Do older people with visual impairment and living alone in a rural developing country report greater difficulty in managing stairs?

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ABSTRACT

Objectives. Managing stairs is a challenging activity of daily living (ADL) for older people. This study aims to examine the association between visual impairment and difficulty in managing stairs among older people living alone and those living with others.

Methods. A population-based cross sectional study was conducted in rural Malaysia from 2007 till 2008. Seven hundred and sixty five older people aged 60 years and over underwent eye examination for visual impairment. Visual acuity criteria were used to define visual impairment. Presenting visual acuity was assessed using a standard metric Snellen Chart of E type. Difficulty in managing stairs was measured according to a question drawn from the Barthel Index which asks “do you need help in climbing stairs”.

Results. Overall, the prevalence of difficulty in managing stairs among older people in our population was 135 (18.3%, 95% CI 15.7–21.2). After adjusting for important confounders the odds ratio (OR) for visual impairment and difficulty in managing stairs among older people living alone was 5.04 (95% CI 2.27, 10.62). Among older people living with others, the adjusted OR for visual impairment and difficulty in managing stairs was 3.10 (95% CI 1.52, 6.80).

Conclusion. In a sample of older people aged 60 years and over, those living alone with visual impairment had greater difficulty in managing stairs than those living with others. Identification of these groups of older people is useful for targeting interventions.

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Introduction

Being old is associated with inability to perform activities of daily living (ADL) that are important in daily life (Tas et al., 2007; Zhao et al., 2009). Managing stairs is a challenging activity of daily living (ADL) for older people. Stairs negotiation (climbing up and down stairs) was rated among the top five tasks that are difficult to perform among older people (Oh-Park et al., 2011). In the hospital setting, self-reported ability to manage stairs is used as a decision-making on whether a patient should be discharged home or to a nursing facility (Stineman et al., 1998). This is mainly so in developed countries. Inability to manage stairs increase the risk of falls, fall related injuries or even death (Alexander and Hausdorff, 2008; Cumming et al., 2007). Declining sensory function such as visual impairment has been associated with mobility disability among older people (DiNuzzo et al., 2001; Salive et al., 1994). Visual impairment is however, modifiable to a certain degree as it may be corrected through surgery and use of optical devices. In many developing countries, older people live with their adult children (Bongaarts and Zimmer, 2002; DaVanzo and Chan, 1994). Nevertheless, this scenario is changing quite rapidly. In Malaysia, as the Malaysian economy changed from being based on agriculture to one that is supported by manufacturing and high technology industry, the younger population are migrating to the urban areas seeking employment leaving their older parents on their own to look after themselves (Pala, 2005). Thus, for older people living alone, managing stairs is a difficult task.

Literature from developed countries has shown that older people with chronic conditions and without partners have greater difficulty managing one or more flights of stairs (McLaughlin et al., 2011). On the contrary, information is sparse from the rural and underserved older population in developing countries. There is minimal evidence in the literature that visual impairment affects ability to navigate stairs. This study aims to examine the association between visual impairment and difficulty in managing stairs among older people living alone and those living with others in a rural population. Our hypothesis is that older people with visual impairment and living alone would report greater difficulty in managing stairs.
Materials and methods

Study population

The participants were rural older people aged 60 years and over from the Alor Gajah Older People Health Survey (OPHS) (Hairi et al., 2010). In Malaysia, 8% of the rural population are older people as compared to 5% of the urban population (Pala, 2005). Alor Gajah OPHS was conducted between May 2007 and November 2008. The target population was non-institutionalised older people aged 60 years and over living in the community of Masjid Tanah. Masjid Tanah is one of the sub-districts in Alor Gajah, situated in the northwest region of the State of Malacca. Malaysia’s recent Population and Housing Census Survey 2010 reported that the total population of Masjid Tanah is 12,000 people. The sampling frame was obtained from a comprehensive community list, developed by the Village Development Security Committee, a government institution at the village level. Eligible participants were all older people aged 60 years and older who had lived in Masjid Tanah for at least 12 months. Respondents’ age was confirmed by their identity card. Exclusion criteria were non-Malaysian citizens, older people residing in nursing homes and admitted to hospitals. All older people aged 60 years and above were included in the study. Household visits were made to all eligible respondents, face to face interviews were conducted and respondents were invited to the Health Clinic for eye and physical examination.

