DISABILITY AND QUALITY OF LIFE AMONG OLDER MALAYSIANS

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Abstract

Introduction: With increases in life expectancy, more Malaysian will live to old ages. The ageing of the Malaysian population is leading to an increasing number of disabled older people, as disability is associated with increasing age. Research on disability prevalence, risk factors for disability, and consequences of disability for quality of life is important in face of the ageing population. This study assessed disability prevalence and determined factors that predict disability and quality of life among older Malaysians (ages 60+) who are community-dwelling.

Methods: Data from the Mental Health and Quality of Life of Older Malaysians Survey (MHQoLOM) were used in this study, which was a national survey conducted from 2003 through 2005 that employed a cross-sectional design. A multi-stage proportional stratified sample of 2980 community-dwelling older persons in Malaysia, ranging in age from 60 to 104 years, were interviewed in the respondent's home. Statistical procedures for the analyses included descriptive statistics, univariate logistic regression, and multivariate logistic regression.

In this study, Verbrugge and Jette's model of disablement process has been used as a conceptual frame of reference.

Results: The prevalence of disability in or more of 13 ADL/IADLs was 22.8 percent. Older women had notably higher disability prevalence (31%) than older men (14%). Among men, predictors of disability are increasing age, Other ethnicity (compared to Malay), being nonmarried, poor self-rated health, heart disease, eye disorder, and functional limitations. Among women, predictors of disability are age, Indian ethnicity (compared to Malay), being nonmarried, smoking, poor self-rated health, respiratory disorders, and functional limitations. Predictors of perceived quality of life for men are ethnicity, education, income, urban/rural residence, physical activity, and self-rated health; and for women, predictors are ethnicity, self-rated health, and functional limitations. Specifically, being of Indian or Chinese ethnicity (compared to Malay) is associated with reduced quality of life for both men and women. By contrast, Bumiputera (indigenous) or Other ethnicity increases odds of good quality of life for men. Very poor self-rated health (compared to excellent) is associated with lower perceived quality of life for both men and women.

Conclusions: These findings confirm the independent contribution of risk factors, medical conditions or disease, and functional limitations for disability and low quality of life in the disablement process in Malaysia. The findings of the study are relevant for program development to improve functional abilities and quality of life among older Malaysians, and also to minimize modifiable risk factors by early intervention.

Key words: ADL/IADLs; disability; prevalence; older people; quality of life

Introduction

Population ageing has emerged as a global phenomenon in light of the universal decline in fertility and the increases in life expectancy. Malaysia, like many other countries world-wide is experiencing demographic transition. With increasing longevity, low mortality, declining fertility and a healthier living environment, the proportion of older people among the Malaysian population is estimated to increase from 6.2 percent in 1990 to 11.3 per cent by 2020 (Arokiasamy, 2000). Based on the past four censuses in 1970, 1980, 1991 and 2000; the proportion of younger age groups (15 years and below) is decreasing, while the proportion of older people is on the increase (Ong, 2001). Life expectancy at birth in 2006 for Malaysian males rose to 71.8 years and 76.3 years for females (Department of Statistics Malaysia, 2007). The ageing of the Malaysian population is leading to an increasing number of disabled older people; as disability is associated with increasing age (Ng, Niti, Chiam, & Kua, 2006; Reyes-Ortiz, Ostir, Pelaez & Ottenbacher, 2006; Pèrés, Verret, Alioum, Barberger-Gateau, 2005; Walter-Ginzburg, Blumstein & Guralnik, 2004). Ageing is a generalized deterioration of many organs and systems, which leads to a lower effectiveness of physiological functions accompanied by an increase in risk factors for various diseases ((Albert, Im, & Raveis, 2002). It is not uncommon for older persons to concurrently have co-morbid diseases and be frail and/or disabled (Fried, Ferruci, Darer, Williamson & Anderson, 2004).

Disability increases the risk of need for home help, hospitalization, nursing home admission and premature death (Quinn, Johnson, Andress, McGinnis & Ramesh, 1999; Fried & Guralnik, 1997; Ferruci, Guralnik, Simonsick, Salive, Corti & Langlois, 1996). Subsequently, it lowers the quality of life of its victims. Older people with difficulties in carrying out activities of daily

living are at the greatest risk for dependent life. Such individuals need help to be able to live in the community.

The factors underlying disability in old age are multiple and vary between individuals and populations. Research on disability in old age has identified several factors, such as age and genetics (Ferruci et al, 1996), and modifiable risk factors, which include both individual factors such as age-related diseases, impairments, functional limitations, sedentary lifestyles and other unhealthy behaviours, and psychological aspects (Gill, Allore & Guo, 2003; Rantanen et al, 2001; Woo, Ho, Yu, Lau & Yuen, 1998; Lawrence & Jette, 1996). Disability is also socially constructed and that it is the existence of a disabling environment which transforms impairments and functional limitations to disabilities (Clarke & George, 2005; Stark, 2004). The Disablement Process model developed by Verbrugge and Jette (1994) posits that the main pathway from pathology to disability may be influenced by several factors such as socio-demographic characteristics, behavioural, psychological, environmental and biological factors. The disablement process model may prompt some global outcome (hospitalization, institutionalization, mortality) and feedback effect. Moreover, it has a powerful effect on happiness, life satisfaction, and quality of life (Verbrugge and Jette, 1994).

