Instrumental daily living activities and its associated factors among community-dwelling elderly in Hue city, Vietnam

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Abstract

Introduction: The extension of life expectancy has led to the expansion of comorbidities and declination of functional ability, which have consequences on mental, physical and social well-being of the elderly. Hence, comprehensive understanding factors influencing instrumental activities of daily living (IADL) will guide future health strategies to improve the quality of life for the elderly. Objective: To access the prevalence of IADL limitation and its related factors among community-dwelling elderly in Hue city. Method: We carried out a cross-sectional study on 427 elderly aged 60 or older in Hue city from April 2020 to March 2021. The Lawton Instrumental Activities of Daily Living scale was used to access the limitation of IADL. Using logistics regression analysis to investigate the potential determinants of IADL limitation in older adults. Result: The prevalence of IADL limitation among community-dwelling elderly were 51.0% and 40.7% for female and male, respectively. Female participants often found difficulty in traveling (41.2%), going shopping (37.6%) and food preparing (33.5%) and problems related to going shopping (38.5%) and traveling (18.1%) were most observed in male. Logistics regression analysis revealed that advanced age (aOR = 8.57, 95% CI: 4.20 – 17.48), illiteracy (aOR = 5.54, 95% CI: 1.79 – 17.20), physical inactivity (aOR = 2.67, 95% CI: 1.67 – 4.56), walking aid usage (aOR = 27.06, 95% CI: 3.15 – 232.89) and visual impairment (aOR = 2.31, 95% CI: 1.36 – 3.93) as being significantly associated with IADL limitation. Conclusion: The overall prevalence of the community-dwelling elderly who reported limitation in performing IADL was considerably high. Healthcare programs should focus on early health status screening and developing healthy lifestyle campaigns for the elderly.

Keyword: instrumental activities of daily living, IADL, community-dwelling elderly, Hue city

1. BACKGROUND

The world's population is aging rapidly at an unprecedented rate, with the percentage of people aged over 60 years doubling from about 11% to 22% between 2000 and 2050, 80% of them will be living in low- and middle-income countries [1]. Aging population projections are also observed in Vietnam. Currently, Vietnam is in the so-called "demographic window", in which the proportion of labor force is double the number of dependents, yet it is predicted that the country will enter the aging period in 2040 [2]. Vietnam witnessed a growing proportion in the aging population, which had increased from 6.96% (1979) to 11.78% within 40 years and will be reaching 26.1% by 2049 [3].

The fast pace of population aging poses great challenges to the provision of social welfare services that the healthcare systems are unable to address the soaring demand of older people, even in high-income countries [4]. The elderly is vulnerable to a decline in physical capacity and changes in neuromuscular since functional impairment is an inevitable result of aging process. Notably, in Vietnam, nearly 40% elderly suffered from comorbidity [5] or more than 80% older people rated their health moderate and poor [6]. Conditions of functional limitation and dependence on others in performing instrumental daily living activities could worsen the quality of life among older people.

The presence of IADL limitation varied widely across countries, timeframe and population settings [7]. In Vietnam, the prevalence of those having at least one IADL ranged from 11.92% to 43.3% [8], [9]. Previous studies showed the development of functional decline was complex, multifactorial and a consequence of the interactions between physical, social and environmental factors. Determinants of IADL limitation are heterogeneous and vary cross different settings. Knowing the fact that some potential factors may influence functioning of IADL is crucial for effective interventions and health promotion.

For all reasons mentioned, this study aimed to explore the limitation of IADL and its related factors among community-dwelling elderly.

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2. METHODS

2.1. Study setting

Data obtained from the prior study which was conducted from April 2020 to March 2021 in Hue city, the capital of Thua Thien Hue province, which is located in the Central Area of Vietnam. Hue city with an area of almost 70,67 km², which is divided into 27 administrative units [10] whose total population and elderly population were estimated about 351,585 and 153,049 people in 2019, in turn [6].

2.2. Study participants:

Participants with following criteria: aged 60 or older, living in Hue city for at least 6 months are eligible for the study. Elderly who was unable to speak or in an unconscious stage (having mental/ cognitive disorders or get drunk) or refused to participate in the survey was excluded.

