PHYSICAL DISABILITY IN INSTRUMENTAL'S ACTIVITIES OF DAILY LIVING (IADLs) AND ITS ASSOCIATED FACTORS AMONG ELDERLY IN KOTA BHARU, KELANTAN

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ABSTRACT

In the Policy for the Elderly in Malaysia , elderly was defined chronologically as those over 60 years of age. Our life expectancy at birth has increased from 56 years in the 1950s to 70.4 years for males and 75.3 years for females in the year 2002. Elderly population are prone to get physical disability as well as chronic medical illnesses. This was a cross-sectional study to determine the prevalence of physical disability and its associated risk factors among elderly, aged 60 years and above. A total of 270 participants were randomly selected from 3 health clinics in Kota Bharu operational areas by using multistage sampling. Interviewer assisted-questionnaire was administered and the subjects were asked to go to clinics or community centre on the appointed date for physical examination and blood taking for fasting blood sugar and total cholesterol. Physical disability was measured by instrumental's activities of daily living (IADLs). IADLs encompass the following domestic function : using the telephone, using transportation, shopping, cooking, house-keeping, taking medication and budgeting. The IADLs methods offer indicators of " applied " problem that extend the disability theme of ADLs scales to include some elements of handicap concept. Physical disability was defined as the inability to accomplish one or more IADLs. Multiple logistic regression was used to determine the associated factors for physical disabilities in IADLs. The prevalence of physical disabilities was 34.8% (95% CI: 29, 41). Significant associated factors of IADLs were

older age (OR=2.39, 95%CI: 1.19,4.83), lower income (OR= 0.22, 95%CI:0.08, 0.62),high diastolic blood pressure (OR=2.02, 95%CI:1.04,3.94), widow or widower (OR=2.38, 95%CI:1.23,4.61) and obesity (OR=4.68,95%CI:1.54, 14.18). The prevalence of physical disability for IADLs was higher others studies. These findings also suggested that certain socio-demographic characteristics (i.e age, income & marital status), life-style behavior (obesity) and medical illnesses (high diastolic blood pressure) were significant associated factors of physical disability in elderly. The majority of predictors of physical disability that were identified by this study are potentially subject to modification either by treatment or life-style changes. Public health efforts to reduce prevalence of all these factors should continue.

INTRODUCTION

In the Policy for the Elderly in Malaysia , elderly was defined chronologically as those over 60 years of age, adopting the criteria set at the World Assembly on Aging in Vienna in 1982. Globally, the number of people 60 years or older increasing from 606 million in the year 2001 to nearly 2 billion by 2050 (Hagmann, 2001). In Malaysia, the decline in fertility and mortality as well as improvement in life expectancy were said to be responsible for the aging of the population by the year 2020. Our life expectancy at birth has increased from 56 years in the 1950s to 70.4 years for males and 75.3 years for females in the year 2002 (Department of statistics,2000). The dramatic shift in the age structure of Malaysian society is receiving increasing public and professional attention. Concern regarding rising health care costs accompany this shift in age structure. The elderly are major consumers of health care, having twice as many hospital stays per capita, lasting twice as long, as those younger. The onset of physical disability accounts for a large portion of this demand for health care services among the elderly. Disability represents the consequences of impairment of an organ or system on the functioning of the individual in terms of limitation of functions or restriction of activities. Disability can be measured by instrumental activities of daily living (IADLs) and it includes the following domestic function : housekeeping, cooking, shopping, washing, using the telephone, using transportation, taking medication and budgeting. This scale was developed by Lawton & Brody in 1969. The IADL methods offer indicators of "applied" problems when it include some elements of handicap concept. The development of IADL scale was stimulated in part by the movement towards community care for the elderly (McDowell &

Newell,1987). The standard, and only economical procedure is to interview individuals about difficulties (self-reports or proxy reports), with simple ordinal or interval scoring of degree-of-difficulty. Most knowledge of functional status is based on self-reported measures of daily routine activities. An alternative is to observe performance of an activity in the person's usual milieu, but this approach is very time-consuming. This is especially true for activities done outside the home, such as shopping, since the interviewers and subjects must venture forth together for the performance assessment (Verbrugge & Jette,1994). Study by Hoeymans *et al.,* (1997) has found that both measures of functional status-self-reported disabilities and performances tests were moderately to highly reproducible in the elderly population, with kappas and Pearson correlation coefficients ranging from 0.49 to 0.90.

