

ASSESSMENT OF FUNCTIONAL ACTIVITIES OF DAILY LIVING IN ELDERLY OUTPATIENTS WITH DIABETES MELLITUS AT TIEN GIANG CENTRAL GENERAL HOSPITAL, VIETNAM

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Abstract – *This study aimed to assess the functional status in instrumental activities of daily living and to describe associated factors among elderly outpatients with diabetes mellitus. A descriptive cross-sectional study was conducted at Tien Giang Central General Hospital from March to May 2021, involving 250 patients aged 60 years and older. Data were collected through interviews using the Vietnamese validated Lawton-Brody Instrumental Activities of Daily Living scale. The results showed that 62.8% of participants were independent, while 37.2% were partially or fully dependent in performing instrumental activities of daily living. Statistical analysis identified significant associated factors, including gender, place of residence, occupation, diabetic complications, smoking, alcohol consumption, physical exercise, and daily dietary habits. The findings highlighted the need to integrate functional screening into outpatient diabetes management to enable early detection and appropriate interventions.*

Keywords: *diabetes mellitus (DM), instrumental activities of daily living (IADL), elderly outpatient.*

I. INTRODUCTION

Population ageing has increased the burden of functional decline among older adults, which is associated with disability, reduced quality of life, and greater long-term care needs. A clinically relevant aspect of functional capacity is

the ability to perform complex everyday tasks, such as managing finances, using transportation, preparing meals, and using a telephone, which can be assessed using the Instrumental Activities of Daily Living (IADL) measure. IADL performance directly reflects older adults' level of independence and their capacity to maintain autonomous living.

The decline in IADL is typically multifactorial, resulting from the combined effects of ageing, multimorbidity, and limitations attributable to chronic diseases. In older adults, chronic conditions and related complications may impair multiple organ systems (e.g., visual, neurological, renal, and cardiovascular systems), thereby reducing the capacity to perform IADLs. In geriatric practice across many countries, IADL is regarded as an early indicator of functional deterioration and is used for risk screening, intervention planning, and care management. Among available assessment tools, the Lawton-Brody scale is a classic instrument developed to evaluate eight IADL domains (which are more complex than basic activities of daily living), supporting the identification of functional decline and informing appropriate care planning [1, 2].

Diabetes mellitus (DM) is a prevalent non-communicable disease among older adults and continues to rise globally, with an increasing burden of complications. In 2019, approximately 463 million adults worldwide had DM, and this number is projected to approach 700 million by 2045; among those aged 65 years and older, about one in five is affected, with a substantial proportion remaining undiagnosed [3]. In Vietnam, the number of older adults living with DM and other chronic diseases has also increased, with implica-

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tions for functional decline and a growing health-care burden [4, 5]. Notably, older adults with DM have been reported to experience higher disability risk and a substantially greater prevalence of IADL limitations than those without DM [6, 7]. From a clinical and public health perspective, IADL impairment may compromise self-care and treatment adherence, reduce the effectiveness of outpatient management, and increase reliance on family and community support. Therefore, integrating functional screening into primary care and chronic disease management may facilitate early risk detection and enable timely, proactive interventions.

Tien Giang Central General Hospital provides outpatient care for a large number of older adults with DM; however, evidence regarding IADL in this patient group remains limited. Generating local evidence is crucial for screening, counseling, and designing effective interventions within outpatient care. This study was conducted to assess IADL status and to describe selected associated factors among older outpatients with DM at Tien Giang Central General Hospital in 2021, thereby providing empirical support for implementing functional screening and guiding care-oriented interventions for older patients at the provincial level.

II. LITERATURE REVIEW

Globally, diabetes mellitus (DM) is an increasing public health concern, particularly among older adults who are vulnerable to metabolic dysregulation and chronic complications. According to the International Diabetes Federation (IDF) [8], the prevalence of DM among adults aged 65–99 years was approximately 19.3% in 2019; the absolute number of older adults living with DM is projected to increase substantially by 2045 [8]. High prevalence among older populations has been reported in several countries, including China, the United States, and Japan [8, 9]. Beyond clinical complications, DM may compromise independent living through functional decline, particularly in IADL, such as shopping, meal preparation, medication management, and financial handling.

Functional decline in IADL among older adults is multifactorial and may be shaped by chronic disease burden and related organ impairment. IADL limitations have been documented not only in DM but also across other chronic conditions, indicating that functional dependence reflects a broader geriatric vulnerability profile. Bowling et al. [10] reported IADL impairment among older adults with heart failure, and a notable proportion of older adults with chronic kidney disease also experience IADL limitations [11]. In DM, complications may contribute to difficulties in daily instrumental tasks. Wu et al. [12] highlighted the association between diabetic complications (e.g., retinopathy) and IADL impairment in older populations. Longitudinal evidence further suggests that IADL decline may evolve and vary by study setting and design [13].