Difficulty in managing stairs was measured according to a question drawn from the Barthel Index, Activities of Daily Living which asks “do you need help in climbing stairs” (Wade and Collin, 1988). Responses were “unable”, “need help” (e.g. verbal, physical, carrying aid) or “independent”. Visual Acuity (VA) criterion was used to define visual impairment in our study. The WHO definition of visual impairment defines mild or moderate visual impairment as presenting visual acuity (PVA) of less than 6/18 but equal to or better than 3/60 (Congdon et al., 2003). Blindness is defined as PVA of less than 3/60 in the better eye (Congdon et al., 2003). Respondents with no visual impairment were categorised as normal. For the purpose of this analysis response were further grouped into two categories: normal vision and older people with visual impairment. This is done as the numbers are relatively small in some subgroups of visual impairment. Presenting visual acuity was assessed using a standard metric Snellen Chart of E type or alphabets at 6 m, in the Masjid Tanah Health Clinic and the Health Promotion Centre. For each eye, the respondents presenting visual acuity was ascertained with them wearing their habitual optical corrections (spectacles).

Data on the following socio-demographic characteristics were collected by face-to-face interview: age, gender, education level, marital status, living arrangements and social support. Information on the following health related variables was obtained: cognitive function, presence of chronic conditions, depressive symptomology. Cognitive function was assessed using the Elderly Cognitive Assessment Questionnaire (ECAQ). ECAQ has been shown to be a valid tool for assessment of cognitive impairment among older people living in developing countries (Koa and Ko, 1992). ECAQ scores range from 0 to 10. A score of 5 or below to indicate probable cognitive impairment, 5 to 6 borderline and 7 and above as normal. Participants with cognitive impairment scores of less than five were removed from the analysis. Social support was assessed using the Lubben Social Network Scale that measures levels of social interaction with relatives and friends. A score below 20 suggest risk of isolation. Respondents were asked about the presence of chronic diseases using the following question: “Has your doctor ever told you that you suffer from……(disease)?” The diseases include: diabetes, epilepsy, hypertension, heart attack or coronary or myocardial infarction, angina, congestive heart failure, chronic lung disease, asthma, stroke and arthritis. Depressive symptomology was assessed using the short version of the Geriatric Depression Scale 15 item (GDS)(Yesavage et al., 1983). Scores ranges from 0 to 15, with scores of six or more indicate depressive symptomology.

This study was approved by the Medical Ethics Committee, University Malaya Medical Centre, Kuala Lumpur and the Ministry of Health, Malaysia (JKN/M Timb 9 May 2007).

Statistical analysis

Descriptive statistics were summarized as percentages and any differences in the proportions between difficulty in managing stairs: independent, unable and needs help were tested using Chi-square for trend statistics. Ordinal logistic regression using SAS Proc Logistic version 9.2 (SAS Institute, Inc., Cary North Carolina) was carried out to examine the differences in climbing stairs dependence; with independent as the reference category. The Score Test for Proportional Odds Assumption was not significant (p = 0.52). The explanatory variables were visual impairment (reference normal vision), living arrangement (reference living with others). We examined potential effect-modification between visual impairment and living arrangements in the model. The multiplicative interaction terms for visual impairment/living arrangements were found to be statistically significant (p<0.05). Our results are reported separately for older people living alone and those living with others. We constructed two models: Model 1 adjusted for age, gender and education level. The disability literature reports low educational level as an acceptable proxy for socioeconomic disadvantage, therefore education level was used as a proxy measure of socioeconomic status. Model 2 adjusted for all variables in Model 1 plus social support, depressive symptomology and doctor-diagnosed chronic conditions.

Results

Of the 907 eligible older people who were approached, 765 completed the questionnaire and physical examination, giving a response rate of 84.3%. Non response was predominantly due to unavailability after two repeated invitations. The overall sample was representative of the older population in Alor Gajah, Melaka (Table 1).

The characteristics of the older people in Alor Gajah OPHS are shown in Table 2. The prevalence of difficulty in managing stairs (unable and needs help) were highest among older age group (> 75 years old), older people with no formal education, and among those diagnosed with more than one chronic disease (all p<0.001). Overall, the prevalence of difficulty in managing stairs among older people in our population was 135 (18.3%, 95% CI 15.7–21.2). Out of these, 58 (7.9%) were unable to manage the stairs at all and 77 (10.4%) needs help (verbal, physical or using a carrying aid) while climbing stairs (Data not shown).

Table 3 shows the relationship between visual impairment and difficulty in managing stairs by different living arrangement status. Among older people living alone, the crude OR for visual impairment was 5.66 (95% CI 3.06, 10.48) and after adjusting for age, sex and education level was 5.19 (95% CI 2.72, 9.89). The inclusion of social support, depressive symptomology and doctor diagnosed chronic condition variables in Model 2 reduced the magnitude of association between visual impairment and difficulty in managing stairs to 5.04 (95% CI 2.27, 10.62). A similar pattern was seen among those living with others but with a much smaller magnitude. Among older people living with others, the crude OR for visual impairment was 4.58 (95% CI 2.67, 7.86) and after adjusting for age, sex and education level was 3.13 (95% CI 1.54, 6.34). Further adjustment for social support, depressive symptomology and doctor diagnosed chronic condition variables in Model 2 reduce the magnitude of association slightly to 3.10 (95% CI 1.52, 6.80).

