Research article

Frequency of daily living activities in older adults and their relationship with sociodemographic characteristics: A survey-based study

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A B S T R A C T

Background: Activities in daily living (ADL) are the fundamental actions people must take to survive, care of themselves, and integrate into their daily environment.
Objective: This study has two objectives: 1) to offer a new questionnaire to assess daily living activities frequency and report evidence of their psychometric properties, and 2) to describe how often older adults in a region of Chile perform different types of daily living activities and to identify their relationship with their sociodemographic characteristics.
Method: 399 older adults from the Biobío Region, Chile, chosen by quota sampling, were surveyed. They answered the DAF and a sociodemographic questionnaire, after giving their informed consent. For the data analysis, a confirmatory factor analysis (CFA) was performed and its reliability was assessed using McDonald's Omega. The relationship with the sociodemographic variables was evaluated using non-parametric bivariate statistics.
Results: The results of the CFA showed an acceptable fit of the data to the eight-factor model: $\chi^2/df = 4.188$, CFI >0.915, TLI >0.903, RMSEA <0.089 (0.085–0.094) and SRMR <0.104. Their reliability fluctuated between $\omega = 0.546$ and $\omega = 0.934$. Specific relationships of some DAF factors were found with gender, age, educational level, income, jobs, children, participation in clubs, and perception of health ($p < 0.05$).
Discussion: The results support the validity and reliability of the DAF. Older adults spend more time on personal care or household care activities, and less time on social activities, taking care of their health, or caring for others. The time they dedicate to these activities is associated with the sociodemographic profile of older adults, where there is an important weight of gender and age, and where a greater social capital of older adults helps them maintain a more stimulating life.

1. Introduction

The World Health Organization (WHO) considers people over the age of 60 to be older adults [1]. This population segment has

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progressively increased worldwide [2], reaching 12 % of all the planet's inhabitants [3], and projections indicate that it will reach 22 % by 2050 [4].

Older adulthood confronts people with a series of changes that are individual, irreversible, and diverse, which, although they occur throughout life, are particularly visible at this stage [5]. This implies a diminished physiological reserve [6] and changes in the psychological and social sphere that will depend on the experiences and adaptive responses of each person [5].It can also be accompanied by social isolation, due to changes in older adults' physical abilities, but also to social changes such as retirement that legally occurs at this stage, which can accelerate the aging process for each individual [7].

For this reason, although people over the age of 60 represent a social and health system success, it is associated with a series of stereotypes such as disability, vulnerability, disability, fragility, and dependence [8].Therefore, one way to assess and support the health and well-being of older adults is through their ability to live independently and solve the challenges of daily life by facing the challenges of their environment, known as functionality [9,10].

Functionality and autonomy are two pillars for estimating the degree of dependence of older adults. In this context, autonomy refers to the degree to which they can decide and act voluntarily and free of coercion in their lives [9].

The performance of activities in daily living (ADL) is usually measured to evaluate functionality. ADL are the fundamental actions people must take to survive, take care of themselves, and integrate into their daily environment [11]. The possibility of performing ADL depends on biological, psychological, and social factors. It is particularly affected by neurodegenerative disorders due to their high cost in economic, social, and quality of life terms [12].

Although there are diverse classifications of daily living activities, there is consensus to classify them into three groups considering their increasing degree of complexity: basic activities of daily living (BADL), instrumental activities of daily living (IADL), and advanced activities of daily living (AADL) [13–15].

BADLs refer to those that are simpler to subsist and take care of one's own body, such as personal hygiene, eating, and dressing. IADLs are those needed to do things within the home and the community; such as cooking, managing money, and maintaining the home [13,14,16]. AADLs are required for an active lifestyle. These adapt to changes and promote a good quality of life, such as hobbies, the use of new technology, and social activities [15].

On the other hand, a qualitative study in Chilean older adults raised a classification that, instead of being based on the complexity of activities, was based on their purpose, differentiating those of personal care, home care, health care, recreation, rest, mobility, family and social ones, and occupational or work-related [17].