Preventing or delaying disability is a major goal of most plans designed to control health care costs and is the most promising approach to reducing the functional consequences of disease and aging (Miller, 1996). Many persons maintain good function to advanced ages, and many persons who experiences disability recover from it, even among the older age group. This evidence of recovery is especially important because it indicates the potential to reverse disability even in the oldest age group (Beckett *et al*, 1996).

The objectives of this study were to determine the prevalence of physical disability in IADLs among elderly in Kota Bharu, Kelantan as well as to find its associated factors.

MATERIALS AND METHODS

This was a cross-sectional study in 4 months period from December 2002 to March 2003.The source population was elderly people who stay in the district of Kota Bharu, Kelantan, Malaysia. A multistage sampling was used. The Health Office of Kota Bharu have 10 health centers (including one maternal and child health clinic) and 3 health centers was chosen by using simple random sampling. Every health center has 3 community clinics. Out of this, only 2 community clinics were selected by simple random sampling. Community nurses in-charge were asked to prepare the list of elderly who stayed in their operational area, considering inclusion and exclusion factors. Then the participants were taken from this list by systematic random sampling. The inclusion criteria were elderly, 60 years of age and above, non- institutionalized and we excluded elderly who have psychiatric illness and cognitive disorders. Respondents who were chosen to participate in this study gave their written consent after explanation given regarding the study. Interviewer assisted-questionnaire was administered first to determine the socio-demographic data, health information and physical disability status. Appointment date then given to the respondent, stated the place, time, date for physical examination and blood taking. They were asked to fast at least 10 hours before they come to health clinic or community center.

Interview were conducted by trained research assistant and researcher, either at home, clinic or community center. The information was mainly from the participants, and proxy responses were allowed if there was a knowledgeable family member available.

Age, sex, race ,religion, and marital status were self-reported as well as from the identity card. Educational level was determined by asking the participants at what level they attended the formal school. Occupation was categorized into 5 main categories i.e. unemployed, pensioner, businessman, farmer/gardener and others. Income was determined based on individual basis only and the source of income either from their work, pension, children, or welfare.

Smoking status was classified as current, past, or never smoker. Physical activity was measured using three items concerning the frequency of taking walks, gardening, and doing vigorous exercise. For each activity, subjects were scored 2 if they performed the activity frequently (three or more times per week), 1 if sometimes (weekly or several times per month), and 0 for rarely or never. Total score for physical activity was created by summing the frequency of walking, gardening, and vigorous exercise. Then we categorized into 3 groups, a value of 3 was assigned when the activity was performed frequently(3-6), 2 when the activity was performed sometimes(1-2), and 1 when the activity was performed rarely or never (0). Medical illnesses were ascertained by using self-reported information or medical officer-diagnosed medical conditions : hypertension, stroke, diabetes, and coronary heart diseases. A dichotomous variable was created to reflect the presence or absence of each condition.

Instrumental's activities of daily living (IADLs) was outcome or dependent variable. This questionnaire was validated amongst 38 of elderly from another health centers. Cronbach's alpha for ADLs was 0 .7346. Then this validated questionnaire were use to measure physical disabilities. An interviewer-assisted questionnaire ascertained self-

report of difficulty performing 7 specific tasks on IADLs. (see Appendix A). Disability was defined as the inability to perform at least one IADLs.

Blood pressure was measured on the right upper arm of the seated person after a rest period of 15 – 30 minutes by using sphygmomanometer. The mean of two measurements obtained at one occasion. Hypertension was defined as systolic blood pressure of ≥140 mmHg, or diastolic blood pressure of ≥ 90 mmHg, or current use of medication for hypertension or have been diagnosed as hypertensive (Joint National Committee, 1993). Height and weight measurements were made to obtain body mass index (BMI) in weight, (kg)/ height, (m^2). Body weight was measured without shoes using a bathroom spring balance. Height was measured using a measuring tape attached to the rigid wall. BMI was categorized into 4 categories. Underweight when the BMI less than 20kg/m^2, normal BMI when the value is between ≥ 20 and < 25 kg/m^2 for female and between ≥ 20 and < 27 kg/m^2 for male, overweight is considered when the value > 25kg/m^2 and > 27kg/m^2 till 30kg/m^2 for female and male respectively and the obese with value ≥ 30 kg/m^2 (Ministry Of Health, Malaysia, 1994).

