Prevalence of Physical Disability among Urban Community-dwelling Adults in Sri Lanka

Inoka E Weerasinghe[1*], P Fonseka[2], S D Dharmaratne[3], J A M S Jayatilake[4]

1. Senior Registrar, Community Medicine, Ministry of Health, Sri Lanka, & Visiting Scholar, Johns Hopkins Centre for Injury Research and Policy, Johns Hopkins Bloomberg School of Public Health, USA
2. Former Professor, Department of Community Medicine, University of Ruhuna and Sri Jayawardanapura, Sri Lanka
3. Associate Professor and Consultant Community Physician, Department of Community Medicine, Faculty of Medicine, University of Peradeniya, Sri Lanka
4. Senior Lecturer, Department of Oral Medicine, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka & a Visiting Scientist in University of Maryland Dental School, Baltimore, USA.

ABSTRACT

Purpose: *Assessment of physical disability at the community level is essential for rehabilitation and supply of services. This study aimed to assess the prevalence of physical disability among adults in an urban community in Sri Lanka.*

Methods: *A descriptive cross-sectional study was conducted among 2460 adults (18 -59 years of age) who were selected using cluster sampling. Physical disability was measured using a Physical Impairment Examination Tool (PIET) and World Health Organisation Disability Assessment Schedule II (WHODAS II).*

Results: *Prevalence of physical disability was 4.2% (95% CI= 3.5-5.1). Physical disability was higher among people in the age group of 40-59 years (6.5%, n=64) than among those in the age group of 18-39 years (2.6%, n=39) (P<0.05). Physical disability was more prevalent among females (4.4%, 95% CI= 4.2-4.6) than males (2.6%, 95% CI: 2.4-2.8), and among Tamils (7.8%, 95% CI=5.1%-10.5%) than Sinhalese (3.3%, 95% CI=2.4%- 4.1%). It was higher among those who were divorced/widowed (58.3%, 95% CI=30.4- 86.2) than among married people (3.6%, 95% CI=2.8- 4.4). The prevalence of physical disability was 7.1% (95% CI=4.6- 9.5) among people with primary education, 4.5% (95% CI=3.4- 5.6) among those with secondary education, and 1.8% (95% CI=0.8-2.8) among those with tertiary education. It was higher among the unemployed (7.2%, 95% CI=5.7-8.7) than the employed (1.8%, 95% CI=1.1-2.5). Age, gender, ethnicity, marital status, education levels and employment status were significantly associated with physical disability.*

* **Corresponding Author:** Inoka E Weerasinghe, 624, N. Broadway, Baltimore MD, 21205, USA. Email:eranganie@yahoo.com

Conclusions: *Though the prevalence of physical disability appears to be higher among Sri Lankan adults than among people in developed countries, it is less than among people in other South-East Asian countries. Associations with socio-demographic variables were consistent with other studies.*

Key words: *Impairment, activity limitation, participation restriction, disability measurement*

INTRODUCTION

Not only the frequency and severity of diseases, but also the quality of life is an important aspect of one's health (WHO, 1997). Disability has a direct impact on quality of life (Edwards, 2003; Benitha&Tikly, 2007; Verbunt, 2008; Amini, 2010). Nearly every person may experience a temporary or permanent disability sometime in life, and this happens more often with advancing age.

Initially, disability was described using a religious model, which later became a medical model and, over the years, changed to a social model; until currently, a human rights-based model is in use (Clapton & Fitzgerald, 2009; WHO, 2011).

The International Classification of Functioning, Disability and Health

The International Classification of Functioning, Disability and Health (ICF), which is the latest classification used by the World Health Organisation (WHO), has advanced the understanding and measurement of disability. The ICF provides a uniform and standard language to define health and health-related states as health or health-related domains described from the perspectives of the body, individual and society. Health-related domains include 2 basic aspects: (1) Body Functions and Structures, and (2) Activities and Participation. According to the ICF, the term "disability" has been used to cover impairments, activity limitations or participation restrictions in which disability is conceptualised as a multidimensional experience for the person involved, with much emphasis on environmental and personal factors (WHO, 2001).

Physical impairments are the problems pertaining to the musculoskeletal and movement-related functions. Activity limitations and participation restrictions may result from physical impairments. This scenario is defined as physical disability in the WHO model of disability. In this context, activity limitations are the difficulties in carrying out day-to-day activities such as walking, transferring,

eating, dressing, bathing, etc. Participation restrictions are the problems a person experiences in life situations like participating in religious activities and social gatherings, and forming interpersonal relationships (WHO, 2001). The World Health Organisation Disability Assessment Schedule version II (WHODAS II), which was developed according to the WHO model and the ICF classification (WHO, 2004), is an internationally accepted study instrument to assess the activity limitations and participation restrictions of an individual.

Physical Disability in Sri Lanka

An early disability survey conducted in Sri Lanka, together with the National Census in 2001 (Department of Census and Statistics, 2003), included both physical and mental disabilities. However, this study covered only a part of the country, and had no disability data pertaining to the homeless and those who lived in non-housing units. Accordingly, the prevalence of physical disability was estimated to be 0.9%, with an overall disability prevalence of 1.6% in Sri Lanka (Department of Census and Statistics, 2009).

The Consumer Finances and Socio-Economic Survey Report 2003/2004 of the Central Bank of Sri Lanka reported the prevalence of physical disability in Sri Lanka as 1.7% (Central Bank of Sri Lanka, 2005). This survey also excluded 3 districts. Accordingly, the prevalence of limb disability was taken to be 1.1%, while the overall disability was 2.3%. The earlier Consumer Finances and Socio-Economic Survey done in 1996/97 showed that the physical disability prevalence was 1.5% (Central Bank of Sri Lanka, 2005). These findings indicate that, over time,there has been a rise in the number of persons with physical disability in Sri Lanka. Furthermore, many of the different methodologies used in the studies cited above are not based on an internationally comparable classification of disabilities such as the ICF classification.

Objective

Therefore, the primary objective of this study was to describe, on the basis of the ICF classification, the prevalence of physical disability among persons in the age group of 18-59 years, living in the Kandy Municipality Council (KMC) area in the Central province of Sri Lanka.