The issue related to disability in old age is a mass problem that requires mass solution (Ebrahim 1999). Thus, disability is an important public health concern for it has considerable negative impact on the quality of life of older individuals and their families and it is associated with increased social and health care needs. Fries (2003) proposed the inclusion of quality of life measures in the monitoring of disability trends in the national survey programmes.

This study on the prevalence, risk factors for disability and consequences of disability is important in the face of the prevailing ageing population. Identification of diseases associated with disability will enable appropriate intervention. Disability causing dependency increases the risk of need for home help, hospitalization, and nursing home admission (Quinn et al, 1999; Fried & Guralnik; 1997; Ferruci et al; 1996); that in turn determine the health care needs of the older people. There is paucity of information on prevalence of disability among older Malaysian, its risk factors, and its impact on their quality of life. The quality of life of the older people is becoming of concern however; there is a dearth of study thus far conducted in Malaysia. Disability and quality of life are important outcomes that determine an older persons' need for care.

Given the general lack of information on prevalence and identified factors for disability and quality of life in the older people and the ageing of the Malaysian population, this study sought to assess the prevalence of disability and to determine factors that predict disability and quality of life of community-dwelling older Malaysians. Verbrugge and Jette's model of disablement process has been used as a conceptual frame of reference.

METHODS

Data Source

The data for the study came from the Mental Health and Quality of Life of Older Malaysians Survey (MHQoLOM) an Intensification of Research in Priority Areas (IRPA) funded research, which was conducted from 2003 through 2005. The Mental Health and Quality of Life of Older

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Malaysians Survey (MHQoLOM) was a national survey that employed a cross-sectional research design. The population in the study consist of older Malaysians aged 60 years and over that reside in the community throughout the thirteen states in Malaysia; Johore, Kedah, Kelantan, Melaka, Negeri Sembilan, Pahang, Perak, Perlis, Pulau Pinang, Selangor, Terengganu, Sabah and Sarawak, including the Federal Territory of Kuala Lumpur. The sample was drawn from the year 2000 Census data and the year 2003 Labour Force Survey obtained from the Department of Statistics, Malaysia. A multi-stage proportional stratified sampling procedure taking into account the total population in each state based on rural-urban dichotomy as well as the gender component was employed to obtain a total of 3000 respondents. However, a total of 2980 respondents were successfully interviewed.

The Mental Health and Quality of Life of Older Malaysians survey used an in-person interviewing technique for data collection which was conducted in the respondent's home. Only one older person from each selected household was interviewed. In the case when there was more than one sequenced gender present in the household, random sampling was employed to select the respondent. Where an older person was unable to respond to the interview, the primary caregiver was asked to be a proxy respondent. In instances, when an older person was not at home at the time of the initial visit, a second attempt was made to reach him/her. Prior to field work, all the interviewers were trained according to standard protocol. Interviewers read all questions aloud and recorded the respondent's responses.

Questionnaire

The instruments used in the MHQoLOM were the General Questionnaire and the Geriatric Mental State Examination (GMS)/ the Automated Geriatric Examination for Computer Assisted Taxonomy (AGECAT). These structured, interview questionnaires were written in both Bahasa Malaysia and English language. The general questionnaire consist of twelve sections, namely socio-demographic; living arrangement; work status; income; social network; daily activities of living (activities of daily living, functional limitation and instrumental activities of daily living); health; disability; behavioral/lifestyle; stress; Rosenberg self-esteem; and quality of life.

Measures

The independent study variables drawn from the survey were socio-demographic characteristics, health behaviours, self-rated health, self-reported medical condition or disease, and functional limitations. The dependent study variables or the major outcome variables drawn from the survey data included activities of daily living and instrumental activities of daily living with the final outcome perceived quality of life.

Socio-demographic factors included were gender, age, ethnicity, marital status, education, income, living arrangement and urban versus rural residence. Health behaviours factors included smoking, alcohol intake and physical activity. Smoking status was categorized as ever smoked or never smoked. Alcohol intake was categorized as ever consumed alcohol or never consumed alcohol. Physical activity was assessed by asking respondents whether they rate themselves as very active, moderately active or not active/sedentary. The self-rated health status was based on

the respondent's response to the question "How would you describe your health status? Excellent, good, poor, or very poor".