Visual acuity was measured at a distance of 6 meters with a Snellen letter test chart or E chart. Each eye was tested separately, the right always first, to avoid confusing right and left. The participant was asked to read from the top. If his/her visual acuity (VA) was poor and he/she can read only the top letter, which can be read by a normal eye at a distance of 60 meter, then her VAR or VAL was recorded as 6/60 with spectacles, if worn (Pavan-Langston, 2002). Visual impairment was defined as vision of less than 6/18 in the better eye using available means of correction (Malaysia Health Reports, 2000).

To check the hearing status, we used Rinne Test and Weber Test. The Rinne test was recorded as positive if air conduction is superior to bone conduction or negative is the converse is true (Birrel, 1982). The Weber test was recorded as positive if the sound lateralize to the both ears. Hearing impairment was defined if the patient recorded negative result either with Rinne Test or Weber Test or both (Birrel, 1982). Blood was drawn by venipuncture from after 10 –12 hour fast and was kept in the sodium fluoride bottle. Glucose levels were measured by the enzymatic reference method with hexokinase (Cobas Integra Glucose, Roche, 2000). For total cholesterol, blood was kept in the plain evacuated tube and the level was measured by enzymatic, colorimetric method with cholesterol esterase, cholesterol oxidase, and 4-aminoantipyrine (Cobas Integra Cholesterol, Roche, 2000). In this study, diabetes mellitus was defined as the use of antidiabetes medication, or have been diagnosed as a diabetic, or a fasting blood sugar level $\geq$ 7.8 mmol/liter according to the World Health Organization criteria (WHO Technical report series 727, 1985). The total cholesterol was categorized to be desirable if it is below 5.20 mmol/l, high if it is equal or above 6.20 mmol/l and borderline high if it is between the two values (The Expert Panel, 1988).

Statistical analysis

Data entry and analysis were conducted by using SPSS for Windows (Norusis, 1999). Data were checked and cleaned. The sample was described according to socio-demographic data, health status using frequency, mean, standard deviation, and median and inter-quartile range (for variables not normally distributed). Simple logistic regression was used to determine the association between physical disability in IADLs and each

independent variable. Then multivariate logistic regression models were proceeded for physical disability as outcome. Selection of the variable was done by using forward and backward LR method. Multi-collinearity was checked by variance-inflation-factors which were obtained by fitting the data in multiple linear regression model. All possible 2-ways or first-order interactions, between significant predictors were checked by LR test. Model fitness was assessed through the use of the receiver operating characteristic (ROC) curve, Hosmer-Lemeshow goodness-of-fit statistic and the classification table. All tests were two-tailed; a *p*- value of less then 0.05 was considered to be statistically significant.

RESULTS

The study population consisted of 270 subjects, however 32 participants did not turn up for physical examination, to give the percentage of drop out about 11.8%, and only 238 were included for further analysis i.e. univariate and multivariate analysis. Concerning development of physical disability, participants and dropouts were similar on most baseline variables, and the results of analysis showed the same pattern.

Prevalence of physical disability

The prevalence of physical disability for IADLs was 34.8% (95% Confidence interval 29, 41) as shown in Figure 1 . Of the disability in IADLs, the commonest to be affected were housekeeping (31.4%) and budgeting (31.5%).