METHOD

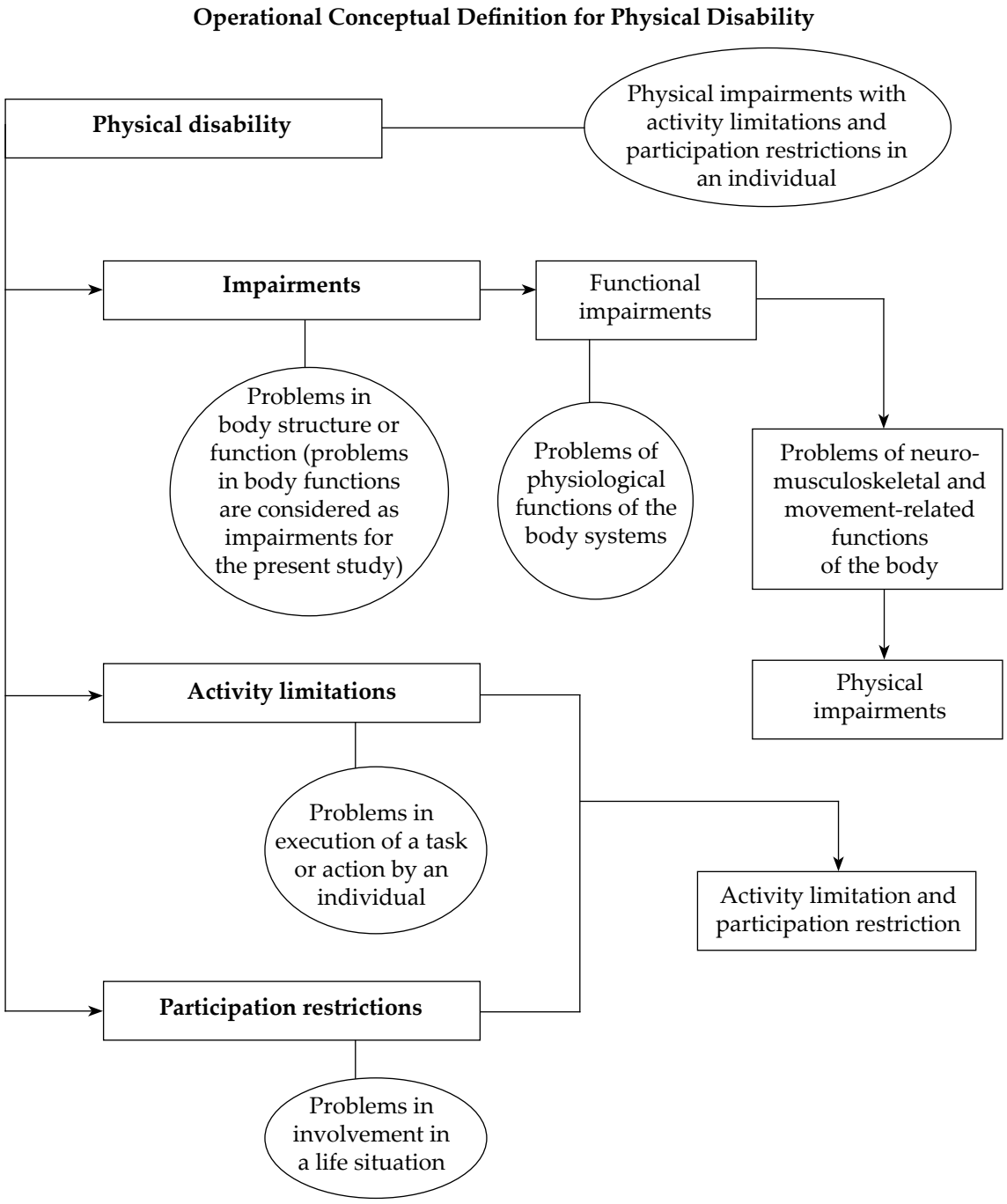
Definition of Physical Disability

A comprehensive literature review was done using "PubMed", "Google", "BMJ Advanced Search" and "JSTOR Archive" since 1988. The key words used in the search were "physical disability definition", "physical disability" and "disability". Several definitions of physical disability were found (Wen & Fortune, 1999;WHO, 2001; Japan International Cooperation Agency, 2002). With the help of a multidisciplinary panel of experts, the operationalised definition was emphasised. In view of the number of definitions, it was decided to use a modelled definition based on the WHO definition of disability (ICF classification-based) for the current study.

Working Definition of Physical Disability

In accordance with the WHO definition of disability, functional problems were selected as impairments. Problems of neuro-musculoskeletal and movement-related functions which are classified under ICF were considered as physical impairments. Physical disability was defined as the occurrence of physical impairment, with activity limitations and participation restrictions, in an individual. Schematic presentation of the working definition of physical disability in the present study is given in Figure 1.

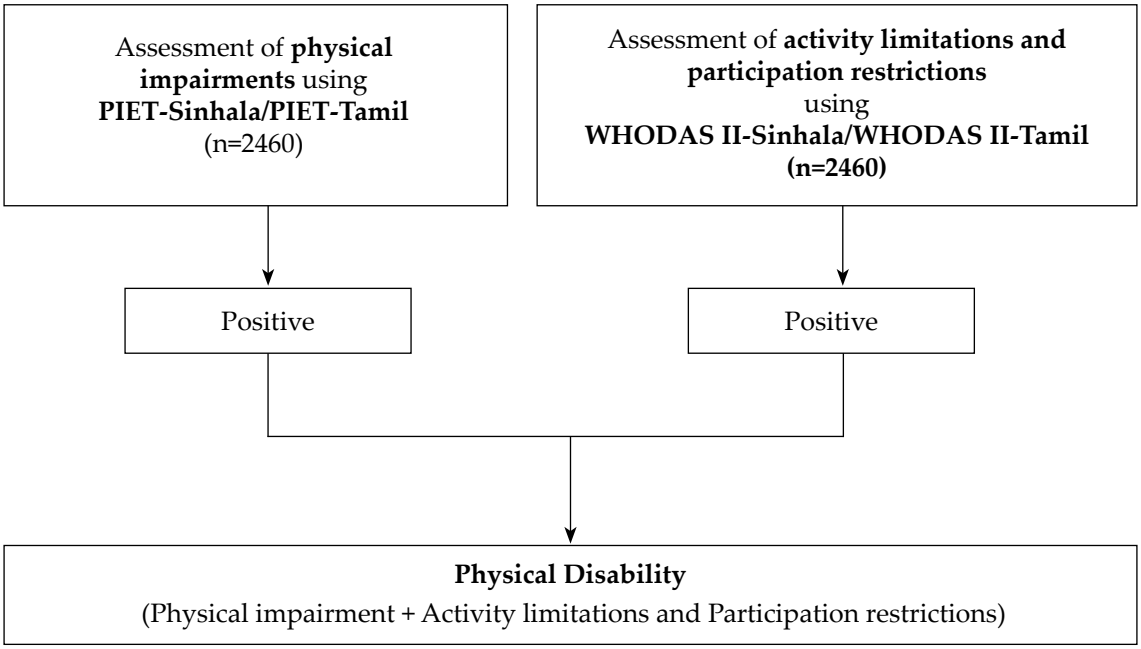
Figure 1: Schematic presentation of Working Definition of Physical Disability (WHO, 2001)



Assessment of Physical Disability

Assessment of physical disability in this study is presented in Figure 2.