Respondents were asked to report the presence of 24 medical conditions or diseases based on the question: "Do you have the following medical problems?" A list of the following specific medical condition or disease was used; arthritis, gout, glaucoma, cataract, asthma, hypertension, heart disease, numbness at extremities, diabetes mellitus, gastritis, kidney disease, prostate problem, cancer, anaemia, stroke, tuberculosis, breathing difficulties, bedsore, fall, head injury fracture, memory problem, urinary incontinence, and faecal incontinence.   For reasons of parsimony, selected medical conditions or diseases were renamed according to physiological functions. Arthritis and gout were combined into one category recoded as arthritis. Stroke and numbness of extremities were combined and classified into a single circulatory disorders category. Tuberculosis, breathing difficulties and asthma were collapsed into respiratory disorders category. Gastritis was renamed as gastrointestinal disorders. Kidney disease and prostate problems were combined and recoded into renal disorders. Glaucoma and cataract were classified into eye disorders. Urinary and faecal incontinence were classified into incontinence. Falls, fracture and head injury were collapsed and recoded into a single category renamed falls, fracture, head injury. Cancer, anaemia, and bedsore were collapsed and categorized as others.
 Hypertension, diabetes, heart disease, gastrointestinal disorders and memory problems were retained. A cumulative index of medical condition or disease was constructed by adding the number of reported medical conditions by the respondents. A three category variable was defined: none (no medical problem), one to two medical conditions and three or more medical conditions.

A functional limitation was defined as reported difficulty in climbing stairs and in sitting and standing, consistent with Verbrugge and Jette (1994) definitions in the disablement process in that those abilities indicate fundamental physical action. Functional limitation was measured by two questions. The first question was "Do you have any difficulty in climbing stairs?" and secondly "Do you have any difficulty in sitting and standing?" The responses were coded into three categories: no difficulties, with difficulties but still able to perform, and with difficulties and require assistance. The responses "with difficulties but still able to perform" and "with difficulties and require assistance" were recoded into a single "yes functional limitation" category and "no functional limitation" category.

The determination of disability status as measured by ADL and IADL difficulties was based on the respondent's reported difficulties to perform the five activities of daily living and six instrumental activities of daily living. The five activities of daily living included were bathing, dressing and undressing, eating, transferring (moving out of bed), and grooming; while the six instrumental activities of daily living were preparing meals, shopping, managing money, housekeeping, doing laundry, and taking and managing medication. Disability is defined as any difficulty in performing activities of daily living and instrumental activities of daily living. Quality of life was based on the respondent's subjective or perceived overall quality of life. A global evaluation item is used to measure perceived quality of life, "Overall how would you describe your quality of life? Excellent, good, moderate, poor or very poor" Perceived quality of life measures were dichotomized for statistical analysis into "very poor", "poor", "moderate" versus "good" or "excellent".

Statistical Analysis

Data were analysed using SPSS version 13 for Windows. Descriptive statistics were used to describe the socio-demographic characteristics, health behaviour, self-rated health, self-reported medical condition, functional limitations, prevalence of disability and perceived quality of life for men and women.

The predicting factors of disability and perceived quality of life were determined by means of univariate logistic regression and multivariate logistic regression. Univariate logistics regression was performed to evaluate the statistically significant effects (*p*- value < 0.05) of each factor on either disability or perceived quality of life. Only variables that were statistically significant at the *p* ≤0.05 at the univariate level analysis were entered in the multivariate model for either disability or perceived quality of life.

In the multiple logistic regression models each estimated coefficient provided an estimate of the log odds adjusting for all other variables included in the model. The logistic regression model was computed using the formula

$$\text{logit}(p) = \log(p/1\text{-}p) = \alpha + \beta_1 X_1 + \beta_2 X_2 \ldots + \beta_i X_i$$

where logit (p) denotes the log odds of eventual outcome or the dependent variables and the α is the constant; X_1, and X_2 are independent variables. β_1 and β_2 are the coefficient that denotes the effects of a unit change in the independent variable on the log odds.

The independent or predictor variables were entered into each of the models in a series of steps. For the disability outcome, the multivariable analyses controlled for the socio-demographic variants (age, ethnicity, marital status, education attainment, income, living arrangement, and

urban versus rural stratum). Secondly the health behaviour factors of smoking, alcohol intake and physical activity were controlled; thirdly, self-rated health controlled. This was followed by the fourth domain of self reported medical condition or disease being added into the model and finally the functional limitation was entered into the model.

Similarly, for the multivariate analyses for the perceived quality of life outcome a series of steps was undertaken in entering the independent variables into the model: (1) the socio-demographic variants were controlled (age, ethnicity, marital status, education attainment, income, living arrangement and urban versus rural stratum); (2) the health behaviour factors, smoking, alcohol intake and physical activity controlled; (3) self-rated health controlled; (4) self reported medical condition or disease controlled; (5) functional limitation controlled and finally disability was added into the model.

Statistical significance associations between a particular explanatory variable and the outcome in the model was based on P-values of <0.05. The Hosmer-Lemeshow statistic was examined after each block was added to the model, to assess the fit of the model.

RESULTS

Characteristics of the Respondents

The sample consisted of 2980 persons living in the community in Malaysia, ranging in age from 60 to 104 years (Table 1). The mean age of the sample was 70.46 years ($S.D.$ = 7.22); and median age was 69 years. There was no statistically significant mean age difference between men (M = 70.25, $S.D$ = 7.13) and women (M = 70.67, $S.D$ = 7.30). The majority of the

respondents were aged between 60 and 69 years (51.8%), 36.0% were aged between 70 - 79 years, and more than 12.0% were aged 80 years and over. The sample represented about equal distribution of men (49.6%) and women (50.4%) respondents. Respondents comprised the different ethnic groups in Malaysia; Malays (58.3%), Chinese (24.8%), Indians (4.8%), Bumiputera (10.8%), and Others slightly more than one percent (1.4%).