In Vietnam, rapid population ageing has increased demand for care models and chronic disease management strategies tailored to older adults [14]. Domestic evidence indicates that IADL decline is present but remains incompletely characterized in outpatient clinical settings. Particularly, Nguyen Thi Lan Thanh et al. [15] reported that 27% of older adults experienced IADL difficulties, with shopping being the most frequently limited activity. However, much of the existing literature has been conducted in community settings or at central-level hospitals; evidence from provincial-level outpatient facilities where large numbers of older adults with DM receive routine care remains limited. Differences in IADL impairment prevalence between domestic studies [7, 15, 16] and international cohorts [13] underscore the importance of locally generated data for clinical practice and service planning.

Regarding measurement, the Lawton-Brody IADL scale is widely used to quantify dependence across eight instrumental domains, and a Vietnamese-standardized version has been reported by Nguyen Van Vy Hau [17]. Using a standardized IADL tool in outpatient diabetes care may support early identification of functional vulnerability and inform targeted counseling and care-oriented interventions. In addition, factors

commonly discussed in the literature, including sociodemographic characteristics (e.g., sex, residence, and occupation) [12, 18–20], DM complications [12], and lifestyle-related behaviors such as alcohol consumption and physical activity [21], should be considered when interpreting IADL status in older outpatients.

Given these gaps, assessing IADL status and examining associated factors among older outpatients with DM at Tien Giang Central General Hospital is practically important to strengthen local evidence for functional screening, counseling, and intervention planning at the provincial level.

III. RESEARCH METHODS

A. Study setting, design, and period

A descriptive cross-sectional study was conducted at the Endocrinology Outpatient Clinic, Department of Outpatient Services, Tien Giang Central General Hospital, from March to May 2021.

B. Study participants and recruitment

Study participants were outpatients aged ≥ 60 years with DM attending the Endocrinology Outpatient Clinic, Department of Outpatient Services, Tien Giang Central General Hospital, during the study period (March – May 2021). DM was diagnosed according to the guidelines of the Ministry of Health of Vietnam [22]. Eligible patients were those who were aged ≥ 60 years at recruitment and had a clinical diagnosis of DM based on the guidelines of the Ministry of Health of Vietnam [22]. Also, all were attending the clinic for follow-up and/or treatment and were able to communicate, complete a face-to-face interview, and provide informed consent. Patients were excluded if they were unable to respond to the interview due to communication barriers (e.g., severe hearing impairment preventing communication or severe speech impairment). Those with severe cognitive impairment, as determined by clinical assessment, were also excluded. In addition, individuals presenting with an acute illness or emergency condition requiring priority

management at the time of recruitment were not considered for inclusion.

During the recruitment period, investigators consecutively approached patients attending the clinic, screened them against the eligibility criteria, and provided standardized information regarding study objectives, procedures, participants’ rights, confidentiality, and the option to withdraw at any time without affecting medical care. Patients who agreed to participate were interviewed directly using the study questionnaire. The number of refusals and reasons for refusal were not systematically recorded.

C. Sample size and sampling method

The minimum sample size for estimating the prevalence of IADL impairment among older outpatients with DM was calculated using the single-proportion formula, as Formula (1):

$$n = Z_{1-\frac{\alpha}{2}}^2 \frac{p(1-p)}{d^2} \tag{1}$$

where:

$Z_{1-\alpha/2}$ is equal to 1.96, at a 95% confidence level;

p denotes the expected prevalence of IADL difficulty;

d represents the absolute precision;

The value of p was taken from a prior Vietnamese study of older adults with DM reporting an IADL difficulty prevalence of 27% [15]; therefore, $p = 0.27$. With $d = 0.06$, the minimum required sample size was $n = 210$.

Regarding sampling, total (consecutive) sampling was applied. The sampling frame comprised all eligible patients attending and receiving outpatient care at the Endocrinology Outpatient Clinic during the study period (March – May 2021). The study was implemented at the Endocrinology Outpatient Clinic within the Department of Outpatient Services; other outpatient clinics were outside the scope of this study. All eligible patients encountered during clinic visits within the study period were invited to participate. The final analytical sample included 250 participants.