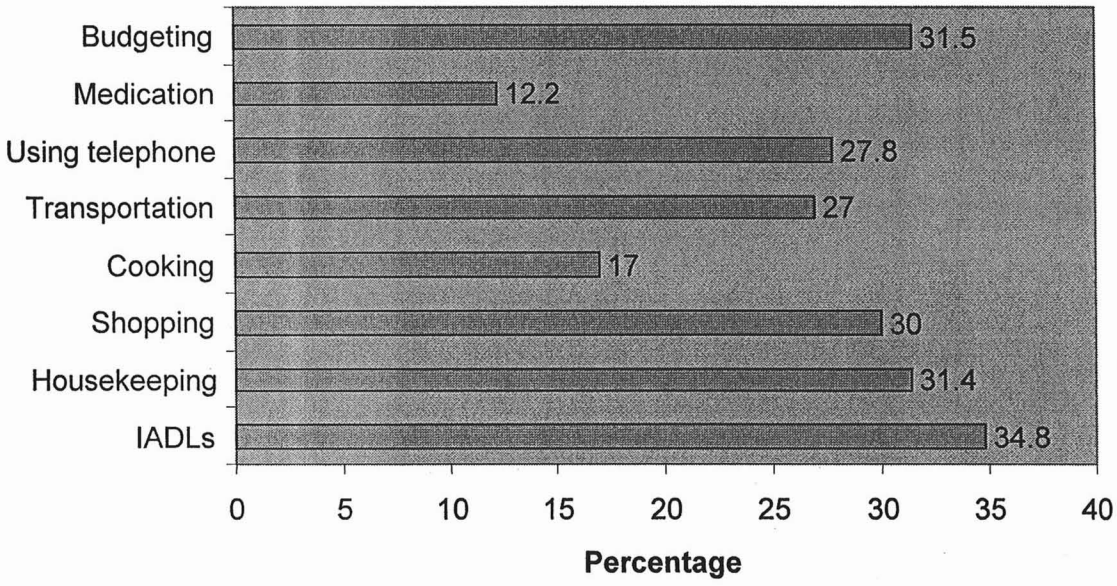

Figure 1 : Prevalence of physical disability in IADLs

Table 1 showed the comparison between two groups i.e. physical disabled and non-physical disabled according to socio-demographic characteristics of the patients. Table 2 showed the distribution of the respondents according to self-reported life-style behavior, medical condition and result of physical examination. Full results of blood investigation was sent to the health centers as well as the patient, so that the newly diagnosed patient will be managed appropriately. From multivariate analysis the significant associated factors were age, marital status, income, body mass index and high diastolic blood pressure a shown on table 3.

Table 1: Distribution of sociodemographic characteristics in physically disabled (n=83) and physically abled (n=155) in IADLs among elderly people in the study.

Independent variable	Physical Disability				χ^2 Statistic	Degree of freedom	p-value[a]
	Absent		Present				
	No.	%	No.	%			
Age							
60 – 74 year	132	80.0	43	58.9	10.67	1	**0.002**
≥ 75	33	20.0	30	41.1			
Gender							
Male	66	40.0	16	21.9			**0.006**[b]
Female	99	60.0	57	78.1			
Ethnic group							
Malay	162	98.2	71	97.3	0.06	1	0.645
Chinese	3	1.8	2	2.7			
Marital status							
Married	109	66.1	30	41.1	12.30	1	**<0.001**
Widow/widower/divorced	56	33.9	43	58.9			
Educational level							
None	96	58.1	56	76.7	9.52	2	**0.002**
Primary	58	35.2	17	23.3			
Secondary/Tertiary	11	6.7	1	0.0			
Occupation							
Unemployed	84	50.9	63	86.3	29.65	4	**<0.001**
Business (small)	12	7.3	1	1.4			
Farmer/gardener	36	21.8	64	5.5			
Pensioner	13	7.9	0	0.0			
Others	20	12.1	5	6.8			
Monthly personal income (RM)							
50 – 100	46	27.9	41	56.2	21.03	3	**<0.001**
101 – 200	51	30.9	19	26.0			
201 – 300	28	17.0	6	8.2			
> 300	40	24.2	7	9.6			
Source of income							
Pension	17	10.7	2	2.7			**0.009**[b]
Daughter/son	80	48.5	55	73.3			
Job	52	31.5	10	13.7			
Welfare	2	1.2	2	2.7			
Others	14	8.5	4	5.6			
Living with							
Husband/wife	100	60.6	30	41.1	7.77	3	0.051
Daughter/son	45	27.3	31	42.5			
Alone	19	11.5	11	15.0			
Others	1	0.6	1	1.4			

[a] Chi Square test for independence [b] Fisher's Exact test

Table 2: Distribution of lifestyle behavior and medical conditions factors in physically disabled (n=83) and physically abled (n=155) in IADLs among elderly people in the study.