More than half (56%) of the respondents were married and men were more likely to be married (77.5%) whereas women were likely to be widowed (61.9%). About 45.2% of the respondents had no formal education, and only slightly more than one percent (1.4%) had tertiary education. Overall, a higher proportion of men attained primary, secondary and tertiary education than women. The mean monthly income was RM551.07 ($S.D$ = 863.408) and median income was RM400.00. The spread in the income distribution was wide as indicated by the large standard deviations. Overall, women were more likely to report a lower monthly mean income than men (RM445 for women versus RM 659 for men). The majority of the respondents lived with others (89.4%) and almost eleven percent (10.6%) lived alone. A slightly higher percentage of women reported to have lived alone (14.7% for women versus 6.4% for men). Respondents that lived in the urban areas comprised 56% and 44% lived in the rural residence.

Table 1: Percentage distribution of socio-demographic characteristics of men and women

Demographic characteristic	Men n = 1477	Women n = 1503	Total n = 2980
Age group			
60 - 69	53.1	50.8	51.8
70 - 79	35.0	37.1	36.0
80+	11.9	12.1	12.2
Age (means ± SD)	70.3±7.1	70.7±7.3	70.5 ±7.2
Ethnicity			
Malay	56.6	59.9	58.3
Chinese	25.6	24.0	24.8
Indian	5.1	4.4	4.8
Bumiputera	11.1	10.4	10.7
Others	1.6	1.3	1.4
Marital status			
Currently married	77.5	34.7	55.9
Not married	1.3	1.3	1.3
Separated/ Divorced	0.7	2.1	1.4
Widow/ Widower	20.5	61.9	41.4
Education			
No formal education	27.2	62.9	45.2
Primary education	58.4	31.0	44.6
Secondary education	12.2	5.4	8.8
Tertiary education	2.2	0.7	1.4
Income			
RM0 – RM499	49.0	67.3	58.3
RM500 - RM1000	36.4	25.4	30.8
RM1001 - RM1499	6.2	3.7	4.9
RM1500 and above	8.4	3.6	6.0
Income (means ± SD)	659 ±859	445 ±853	551 ±863
Living arrangement			
Alone	6.4	14.7	10.6
With others	93.6	85.3	89.4
Residence			
Urban	61.6	51.4	56.4
Rural	38.4	48.6	43.6

More than half of the respondents never smoked and about thirty-five percent (34.9%) smoked (Table 2). The majority of the respondents never drank alcohol; only 8.5% had ever consumed alcohol. In general, men reported higher percentage of smoking (55.6%) and alcohol use (13.9%) than women (14.5% and 3.2%). Nearly fifty-three percent of the respondents led a sedentary lifestyle and about six percent (5.7%) were physically active. Overall, women were more likely to report sedentary lifestyle (59.6% for women versus 46% for men). More than two-thirds of the respondents rated their health as "good" and "excellent". Men were more likely to rate their health as "good" and "excellent" (65.0% for men versus 59.7% for women), whereas slightly more women rated their health as "poor" and "very poor" (40.2% for women versus 35.0% for men).

The most common medical conditions or disease were arthritis (41.4%), hypertension (30.5%), diabetes mellitus (14.4%), circulatory disorders (11.8%), and memory problems (10.4%). The respondents reported a mean of 1.6 ($S.D$ =1.63) medical conditions, with 72% reporting at least one medical disease. Arthritis, hypertension, memory problems, eye disorders, and gastrointestinal disorders were more common among women than men. By contrast, men were more likely to have reported heart diseases, respiratory disorders and renal disorders.

About 18% of women and 8% of men reported difficulty in climbing stairs. Thirteen percent of women and nearly six percent of men had difficulty in sitting and standing. Overall, functional limitations were higher among women than men.

Table 2: Descriptive Statistics of Study Variables

Variables	Men n = 1477	Women n = 1503	Total n = 2980
Health behaviour			
Smoking status			
Never smoked	44.4	85.5	65.1
Smoked	55.6	14.5	34.9
Alcohol intake			
Never drank	86.6	96.8	91.5
Drank alcohol	13.9	3.2	8.5
Physical Activity			
Very active	8.8	2.6	5.7
Moderately active	45.2	37.8	41.5
Sedentary	46.0	59.6	52.8
Self-rated health			
Very Poor	3.3	4.4	3.8
Poor	31.7	35.8	33.8
Good	56.0	51.6	53.8
Excellent	9.0	8.2	8.6
Self-reported Medical Condition or Disease			
Arthritis	34.7	48.0	41.4
Hypertension	28.9	32.1	30.5
Diabetes Mellitus	13.8	14.9	14.4
Circulatory disorders	11.0	12.6	11.8
Memory problems	8.3	12.5	10.4
Heart diseases	10.4	7.4	8.9
Respiratory disorders	9.2	8.1	8.6
Eye disorders	5.6	8.1	6.9
Gastrointestinal disorders	4.9	8.0	6.5
Falls, fracture, head injury	4.4	5.4	4.9
Renal disorders	3.9	2.1	3.0
Incontinence (urinary/ fecal)	3.1	2.1	2.6
Others (cancer, anaemia, skin problems)	1.4	2.0	1.7
Number of medical conditions or disease			
None	20.5	24.2	28.1
1-2	48.1	51.0	49.6
≥ 3	31.4	24.8	22.3
Functional Limitation			
Difficulty in climbing stairs	8.0	17.9	12.9
Difficulty in sitting and standing	5.8	13.0	9.4