Although there is consensus that being able to perform these daily activities is the basis of functionality [11] and that their evaluation in older adults requires an individualized approach, it is necessary to make studies that allow identifying how often they are performed in a country, if there are differences between them, and how their performance varies considering the people's characteristics (e.g., their gender, their age). This is to have contextually sensitive approaches to the relevance of each ADL, explore what factors condition performing the ADL, and make research on their consequences on people's health and well-being. There are studies in this line that have associated the performance of daily living activities with a lower cognitive impairment [18], cognitive function [19], global and cognitive disability, and to a lesser extent physical disability [20]. Likewise, some studies have associated it with an increased risk of suicide in older adulthood [21]. However, these studies do not have evidence of validity and reliability for the instruments used.

Although there are scales such as the Barthel Index of ADL scale [22], the Lawton-Brody IADL [23], and the Activities of Daily Living Scale (XIE), these evaluate dependence or difficulty of activities and not their frequency, which is complementary and necessary information about each activities' relevance for older adults' lives.

While there is extensive research on the importance of daily living activities (ADL) for older adults' well-being and standardized scales to measure dependence in these activities [11,22,23], a key gap exists - the frequency with which older adults perform these ADLs. Understanding this frequency is crucial for tailoring interventions and support systems to the specific needs of this population. Additionally, prior studies focus on the complexity of ADLs (BADL, IADL, AADL) but a qualitative study in Chile suggests an alternative categorization based on purpose (personal care, leisure, social) might be more relevant [13,17]. This study aims to bridge these gaps by developing a new tool to assess ADL frequency and explore how often older adults perform different types of ADLs, categorized by purpose, considering their sociodemographic characteristics.

Therefore, this study has two objectives: 1) to offer a new questionnaire to assess daily living activities frequency and report evidence of their psychometric properties, and 2) to describe how often older adults in a region of Chile perform different types of daily living activities and to identify their relationship with their sociodemographic characteristics.

2. Method

A survey-based quantitative, observational, and analytical study was performed in two phases: the first involved developing the questionnaire and evaluating its psychometric properties, and in the second one we used it to describe daily living activities in older adults.

2.1. Participants

In the first stage, to estimate the contents' validity, we recruited 12 health professionals from different universities and health institutions across Chile, experts on older adulthood, including doctors, nurses, psychologists, occupational therapists, physiotherapists, and sociologists. They critically evaluated this study's questionnaire.

To empirically test the questionnaire and to describe daily living activities in older adults, we considered a population of independent older adults from the Biobío Region. The inclusion criteria were people over the age of 65, classified as independent, i.e., with 43 or more points on the EFAM-A, a modified version of the Mini-Mental State Examination or MMSE [24], who have resided in the last 12 months in rural and urban areas of the Province of Concepción. The exclusion criteria are enacted if they are institutionalized older adults with a diagnosis of mental health disorders that affect the judgment of reality (e.g., schizophrenia, etc.).

For the descriptive use of the results, a minimum sample size of 385 cases was estimated, considering a 95 % confidence interval, a 5 % margin of error, and the greatest possible variability. Meanwhile, for its use in structural equations, which is the analysis used for confirmatory factor analysis, a recommended minimum sample size of 177 participants was estimated, for a model of 31 observable and 8 latent variables, considering an effect size of 0.3, a power of 80 %, and a confidence interval of 95 %. Finally, a sample of 399 older adults chosen by a non-probabilistic quota sampling was obtained, seeking to proportionally represent the 33 municipalities of the Biobío Region.

2.2. Instruments

The participants answered the **Daily Activities Frequency Scale**, developed by the research team using the conceptual proposals by difficulty [13–16] and the categories by purpose (Briede et al. (2020) [25] raised in a qualitative study in Chilean older adults.

A final questionnaire of 40 items was developed, which was evaluated by 12 experts. Eight conceptual dimensions were refined from its evaluation (Fig. 1), and 31 items were selected for the final version.

