

Research Article



Prevalence and Associated Factor of Walking Disability among Adults: Finding from National Health & Morbidity Survey 2015 (NHMS 2015)

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Abstract

Introduction: Prevalence and associated factors of walking disabilities among adult should be understood in order to mitigate other leading health effects. The objective of this study is to determine prevalence and associated factors of walking disability among adults aged 18 and above.

Method: National Health and Morbidity Survey (NHMS) is a cross-sectional survey (two-stage stratified sample) designed to collect health information on a nationally representative sample of the Malaysian adult's population. Data were obtained via face-to-face interviews using validated questionnaire based on International Classification of Functioning, Disability and Health (ICF) framework by the Washington Group on Disability Statistics (WG). Data obtained were analysed using SPSS 20.

Result: Prevalence of Malaysian adult having at least some difficulty in walking is 11.3% (95% CI: 10.65, 12.00). In general, five socio demographic variables: Rural, Female, Elderly age 61 and above, Widower and Have no formal education were statistically significant in having at least some difficulty in walking varying from 13.9% to 41.6% of significant level. Based on logistic regression, elderly age 61 and above [AOR=13.60; 95%CI: (10.12,18.28)], Female [AOR=1.27; 95%-CI=(1.12, 1.43)], Have no formal education [AOR=1.82 ; 95%-CI=(1.42,2.34)], Having diabetes mellitus [AOR=1.51 ; 95%-CI=(1.33,1.70)] and Having hypertension [AOR=1.33; 95%-CI=(1.18,1.51)] were more odd to have walking disabilities.

Conclusion: Findings show co-morbidities could be one of the contributors to disability in walking besides aging. Understanding cause and effects of disability among adult would help in improvement of effective prevention of disabilities in Malaysian Adult.

Keywords

Associated Factor; Diabetes; Disability in Walking; Hypertension; Malaysia; Prevalence

Introduction

According to the World Health Organization (WHO), disabilities can be classified into three dimensions; impairments involving problem in mental or body function/structure, limitation in activity due to difficulty encountered

in doing task or action and participation restriction involving life situations [1]. Disabled population experienced various challenges in their daily activities such as pain, unhealthy body weight due to lack of healthy food choices, difficulty in chewing or swallowing food and mobility limitation that restrict them from physical activity [2].

Mobility is an important element in quality of life's impaired physical function is found to be the early warning sign to disability [3,4]. A few studies, has shown that the level of difficulty in walking can be used to measure and monitor mobility disability [5]. Findings from National Health and Morbidity Survey 2015, shows 11.3% prevalence of walking disability which is one of the highest prevalence among six disability domains assessed in the survey [6]. Report of American Community Survey 2015, stated that an estimated 7.0% of non-institutionalized, male or female, all ages and races, regardless of ethnicity, with all education levels were among 2,914,010 people to have serious difficulty in walking or climbing stairs [7]. Prevalence of walking disability varies across countries due to different methods in assessing them.

Morbidities and co-morbidities in addition to ageing could be a main underlying mechanism leading to difficulties in walking. However, previous work showed that general impairment contributes more to walking disability compared to chronic disease among the elderly [4]. Meanwhile, previous studies also stated that walking disability will increase the risk of all-cause of death and cardiovascular incidents especially among patients with osteoarthritis [8].

Walking disability is one of the health problems that affect daily and social life of disabled people. People with walking disability have similar health need as non-disabled people especially for immunization, health screening and rehabilitation. They face barriers in getting health and rehabilitation services which worsen their health status. Understanding the trends and risk factor of walking disability among adults would help in the development of effective prevention and treatment plans. Therefore, the aim of this study is to determine the prevalence and associated factor of walking disability among adult age 18 and above with walking disabilities, since impaired physical function can act as early warning of disability.

Methods

Study design and sampling

The target population in National Health Morbidity Survey 2015 (NHMS 2015) were the residents of the non-institutionalised Living Quarters (LQ) from urban and rural areas in every state in Malaysia. Institutional population such as population who are staying in hotel, hospital and etc., were excluded from the survey. Based on updated sampling frame in 2014 provided by Department of Statistic Malaysia (DOS), there are about 75,000 Enumeration Blocks (EB) in Malaysia, every EB consist of 80 to 120 LQ with average population of 500-600 people. This cross-sectional, population-based study employed two-stage stratified sampling to ensure national representativeness. Two stages of sampling involved are the Primary Sampling Unit (PSU) and EB provided by DOS

and Second Sampling Unit (SPU) are randomly selected from each selected EB.