Prevalence of ADL/IADL Disability

Statistically significant differences were found between the sexes for each of the activities examined (Table 3). Women were more likely than men to report difficulties in bathing, dressing and undressing, eating, transferring and grooming. Women reported the greatest difficulties in taking and managing medication (25.9% for women versus 11.7% for men); and shopping (20.4% for women versus 9.2% for men).

Table 3: Percentage of respondents with activities of daily living (ADL)/instrumental activities of daily living (IADL) disability for men and women

ADL activities	Men n = 1477	Women n = 1503	Total n = 2980	χ^2
Bathing	4.1	7.4	5.8	14.45 ***
Dressing and undressing	3.7	6.3	5.0	9.52 **
Eating	3.1	5.1	4.1	7.06 **
Transferring	5.1	11.3	8.2	36.83 ***
Grooming	3.8	6.3	5.0	9.83 **
Preparing meals	8.6	15.6	12.1	31.74 ***
Shopping	9.2	20.4	14.8	70.35 ***
Managing money	6.8	14.8	10.8	46.87 ***
Housekeeping	7.9	13.8	10.9	25.69 ***
Doing laundry	9.5	16.9	13.3	33.07 ***
Taking and managing medication	11.7	25.9	18.8	92.99 ***

** $p < 0.01$. *** $p < 0.001$

The prevalence of disability among Malaysian's community-dwelling population was observed at 22.8 percent (14.5% and 31% for men and women respectively). Women were twice as likely to report difficulty in activities of daily living (ADL) and instrumental activities in daily living (IADL) compared with men (Table 2).

Table 4: Prevalence of ADL/IADL disability of men and women (n = 2980)

| | Independent | | ADL/IADL Disability | | | | | | Total | |
| | | | ADL | | IADL | | ADL and IADL | | | |
	n	%	n	%	n	%	n	%	n	%
Men	1263	85.5	12	0.8	124	8.4	78	5.3	1477	49.6
Women	1037	69.0	24	1.6	281	18.7	161	10.7	1503	50.4
Total	2300	77.2	36	1.2	405	13.6	239	8.0	2980	100.0

Factors associated with Disability

The multivariate logistic regression analyses of variables which determine disability is shown in Table 5. With statistical adjustment, age remained a significant risk factor of ADL/IADL disability for men: 80 years and over (OR= 4.16, CI: 2.32 – 7.47), 70 – 79 years (OR= 2. 55, CI: 1.59 – 4.07) when compared to those 60 to 69 years age group. Ethnicity also remained a risk factor, the group categorized under "Others" had higher odds of reporting ADL/IADL disability (OR= 6.69, CI: 2.14 – 20.93) compared to the Malays. Being unmarried increased the odds by almost two fold (OR= 1.84, CI: 1.18 – 2.88). Having a heart disease remained a risk factor (OR= 1.99, CI: 1.07 – 3.69) and eye disorders (OR= 2.79, CI: 1.36 – 5.73). Men who rated their health as very poor had higher odds of reporting ADL/IADL disability (OR= 9.47, CI: 2.05 – 43.75) than those who rated their health as excellent. Men with any functional limitations (OR= 31.80, CI: 16.68 – 60.64) compared with no limitation.

Among women, the odds of reporting ADL/IADL disability increased with older age, 80 years and older (OR= 4.56, CI: 2.73 – 7.59), and 70 to 79 years (OR= 2.07, CI: 1.46 – 2.94). Ethnicity

remained significant, being of Indian ethnicity (OR= 2.98, CI: 1.50 – 5.92) compared with the Malay. Women who were not married (OR=1.69, CI: 1.16 – 2.46) compared to those who were married. A surprising finding was the reduced odds of reporting disability in women who smoked (OR= 0.34, CI: 0.18 – 0.63). Women who rated their health as very poor were almost eighteen times more likely to report ADL/IADL disability (OR= 17.65, CI: 4.32 – 72.08); poor self-rated health (OR= 7.29, CI: 2.41 – 22.04); good self-rated health (OR= 3.12, CI: 1.05 – 9. 26) than those women who rated their health as excellent. An unanticipated finding was women with respiratory disorders had a reduced odds of reporting ADL/IADL disability (OR= 0.38, CI: 0.21 – 0.71). Having a functional limitation was associated with an increased likelihood of disability (OR= 23.83, CI: 14.57 – 38.96) compared with those without any functional limitation.