The 31 items of the final version indicate daily living activities from eight dimensions: Personal care, Home care, Mobility, Social activities, Communication using technologies, Hobbies, Health care, and Care for Others. The participants, to answer the instrument, had to choose between six response alternatives using a Likert-type scale format: 0 = Never, 1 = Rarely, 2 = Once a month, 3 = Once a week, 4 = A few times a week, 5 = Every day, and 6 = Several times a day.

The evidence of the questionnaire's validity, in terms of its content's validity and internal structure, and reliability, in terms of its internal consistency, are presented in the results of this work.

2.3. Procedure

The study was approved by the Ethics Committee of the University of Bío-Bío. For the data collection, a quota of older adults from each municipality of the Biobío Region in Chile was defined. Within each municipality, blocks were chosen randomly, and within these blocks, older adults who met the inclusion criteria were contacted. As older adults regularly have medical checkups in public and private Chilean health systems, they were asked for their EFAM-A last outcomes to identify if they could be included in the sample.

To collect the data, a face-to-face survey was used [26]. These older adults were contacted in person by previously trained survey-takers between October to February, who first obtained an informed consent, formalized by the participant and the researcher by signing the respective form. A copy of this consent was given to the older adult.

To collect the data, a face-to-face survey was used, with the researchers employing trained survey-takers who contacted the elderly
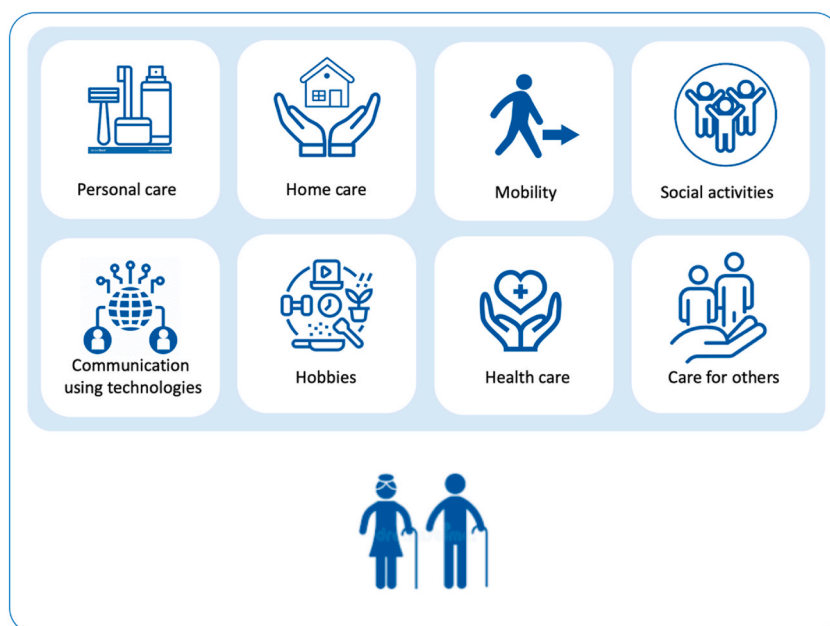

Fig. 1. Factors of the daily activities frequency scale.

in person between October to February. While this method offers the advantage of providing clarification [27]. and assistance to participants, it is important to recognise the potential biases introduced by the interviewers themselves.

To minimise these biases, and need to improve training according to the different characteristics of the interviewers (age, gender, education, etc.) [28], interviewers were recruited; university students, aged 28–35 years old. They implemented a comprehensive training programme for enumerators that included an 11/2 h session. This training would have covered the objectives of the study, the specific meaning of each question and response option, the importance of a standardised approach to support and facilitate the process. In addition, ethical considerations such as the application of informed consent and confidentiality of participants, as well as access to research results, were included. The survey took a maximum of 60 min per participant, where the survey-takers orally asked the questions to the older adults and recorded them on the survey form.

Table 1
Characterization of older adults.