Figure 2: Assessment of Physical Disability



Study Setting

The study setting was Kandy Municipal Council area (KMC), located in Kandy District of the Central Province of Sri Lanka. KMC spreads over three Divisional Secretariat areas and consists of 47 GN divisions. The approximately 26.8 square kilometre area has a population of 110,049 persons, which amounts to 8.6% of the total population of Kandy District and 0.6% of the Sri Lankan population. The population density is 4106 persons per square kilometre (Kandy Municipality Council, 2006).

The population of persons between 18 - 59 years of age in the KMC area is reported to be 61,415, or 55.8% of the total KMC population. Among them, 30,817 were males and 30,598 were females (Department of Census and Statistics, 2005).

Study Population

The study population consisted of all adults between 18 -59 years of age, residing in the KMC area on the date of the interview.

Sample Size

Sample size was calculated using z value of 1.96, an expected prevalence of physical disability of 0.03 (3%)(Department of Census & Statistics, 2003; Central Bank of Sri Lanka, 2005), and a required level of precision of 0.01 (Lwanga & Lameshow, 1991). A design effect of 2 was used. The final sample size computed was 2236 persons. In order to overcome non-response, it was decided to oversample at the primary sampling unit level. Therefore, 10% was added to the sample size and the adjusted final sample size was 2460 adults.

Sampling Technique

Cluster sampling technique was used from the 45 GN divisions in the KMC area (Kandy Municipal Council, 2006). As the population varied from one GN area to another, clusters were selected according to the probability proportionate to the size from each GN division. The number of individuals in a single cluster was decided according to the number of individuals who could be assessed in one working day (approximately 25 individuals per day). Finally there were 99 clusters.

The Electoral Register was used as the sampling frame. It consisted of an enumerated list of persons in a GN division according to the roads along which they resided. An individual was randomly selected from the Electoral Register within the GN division, and that person's household was taken as the starting point.

From the starting point, households were visited at random until 25 eligible individuals were identified. Business premises, schools, boarding houses, places of worship and elderly/disability/orphan homes were excluded. If it was not possible to cover the required number of households on the same road, a second set of households was selected in the same manner by turning to the right.

If no one in the household met the selection criteria, the next household was visited. If a house was closed or the individuals between 18 and 59 years of age were not at home, a second visit was made on the following day. If the second visit was again unsuccessful, another individual was randomly selected and enrolled for the study. When another cluster was to be identified from the same

GN division, another road (which had not been selected earlier)was chosen at random and a similar procedure was followed.

Data was collected during the weekends, on public holidays and on weekday evenings. If a study participant was unavailable at his/her residence during the first visit, at least 2 more attempts were made to meet him/her.

All persons aged between 18 and 59 years, who were residents in the KMC area for a continuous period of at least six months and were able to understand and speak Sinhala or Tamil language, were included in the study.

Those who were pregnant, acutely ill or with severe psychiatric illness were excluded.

Study Instruments

Study instruments were WHODAS II (Sinhala and Tamil) (Samarasekera, 2009; Sousa, 2010), Physical Impairment Examination Tool (PIET) and Questionnaire-1 (Q-1)(Sinhala and Tamil). WHODASII-Tamil version was validated to Sri Lanka. Q-1 was an interviewer-administered questionnaire to collect the participants' demographic and socio-economic information. Both Q-1 and PIET were also validated and pre-tested.

Based on the score of WHODASII for each question, a single cumulative score was calculated. The score ranged from 12 - 60, and a value of 13 or more indicated the presence of activity limitations and participation restrictions or WHODAS II "positive" (WHO, 2010).

In the absence of a tool to identify physical impairments, Physical Impairment Examination Tool (PIET) was developed using GALS locomotor screen (Doherty, 1992), 2-minute orthopaedic screening examination (Gomez, 1993), and expert opinion. PIET is a twenty-item physical examination. The items in PIET are given in Appendix 1.

If at least one of the physical examination items was found to be positive, it was considered to be PIET "positive" or physically impaired.

If both the WHODAS II and PIET were positive, the respondent was categorised as a person with physical disability.

Data Collection

There were 3 groups of data collectors. Each group consisted of two medically qualified personnel and one research helper who had completed secondary education.

Prior to carrying out the study, all data collectors were given training in performing clinical examination to detect physical impairments. They were also given a three-day field data collection training programme prior to the commencement of the field work. An interviewer guide was provided to each data collector.

After obtaining informed written consent, the Q-1, WHODAS II and PIET were administered to all eligible study participants. Data collection was carried out from 1st May to 30th July, 2011. Interviews were conducted again in the case of incomplete questionnaires.

Data Analysis

Data was coded and entered into a Microsoft Excel data sheet and was analysed by SPSS (version 17.0) statistical software. Descriptive analysis of socio-demographic profile and other associated factors was performed initially, and the prevalence of physical disability was calculated.

