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke Programme, National Mental Health Programme, National Programme for Prevention and Control of Deafness, National Programme for Health Care of the Elderly and National Blindness Control Programme have a major role in providing preventive, curative and rehabilitative services to reduce the burden of disability in their areas of operation. Early detection and management of comorbid illness and visual impairment, prevention of injury and addressing noise pollution could potentially prevent disabilities.

The strengths of the Census survey include its implementation through universal reach and use of standardized protocols in data collection. However, there are limitations due to non-response and under-reporting might result due to inability to capture the complex and sensitive information related to disability. To estimate the current burden of disability in Tamil Nadu, appropriate statistical modelling will have to be applied to the Census data of 2011.

Disability rates reflect the overall health status of the population. We have presented the estimates of disability prevalence, geographical and gender differentials in the disability rates in Tamil Nadu. To understand the reasons, additional research studies will have to be planned. Implementing effective and focused strategies for prevention will help to reduce the burden of disability in Tamil Nadu in the years to come.

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Conflict of interest. None declared.

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