Variable	Values	n(%)
Sex	Man	180 (45.1)
	Woman	218 (54.6)
	Not reported	1 (0.3)
Marital status	Single	36 (9.0)
	Married	236 (59.1)
	Informal partner	9 (2.3)
	Separated	30 (7.5)
	Widowed	85 (21.3)
	Not reported	3 (0.8)
Educational level	Without education	29 (7.3)
	Incomplete primary education	78 (19.5)
	Complete primary education	30 (7.5)
	Incomplete secondary education	49 (12.3)
	Complete secondary education	91 (22.8)
	Incomplete higher education	7 (1.8)
	Complete higher education	114 (28.6)
	Not reported	1 (0.3)
Adult children	No	36 (9.0)
	Yes	362 (90.7)
	Not reported	1 (0.3)
Legally retired	No	60 (15.0)
	Yes	335 (84.0)
	Not reported	4 (1.0)
Paid work	No	320 (80.2)
	Yes	71 (17.8)
	Not reported	8 (2.0)
Monthly personal income	$0 to $48,750	23 (5.8)
	$48,751 to $74,969	8 (2.0)
	$74,970 to $100,709	41 (10.3)
	$100,710 to $125,558	51 (12.8)
	$125,559 to $154,166	24 (6.0)
	$154,166 to $193,104	32 (8.0)
	$193,105 to $250,663	48 (12.0)
	$250,664 to $352,743	43 (10.8)
	$352,744 to $611,728	84 (21.1)
	$611,729 or more	34 (8.5)
	Not reported	11 (2.8)
Monthly family income	$0 to $48,750	5 (1.3)
	$48,751 to $74,969	9 (2.3)
	$74,970 to $100,709	33 (8.3)
	$100,710 to $125,558	37 (9.3)
	$125,559 to $154,166	21 (5.3)
	$154,166 to $193,104	29 (7.3)
	$193,105 to $250,663	55 (13.8)
	$250,664 to $352,743	58 (14.5)
	$352,744 to $611,728	93 (23.3)
	$611,729 or more	32 (8.0)
	Not reported	27 (6.8)
Participation in groups for older adults	No	262 (65.7)
	Yes	126 (31.6)
	Not reported	11 (2.8)
Perception of state of health	Very bad	2 (0.5)
	Bad	24 (6.0)
	Regular	145 (36.3)
	Good	201 (50.4)
	Very good	25 (6.3)
	Not reported	2 (0.5)

2.4. Analysis plan

To address the first study objective, to provide content's validity evidence we evaluated Content Validity Ratios (CVR) for each item assessed by experts and defined a cutoff point of CVR = 0.54 to determine an item as acceptable.

The instrument's internal dimensionality was evaluated as evidence of its validity. For this, a confirmatory factor analysis was made using the weight least squares with means and variables adjusted method (WLSMV), which is suitable for ordinal items.

The following indicators were used to evaluate its fit: the χ^2 test, even though its power leads it to reject poorly specified models [29,30], hence it was complemented with the χ^2/df ratio; the Comparative Fit Index (CFI); the Tucker-Lewis Index (TLI); the Root Mean Square Error of Approximation (RMSEA) with a 90 % confidence interval; and the Standardized Root Mean-Square (SRMR) [27]. The following were considered as values of a good fit: $\chi^2/df < 3$, CFI >0.95, TLI >0.95, RMSEA <0.06, and SRMR <0.08 [29,30], and the following as indicators of an acceptable fit: $\chi^2/df < 5$, CFI >0.90, TLI >0.90, RMSEA <0.10, and SRMR <0.12 [28].