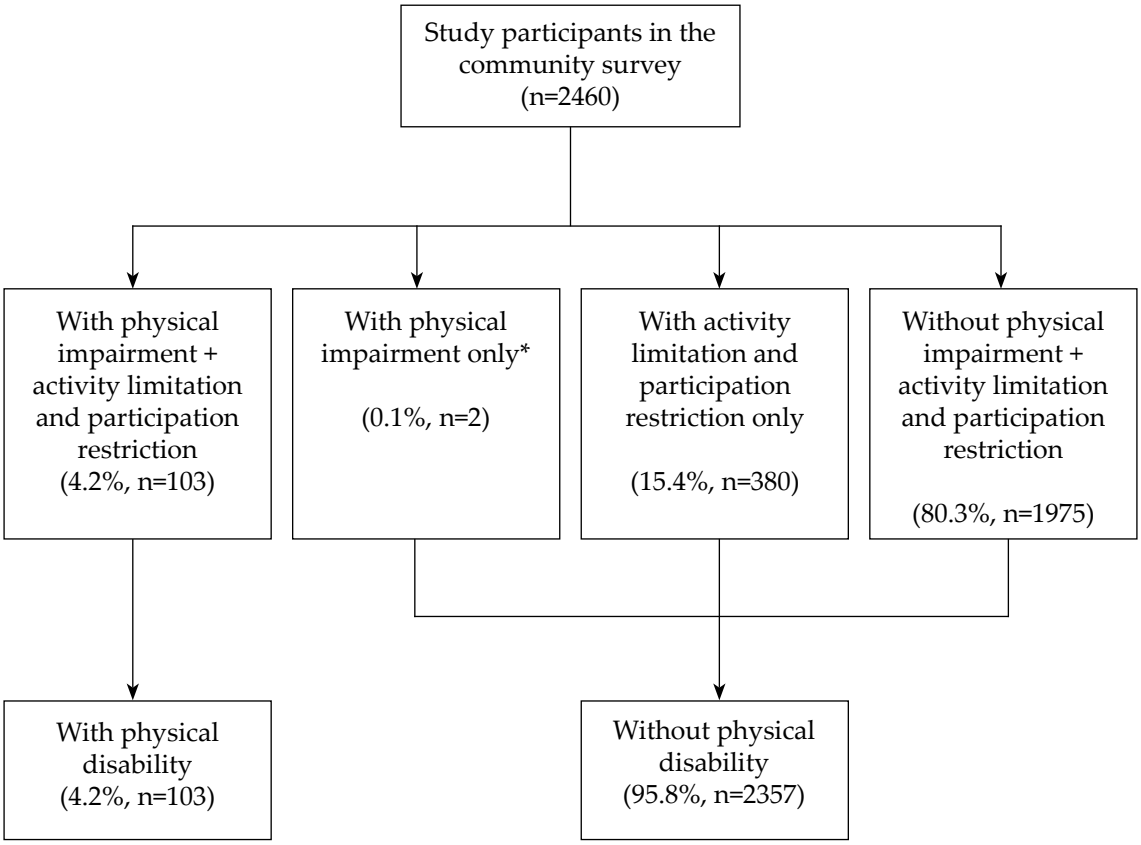
Both crude and standardised period prevalence rates for physical disability were determined. Univariate descriptions were presented for prevalence of physical disability and its associated factors. Counts and percentages were employed to describe the frequency distributions, while Chi-square test was used for comparisons of discrete variables.

RESULTS

Assessment of Physical Disability

The assessment of physical disability using WHODAS II and PIET is presented in Figure 3. Those who were positive according to both PIET and WHODAS II were considered to have physical disability.

Figure 3: Assessment of Physical Disability in the Community Survey using WHODAS II and PIET



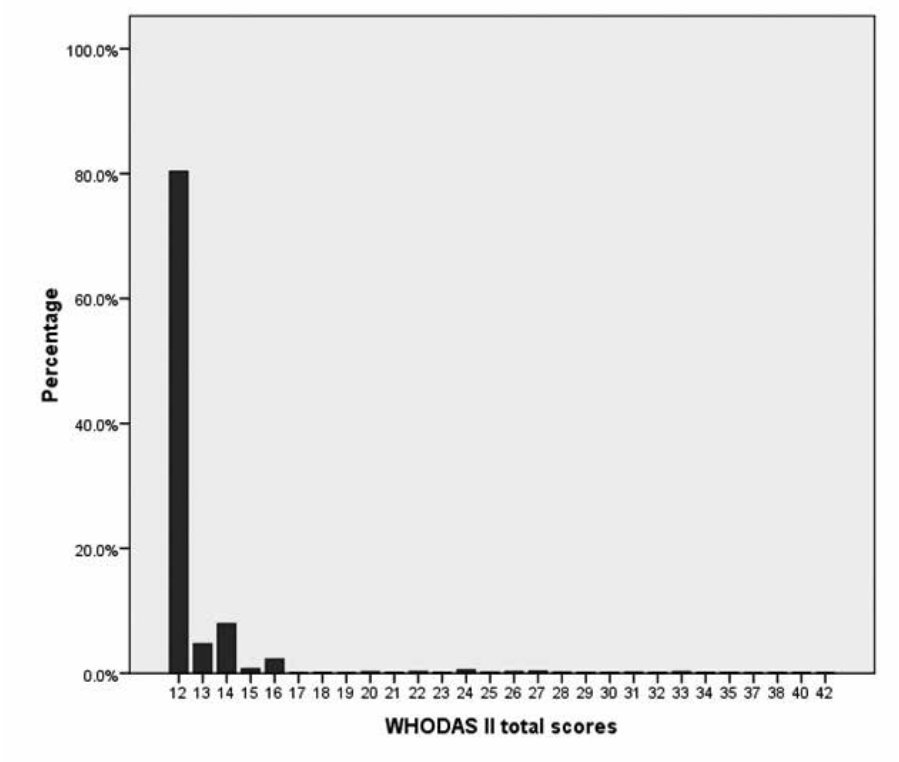
*Two persons with restriction of movement of small finger

The WHODAS II was positive for 483 (19.6%) study participants, and among them 4.2% were positive for both WHODAS II and PIET, while 15.4% reported positive for WHODAS II only. Only PIET was positive among 0.1% (n=2), while 80.3% (n=1975) were negative for both WHODAS II and PIET.

The prevalence of physical disability among adults between 18 - 59 years of age in the KMC area was 4.2% (95% CI = 3.5%-5.1%).

The distribution of the WHODAS II total scores among the study population is presented in Figure 4.