D. Data collection and data analysis

Data were collected through face-to-face interviews using a structured questionnaire based on the Lawton–Brody IADL scale. The Vietnamese-adapted and standardized version developed by Nguyen Van Vy Hau [17] was used and tailored to the study objectives. The scale assesses eight instrumental domains: telephone use, transportation, meal preparation, housekeeping, laundry, medication management, financial management, and shopping. Each item is scored 0 (dependent) or 1 (independent), producing a total score from 0 to 8. In accordance with the Vietnamese standardization [17], IADL dependence was defined as a total IADL score ≤ 5 for men and < 8 for women; IADL independence was defined as > 5 for men and 8 for women.

Data were double-checked, entered using Epi-Data 3.1, and analyzed using Stata 14. Categorical variables were summarized as frequencies and percentages. Associations between participant characteristics and IADL dependence were examined using the chi-square test. To estimate crude prevalence ratios (cPRs) and 95% confidence intervals (CIs), univariable Poisson regression with robust variance was applied. Statistical significance was set at $p < 0.05$.

E. Study variables and potential confounders

The dependent variable was IADL status (dependent/independent). Independent variables included sociodemographic characteristics, health-related behaviors, and clinical characteristics (as specified in the study variable table). Employment status (currently working/not working) and income may be associated with both functional status and access to healthcare services; therefore, they were considered potential confounders and/or potential interaction factors. These variables were collected and examined in the analysis to reduce confounding bias.

F. Ethical considerations

The study protocol was reviewed and approved by the Scientific Council of the Faculty of

Medicine and Pharmacy, Tra Vinh University, and by the Board of Directors of Tien Giang Central General Hospital, in accordance with institutional regulations applicable at the time of the study.

All participants were clearly informed about the study objectives and procedures, participated voluntarily, and provided informed consent. Participants were free to withdraw at any time without affecting their medical care. Personal information was kept strictly confidential and used solely for research purposes.

IV. RESULTS AND DISCUSSION

A. Functional status of study participants

Table 1: IADL status among study participants (n = 250)

IADL status	Frequency (n)	Percentage (%)
Independent	157	62.8
Dependent	93	37.2

In this study, the prevalence of IADL dependence among older adults with DM was 37.2% (Table 1). This estimate lies between previously reported Vietnamese figures, including 23.5% reported by Nguyen Trung Anh et al. [16] and 59.9% by Le Anh Tu [7]. Direct comparisons should be interpreted cautiously because definitions, measurement tools, and study settings varied across studies. Such variability may be explained by differences in study populations and settings (community-based versus hospital-based), sampling criteria, and the distribution of disease severity and complication burden. In a community-based study of older adults with multiple chronic conditions, Nguyen Thi Lan Thanh et al. [15] reported an IADL difficulty prevalence of 27%, which is lower than the prevalence observed in the present outpatient DM sample. A plausible explanation is that older adults with DM are more likely to experience functional impairment related to comorbidities and diabetes-related complications (e.g., cardiovascular disease, chronic kidney disease, visual impairment, and diabetic foot problems), thereby increasing

dependence in complex daily activities. In addition, a 6-year longitudinal study in Japan reported an IADL decline rate of 13.6% among older adults with DM [13], substantially lower than the present estimate; this discrepancy may reflect differences in study design (cross-sectional versus longitudinal) and in how functional decline was defined and measured over time. Evidence from other chronic conditions also indicates that IADL decline is common in older adults. Bowling et al. [10] reported a prevalence of 24% among older patients with heart failure, whereas the corresponding prevalence was 35% among patients with chronic kidney disease [11]. Taken together, these findings suggest that IADL dependence is not unique to DM but represents a clinically relevant functional indicator across multiple chronic disease populations.

The observed prevalence of IADL dependence in this outpatient DM sample (Table 1) suggests a need to integrate functional screening into routine chronic disease management to facilitate early identification of patients who may require additional support. Potentially feasible approaches include health education and periodic follow-up to optimize glycemic control and prevent complications, counseling to promote physical activity tailored to functional capacity, referral for rehabilitation when indicated, and strengthened family and community support for IADL-dependent patients. In the longer term, longitudinal and interventional studies are warranted to clarify trajectories of functional decline and to generate stronger evidence for designing care models that better address the needs of older adults with DM in community settings.

B. Factors associated with instrumental activities of daily living dependence among study participants

In this study of 250 older adults with DM receiving outpatient care, several factors statistically significantly associated with dependence in IADL were identified (Table 2). Overall, sociodemographic characteristics (sex, place of residence, and occupational status), clinical factors

(diabetic complications), and health-related behaviors (tobacco smoking, alcohol consumption, physical activity, and dietary pattern) were associated with IADL dependence. However, given the cross-sectional design, these findings reflect associations and do not allow causal inference.