The internal consistency of the measurements was evaluated using McDonald's omega coefficient which makes a less biased estimate of the internal consistency than other options such as Cronbach's Alpha [31].
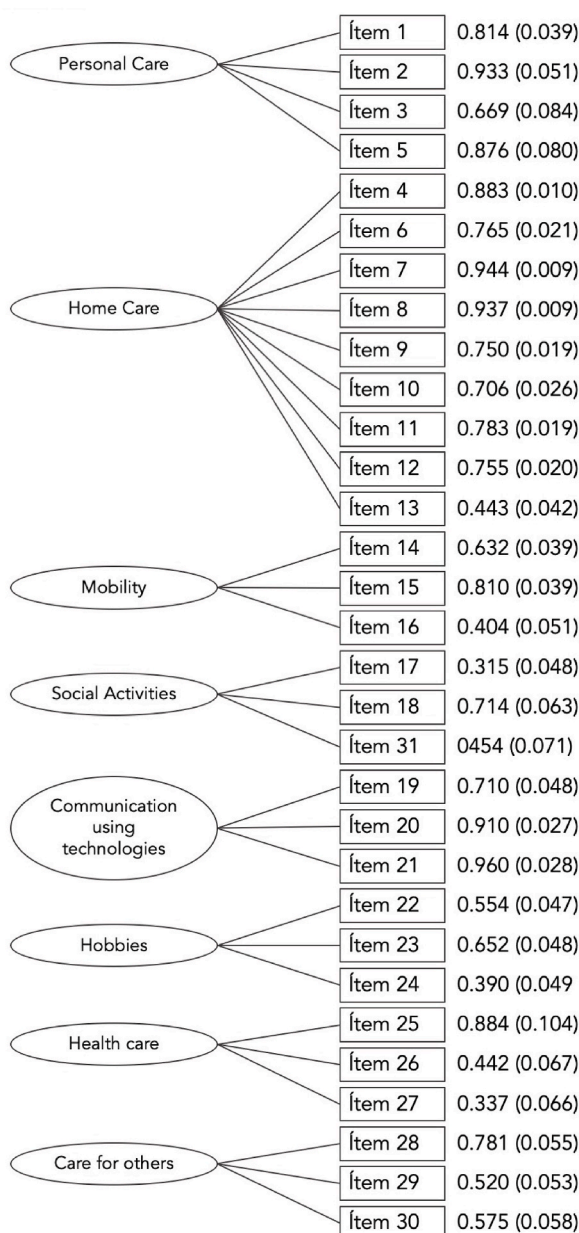

Fig. 2. Confirmatory factor analysis for the Daily Activities Frequency Scale in older adults.

The psychometric analysis was performed using the Mplus 8.4 program.

To address the first study objective, for the bivariate analyses, the scores of the daily activity frequency scale were connected using the Mann-Whitney U non-parametric tests to compare groups and Spearman's rho to link with ordinal variables.

The bivariate analyses were done using Stata SE 16.0.

A p-value <0.05 was considered statistically significant.

3. RESULTS

3.1. Description of the participants

399 older adults, aged between 60 and 99 (M = 72.28; SD = 7.01), were surveyed, of which 54.6 % were women, Table 1.

3.2. Psychometric properties of the instrument

Twelve experts evaluated the 40 original questionnaire items, so 31 showed Content Validity Ratios (CVR) between 0.67 and 1.00 and were included in the final version. However, nine items with CVR lower than the established threshold (CVR = 0.54) were eliminated [32].

Considering these 31 items, the results of the confirmatory factor analysis, as evidence of the questionnaire's validity, have an χ^2 = 1700.31 (df = 406) which would indicate a poor fit. However, this indicator usually rejects poorly specified models in large samples, which is why it is recommended to complement it with other indicators. These, on the other hand, showed an acceptable fit of the model and the data obtained: χ^2/df = 4.188, CFI >0.915, TLI >0.903, RMSEA <0.089 (0.085–0.094), and SRMR <0.104 [33–36], Fig. 2.

The model obtained is shown in the following figure.