Figure 4: Distribution of WHODAS II total scores among the Study Population (n=2460)



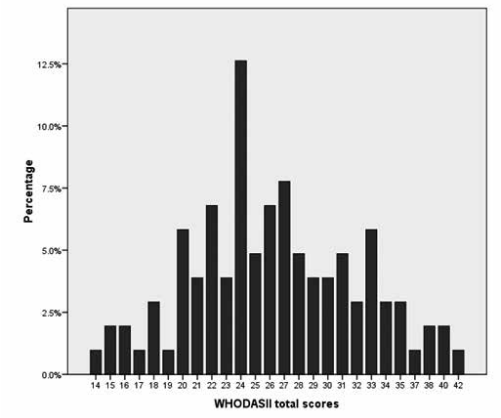
According to the test of assumption of normality, Kolgomorov Smirnov Z test, the total scores of the WHODAS II among study participants in the prevalence study was not normally distributed (n=2460, Kolgomorov Smirnov Z=20.7, p=0.0). The mean and median of the total disability scores of the study participants (n=2460) are as follows:

Mean (SD) = 12.9(3.2)

Median (IQR) =12(12-12).

The distribution of the WHODAS II total scores among persons with physical disability is presented in Figure 5.

Figure 5: Distribution of WHODAS II total scores among Persons with Physical Disability (n=103)



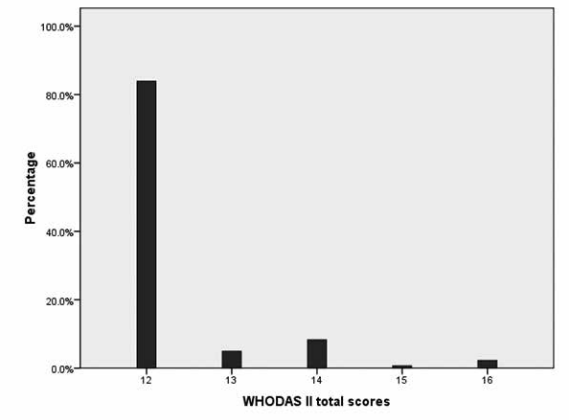
The majority (13) of persons with physical disability had a total score of 24. The WHODAS II total scores were distributed normally (n=103, Kolgomorov-Smirnov Z value=0.9, p=0.4). Mean and median of the total disability scores of the study participants (n=103) are as follows:

Mean (SD) = 26.4(5.9)

Median (IQR) =26(22-31).

Distribution of the WHODAS II total scores among those without physical disability (n=2357) are presented in Figure 6.

Figure 6: Distribution of WHODAS II total scores among those without Physical Disability (n=2357)



The total score of WHODAS II among study participants in the prevalence study was not normally distributed (n=2357, Kolgomorov Smirnov Z=23.8, p=0.0).

Mean and median of the WHODAS II total scores of the study participants (n=2357) are as follows:

Mean (SD) = 12.3 (0.8)

Median (IQR) =12(12-12).

Individual disability assessment items of WHODAS II among persons with physical disability

The distribution of persons with physical disability according to the difficulty in carrying out individual disability assessment items is presented in Table 1.

Table 1: Distribution of persons with physical disability according to the difficulty in carrying out individual disability assessment items in WHODAS II (n=103)

No.	Difficulty	No	%
1	Standing for long periods	56	54.4
2	Taking care of your household responsibilities	58	56.3
3	Learning a new task	45	43.7
4	Joining in community activities	52	50.5
5	Emotionally affected by health problems	78	75.7
6	Concentration	28	27.2
7	Walking a long distance	66	64.1
8	Washing whole body	30	29.1
9	Getting dressed	26	25.2
10	Dealing with unknown people	32	31.1
11	Maintaining a friendship	22	21.4
12	Day-to-day work	90	87.4

Among the individual disability assessment items of persons with physical disability, the highest proportion reported difficulty in carrying out day-to-day work (90%), followed by being emotionally affected by health problems (78%) and having difficulty in walking a long distance (66%).

Demographic and Socio-economic factors associated with Physical Disability

Demographic and socio-economic factors of persons with physical disability and those without physical disability in the study population are presented in Table 2.

Table 2: Demographic and Socio-economic factors of Persons with Physical Disability in the study population

Characteristics	Physical Disability				Total (n=2460)		Significance
	Present (n= 103)		Absent (n=2357)				
	No	%	No	%	No	%	
Age Categories (years)							
18-29◎	16	2.2	710	97.8	726	100.0	$\chi 2$ =20.8
30-39 ◎	23	3.1	725	96.9	748	100.0	df= 1
40-49*	27	4.0	656	96.0	683	100.0	P<0.0001
50-59*	37	4.2	266	95.8	303	100.0	
Gender							
Male	30	2.7	1221	97.3	1251	100.0	$\chi 2$ = 19.4
Female	73	5.5	1136	94.5	1209	100.0	df= 1, P<0.0001
Ethnicity							
Sinhala	56	3.3	1659	96.7	1715	100.0	$\chi 2$ = 11.2
Tamil*	29	7.8	344	92.2	373	100.0	df= 1,
Muslim & others*	18	4.8	354	95.2	372	100.0	P=0.0008
Religion							
Buddhist	55	3.3	1610	96.7	1665	100.0	$\chi 2$ = 9.4
Hindu*	26	7.9	302	92.1	328	100.0	df=1 ,
Muslim*	18	5.2	329	94.8	347	100.0	P=0.002
Christian/Catholic*	4	3.3	116	96.7	120	100.0	
Marital Status							
Married	82	3.6	2201	96.4	2283	100.0	$\chi 2$ = 26
Unmarried*	14	8.5	151	91.5	165	100.0	df= 1, P=0.0001
Divorced/ Widowed*	7	58.3	5	41.7	12	100.0	
Level of Education							
Primary	31	7.1	403	92.9	434	100.0	$\chi 2$ = 10.6

Secondary*	59	4.5	1251	95.5	1310	100.0	df=1 , P=0.0
Tertiary*	13	1.8	703	98.2	716	100.0	
Current Employment Status							
Employed	25	1.8	1359	98.2	1384	100.0	$\chi 2 = 43.3$
Unemployed	78	7.2	998	92.8	1076	100.0	df= 1, P<0.0001
Monthly Household Income (US$)							
Less than 225	50	3.5	1396	96.5	1446	100.0	$\chi 2 = 4.2$
225-550*	41	5.0	774	95.0	815	100.0	df= 1
More than 550*	12	6.0	187	94.0	199	100.0	P=0.04
Living Arrangement							
With spouse /children*	86	3.8	2161	96.2	2247	100.0	$\chi 2 = 7.4$
Lived with others	17	8.0	196	92.0	213	100.0	df= 1, P=0.007
Standards of Living Index							
Low*	8	6.4	117	93.6	125	100.0	$\chi 2 = 0.4$
Medium*	28	3.4	792	96.6	820	100.0	df= 1
High	67	4.4	1448	95.6	1515	100.0	P=0.5

◎rows were amalgamated to calculate $\chi 2$
*rows were amalgamated to calculate $\chi 2$

Physical disability was significantly higher among persons in the age group of 40-59 years (6.5%,n=64) than in the age group of 18-39 years (2.6%,n=39) ($p<0.05$). Physical disability among females (5.5%,n=73) was significantly higher than among males (2.7%,n=30) ($p<0.05$), and physical disability was significantly higher among those who were unmarried (8.5%,n=14) than among married people (3.6%,n=82) ($p<0.05$).