Table 5: Multivariate logistic regression for predictors of disability among men and women (n = 2980)

Predictors	Men Adjusted OR (95%CI)	Women Adjusted OR (95%CI)
Socio-demographic		
Age group		
60 – 69	1.00	1.00
70 – 79	2.55 (1.59 – 4.07)***	2.07 (1.46 – 2.94)***
80+	4.16 (2.32 – 7.47)***	4.56 (2.73 – 7.59)***
Ethnicity		
Malay	1.00	1.00
Chinese	0.81 (0.47 – 1.40)^{ns}	1.25 (0.82 – 1.89)^{ns}
Indian	0.96 (0.39 – 2.36)^{ns}	2.98 (1.50 – 5.92)**
Bumiputera	1.01 (0.53 – 1.93)^{ns}	1.03 (0.56 – 1.91)^{ns}
Others	6.69 (2.14 – 20.93)*	3.77 (0.85 – 16.62)^{ns}
Marital status		
Currently married	1.00	1.00
Not married	1.84 (1.18 – 2.88)**	1.69 (1.16 – 2.46)**
Health behavior		
Smoked	ns	0.34 (0.18 – 0.63)**
Self-rated health		
Excellent	1.00	1.00
Good	1.33 (0.39 – 4.54)^{ns}	3.12 (1.05 – 9.26)*
Poor	3.16 (0.90 – 11.07)^{ns}	7.29 (2.41 – 22.04)***
Very poor	9.47 (2.05 – 43.75)**	17.65 (4.32 – 72.08)***
Medical condition or disease		
Heart disease	1.99 (1.07 – 3.69)*	ns
Eye disorders	2.79 (1.36 – 5.73)**	ns
Respiratory disorders	ns	0.38 (0.21 – 0.71)**
Functional limitation		
Any limitation	31.80 (16.68 – 60.64)***	23.83 (14.57 – 38.96)***

The reference category is 1.00
ns: non significant
* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Factors associated with perceived good quality of life

Univariate logistic regression analysis of disability occurrence effect on perceived quality of life of the respondents showed a significant relationship for both men (OR= 0.52, CI: 0.37 – 0.73) and women (OR= 0.59, CI: 0.45 – 0.75). However, with statistical adjustment (Table 6) ethnicity, education, income, residence, health behavior and self-rated health remained as significant predictors of perceived good quality of life among men. Being of the "Other" ethnicity increased the odds of perceived good quality of life (OR= 8.95, CI: 2.79 – 28.69) and for the Bumiputera (OR= 2.64, CI: 1.70 – 4.10) compared to the Malays. Contrary for the Indians, the odds were decreased (OR= 0.48, CI: 0.26 – 0.88), and for the Chinese (OR= 0.61, CI: 0.44 – 0.84) compared to the Malay. For men with no formal education the odds ratio for perceived good quality of life was low (OR= 0.26, CI: 0.10 – 0.66) versus men with tertiary education. Men with an income of RM499 (OR= 0.33, CI: 0.20 – 0.54), income within the RM500 – RM1000 ((OR= 0.57, CI: 0.36 – 0.92) compared with men who had an income of RM1500 and above. Living in the rural areas versus urban areas also decreased the odds of perceived good quality of life for men (OR= 0.66, CI: 0.50 – 0.89). Likewise being sedentary (OR= 0.52, CI: 0.33 – 0.82) compared to men who were very active. Men who rated their health as very poor (OR= 0.04, CI: 0.01 – 0.14), poor self-rated health (OR= 0.15, CI: 0.09 – 0.26), and good self-rated health (0R= 0.37, CI: 0.23 – 0.59) compared to men who rated their health as excellent.

For women; ethnicity, self-rated health and functional limitation remained significantly associated with perceived good quality of life. Being Chinese women (OR= 0.71, CI: 0.50 – 0.99) and for the Indian women (OR= 0.34, CI: 0.16 – 0.17) compared with the Malay women.

Women who rated their health as very poor were more likely to perceive their quality of life poorly (OR= 0.05, CI: 0.01 – 0.16), poor self-rated health (OR= 0.16, CI: 0.09 – 0.29), good self-rated health (OR= 0.23, CI: 0.13 – 0.39) compared to women who rated their health as excellent. Women with any functional limitation were less likely to perceive their quality of life as good (OR= 0.60, CI: 0.38 – 0.93).

Table 6: Multivariate logistic regression for predictors of perceived good quality of life among men and women (n = 2980)