3.3. Descriptive analysis of the frequency of daily activities

Subsequently, the reliability of the four factors was calculated. The McDonald's omega coefficients were between ω = 0.546 and ω = 0.934, Table 2, evidencing a sufficiently accurate measurement for the instrument's factors. The descriptive statistics of the scale are also reported in this Table, where it is shown that the activities reported as the most frequent are personal care (M = 5.13) and home care (M = 3.18), and the least frequent are caring for others (M = 0.84) and hobbies (M = 1.96). When evaluating the normality of the distribution, the Kolmogorov Smirnoff test with the Lillifors correction showed that all the factors differed significantly from the normal distribution (p < 0.001), hence, the following section considered non-parametric tests.

3.4. Relationship of the daily activities frequency with sociodemographic characteristics

The identification of the relationship of the frequency of daily activities with socio-demographic characteristics is synthesized in Fig. 3, from which the following are highlighted:

In terms of gender differences, women showed they did more home care (p < 0.001), social activities (p < 0.05), communication using technologies (p < 0.05), hobbies (p < 0.01), health care (p < 0.01), and caring for others (p < 0.001).

The oldest older adults reported fewer social activities (p < 0.01), less communication using technology (p < 0.001), less frequency of hobbies (p < 0.05), and less time spent caring for others (p < 0.001).

A higher educational level was associated with a lower frequency of activities for personal care (p < 0.001) and health care (p < 0.001), and a higher frequency of activities related to mobility (p < 0.001), communication using technologies (p < 0.001), and hobbies (p < 0.001).

A higher individual economic income was associated with a lower frequency of personal care activities (p < 0.001), home care (p < 0.05), and health care, and a higher frequency of activities for mobility (p < 0.001), communication using technologies (p < 0.001), and hobbies (p < 0.001). Meanwhile, a higher household economic income was associated with a higher frequency of activities for mobility (p < 0.001), communication using technologies (p < 0.001), and hobbies (p < 0.001).

Table 2
Reliability and descriptive of the Daily Activities Frequency Scale factors in older adults.

	ω	M	Md	SD	Min	Max	IR	Asymmetry	Kurtosis	KS
Personal care	0.896	5.13	5.00	0.23	3.75	6.00	0.25	−0.22	8.08	0.26***
Home care	0.934	3.18	3.56	1.32	0.00	5.78	1.67	−0.90	−0.05	0.14***
Mobility	0.657	2.58	2.67	1.24	0.00	5.00	1.67	−0.31	−0.50	0.08***
Social activities	0.502	2.39	2.33	0.87	0.00	4.67	1.33	0.04	−0.09	0.09***
Communication using technologies	0.899	2.09	1.67	1.41	0.00	6.00	1.33	1.17	0.60	0.27***
Hobbies	0.546	1.75	1.67	1.32	0.00	5.33	2.67	0.22	−0.86	0.13***
Health care	0.592	1.96	2.00	0.88	0.00	4.33	1.33	0.78	−0.33	0.16***
Caring for others	0.663	0.84	0.67	1.01	0.00	4.33	1.33	1.24	0.82	0.21***

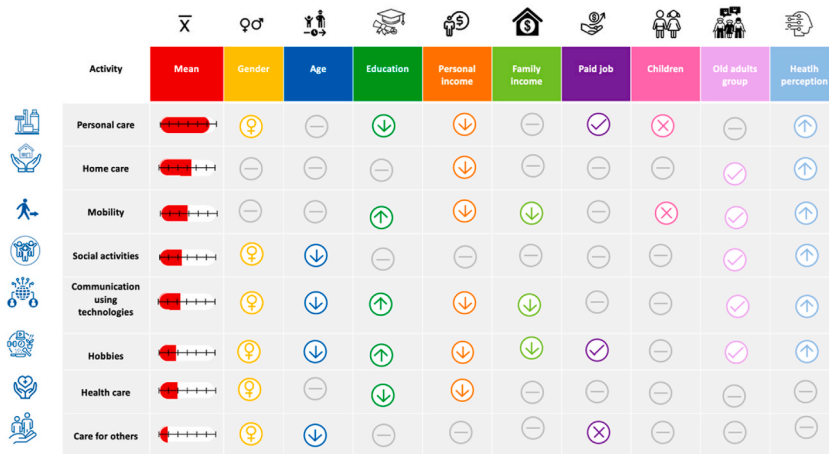*: p < 0.05; **: p < 0.01; ***: p < 0.001.