2.3. Sample size and sampling:

Data from the study related to health issues among community-dwelling elderly conducted in Hue city in 2020 was used to analyzed in the present study. The sample size was calculated based on the standard formula for cross-sectional study with the expected proportion of 0.41, significant level of 0.05, error margin of 0.05 and the non-respondent rate of 10%.

The participants were recruited based on a multi-stage random sampling method. Hue city was divided into Northern and Southern areas. In the initial stage, four wards were randomly selected among 27 administrative units of Hue city, with two wards for each area by cluster sampling technique. In the second stage, 16 subgroups were randomly selected in chosen wards, with four subgroups for each ward, after which a list of older adults in each ward was made. Finally, using PPS sampling, we randomly selected elderly aged 60 or older (110, 122, 120 and 75 older people in Truong An, Phuoc Vinh, Tay Loc and Phu Hiep, respectively). The final sample study was 427 people aged over 60 years.

2.4. Measurement instruments:

The questionnaire was divided into four parts: socio-demographic characteristics, functional status and instrumental daily living activities performance (IADL) and environmental factors.

Demographic and socioeconomic information was collected through questions about age (year of birth), gender (female and male), marital status (married, singled, separated/divorced and widowed), educational level (illiteracy, primary to high school, upper education), living arrangement (living with their spouses and/or their children, and living alone) and economic status. Household economic condition was categorized into poor, sub-poor and normal/rich by using the national poverty line for urban areas and based on monthly per capital income. Poor household status was defined as monthly income less than VND 900,000 or from VND 900,000 to VND 1,300,000 and lacking from 3 multidimensional poverty index. Household economic status with monthly income being from VND 900,000 to VND 1,300,000 and lacking below 3 multidimensional poverty index was classified as "sub-poor" [11].

Functional status consists of variables about physical activity (yes vs. no); participants engaging in either vigorous-intensive exercises or moderateintensive exercises were recorded as "physical activity", sedentary lifestyle (hours spent on sedentary activities), history of fall (events of fall within 12 months), the presence of chronic diseases (hypertension, musculoskeletal disorder, diabetes and others), walking and visual difficulty (yes vs. no), walking aid usage (yes vs. no) and self-perceived general health. The general health was ranked from 1. Poor, 2. Fairly, 3. Good, 4. Very good to 5. Excellent based on 5-point-Liker scale.

Environmental factors included variables related to housing type (single-storey house and multistorey house) and staircase access (yes vs. no). Staircase access was measured via single question, whether participants used staircase to access to their neighbor/house/bedroom.

Instrumental daily living activity limitation was accessed by Lawton Instrumental Activities of Daily Living Scale (IADL), which consists of eight domains of function: using the telephone, going shopping, preparing meals, performing housework, doing laundry, traveling, taking medications and managing finance, each of which is rated from 0 (Dependence) to 1 (Independence). Female were scored on all 8 areas of function and for male, only 5 areas was evaluated with the exception of meals preparation, housekeeping and laundry. The maximum score is 8 for female and 5 for male, with a lower score demonstrating a greater level of dependence. In the present study, the cut-off point for the overall score was set as 8 for female and 5 for male to categorize "Independence" or "No IADL limitation". The overall score was less than 8 for female and 5 for male was classified "Dependence" or "IADL limitation". [12], [13] IADL was validated with the inter-rater reliability at 0.85 [13] and previously used in Vietnamese context [14].

2.5. Data collection

The referral letters got from the Administrative Office of Hue University of Medicine and Pharmacy were sent to the Health Station and People's Committee of four wards (Truong An, Phuoc Vinh, Tay Loc and Phu Hiep ward). With the permission from the heads of Health Station and People's Committee, the research team did the fieldwork and approached each household from the list of elderly. All participants were face-to-face interviewed by well-trained preventive medicine and public health students with a structured questionnaire. Each interview took about 10-15 minutes. At the end of the collection day, the study supervisor checked all the responses of the questionnaires.