Concerning sex, there was a statistically significant association between sex and functional status, with men exhibiting a lower prevalence of IADL dependence than women (PR = 0.48, 95% CI: 0.33–0.68; $p < 0.001$) (Table 2), consistent with the findings reported by Wu et al. [12]. Differences in physical capacity and muscle strength, with women generally having lower muscle strength than men, may partly explain the higher level of dependence observed among women [18]. Beyond biological mechanisms, gender roles in household activities and the degree of support from family members may also influence opportunities to maintain independence in routine tasks. In light of this association, functional screening and supportive interventions should prioritize older women, with a focus on maintaining physical capacity, preventing osteoporosis, and reducing the risk of chronic complications through tailored counseling on physical activity and nutrition.

Regarding place of residence, the study documented a statistically significant difference (PR = 0.67, 95% CI: 0.49–0.92; $p = 0.02$). Interpretation should adhere to the direction and magnitude of the effect estimates reported in the table (dependence prevalence and PR by urban/rural residence) and consider potential confounding factors, such as habitual daily activity, socioeconomic conditions, family support structures, and patterns of healthcare access and utilization. Therefore, the observed association between residence and IADL reflects broader contextual and behavioral factors rather than differences in healthcare resources alone. These results highlight the importance of strengthening functional screening and health communication at the primary care level, while integrating health education into community activities to raise awareness and improve the health care of older adults [19].

Table 2: Association between participants’ general characteristics and IADL status (n = 250)

Characteristic		Instrumental activities of daily living		PR (95% CI)	P
		Dependent n (%)	Independent n (%)		
Gender	Female	64 (50)	64 (50)	1	
	Male	29 (23.77)	93 (76.23)	0.48 (0.33 – 0.68)	< 0.001
Place of residence	Urban	44 (46.81)	50 (53.19)	1	
	Rural	49 (31.41)	107 (68.59)	0.67 (0.49 – 0.92)	0.02
Occupation	Retired/ Unemployed	84 (62.22)	51 (37.78)	7.95 (4.3 – 16.86)	< 0.001
	Still working	9 (7.83)	106 (92.17)	1	
Diabetes complications	Yes	89 (56.69)	68 (43.31)	13.18 (5 – 34.71)	< 0.001
	No	4 (4.3)	89 (95.7)	1	
Smoking	No	84 (43.52)	109 (56.48)	1	
	Yes	9 (15.79)	48 (84.21)	0.36 (0.19 – 0.67)	< 0.001
Alcohol consumption	No	87 (44.85)	107 (55.15)	1	
	Yes	6 (10.71)	50 (89.29)	0.24 (0.11 – 0.52)	< 0.001
Physical exercise	No	71 (47.97)	77 (52.03)	1	
	Yes	22 (21.57)	80 (78.43)	0.45 (0.3 – 0.67)	< 0.001
Daily dietary habits	Normal diet	68 (34.0)	132 (66.0)	1	
	Diabetes specific diet (doctor-advised)	23 (60.53)	15 (39.47)	1.78 (1.29 – 2.46)	0.001
	High salt diet	2 (16.67)	10 (83.33)	0.49 (0.13 – 1.77)	0.28

Occupational status was significantly associated with IADL dependence (PR = 7.95, 95% CI: 4.3–16.86; p < 0.001), with a higher prevalence of dependence among retired older adults compared with those who were still working. This finding is consistent with the hypothesis that maintaining activity through work or appropriate social engagement may help preserve function and mitigate sedentary lifestyles, in line with the study by De Paiva et al. [20]. A practical recommendation derived from these findings is to encourage retired older adults to participate in social activities, health clubs, or light work appropriate to their physical condition, to maintain mobility, support mental well-being, and potentially reduce the risk of functional decline.

In terms of clinical factors, a strong association between diabetic complications and IADL dependence was observed (PR = 13.18, 95% CI 5–34.71; p < 0.001). This is in line with prior evidence indicating that complications, particularly ocular complications, may increase the

risk of IADL limitations [12]. Mechanistically, visual impairment due to diabetic retinopathy may hinder daily tasks such as cooking, house-keeping, using transportation, or managing medications. Therefore, these results support strengthening complication management within outpatient care, including health education, emphasizing routine follow-up, screening for complications (eye, kidney, neurological, and cardiovascular), and timely intervention to slow disease progression and reduce long-term caregiving burden [12]. For health-related behaviors, statistically significant associations were identified between tobacco smoking, alcohol consumption, and IADL dependence (p < 0.001). However, in cross-sectional research, the direction of observed associations may be influenced by reverse causation: individuals with functional decline or more severe disease/complications may have been advised and/or may have self-reduced or discontinued alcohol and tobacco use, resulting in a higher concentration of IADL-dependent partic-