Independent variable	Physical Disability				χ^2 Statistic	Degree of freedom	p-value [a]
	Absent		Present				
	No.	%	No.	%			
Smoking status							
Non-smoker	89	53.9	40	54.8	0.29	2	0.862
Ex-smoker	46	27.9	21	28.8			
Current smoker	30	18.2	12	16.4			
Physical activity							
Non-active/less active	107	64.8	42	57.5	0.91	1	0.209
Active	58	35.2	31	42.5			
Reported medical condition							
None	97	58.8	39	53.4			**0.036** [b]
HPT	39	23.6	13	17.8			
DM	10	6.1	1	1.4			
HPT & DM	14	8.5	11	15.1			
CVA	1	0.6	3	4.1			
Others	4	2.4	6	8.2			
Visual acuity							
6/6 – 6/18	74	44.8	19	26.0	7.16	1	**0.036**
6/24 – 6/60	91	55.2	54	74.0			
Hearing status							
Normal	121	73.3	38	52.1	9.59	1	**0.002**
Impaired	44	26.7	36	47.9			
Body mass index (kg / m^2)							
Underweight	45	27.3	25	34.3	10.93	3	**0.012**
Normal	72	43.6	22	30.1			
Overweight	39	23.6	13	17.8			
Obese	9	5.5	13	17.8			
Diastolic BP (mmHg)							
< 90	93	56.4	30	41.1	4.34	1	**0.026**
≥90	72	43.6	43	58.9			
Systolic BP (mmHg)							
< 140	74	44.8	23	31.5	3.45	1	0.084
≥ 140	91	55.2	50	68.5			
Fasting Blood Sugar (mmol/ L)							
< 7.8	141	85.5	56	76.7	2.11	1	0.105
≥ 7.8	24	14.5	17	23.3			
Total Cholesterol (mmol/ L)							
< 5.2	39	23.6	14	19.2	0.75	2	0.687
5.2 -6.2	57	34.6	24	32.9			
> 6.2	69	41.8	35	47.9			

[a] Chi Square test for independence [b] Fisher's Exact test

Table 3:The associated factors of physical disability in IADLs by Multiple Logistic Regression

Independent variables	Crude *OR*[a] (95%CI[b])	Adj.*OR*[a] (95%CI[b])	*LR* Stat.	*p*-value[c]
Age (year)				
≥ 75	2.72 (1.48, 4.98)	2.39 (1.18, 4.83)	5.94	0.015
60 – 74	1.0	1.0		
Monthly income (RM)				
50 – 100	1.0	1.0	12.90	< 0.001
101 – 200	0.42 (0.21, 0.82)	0.43 (0.20, 0.90)		
201 – 300	0.24 (0.09, 0.64)	0.28 (0.09, 0.83)		
> 300	0.16 (0.06, 0.43)	0.22 (0.08, 0.62)		
Marital status				
Widow/widower or divorced	2.75 (1.56, 4.86)	2.38 (1.23, 4.61)	7.32	0.007
Married	1.0	1.0		
Body mass index (kg/m^2)	1.82 (0.92, 3.60)	2.16 (0.97, 4.77)	3.89	0.048
Underweight	1.06 (0.48, 2.24)	1.48 (0.61, 3.69)		
Overweight	4.36 (1.63, 11.72)	4.68(1.54,14,18)		
Obese	1.0	1.0		
Normal				
Diastolic BP (mmHg)				
≥ 90	1.83 (1.04, 3.20)	2.02 (1.04, 3.94)	6.07	0.014
< 90	1.0	1.0		

LR* Stat. = Likelihood ratio statistic** [a]OR*=Odds Ratio** [b]**CI=Confidence Interval** [c]***LR* test**
Hosmer-Lemeshow test (*p*-value)= 0.789
Area under ROC = 0.798
Sensitivity = 37.5% **Specificity = 90.3%**

DISCUSSION

Prevalence of physical disability

The present study demonstrates that the prevalence of disability in IADL (34.8% , 95% CI = 29,41) generally was high and quite similar to the observed in the previous studies, which range between 20.1% to 36% (Jette & Branch,1981, Molina *et al,* 1996, Barbotte *et al*, 2001, Nugegoda & Balasuriya, 1995, Guccione *et al*, 1994, and Loh *et al,* 2002).