Data collection

To assess walking disability, a validated bilingual questionnaire (Bahasa Malaysia and English) based on International Classification of Functioning, Disability and Health (ICF) framework by the Washington Group on Disability Statistics (WG) was used in the survey and administered as a face-to-face interview using mobile device. A question on "Do you have difficulty walking or climbing steps?" was asked to the eligible respondent with four options of answers; 1: No, no difficulty, 2: Yes, some difficulty, 3: Yes, a lot of difficulty and 4: Cannot do it at all. Meanwhile, related questions were asked on obesity, hypertension and diabetes besides measuring weight and height for Body Mass Index using SECA Portable Sadiometer 213 and TANITA digital Weighing Scale HD 319, Cardiocheck PA and Omron Japan Model HEM-907 were used to assess fasting blood sugar level and blood pressure respectively.

Statistical analysis

Data obtained was analysed using Statistical Package of Social Science (SPSS) software version 20.0. Complex sample analysis was used to determine the prevalence of walking disabilities in this large sample since this survey was using complex sampling. Associated factors of walking disability were analysed using logistic regression. Ten variables with p-value less than 0.25 from simple logistic regression were included in multivariable model. Backward Likelihood Ratio (LR) method was used to obtain the final model. Possibility of two-way interaction terms, multicollinearity issue and fitness of the module were checked on the final model. In the final model, five variables; sex, age, education, having diabetes and hypertension were significantly associated with having at least some difficulty in walking.

Ethics approval

This survey was reviewed and approved by the Medical Research and Ethics Committee Malaysia (NMRR-14-1064-21877). All respondents were provided with information sheet and a copy of signed consent form. For those who are illiterate, the information sheet and consent form were read to them and a thumb print was taken to replace signature.

Results

Among 19,930 of eligible respondents who are adults aged 18 years and above answering this module, 11.3%, (n=2824) with 89.2%, were having at least some difficulty in walking. By category, 9.5% were having moderately difficulty followed by very difficult and unable with prevalence of 1.1% and 0.6%, respectively (Table 1).

From table 2, the higher prevalence of having at least some difficulty in walking were found among the respondents from rural areas; 13.9% (95% CI: 12.62,15.30) , Female; 13.5% (95% CI: 12.63,14.51) elderly aged 61 and above, 41.6% (95% CI: 39.18,44.02), Widower; 34.9% (95% CI: 32.09,37.81) and having no formal education 25.1% (95% CI: 22.00,28.55).

Category of walking disability	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Not Difficult	17106	17913107	88.7	88	89.35
Moderately Difficult	2348	1926253	9.5	8.94	10.17
Very Difficult	301	228510	1.1	0.96	1.33
Unable	175	129011	0.6	0.52	0.78

Table 1: Prevalence of walking disability by category of difficulty, NHMS 2015 (n=19930).

Socio-demographic characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Malaysia	2824	2283774	11.3	10.61	12.03
Locality					
Urban	1426	1615680	10.5	9.73	11.32
Rural	1398	668093	13.9	12.62	15.3
Sex					
Male	1116	960236	9.2	8.44	10.04
Female	1708	1323538	13.5	12.63	14.51
Age					
18-30	161	210934	3	2.39	3.65
31-40	214	230824	5.1	4.3	6.09
41-50	374	342340	9.8	8.65	11.12
51-60	664	500244	18.8	17.01	20.76
61 and above	1411	999434	41.6	39.18	44.02
Ethnicity					
Malay	1690	1093926	11	10.2	11.93
Chinese	453	517503	10.9	9.7	12.25
Indian	222	176292	12.9	10.96	15.02
Other bumiputeras	359	371613	17.2	14.55	20.2
Others	100	124441	6.2	4.61	8.28
Marital status					
Single	190	205956	3.7	3.01	4.43
Married / Cohabiting	1935	1587590	12.1	11.24	12.95
Separated/Divorcee/Widower	699	490226	34.9	32.09	37.81
Education level					
No formal education	399965	399965	25.1	22	28.55
Primary education	836793	836793	18.8	17.29	20.38
Secondary education	742351	742351	8.3	7.54	9.08
Tertiary Education	256740	256740	5.4	4.56	6.3
Occupation					
Government/Semi Government	479	140594	8	6.47	9.9
Private Employee	363	419007	5.6	4.88	6.51
Self Employed	401	316406	9.9	8.65	11.26
Unpaid worker/ homemaker	483	372738	13.3	11.8	15.05
Retiree	166	112990	18.2	14.93	22.06
Diabetes					
No	1785	1528416	9.2	8.55	9.83
Yes	1039	755358	21.4	19.76	23.16
Hypertension					
No	1070	939553	7.2	6.59	7.8
Yes	1624	1213978	20.5	19.14	21.89
Obesity					
No	829	515263	11.3	10.14	12.49
Yes	895	674769	9.8	8.67	10.99