Prevalence of Physical Disability: Age standardised prevalence for males and females

Prevalence of physical disability in the study sample according to age and gender is presented in Table 3.

Table 3: Prevalence of Physical Disability in the study sample according to Age and Gender

Age Group (years)	No. in the Study Population	Disability Nos.	Observed Prevalence (%) (sample)	95% CI
Male				
18-29	319	6	1.9	0.4-3.4
30-39	388	4	1.0	0.0-2.0
40-49	366	8	2.2	0.7-3.7
50-59	178	12	6.7	3.0-10.4
Total	**1351**	**30**	**2.2**	**1.4-3.0**
Female				
18-29	407	10	2.5	1.0-4.0
30-39	360	19	5.3	3.0-7.6
40-49	317	19	6.0	3.4-8.6
50-59	125	25	20.0	13.0-27.0
Total	**1209**	**73**	**6.0**	**4.7-7.3**

The prevalence of physical disability among females (6.0%, n=73, 95% CI=4.7-7.3) was higher than among males (2.2%, n=30, 95% CI=1.4-3.0). An increase in the prevalence of physical disability was observed from lower to higher age groups in the total study sample and among males and females.

Calculation of age and gender adjusted/standardised prevalence rates for physical disability is presented in Table 4.

Table 4: Age adjusted/standardised Physical Disability prevalence rates for Males and Females

Age Group (years)	Observed Prevalence (sample)	Population of KMC area	Expected number of Physical Disability cases	Age standardised Physical Disability prevalence (95% CI)
Male				
18-29	1.9	9111	173.1	2.6
30-39	1.0	8460	84.6	(2.4- 2.8)
40-49	2.2	7539	165.8	
50-59	6.7	5707	382.4	
Total		**30817**	**805.9**	
Female				
18-29	2.5	8808	220.24	4.4
30-39	5.3	8473	449.1	(4.2- 4.6)
40-49	6.0	7592	455.5	
50-59	0.2	5725	229	
Total		**30598**	**1353.8**	

The standardised physical disability prevalence rate for males in the KMC area is 2.6% (95%CI = 2.4%-2.8%), and the standardised physical disability prevalence rate for females is 4.4% (95%CI = 4.2%-4.6%).

The crude and the standardised physical disability prevalence rates are presented in Table 5.

Table 5: Crude and Standardised prevalence rates for Physical Disability

Specific Physical Disability Prevalence	Crude Prevalence (95% CI)	Standardised Prevalence (95% CI)
Age-specific physical disability prevalence for males	2.2 (1.4-3.0)	2.6 (2.4- 2.8)
Age-specific physical disability prevalence for females	6.0 (4.7-7.3)	4.4 (4.2- 4.6).

Standardised age-specific physical disability prevalence is higher for females (4.4%, 95% CI = 4.2%- 4.6%) than males (2.6%, 95% CI = 2.4%- 2.8%).

Physical disability prevalence according to some demographic and socio-economic characteristics

Physical disability prevalence according to some demographic and socio-economic characteristics is presented in Table 6.

Table 6: Physical Disability prevalence according to some Demographic and Socio-economic Characteristics

Characteristics	Male				Female				Total			
	Study Sample Nos.	Disability Nos.	Prevalence (%)	95% CI	Study Sample Nos.	Disability Nos.	Prevalence (%)	95% CI	Study sample Nos.	Disability Nos.	Prevalence (%)	95% CI
Ethnicity												
Sinhala	889	15	1.7	0.8-2.5	826	41	5.0	3.5- 6.5	1715	56	3.3	2.4- 4.1
Tamil	163	8	4.9	1.6-8.2	210	21	10.0	5.9- 14.1	373	29	7.8	5.1-10.5
Muslim & others	199	7	3.5	3.5-10.5	272	11	4.0	1.7- 6.3	372	18	4.8	2.6-7.0
Religion												
Buddhist	862	15	1.7	0.8-2.56	803	40	5.0	3.5- 6.5	1665	55	3.3	2.4- 4.2
Hindu	140	7	2.1	-0.3-4.5	188	19	10.1	5.8-14.4	328	26	7.9	5.0-10.8
Muslim	182	7	3.8	1.0-6.56	165	11	6.7	2.9- 10.5	347	18	5.2	2.9- 7.5
Christian/ Catholic	67	1	1.5	-1.4- 4.4	53	3	5.7	-0.5- 1.9	120	4	3.3	0.1- 6.5
Marital Status												
Married	1152	19	1.6	0.89-2.3	1131	63	5.6	4.23- 7.0	2283	82	3.6	2.8- 4.4
Unmarried	96	9	9.4	3.6-15.2	69	5	7.2	1.1- 13.3	165	14	8.5	4.2-12.8
Divorced/ Widowed	3	2	66.7	13.4-120.0	9	5	55.5	-9.4-20.4	12	7	58.3	30.4-86.2
Education												
Primary	169	9	5.3	1.9- 8.7	265	22	8.3	5.0- 11.6	434	31	7.1	4.6- 9.5
Secondary	703	16	2.3	1.2- 3.4	607	43	7.1	5.1- 9.1	1310	59	4.5	3.4- 5.6
Tertiary	379	5	1.3	0.2- 2.4	337	8	2.4	0.8- 4.0	716	13	1.8	0.8- 2.8
Employment Status												
Employed	1010	16	1.6	0.8- 2.4	374	9	2.4	0.8- 3.9	1384	25	1.8	1.1- 2.5
Unemployed	241	14	5.8	2.8- 8.7	835	64	7.7	5.9- 9.5	1076	78	7.2	5.7- 8.7
Monthly Household Income (Rs)												
Less than 225	724	15	2.1	1.1- 3.1	722	35	4.8	3.2-6.34	1446	50	3.5	2.5- 4.4
225-550	418	11	2.6	1.1- 4.1	397	30	7.6	4.9- 10.2	815	41	5.0	3.5- 6.5
More than 550	109	4	3.7	0.1- 7.2	901	8	8.9	7.0- 10.8	199	12	2.5	0.3- 4.7

The highest prevalence of physical disability was found among the Tamils (7.8%, 95% CI=5.1%-10.5%) while the lowest prevalence was among the Sinhalese (3.3%, 95% CI=2.4%-4.1%). The prevalence reported among Tamil females was 10% (95% CI= 5.9%-14.1%) and among Tamil males was 4.9% (95% CI=1.6-8.2).