2.6. Data analysis

Both descriptive and analysis was performed on SPSS 20. Comparisons between elderly with and without IADL limitation were analyzed by Chi-squared test. Logistics regression model was used to examine the association between the dependent variable (limitation of IADL) and the independent variables (age, gender educational level, marital status, physical activity, self-reported general health, comorbidity, hypertension, musculoskeletal disorders, fall history, walking aid usage, walking and visual difficulty and staircase access) with 95% confidence interval. Statistical significance level was set at 0.05.

2.7. Ethical considerations

The general information of the study was given to each participant with verbal briefing and explained on the first page of the questionnaire. All the enrolled participants agreed to cooperate with the investigators after the purpose of the research was explained.

All participants' identities remained secured and anonymous by using ID numbers.

3. RESUTLS

Of a total of 427 community-dwelling elderly, the study included more women (57.4%) than men (42.6%). The mean ages were 73.2 ± 9.0 , 72.4 ± 8.8 and 73.7 ± 9.2 for all subjects, male and female, respectively. Most participants were in the 60 – 69 age group (41.2%), completed primary and high school level (67%), got married (66.0%), lived with their spouses and/or children (95.3%) and had normal/rich economic condition (97.0%).

| | Male (| n = 182) | Female (n = 245) | | |
|--|---------------------|-----------------------|---------------------|-----------------------|--|
| Domain | Dependence n (%) | Independence n (%) | Dependence n (%) | Independence n (%) | |
| Using the telephone | 20 (11.0) | 162 (89.0) | 46 (18.8) | 199 (81.2) | |
| Going shopping | 70 (38.5) | 112 (61.5) | 92 (37.6) | 153 (62.4) | |
| Preparing meals | - | - | 82 (33.5) | 163 (66.5) | |
| Performing housework | - | - | 45 (18.4) | 200 (81.6) | |
| Doing laundry | - | - | 63 (25.7) | 182 (74.3) | |
| Traveling | 33 (18.1) | 149 (81.9) | 101 (41.2) | 144 (58.8) | |
| Taking medications | 14 (7.7) | 168 (92.3) | 35 (14.3) | 210 (85.7) | |
| Managing money | 24 (13.2) | 158 (86.8) | 42 (17.1) | 203 (82.9) | |
| Having at least one problem in IADL | 74 (40.7) | 108 (59.3) | 125 (51.0) | 120 (49.0) | |

Table 1. Daily living tasks performance of respondents (n = 427)

Table 1 shows the difficulties for each item of the IADL in male and female. The overall prevalence of reporting having at least one problem in IADL for both genders was 46.6%. The IADL limitation prevalence of women was greater than that of men (51.0% and 40.7%), with the mean score of 5.9 ± 2.7 and 4.1 ± 1.3 , respectively. Most problems with IADL were found related to traveling (41.2%), going shopping (37.6%) and food preparing (33.5%) for females. Male respondents had problems going shopping (38.5%) and traveling (18.1%).