Prevalence of IADLs can be influenced by socially defined roles and the socio-cultural and physical environment. For example, certain activities might not be performed by the men in this study population (e.g. preparing meals, shopping). Some men might not know whether they were able to do these activities (Koyano *et al*, 1988 & Wiener *et al* 1990). Meanwhile Boult *et al.* (1994) suggested that disability may be caused, not only by physical or mental limitation, but also by cultural expectations, environmental obstacles, or lack of motivation and training. Study by Hoeymans *et al.* (1997) has found the contributions of psychological factors to physical functional limitations in the elderly. Physical disability is not merely the end result of physical conditions. Successful performance of many functional activities, such as housekeeping, requires motivation and cognitive abilities as well as physical ones. This view also supported by Kelly-Hayes *et al*, (1992) in which in their study, cognitive impairment showed significantly greater

differences between functional limitations and disability. In this present study, we tried to control this, by excluding the participants with history of cognitive and psychiatric disorders.

Differences in survey methodology also have a substantial effect on the prevalence estimates of disability in the elderly (Picavet & van de Bos, 1996, Jette, 1994 & Wiener *et al*, 1990). These differences should be taken into account when making international comparisons and studying time trends based on survey data. Differences in methodology that can affect the comparability of data from population based surveys, included sampling methods, methods of data collection, and instruments used. The only sure way to compare different IADLs disability estimates is to use the same scaling methods across studies. Yet, there is no one correct method for operationalizing disability.In general, standardizing reduces but does not eliminate the differences across surveys.

Risk factors of physical disability

Many of the discrepancies of the prevalence of physical disability among these previous studies may be related to their use of different scales and different methodologies. In spite of these differences, their findings regarding the risk factor of this disability were quite similar. In this present study, the risk factors for physical disability in IADLs were older age, widow/widower, high diastolic blood pressure, high body mass index and low income.

Sociodemographic data

Associations between demographic characteristics such as age, sex, race, socioeconomic status, and physical disability at older ages have been most extensively documented. In this present study, the significant socio-demographic risk factors were older age, income and marital status. Age has been consistently found to be associated with physical disability (Beckett *at el,*1996, Hebert *et al*, 1999, Guralnik *et al*, 1993, Boult *et al*, 1994, Picavet & Hoeymans, 2002, Mendes de leon *et al*, 2003, Oman *et al*, 1999, Leveille *et al,* 1999, Ho *et al*, 197 and Wilcox *et al*, 1996). In this present study, higher age proved to be a significant predictors of physical disability. It has been suggested that aging-related physiological changes play a relevant role in the development of functional disability, like previously mentioned. Only one study has been noted to have the result that was against in this present study i.e. study by Maddox and Clark (1994). They suggested that, while chronological age as a crude indicator of biological maturation is important as a risk factor for impairment and disability, age is not the sole or always necessarily the principal explanation of functional impairment and associated levels of disability in late adulthood. Study by Kai *et al* (1991) has shown that, the rate of decrease of ADL among initially independent elderly increased as the age of the participants advanced. Active Life Expectancy (ALE) of the elderly aged 60 to 64, who were initially able to accomplish all the six items of ADL, was 15.2 years, gradually decreasing to 2.2 years for the elderly aged 90 and over. Interestingly enough, ALE for the females with "longer expectancy" was almost similar to that of males.

Income proved to have a significant association with physical disability in this present study. This finding was consistent with other studies (Guralnik & Kaplan, 1989,

Guralnik *et al*, 1993,Berkman *et al*, 1993, Maddox *et al*,1994,). However, finding of another studies have revealed that income was not a significant predictor for physical disability (Mor *et al,* 1989, Hebert *et al*, 1999 , Clark, 1996, and Boult *et al*, 1994). The associations between lower income and physical disability is possibly due to a direct influence of economic resources-for example, the possibilities to acquire healthy food and medical services, or to life free of the stress caused by economic troubles.