DISCUSSION

Physical disability has different definitions internationally, and its prevalence has been assessed using different methodologies (Wen & Fortune, 1999; United States Census Bureau, 2007; Australian Bureau of Statistics, 2009). Wen and Fortune (1999) have pointed out that the prevalence of physical disability basically depends on the screening instrument and the definition of physical disability. Therefore it is important to use an internationally accepted standard methodology when assessing the prevalence of disability. In the present study, the definition of physical disability is derived from an internationally accepted classification, the ICF. Furthermore, WHODAS II and PIET were utilised to identify the components of disability described in the ICF-based WHO model.

According to the National Disability Survey-2001 in Sri Lanka, the prevalence of overall disability was 1.6% whereas the prevalence of physical disability was 0.9% and the prevalence of limb disability was 0.8% (Department of Census and Statistics, 2003). Both these values were less than those acquired from the current study. It is also to be noted that the National Disability Survey-2001 covered only 18 districts and did not include non-housing units and homeless people (Department of Census and Statistics, 2003). As a result, the physical disability prevalence would have been underestimated. In addition, the current study and the National Disability Survey used different criteria to assess physical disability, and the operational definition used in the present study was more comprehensive than the one used in the National Disability Survey.

Meanwhile, the current study has obtained a higher physical and limb disability prevalence rate than the figure given by the Consumer and Finance Survey 2003/2004, Sri Lanka. According to the Consumer and Finance Survey 2003/2004, physical disability prevalence in Sri Lanka is 1.7% while limb disability prevalence is 1.1% (Central Bank of Sri Lanka, 2005). This difference may be partly due to the fact that this survey excluded some areas of the Northern Province, and used different criteria to identify physical disability. Therefore, the actual physical disability prevalence may have been underestimated. A similar survey done in 1996/97 has also given lower prevalence values than the

present study (Central Bank of Sri Lanka, 2005). In the Census Disability Survey (2001), physical disability included disability in hands, legs, and other physical disabilities which are not fully defined. Disabilities in hands included loss or paralysis or other disability in one or both hands. Similarly, disabilities in legs included loss or paralysis or other disability in one or both legs (Department of Census and Statistics, 2003). The Consumer Finance and Socio-Economic Survey also had used a similar format as in the National Disability Survey (Central Bank of Sri Lanka, 2005). Conversely, physical disability in the current study includes restriction of movements of the body according to the scientific categorisation (WHO, 2001). Therefore, the present study was aimed at all people with physical impairments and restriction of movements, giving a more scientific value for the prevalence of physical disability.

In both surveys mentioned above (National Disability Survey and Consumer Finance and Socio-Economic Survey in Sri Lanka) the value for the prevalence of physical disability in the KMC area is not available. However, in the Census survey the physical disability prevalence for Kandy District is given as 0.82% (Department of Census and Statistics, 2003). Consumer Finance and Socio-Economic Survey 2003/04 provides only the overall prevalence in the island, with no breakup for the district levels. In contrast, the prevalence of physical disability derived from the present study is higher than the figure determined by the Consumer Finance and Socio-Economic Survey 2003/04 (Central Bank, 2005). It is likely that differing methodologies in assessing disability status among the population may be responsible for this difference.

However, the prevalence of disability in the same country can vary depending on the definition of disability and the disability types used (Mitra & Sambamoorthi, 2006). For example, almost 20% discrepancy was revealed in the prevalence estimates for disability in India in two different surveys, namely, 2001 Census and the National Sample Survey 2002 (WHO, 2011). This in turn shows how difficult it is to compare the disability prevalence even within the same country.

Importantly, in relation to gender and age, the present study sample did not differ significantly from the reference population of the KMC area. Further, the crude prevalence rates computed from the sample were standardised for age and gender differences in relation to physical disability. The age-specific prevalence of physical disability for males showed a slight increase from 2.2% to 2.6% when standardised, while the age-specific prevalence of physical disability for females showed a reduction from 6.0% to 4.4%. The 95% CI shows the precision of the

effect measures computed. However, 95% CIs for crude and standardised physical disability prevalence have been very narrow, indicating high precision. Precision depends on the sample size, and therefore the narrow CIs are a reflection of adequate sample sizes as well (Poole, 2001). This shows that the sample size in the current study is adequate to determine the prevalence of physical disability.

Demographic and Socio-economic Characteristics associated with Physical Disability

Physical disability affects people of any age. The present study was confined to people between 18 and 59 years of age, the period during which people actively participate in the production and economy of the country (Department of Demography, 2000). Occurrence of physical disability showed an increase with the advancement of age, reporting 15.5% (n=16), 22.4% (n=23), 26.2% (n=27) and 35.9% (n=37) among the 18-29, 30-39, 40-49 and 50-59 year age groups respectively. Physical disability was significantly higher among adults in the age group of 40-59 years than among those who were 19-39 years of age ($p<0.05$). Similarly, a study done among community-dwelling adults with mobility limitations in the United States of America revealed that the percentage of people with mobility impairment increases with the advancement of age, and there had been a significant association between age and mobility impairment ($p<0.05$) (Rasch et al, 2008). Moreover, there had been a steady increase in the percentage of people with mobility impairment from 18-44 years (22%), 45-64 years (30%) and 65 years or more (47%) (Rasch et al, 2008). In addition, according to the National Disability Survey in Sri Lanka 2001, disability was highest among the age group of 20-54 years. Among those with physical disability, a higher percentage was reported in the age group of 40-59 years (52.5%) than in the age group of 20-39 years (47.5%) (Department of Census and Statistics, 2003). Comparably, a population-based study done in Chile showed a positive association between age and disability (OR=1.1) (Melo&Valdes, 2011).