Predictors	Men Adjusted OR (95%CI)	Women Adjusted OR (95%CI)
Socio-demographic		
Ethnicity		
Malay	1.00	1.00
Chinese	0.61 (0.44 – 0.84) **	0.71 (0.50 – 0.99) *
Indian	0.48 (0.26 – 0.88) *	0.34 (0.16 – 0.70) **
Bumiputera	2.64 (1.70 – 4.10) ***	1.22 (0.77 – 1.93) ns
Others	8.95 (2.79 – 28.69) ***	2.69 (0.87 – 8.26) ns
Education		
Tertiary education	1.00	
Secondary education	0.55 (0.21 – 1.40) ns	ns
Primary education	0.48 (0.19 – 1.19) ns	ns
No formal education	0.26 (0.10 – 0.66) **	ns
Income		
RM1500 and above	1.00	
RM1001 – 1499	1.34 (0.71 – 2.55) ns	ns
RM500 – RM1000	0.57 (0.36 – 0.92) *	ns
RM0 – RM499	0.33 (0.20 – 0.54) ***	ns
Residence		
Urban	1.00	
Rural	0.66 (0.50 – 0.89) **	ns
Health behavior		
Physical activity		
Very active	1.00	ns
Moderately active	0.66 (0.42 – 1.03) ns	ns
Sedentary	0.52 (0.33 – 0.82) **	ns
Self-rated health		
Excellent	1.00	1.00
Good	0.37 (0.23 – 0.59) ***	0.23 (0.13 – 0.39) ***
Poor	0.15 (0.09 – 0.26) ***	0.16 (0.09 – 0.29) ***
Very poor	0.04 (0.01 – 0.14) ***	0.05 (0.01 – 0.16) ***
Medical condition or disease	ns	ns
Functional limitation	ns	0.60 (0.38 – 0.93) *
Disability		ns

The reference category is 1.00
ns: non significant
$^*p < 0.05$ $^{**}p < 0.01$ $^{***}p < 0.001$

Discussion

The purpose of this study was to assess prevalence and to determine factors that predict disability and quality of life in a sample of community-dwelling older Malaysians. Prevalence of disability among Malaysian's community-dwelling population was observed at 22.8 percent (14.5% and 31% for men and women respectively) which provide baseline data on disability among the older population in Malaysia. Manton and Gu (2001) using definition of disability as limitations in activities of daily living (ADL) and/or instrumental activities of daily living (IADL) reported disability prevalence of 19.7 percent among older adults in the United States aged 65 years and over. The prevalence of disability in Malaysia appeared to be higher than the study population by Manton and Gu (2001), however, the findings should be interpreted cautiously since it is possible that differences exist in the number of activities of daily living (ADL) and instrumental activities of daily living (IADL) items used, the sample studied and the definition used for older people.

This study confirms previous findings (Ng et al, 2006; Pérès, et al, 2005; Walter-Ginzbury et al, 2004; Lamarca et al, 2003; Ho et al, 2002; Melzer, McWilliams, Brayne, Johnson, & Bond, 2000) that the risk of disability is higher in women than men. The greatest proportion of older women were disabled in instrumental activities of daily living (IADL) (18.7%) compared to men (8.4%). Instrumental activities of daily living (IADL) that contributed to the greatest difficulty among women were taking and managing medication (25.9%), shopping (20.4%), doing laundry (16.9%) and for men were taking and managing medication (11.7%) and doing laundry (9.5%). This finding could also reflect the effect of not having formal education which was high in this population (27.2% and 62.9% for men and women respectively). The disability prevalence given

here were indicators of less severe disability, however an evaluation of IADL is important in determining the level of assistance needed by an older person to live independently.

The prevalence of activities of daily living (ADL) disability was low among the older Malaysians, respectively for women (1.6%) and for men (0.8%). The relatively low prevalence of severe disability among both older men and women in the older population in this study reflect relatively good functional abilities. Similarly, Shahar et al (2001) and Andrews (1987) observed rather good functional abilities among community-dwelling older Malaysians aged 60 years and over in their studies. While this finding is encouraging, it is worthwhile to note that the study population did not include institutionalized older people. As was pointed out by Cutler (2001), a direct measure of disability is residence in a nursing home. Older people that reside in nursing homes received help with activities of daily living (ADL).

Age is a statistically significant risk factor of ADL/IADL disability and with increasing age the odds of reporting disability also increased, consistent with other studies that confirmed the important role of older age on disability process (Tas et al, 2007; Ng et al, 2006; Pérès, et al, 2005; Walter-Ginzbury et al, 2004). Indian women had higher risk of ADL/IADL disability by almost three fold compared to the Malay women. Among men being non Malay was a risk factor for disability. This finding is consistent with other studies that observed ethnic differences in disability (Bryant, Shetterly, Baxter, & Hamman, 2002; Andresen & Brownson, 2000; Tucker, Falcon, Bianchi, Cacho, & Bermudez, 2000). This result need to be further studied, however previous research has attributed ethnic differences in disability might be due to education or socio-economic differences (for example, Boult, Kane, Louis, Boult, & Mccaffrey, 1994). Being

married has a protective effect on ADL/IADL disability for both men and women and conversely being unmarried increased the risk of ADL/IADL disability. Marriage might reflect the better social support among the married people in the prevention of functional disability in older people (Avlund et al., 2004).

A notable finding in this study is the association of smoking on disability among the older women. The result demonstrated strong association between smoking and reduced ADL/IADL disability among women. Haas, Eng, Dowling, Schmitt and Hall (2005) also found that current smokers in their study were more independent on ADL/IADL tasks than former and never smokers. This result may appear contradictory because smoking has been associated with other adverse health consequences. However smokers were found to be more independent on activities that relate to their capacity to procure cigarettes.