| Characteristics | | | Limitation of IADL | | | | |
|----------------------------------|---|--|--------------------|----------------------|-----------------|----------------------|----------|
| | | Total | Y | es | No | | p-value* |
| | | 11 (70) | n | % | n | % | - |
| Socio-demogra | aphic information | | | | | | |
| Age group | 60 - 69 70 - 79 80 - 100 | 176 (41.2) 136 (31.9) 115 (26.9) | 36 67 95 | 20.5 49.3 83.5 | 140 69 19 | 79.5 50.7 16.5 | < 0.001 |
| Gender | Male Female | 182 (42.6) 245 (57.4) | 74 125 | 40.7 51.0 | 108 120 | 59.3 49.0 | 0.034 |
| Educational level | Illiteracy Primary to high school Upper education | 44 (10.3) 286 (67.0) 97 (22.7) | 36 139 24 | 81.8 48.6 24.7 | 8 147 73 | 18.2 51.4 75.3 | < 0.001 |
| Marital status | Married Single/formerly married | 282 (66.0) 145 (34.0) | 107 92 | 37.9 63.4 | 175 53 | 62.1 36.6 | < 0.001 |
| Living arrangement | Alone With others | 20 (4.7) 407 (95.3) | 12 187 | 60.0 45.9 | 8 220 | 40.0 54.1 | 0.219 |
| Economic status | Poor, sub-poor Normal, rich | 13 (3.0) 414 (97.0) | 9 190 | 69.2 45.9 | 4 224 | 30.8 54.1 | 0.097 |
| Functio | onal status | | | | | | |
| Physical activity | No Yes | 182 (42.6) 245 (57.4) | 126 73 | 69.2 29.8 | 58 172 | 30.8 70.2 | <0.001 |
| Sedentary behavior | ≤ 4h > 4h | 319 (74.7) 108 (25.3) | 140 59 | 43.9 54.6 | 179 49 | 56.1 45.4 | 0.053 |
| Self-perceived health | Poor, fair Good, very good, excellent | 214 (50.1) 213 (49.9) | 137 62 | 64.0 29.1 | 77 151 | 36.0 70.9 | < 0.001 |
| Comorbidity | No Yes | 78 (18.3) 349 (81.7) | 20 179 | 25.6 51.3 | 58 170 | 74.4 48.7 | < 0.001 |
| Hypertension | No Yes | 215 (50.4) 212 (49.6) | 88 111 | 40.9 52.4 | 127 101 | 59.1 47.6 | 0.018 |
| Musculoskeletal disorder | No Yes | 244 (57.1) 183 (42.9) | 96 103 | 39.3 56.3 | 148 80 | 60.7 43.7 | 0.001 |
| History of fall within 12 months | No Yes | 358 (83.8) 69 (16.2) | 152 47 | 42.5 68.1 | 206 22 | 57.5 31.9 | < 0.001 |
| Walking aid usage | No Yes | 383 (89.7) 44 (10.3) | 156 43 | 40.7 97.7 | 227 1 | 59.3 2.3 | < 0.001 |
| Walking difficulty | No Yes | 280 (65.6) 147 (34.4) | 89 110 | 31.8 74.8 | 191 37 | 68.2 25.2 | < 0.001 |
| Visual difficulty | No Yes | 239 (56.0) 188 (44.0) | 75 124 | 31.4 66.0 | 164 64 | 68.6 34.0 | < 0.001 |

Table 2. Demographic characteristics of respondents (n = 427)

| Environmental factors | | | | | | | |
|-----------------------|---|--------------------------|-----------|--------------|------------|--------------|-------|
| Housing type | Single-storey house Multi-storey house | 240 (56.2) 187 (43.8) | 118 81 | 49.2 43.3 | 122 106 | 50.8 56.7 | 0.229 |
| Staircase access | No Yes | 308 (72.1) 119 (27.9) | 158 41 | 51.3 34.5 | 150 78 | 48.7 65.5 | 0.002 |

*Chi-square test

The overall prevalence of IADL limitation significantly increased with age and female gender (p < 0.001 and p = 0.034). There were significantly differences between IADL limitation and education level and marital status. (Table 2) Regarding functional status, IADL limitation was significantly greater among those with physical inactivity, low reported of overall health, comorbidities (hypertension and musculoskeletal disorders), walking aid usage, fall experiences in the past and walking and visual impairment. (Table 2)

 Table 3. Associations between respondents' characteristics and IADL limitation

 via multivariate logistics regression analysis (n = 427)