In addition, the current study shows that physical disability is significantly higher among females (70.9%, n= 73) than among males ($P<0.05$). Similar results were obtained in studies done in other countries as well as in Sri Lanka. Although there are no studies that directly compare physical disability between genders, Rasch and colleagues (2008) have found a higher percentage of females with mobility impairment than males ($p<0.001$). A population-based survey done in Chile has also reported a higher prevalence of disability among women than

men (OR=1.15) (Melo&Valdes, 2011). According to the National Disability Census 2001 in Sri Lanka, more males (69.1%) had physical disability than females (30.9%). Similarly, disabilities in hands and legs were observed to be higher among males than females (Department of Census and Statistics, 2009). However, Consumer Finance and Socio-demographic Survey 2003/04 in Sri Lanka has not given details of physical disability on the basis of gender. It is intriguing that a significant difference in ethnicity ($P<0.05$) and religion ($P<0.05$) between those with and without physical disability has been observed in the present study. In the absence of similar studies in Sri Lanka it was not possible to make direct comparisons.

Social support measures like marriage and living arrangements are known to be associated with disability status. According to Koukouli and colleagues (2003), both marital status and living arrangements were significantly associated with functional status ($P<0.05$). This finding is similar to that of the present study which reveals that physical disability is higher among those who are unmarried, divorced/widowed than among married people. Similarly, a population-based anonymised survey in Chile has revealed that being divorced (OR=1.5) or widowed (OR=3.9) was positively associated with the chance of having a disability (Melo&Valdes, 2011). A possible explanation could be that persons with disability, rather than healthy people, usually tend to be unmarried or divorced.

According to the Census Disability Survey 2001 in Sri Lanka, among those with physical disability, 51.5% were educated up to grade five, 32.5% up to grade 10, and 16% above grade10 (Department of Census and Statistics, 2003). In contrast, the current study indicates that physical disability was higher among those who had more than primary school education (n=72, 69.9%) rather than those who had only studied up to grade five (7.1%, n=31) ($P<0.05$). However, it is important to note that urban settings generally have good educational facilities, with many schools nearby. It is likely that persons with disability benefit from the facilities available in their schools and,at the very least, continue their education beyond primary school level. In addition, free education and the culture influenced by the religions promote schooling and education for all in Sri Lanka.

It is estimated that about 80%-90% of people with disabilities of working age in developing countries are unemployed, and in industrialised countries the figure is between 50%-70% (United Nations, 2008). However, this is still higher than

the national unemployment rate of 8.3% in USA (Bureau of Labour Statistics, 2012) and 6.3% in the United Kingdom (Office for National Statistics, 2014). It is also important to note that the proportion of unemployed persons with physical disability in the present study (75.7%, n=78), is close to the world unemployment percentage of persons with disability. At the same time, the present study revealed that physical disability is higher among unemployed adults than among those employed (P=0.0%). According to the National Disability Survey, Sri Lanka, 2001, 84.2% of those with physical disabilities were unemployed. However, the current study reports a lower proportion of unemployment (75.7%, n=78) than the National Disability Survey, 2001. This may be attributed to the urban setting in which the study was conducted. Urban settings offer more employment opportunities that are suited to people with physical disability,such as businesses and self-employment, compared to rural areas.

According to a study done in the USA on adults with disability, between 19 and 64 years of age, 85% had reported being unemployed (Henry et al, 2011). This is higher than the unemployment percentage of the present study. It may be due to the fact that all types of disabilities were included in the study done by Henry and colleagues (2011), unlike the current study which included only persons with physical disability. At the same time, the infrastructure with regard to social benefits is very different in the two countries - Sri Lanka and the USA.

The present study also reveals that the majority of people with physical disability have a higher income (monthly income more than US$ 225). In contrast, the study of Rasch et al (2008) reported that the majority of people with mobility impairment were in the poor, low income or middle-income groups. There may be several reasons for this difference, including the higher educational and employment levels of the population with disability and the urban settings in which they live. Therefore, the current study has found that there are associations between disability and gender, income, education and occupation. Supporting the above concept, a nationally representative population-based survey (n=268,873) conducted in Chile has also revealed that income, education and occupation are associated with disability in that country (Melo&Valdes, 2011).

Limitations

The present study was carried out in the Kandy Municipality area in the Central province of Sri Lanka, and the findings may not be generalised to the country.

CONCLUSION

Physical disability prevalence was 4.2% (95% CI: 3.5-5.1) among people between 18 and 59 years of age in the KMC area. The age standardised physical disability prevalence for males and females were 2.6% (95% CI: 2.4-2.8) and 4.4% (95% CI: 4.2-4.6) respectively.

Majority of those with physical disability were females (n=73, 70.9%). There were significant associations between physical disability and age (P=0.05), gender (P=0.05), ethnicity (P=0.05), religion (P=0.05), marital status (P=0.05), levels of education (P=0.05), current employment status (P=0.05), monthly household income (P=0.05), and living arrangements (P=0.05).

Recommendations

In Sri Lanka, specific physical disability prevention and rehabilitation programmes are needed, in keeping with the demographic and socio-economic factors in the community.

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Appendix 1

Physical Impairment Examination Tool (Doherty, 1992)

Examination:

No.	Position/Activity	Observation
1	**Spine**	
	Bend forward and touch toes	Forward flexion
	Keep hands across chest and ask to rotate	Rotation
	Slide palm of the hand towards knee	Lateral flexion
	Cervical spine	
	Look down	Forward flexion
	Bend the head backward	Extension
	Keep ear on the shoulder	Lateral flexion
	Look to one side and then to the other side	Rotation
2	**Arms**	
	Shoulder	
	Keep both hands behind head	Abduction
	Press elbows backwards	External rotation
	Keep both hands behind the upper back	Internal rotation
	Elbow	
	Keep hands straight by the side	Extension
	Palms and hands	
	Show palms of both hands by keeping both hands in front of you	Supination
	Show the dorsum of palms	Pronation
	Touch each fingertip with the thumb	Pincer grasp
	Squeeze two fingers	Flexion of fingers
3	**Legs**	
	Hip and knee	
	Bend the knee	Flexion of knee
	While bending the knee flex the leg towards abdomen	Flexion of hip
	While bending the knee move the leg laterally	Internal rotation of hip
	Ankle	
	Bending foot towards client	Dorsiflexion
	Side to side (lateral) joint movement	Taler-tibular joint movement