Very poor self-rated health was associated with disability for both men and women, consistent with other study findings (Femia, Zarit, & Johansson, 2001; Idler & Kasl, 1995). Femia et al (2001) provided further evidence that belief about one's health (self-rated health) and the motivation to perform those activities of daily living were as important as the ability to perform the task. Consistent with other studies (Kamper, Stott, Hyland, Murray & Ford, 2005; Spiers et al, 2005; Kattainen et al, 2004; Femia et al, 2001; Baggio, 1999; Fried & Guralnik, 1997; Guccione et al, 1994) that have shown the deleterious association of heart disease on risk of disability, heart disease increased the risk of disability for men in this study. Eye disorders strongly increased the risk of disability independent of other factors in older men. Previous studies (Spiers et al, 2005; Femia et al, 2001; Horowitz, 1994; Ford et al, 1988) had identified

visual impairment as a cause of disability in older adults. One unanticipated finding was the significant association between respiratory disorders and reduced risk of disability in women. This independent relationship with decreased disability might be explained by the association of respiratory diseases with smoking. It might be possible that women smokers in this study under report their difficulties on activities that relate to their capacity to procure cigarettes.

Functional limitations strongly increased the risk of disability in both men and women. The disablement process model (Verbrugge & Jette, 1994) provided the theoretical basis for this relationship, that the main pathway from pathology to disability is through functional limitations. Previous studies (Peek, Ottenbacher, Markides & Ostir, 2003; Femia et al, 2001; Jette, Assmann, Rooks, Harris, & Crawford, 1998; Lawrence & Jette, 1996) provided evidence that functional limitations were predictive of subsequent disability.

The important role of ethnicity on perceived quality of life was observed for both men and women in this study. Being of Indian and Chinese ethnicity was associated with decreased perceived good quality of life, while the reverse holds for the Bumiputera and Others ethnicity compared with the Malay. As its effect on perceived good quality of life is independent of all the factors included in the model, this effect could reflect true distinctive cultural influences. Thumboo et al (2003) also observed that ethnicity independently influenced health-related quality of life after adjusting for the influence of other determinants of health-related quality of life among the multi-ethnic Singaporean population.

This study finding that no formal education compared to tertiary education was associated with decreased perceived good quality of life among men is consistent with studies by Lasheras Patterson, Casado, and Fernandez (2001) and Sprangers et al (2000). As reported in previous studies (Bowling et al, 2003; Bowling & Windsor, 2001; Lau, Chi, & McKenna, 1998), income was significantly associated with quality of life, likewise in this study low income compared to high income in older men significantly decreased perceived good quality of life. Money was important and contributed to quality of life among men but not among women which might be culturally related as men tend to manage finances. Research evidence (for example, Breeze et al, 2005; Bowling, Banister, Sutton, Evans, & Windsor, 2002) indicated that the characteristics of the area where older people lived in the community were associated with quality of life. Among older men, rural residence versus urban residence contributed to a decreased perceived quality of life. Sedentary men compared to very active men in this study were associated with decreased perceived good quality of life, consistent with other studies (Luleci, Hey & Subasi, 2007; Guallar-Castillón, Santa-Olalla Peralta, Banegas, López, & Rodríguez-Artalejo, 2004) that reported the important role of physical activity on perceived quality of life.

Independent of the other factors, self-rated health was the most significantly associated with perceived quality of life among men and women. Other previous studies showed that health was related to quality of life (Gabriel & Bowling, 2004; Bowling et al, 2002; Bowling & Windsor, 2001). Indeed, self-rated health has a predictive association with perceived quality of life among the older people in this study but this finding was based on cross-sectional study which permits interpreting associations.

The significant functional limitation association with lower quality of life among women in this study could be expected because functional limitation affects the capability of an individual in accomplishing daily life activities and recreational activities. Other previous studies showed that there was an association between functional limitation with quality of life (Jakobsson & Hallberg, 2006; Lebrun et al, 2006; Orfila et al, 2006).

Conclusion

This study supports the usefulness of the Disablement Process Model in disability research among the older population, although partial component of the conceptual model was utilized and the relationships between the components of the main pathway were not examined. Indeed, risk factors, medical conditions or disease, and functional limitation had strong relations to disability in the population studied. This study was an attempt to add one outcome to the Disablement Process Model and that was perceived quality of life. The examination of perceived quality of life in relation to the disablement process indicated that risk factors and functional limitation contributed to low perceived quality of life. The intriguing findings were the association of functional limitation but not disability with perceived quality of life and this warrant further investigation to fully conceptualize the Disablement Process model.

The findings on the contribution of risk factors (older age, gender, ethnicity, marital status or smoking) and psychological factor (self-rated health) on disability provides useful information to target population at risk in order to prevent or delay disability. As more Malaysians live to old ages, there is a need to develop and promote interventions that prevent or postpone the onset of disability. Both illness prevention and health promoting components of lifestyle should be

addressed in program of health promotion for older people. In addition the identified risk factors (ethnicity, education, income, urban versus rural residence, physical activity) and psychological factor (self-rated health) on perceived quality of life provides information essential for planning and implementing public health policy.

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