ipants in the ‘non-use’ groups. In addition, self-report bias and residual confounding (e.g., age, disease severity, and socioeconomic conditions) may have affected these findings; thus, these behaviors should not be interpreted as ‘protective’ for function. Nonetheless, considering the broader medical evidence and the principles of chronic disease management, the observed differences across behavioral strata reinforce the need to integrate behavioral counseling into outpatient care. Specifically, brief counseling interventions to support reduction or cessation of alcohol and tobacco use can be incorporated into routine follow-up visits; in parallel, health communication tailored to older adults should emphasize the benefits of maintaining functional capacity and preventing decline through lifestyle modification [21]. At the system level, provincial health facilities could collaborate with primary care providers to enhance routine screening, counseling, and monitoring of health-related behaviors, thereby improving quality of life and reducing long-term caregiving burden. With respect to physical activity, exercise habits were significantly associated with IADL status (PR = 0.45, 95% CI 0.3–0.67; $p < 0.001$). This association is clinically plausible, as regular physical activity can improve endurance, muscle strength, and balance, reduce fall risk, support disease control, and enhance quality of life. Accordingly, a direct practice recommendation from this finding is to strengthen counseling and promotion of physical activity tailored to functional status, accompanied by simple, easy-to-understand educational materials for older adults and adherence monitoring as part of outpatient management.

Moreover, the study found a statistically significant association between daily dietary patterns and IADL dependence (PR = 1.78, 95% CI 1.29–2.46; $p = 0.001$). Specifically, participants who reported following a diabetes-specific diet after physician counseling had a higher prevalence of IADL dependence than those consuming a ‘usual’ diet. This finding should not be interpreted as evidence that dietary modification causes functional decline. Rather, it likely re-

flects confounding by indication and/or reverse causation: older adults with more severe disease, established complications, or emerging functional limitations are more likely to receive repeated dietary counseling during outpatient visits and to adhere to prescribed dietary recommendations. In addition, IADL-dependent individuals often rely on family members for meal planning and preparation; caregiver involvement may increase the likelihood of implementing a ‘diabetes-specific’ diet compared with more independent individuals who continue habitual eating patterns. Therefore, the observed association is best understood as a marker of clinical complexity and higher care needs, rather than a harmful effect of dietary counseling. From a practice perspective, this pattern underscores the importance of delivering nutrition counseling earlier in the disease course and tailoring it to functional capacity. Counseling should focus on practical, actionable components relevant to older adults with DM, including overall energy balance; carbohydrate quality and distribution; healthy fats and adequate protein; increased dietary fiber; limitation of salt and added sugars; and appropriate meal timing. For IADL-dependent patients, educational materials should be simplified and may need to target both patients and caregivers, with emphasis on feasible meal planning and preparation strategies. In provincial hospital settings where dietitians may be limited, physicians can provide core dietary messages during outpatient visits, while nurses and primary care staff reinforce standardized guidance; dietitians/nutritionists (if available) should be reserved for complex cases requiring individualized plans. Finally, regarding cultural aspects of alcohol use in Southern Vietnam, this study did not collect qualitative data or specific sociocultural variables; therefore, it is not possible to draw substantive conclusions about cultural drivers of alcohol consumption. Nevertheless, sociocultural context may shape health behaviors and should be considered in future research.

V. CONCLUSION

This cross-sectional study among older adults with diabetes mellitus receiving outpatient care at Tien Giang Central General Hospital found a substantial prevalence of dependence in IADL. IADL dependence was associated with sociodemographic characteristics (sex, place of residence, and occupational status), clinical status (diabetes-related complications), and health-related behaviors (tobacco smoking, alcohol consumption, physical activity, and dietary pattern). Given the cross-sectional design, these findings indicate associations and do not permit causal inference. Nonetheless, the results support incorporating routine functional assessment using a validated IADL instrument into outpatient diabetes management, with targeted and feasible interventions for groups at higher risk of functional dependence. Practical priorities include standardized functional screening, systematic complication screening and management, tailored counseling on physical activity and nutrition, and brief behavioral support for smoking and alcohol reduction/cessation, implemented in coordination with primary care and community health services. Future longitudinal and interventional studies should evaluate integrated care models and their effects on functional outcomes, quality of life, and long-term caregiving burden among older adults living with diabetes.

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