Maddox *et al.* (1994) in their study were interested in assessing whether education as a covariate of income has a significant independent contribution to make in the prediction of functional capacity in later life. They found that, both income status and education are significant predictors of impairment status. Chronological age per se is not. Study by Mendes de Leon *et al.* (1995) suggests that the extent to which socioeconomic factors explain racial differences in disability varies from one setting to another. The degree to which education and income are markers of actual social class however, differs across geographic areas. Vulnerable populations included aged people have limited economic resources, having poorer access to healthcare, are more medically uncontrolled chronic conditions and have limited psychological or social resources. Current differences in functional levels may reflect recent changes, life-long patterns or even exposures or nutritional patterns of earlier life stages.

Regarding marital status, this present study has found that participants who were widow, widower or divorced have a risk to develop physical disability, and it was similar with others findings (Mor *et al*,1989, Freedman & Martin, 1998 and Picavet & Hoeymans, 2002). However, finding from this present study was difference from studies by Guralnik

and Kaplan (1989), Clark (1996) and Hebert *at el.* (1999). For marital status it is usually found that those who are married are healthier than those who are never married, divorced or widowed. Study by Joung *et al.* (1994) revealed that people who live with a partner have lower morbidity rates than those who live alone. They further showed that the excess risks of the never married, widowed and divorced decreased by 40-70% for all health measures after controlling living arrangement. The explanation for the association between marital status and health was that health depends on marital status; one's marital status influences one's health through the social support provided by the marriage partner or through social control and regulation.

Lifestyle behavior

Regarding body mass index, this present study has shown that it was highly significant risk factor for physical disability, in which elderly who have body mass index (BMI) more than 30 kg/m^2 or obese have nearly 5 times risk to develop physical disability. Similar findings has been found in others studies (La Croix *et al,*1993, Guralnik & Kaplan, 1989, Linda *et al,* 1994, Keil *et al*, 1989, Oman *et al*, 1999 and Ho *et al*, 1997). However, studies by Leveille *et al.* (1999), Harris *et al.* (1989), Lammi *et al.* (1989), Berkman *et al.* (1993), Clark (1996), Boult *et al.* (1994) and Guccione *et al.* (1994) have failed to identify BMI as a risk factor for physical disability. An effect of obesity on physical disability has several potential biologically plausible mechanisms. First, obesity may increase the risk of cardiovascular disease events that, in turn, could lead to disability. Second, obesity has been consistently associated with osteoarthritis, a major cause of physical activity, because obesity can increased mechanical stress on joints (La Croix *et al*,1993).

Medical condition

Medical co-morbidity in the elderly is well documented. Study by WHO reported that the common health problems found among elderly in Malaysia were vision problem (67%), difficulty in chewing food (48%) and 15% for hearing problems (Andrews, 1987). In this study, it was found that about 58% of elderly never have any medical illnesses. Elderly with hypertension was 38%, diabetes was 23% and 77% of them have high blood cholesterol. An increase in the number of coexistent conditions among elders is directly associated with an increase in limitations in activities of daily living. According to Brody and Schneider (1986), diseases and disorders of aging can be classified as age-dependent and age-related. Age-dependent diseases and conditions appear to be intimately related to the normal aging of the host e.g. coronary heart disease, cerebrovascular disease, blindness, deafness and Type II diabetes mellitus. Whereas age-related diseases and disorders can be defined as those which have specific temporal patterns for their occurrence, but it is proposed that they are not necessarily related to the normal process of aging. An example is multiple sclerosis, where the disorder can occur occasionally at older ages but were vulnerability is essentially limited to the third and fourth decades of life. Most disability is, or gradually will be, associated with age-dependent disease. Associations between disease and physical disability in the elderly have been found for arthritis, hip fracture, diabetes, hypertension, coronary heart disease, stroke, visual impairment and hearing impairment. There is, however, no reason to assume that all conditions have similar impacts on function. This present study has identified the diseases that have association with physical disability i.e. high diastolic blood pressure, high

cholesterol level, and hearing impairment. Hypertension, diabetes, visual impairment, systolic blood pressure and fasting blood sugar were not related with physical disability.