Table 2: Socio-demographic profiles of Malaysian adults aged 18 years and above having difficulties in walking, NHMS 2015 (n=19930).

Results from logistic regression analysis (Table 3) found that older people aged 61 years and above have higher odd in having at least some difficulty in walking with Adjusted Odd Ratio (AOR) of 13.60 compare to other age group. The odd of having at least some difficulty in walking were also found higher in female (AOR: 1.27) compare to male and no formal education

Factors associated with walking disability	Simple Logistic Regression (SLR)			Multiple Logistic Regression (MLR)		
	b	Crude Odd Ratio (95% CI)	p-Value	B	Adjusted Odd Ratio (95% CI)	p-Value
Locality						
Urban	0	1			-	
Rural	0.34	1.41 (1.30,1.52)	<0.001			
Sex						
Male	0	1		0	1	
Female	0.38	1.46 (1.35,1.59)	<0.001	0.24	1.27 (1.12,1.43)	<0.001
Age at pregnancy						
18-30	0	1		0	1	
31-40	0.62	1.85 (1.50,2.25)	<0.001	0.45	1.57 (1.13,2.18)	0.007
41-50	1.29	3.62 (2.99,4.37)	<0.001	1.17	3.23 (2.39,4.36)	<0.001
51-60	2.02	7.56 (6.32,9.03)	<0.001	1.69	5.42 (4.04,7.27)	<0.001
61 and >	3.08	21.81 (18.32,25.87)	<0.001	2.61	13.60 (10.12,18.28)	<0.001
Ethnicity						
Malay	0	1			-	
Chinese	0.04	1.04 (0.93,1.17)	0.467		-	
Indian	0.16	1.18 (1.01,1.37)	<0.001		-	
Other bumiputeras	0.49	1.63 (1.43,1.84)	<0.001		-	
Others	-5.9	0.55 (0.45,0.68)	<0.001		-	
Marital status						
Single	0	1			-	
Married / Cohabiting	1.23	3.43 (2.95,4.00)	<0.001		-	
Separated/Divorcee/Widower	2.47	11.86 (9.97,14.09)	<0.001		-	
Education level						
No formal education	1.8	6.03 (5.12,7.10)	<0.001	0.6	1.82 (1.42,2.34)	<0.001
Primary education	1.44	4.23 (3.67,4.87)	<0.001	0.51	1.67 (1.36,2.05)	<0.001
Secondary education	0.46	1.58 (1.37,1.83)	<0.001	0.19	1.21 (0.99,1.48)	0.06
Tertiary Education	0	1			-	
Occupation						
Government/Semi Government	0	1			-	
Private Employee	-0.4	0.67 (0.56,0.81)	0.026		-	
Self Employed	0.21	1.23 (1.03,1.49)	<0.001		-	
Unpaid worker/ homemaker	0.59	1.81 (1.51,2.17)	<0.001		-	
Retiree	1.04	1.82 (2.24,3.56)	<0.001		-	
Diabetes						
No	0	1		0	1	
Yes	0.93	2.54 (2.33,2.77)	<0.001	0.41	1.51 (1.33,1.70)	<0.001
Hypertension						
No	0	1		0	1	
Yes	1.14	3.13 (2.88,3.41)	<0.001	0.29	1.33 (1.18,1.51)	<0.001
Obesity						
No	0	1		0	1	
Yes	-0.09	0.91 (0.83,1.01)	0.083	-0.18	0.84 (0.75,0.94)	0.002

Table 3: Associated Factors of walking disability among Malaysian Adult aged 18 years and above (n=19930).

*Backward LR Multiple Logistic regression was applied. Multicollinearity and interaction were checked and not found. Hosmer Lameshow test P value =0.967, Classification Table (overall correctly classified percentage =86.3%. Area under ROC curve =87.2%, with significant at (p< 0.05) were accepted to check model fitness.