| Independent variables | | Limitation of IADL | | | | |
|-------------------------------|--------------------------------------|---------------------------------|---|--|--|--|
| | | Univariate analysis | Multivariate analysis | | | |
| | | Crude OR (95% CI) | Adj OR (95% CI) | | | |
| | 60 – 69 | Ref | Ref | | | |
| Age group | 70 – 79 | 3.78 (2.30 – 6.21) *** | 2.55 (1.42 – 4.58) ** | | | |
| | 80 - 100 | 19.6 (10.6 – 36.6) *** | 8.57 (4.20 – 17.48) *** | | | |
| Candar | Male | Ref | Ref | | | |
| Gender | Female | 1.52 (1.03 – 2.24) * | 0.94 (0.53 – 1.68) | | | |
| | Upper education | Ref | Ref | | | |
| Educational level | Primary to high school Illiteracy | 2.88 (1.72 – 4.82) *** | 1.69 (0.85 – 3.36) | | | |
| | | 13.7 (5.6 – 33.47) *** | 5.54 (1.79 – 17.20) ** | | | |
| | Married | Ref | Ref | | | |
| Marital status | Single/formerly | 2.84 (1.88 – 4.30) *** | 1.69 (0.85 – 3.36) | | | |
| | Marrieu | Def | D-f | | | |
| Physical activity | res | Ket | Ref | | | |
| | NU Cood availant | <u> </u> | 2.07 (1.07 - 4.30) | | | |
| Self-perceived health | Poor fair | кеі И 33 (2 89 – 6 51) *** | 1 47 (0.82 - 2.63) | | | |
| | No. | 4.55 (2.65 0.51) | | | | |
| Comorbidity | NO | Ref 2 05 (1 76 – 5 20) *** | Ref 1 12 (0 47 – 2 69) | | | |
| | No | | 1.12 (0.47 - 2.03) | | | |
| Hypertension | NO | Ref 1 EQ (1 QQ - 2 22) * | Ref 1 12 (0 62 – 2 02) | | | |
| | No | 1.35 (1.06 - 2.32) | 1.12 (0.02 - 2.02) | | | |
| iviusculoskeletal disordor | NO | KET | $\operatorname{Ref}_{0,08}(0,54,-1,70)$ | | | |
| disorder | N- | 1.99 (1.55 - 2.95) | 0.98 (0.54 - 1.79) | | | |
| History of fall | NO | Ret 2.00/1.67 E.00*** | Ref 1 24 (0 58 - 2 66) | | | |
| | No | 2.50 (1.07 - 5.00) | 1.24 (0.58 - 2.00) | | | |
| Walking aid usage | NU Vec | KEI 62 6 (8 52 - 450 15) *** | KEI 27 06 (2 15 - 222 80) *** | | | |
| | No | 02.0 (8.55 - 455. 15) | 27:00 (3:13 - 232:89) | | | |
| Walking difficulty | NO | Kei 6 28 (4 07 10 0) *** | | | | |
| | ies | 0.38 (4.07 - 10.0) | 1.21 (0:05 - 2.28) | | | |
| Visual difficulty | NO | Ket | Ket | | | |
| | res | 4.24 (2.82 - 6.37) *** | 2.31 (1.36 - 3.93) ** | | | |
| Staircase access | Yes | Ref | Ref | | | |
| | No | 2.00 (1.29 – 3.11) ** | 0.78 (0.61 – 1.94) | | | |

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Significant at * p < 0.05, ** p < 0.01, *** p < 0.001.

Significant differentiated variables were included in the logistics regression model. Table 3 represents the findings from logistics regression models on IADL limitation and its potential factors among community-dwelling elderly. The model shows older adults who aged over 70 years (aOR = 2.55, 95% CI: 1.42 - 4.58), over 80 years (aOR = 8.57, 95% CI: 4.20 - 17.48), had illiteracy education (aOR = 5.54, 95% CI: 1.79 - 17.20), did not take part in physical exercises (aOR = 2.67, 95% CI: 1.67 - 4.56), used walking aid (aOR = 27.06, 95% CI: 3.15 - 232.89), had visual difficulty (aOR = 2.31, 95% CI: 1.36 - 3.93) were prone to be limited in IADL.

4. DISCUSSION

Among 427 elderly in Hue city the percentage of people having IADL limitation was 46.6%, this figure was reported higher in female. Additionally, advanced age, educational level, physical inactivity, walking aid usage and visual difficulty were identified to be associated with IADL limitation.