High blood pressure was already identified to be important risk factors for coronary heart disease and cerebrovascular disease by many studies (Reid *et al*,1976, Kromhout *et al*, 1994, Engstrom *et al*,2000). At the same time, both these diseases were also the important predictors for physical disability (Guccione *et al,* 1994, Guralnik *et al,* 1993, Idler *et al,* 2000, and Boult *et al*,1994). High blood pressure may effect the physical disability through these diseases. However,in this present study, we did not put cerebrovascular and coronary heart diseases as an independent risk factor because very few patient reported to have these diseases and we did not measure objectively like we did for hypertension and diabetes mellitus. Findings from this present study also parallel those from study by Berkman *et al.* (1993), in which they also found, glycosylated hemoglobin (provides an assessment of integrated long-term blood glucose concentrations), and systolic blood pressure were did not vary across the groups of disabled and non-disabled. Study by Berkman *et al.* (1993) has found that body mass index and diastolic blood pressure were not significant risk factors for physical disability which was contrast with this present study. In the Framingham study, the extent to which known cardiovascular risk factors are related to the development of physical disability was examined in the absence of diagnosed cardiovascular disease. Pinsky and co- investigators (1985) in that study has identified very few cardiovascular risk factors predictive of good functioning. Separate analysis were conducted among women and men to avoid possible confounding by this key characteristic. Physiologic parameters that did not predict physical disability in men included serum glucose, blood pressure and body mass index. Whereas among

women, both current and long term history of hypertension, smoking, elevated body mass index, current diabetic status as well as elevated blood sugar level, were positively associated with increased functional disability in those free of diagnosed cardiovascular disease. Neither current cholesterol nor mean cholesterol level calculated from measures taken over 25 years was independently related to increased physical disability in the study group, after controlling for the non-cardiovascular disease (Berkman *et al*, 1993). Not many studies attempt to determine medical illnesses risk factors by doing more objective measurement, and they usually got the data by self-reporting. Study by Keil *et al*, (1989) has found that cholesterol was a significant predictors of physical disability only in elderly blacks females. Study by Lammi *et al,* (1989) has produced similar result with this present study. They found cholesterol level, and systolic blood pressure were not a predictor for physical disability, whereas diastolic blood pressure was predict high disability 20 – 25 years later.

As a summary, the prevalence of physical disability for IADLs was 34.8% and it was considered as high, however it is similar with others studies. These findings also suggest that certain socio-demographic characteristics (i.e age, income & marital status), lifestyle behavior (high body mass index) and medical illnesses (high diastolic blood pressure) were significant risk factors of physical disability in elderly. The majority of predictors of physical disability that were identified by this study were potentially subject to modification, including body mass index and high blood pressure. Public health efforts to reduce prevalence of all these factors should continue.

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Appendix A

Instrumental Activities of Daily Living (IADLs)

1. Telephone:

I: able to look up numbers, dial, receive and make calls without help
A: able to answer phone or dial operator in an emergency but needs special phone or help in getting number for dialing
D: unable to use the telephone

2. Traveling:

I: able to drive own care or travel alone on bus or taxi
A: able to travel but not alone
D: unable to travel

3. Shopping:

I: able to take care of all shopping with transportation provided
A: able to shop but not alone
D: unable to shop

4. Preparing meals:

I: able to plan and cook full meals
A: able to prepare light foods but unable to cook full meals alone
D: unable to prepare any meals

5. Housework:

I: able to do heavy housework (like scrub floors)
A: able to do light housework but needs help with heavy tasks
D: unable to do any housework

6. Medications:

I: able to take medications in the right dose at the right time
A: able to take medications but needs reminding or someone to prepare it
D: unable to take medications

7. Money:

I: able to manage buying needs, pay bills
A: able to manage daily buying needs but needs help paying bills
D: unable to manage money

Abbreviations: I, indepedent; A, assistance; D, dependent

Source : Lewis (1996)