(AOR: 1.82) compared to other level of education. In terms of morbidity, higher odd were noted among having diabetes mellitus (AOR: 1.51) and having hypertension (AOR: 1.33).

Discussion

Based on the analysed data, 11.3% of Malaysian adults are having at least some difficulty in walking and going up and down the stairs and the elderly are at higher risk compared to other age groups. Having difficulty in walking is an inevitable aging process which give the reason why difficulty in walking is common among the elderly. According to WHO, the older elderly are more likely to experience disability than the young elderly which indicates that disability increases with increasing age [9]. Our finding is comparable to other study, which stated that self-reported level of difficulty in walking 2-3 neighbourhoods' blocks can be used to assess walking disability among elderly [5]. This phenomenon might be due to loss of leg strength and high fat body mass which are potential risk factors besides aging [10]. Moreover, this population is more vulnerable to injuries due to repeated falls and shorted survival compared to elderly without disabilities. Previous study also showed that general impairments have higher effects on walking disability compared to common chronic diseases such as cardiovascular diseases and diabetes mellitus in elderly population which might be the reason why our result shows non-obese is more odd to have at least some difficulty in walking [4]. Although at least some difficulty in walking is an inevitable part of aging, there is a tremendous inter-individual variability in the rate at which this process occurs [3,10].

Beside elderly, our studies found that, women show higher prevalence of having at least some difficulty in walking and were 1.48 times odd to have some difficulties in walking compare to men which is similar to previous studies [11-14]. The reason for women tendency to suffer more difficulty in walking compared to men is might be due to osteoarthritis, muscle weakness and change of health status [15]. A study has reported that there are relationship between high oxidative stress, as indicated by oxidative damage to proteins and decline in walking speed that lead to progression of severe walking disability among older women living in the community [16].

Morbidities and co-morbidities are also known to be linked with walking disability due to various health complications [17]. Chronic diseases such as diabetes and hypertension in addition to aging could be the main underlying mechanism leading to have at least some difficulty in walking. Our studies found that, respondents with hypertension and diabetes mellitus have higher risk of having at least some difficulty in walking. People with hypertension are more likely to have physical functioning difficulties, dementia, depression and falls [18]. Elderly with diabetes shows greater potential in declining physical function compared to non-diabetic population [19]. Previous study indicates that, there was a significant association between mobility disability and both; hypertension and diabetes after adjusting for potential confounders [20].

Previous studies show that obesity is high among disability compared to non-disability population [21-23]. This is contra

with our finding, where the non-obese have higher prevalence and odd of having at least some difficulty.it might be due to other health complication due co-impairment, osteoarthritis and abnormalities [24, 25].

Diabetes might act as a risk factor of disability due to various complications that may contribute to slower walking speed, chair stand performance, and balance [26]. Chronic diseases such diabetes, hypertension, osteoarthritis, gastrointestinal tract diseases, anaemia, neurological problems have also been associated to decreasing in cognitive ability that contributes to impairment of physical function [27]. Pulmonary Arterial Hypertension (PAH) can contribute to severe disability and inability to retain gainful employment of the worker [28]. Previous study shows that treatment of hypertension can reduce the development of physical disability and dementia [29]. Assessment of the morbidity profile, chronic conditions and co-morbidity on functional disability and psychological well-being is vital in studying the relationship between perceived health, chronic and disabling conditions.

Our finding on high prevalence and positive association between having some difficulty in walking with low education level is similar to the study done on men and women aged 50 and above [30,31]. A study in Australia showed that, 19% of people with disability aged 15 and above faced discrimination in educational institution in previous twelve-month during attending learning session which teacher or lecturer were identified to be the main role of discriminator [32].

This study has several limitations. Respondent's disability conditions were self-reported and subject to social desirability bias. The study design is observational and cross-sectional, so that the estimated relationship between disability statuses should be interpreted as an association rather than causation.

Conclusion

In our study, the results show that co-morbidities; diabetes and hypertension might act as the precursor to walking disability besides aging. The rise of these non-communicable diseases in Malaysia indicates that Malaysian adults are also at high risk in walking disability. In order to control population who live longer with burden of walking disability due to poor health condition, more studies are warranted to explore effective intervention to halt walking disability in Malaysia.

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Conflict of Interest Statement

The authors declare that there is no conflict of interest.

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