Our result presented that the prevalence of IADL limitation in this study was higher than those in Vietnam, which were 43.3% in Thua Thien Hue province [8], 11.92% in Ho Chi Minh City [9] and 4.59% in Long An Province [15]. This is generally because data from our study was collected recently, in 2020, whereas studies in the same study setting and other areas were conducted in 2019 and more than 10 years ago. The upward trend of elderly having at least one IADL limitation can clearly be seen in Vietnam, which results in elderly have a tendency to seek help and support from caregivers when doing instrumental activities of daily living. Our study also found a higher prevalence of IADL limitation (46.6%) as compared to findings from other countries: 37.9% in Singapore [16], 35.75% in Poland [17], 32.1% in Indonesia [18], 31.9% in Spain [19], 23.8% in European population [7], 18.5% in Korea [20], 11% in Ireland [21]. However, our result was lower than that in India (89.93%) [22]. These discrepancies can be explained due to the diversity of socioeconomic, social policies, geographic and cultural context between countries. Differences in methodology could be also an explanation to these disparities. In our study, we set the total IADL score as 8 for women and 5 for men, while most previous studies used the total IADL score as 8 for both genders [8], [17], [18], [19], [20].

It is clearly that the most common limitations in IADL for both genders in the study were traveling

and going shopping. Female participants found difficulties in traveling (41.2%), going shopping (37.6%) and food preparing (33.5%), while their male counterparts had problems with going shopping (38.5%) and traveling (18.1%). This result is similar to estimates in previous study [8], [17], [23]. However, our result differed from findings in Singapore, where most people found the area of housekeeping (25.6%), and laundry (22.9%) troublesome [16] and in India, in which managing finance posed the most problems [22].

The multivariate logistics regression models demonstrated advanced age was an important risk factor. Aging, as a natural process, will be associated with disability, and therefore impact the presence of IADL limitation. In our study, IADL limitation was 2.55 times and 4.58 times prevalent in 70 – 79 age group and 80 - 100 age group, respectively. This finding was consistent with other studies in Vietnam and other population [7], [8], [15], [21], [22], [24]. Additionally, disabilities such as: visual, walking, hearing and memory disability might often be more prevalent when people were getting older. Findings from this study showed people with visual difficulties and walking aid need were 2.31 and 27.06 times likely to have IADL limitation. Our study also found one factor that might be link to IADL was lower level of education. This result was in agreement with previous evidence [7], [19], [25], in which lower education was predicted to be associated with IADL limitation since some housework or tasks involving cognitive skills might be difficult for lower-educated people to handle.

Moreover, the association between physical inactivity and IADL limitation has been reported in prior studies [7], [17], [21]. Confirming previous research, this study indicated people with low level of physical activity was 2.67 times more likely to have IADL limitation since people engaged in physical activity would strengthen muscle mass and feel more confident when performing instrumental daily living activities. Findings from bivariate analysis showed staircase access was associated with the presence of IADL limitation but the association was not observed in the multivariate analysis. The small sample size might be an explanation for this difference. Study in Japan found that older people residing in walk-up buildings were significantly less prone to be decline in IADL compared to those living in one-storey houses [24]. Though the relationship of staircase assessment and IADL limitation was not fully explained, it was suggested that physical activity coming from the use of staircase: going up and down the stair at home may help communitydwelling elderly maintain IADL [24]. Therefore, it is essential to promote physical activity to prevent or delay the onset of IADL limitation.

5. STRENGTH AND LIMITATION

Our study has some limitations that should be considered. First, the relatively small sample size of this study was one major limitation, which makes it difficult to precisely ascertain the underlying associations between the risk factors of IADL limitation. With a small sample size, results should be interpreted with caution, as findings might not be representative to elderly aged 60 or above in Vietnam. Additionally, the establishment of causal inference cannot be confirmed due to cross-sectional study. Despite these limitations, our study provides the most current evidence of IADL limitation and its related factors among community-dwelling elderly to improve prevention strategies for the elderly.

6. CONCLUSION

In summary, estimates from our study showed a considerable prevalence of IADL limitation in the elderly living in Hue city. The problems relating to traveling, going shopping and meal preparing were most commonly reported in female while male found going shopping and traveling more problematic. IADL limitation was associated with advanced age, lower educational level, physical inactivity, walking aid usage and visual difficulty.

Hence, by looking at the identified associated factors, it is off great importance for health policy makers to establish effective interventions on health screening and physical activity for elderly to reduce limitation of IADL.

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