Discussion

Our study found that overall, the “old–old” or those aged above 75 years old, older people with no formal education and diagnosed

Table 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>Survey sample (n = 765)</th>
<th>Population of Alor Gajah, 2010*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group (years)</td>
<td>n (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>60–64</td>
<td>285 (37.2)</td>
<td>6061 (33.6)</td>
</tr>
<tr>
<td>65–69</td>
<td>172 (22.5)</td>
<td>4348 (24.1)</td>
</tr>
<tr>
<td>70–74</td>
<td>159 (20.8)</td>
<td>3408 (18.9)</td>
</tr>
<tr>
<td>75 and above</td>
<td>140 (18.5)</td>
<td>4223 (23.4)</td>
</tr>
</tbody>
</table>

* Population and Housing Census of Malaysia 2010.
with more than one chronic disease reported needing help and were unable to manage stairs on their own. The prevalence of difficulty in managing stairs among older people in rural Malaysia was high with almost one in five older people being unable or need help in managing stairs. In regression analysis, visual impairment was associated with difficulty in managing stairs. Modelling demonstrated that the magnitude of association between visual impairment and difficulty in managing stairs was much greater among older people living alone than those living with others.

Managing stairs is considered one of the most difficult daily activity tasks among the older people (Oh-Park et al., 2011). Compared to mobility on level surface, managing stairs is more challenging. Additionally, stairs vary in their designs and are present in a variety of environments. Stairs are common in rural Malaysian homes. Living quarters tend to be located on the upper floor. The design of stairs in Malaysia has remained unchanged for many decades which further adds on to challenge of managing stairs. To our knowledge, this is the first study in a rural population that highlights the importance of vision when managing stairs among older people living alone and those living with others. This information has potential implications to those involved in designing stairs and fall prevention programmes.

Visual acuity reduces with age. The influence of other age-related eye diseases such as cataracts, diabetic retinopathy, glaucoma and macular degeneration further worsens this condition. Based on our findings, eye screening for early detection as well as treating visual impairment among older people in our rural population should be the focus of our rural health service. Correcting visual impairment through first eye cataract surgery as well as vision rehabilitation such as counselling and low vision clinical services has shown to reduced the risk of falls and fractures (Harwood et al., 2005; Horowitz et al., 2005). Counselling on visual rehabilitation to the older people and their caregivers can be integrated into our elderly health care services.

Although this may seem a logical approach, it is not easily practised in a rural developing country set-up. These areas have a unique set of conditions that makes service delivery difficult. Developed countries have had decades to adjust to the changing age structure of their population and this change has been supported by relative economic prosperity (Kinsella and He, 2009). This enables the developed countries to gradually improve the health service for their older people. In contrast, the aging of populations in developing countries is moving at a much faster rate with far less well developed infrastructure (Kinsella and He, 2009). Lack of facilities and expertise slows down the delivery of health services. For example in Malaysia health care services for the elderly was introduced by the Ministry of Health in 1995 but the infrastructure support for geriatric care and geriatric rehabilitative services in all Malaysian district hospitals will only be completed by 2020 (Ong Fon Sim, 2007). Moreover, there is still a wide gap in human resource availability. To date, there are only fifteen geriatricians, five psycho-geriatricians and 13,000 health care workers who have had training in the care of the elderly for the whole country (Ong Fon Sim, 2007).

A limitation of this study is as with all cross sectional studies is that the study design does not allow us to draw causal inferences. Secondly, our assessment on visual impairment does not include other measures such as changes in contrast sensitivity, depth perception, glare impairment and visual field loss. Thirdly, we could only compare older people with normal vision to those with visual impairment without looking at the severity of visual impairment. Nonetheless, there is an important strength of this study; this is the first ever study to report the prevalence of difficulty in managing stairs among older people living alone and living with others in a rural developing country.

In conclusion, in a sample of older people aged 60 years and over, those living alone with visual impairment had greater difficulty in managing stairs than those living with others. Identification of these groups of older people is useful for targeting interventions.

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Authors' contributions

NNH: study concept, data analysis, interpretation of data and writing manuscript. AB, DP, IM contributed in critically editing the manuscript. All authors read and approved the final manuscript.

References