Fig. 3. Relationship between daily activities and characteristics of older adults.

As for people who had paid jobs, they more frequently performed personal care activities ($p < 0.05$), used technologies to communicate more ($p < 0.01$), had fewer hobbies ($p < 0.05$), and activities related to caring for others ($p < 0.05$).

And as for having adult children, those who had adult children performed fewer household care activities ($p < 0.01$) and had fewer mobility-related activities ($p < 0.01$).

On comparing those who took part in a group for older adults, it was found that those who took part, performed more activities for home care ($p < 0.05$), more mobility ($p < 0.05$), more social activities ($p < 0.01$), communicated more using technologies ($p < 0.05$) and had more hobbies ($p < 0.001$).

Finally, a more positive perception of health status was associated with a lower frequency of personal care ($p < 0.001$) and health ($p < 0.001$) activities, and a higher frequency of home care activities ($p < 0.001$), mobility ($p < 0.001$), social activities ($p < 0.05$), communication using technologies ($p < 0.001$), and hobbies ($p < 0.001$).

4. Discussion

As for the confirmatory factor analysis, except for one of the indicators, which due to its sensitivity is usually not considered, all the indicators support an acceptable fit of the eight-factor model proposed for the Daily Activities Frequency Scale. This could provide evidence of the instrument's validity, in terms of its internal dimensionality [32].

The model proposed, suggested from the goals of the ADL, allows differentiating in one factor the activities for basic Personal Care, such as dressing, undressing, balancing sleep, and eating, from another factor that groups those specifically targeting Health Care, such as taking medication and attending checkups and doctor's appointments. This distinction had already been observed in Chilean older adults in the qualitative study by Briede-Westermeyer et al. (2020) [25]. The former, in turn, contains the typical activities of the basic ADLs, while the latter would point to instrumental ADLs [13–16].

A factor that also includes instrumental ADLs is the so-called Home Care, which includes diverse aspects such as cooking, making the bed, washing the dishes or clothes, and cleaning [13–16] and is also consistent with Home Care dimension identified by Brie-de-Westermeyer's team [17].

A fourth factor associated with caregiving, caring for others, does not appear in the categories of the previous studies but was suggested in the open comments of the experts. And it would make sense. Although many studies point to caregivers of older adults (for example: [31,37,38]), older adults also exercise caregiving roles, especially independent ones. Indeed, in the qualitative Briede-Westermeyer study, activities such as" taking the grandchildren somewhere "," taking the children somewhere" and "walking the dog" also appeared as activities, although they were classified globally as Family and social. In this way, understanding that activities in the home and the community not only require older adults to take care of themselves but also of their family members, these ADLs would have a much closer relationship to the definition of instrumental ADL [13–16].

The last factor that would fall under instrumental ADLs [13–16] would be the Mobility factor, directly based on the homonymous category of the qualitative study in Chile [17] and that includes going for a walk in the neighborhood, in another part of the city, or using public transport.

The last three factors are related to advanced ADLs because they contribute to people's quality of life [15,16]: Hobbies, referring to hobbies that require physical, mental, or manual effort; Social Activities, such as visiting people or receiving visitors, and a transformation of social activities for the current context where social networks have an increasingly important role: Communicating using Technology. The first two are consistent with the Recreational and Family and Social categories of the study by Briede-Westermeyer et al. (2020) [25], and the latter emerges from comments by the experts, who suggested differentiating and highlighting the role of technologies in social interactions. This, considering that social activity in older adults has been shown to be related to the use of mobile phones, by facilitating communication with other social contexts [25,39,40].

The McDonald's omega coefficient also showed acceptable reliability, with an internal consistency indicating that it accurately measures the factors [41], and even though the Social Activities factor has the lowest reliability, this may be due to the heterogeneity of activities it includes.

So, the questionnaire showed acceptable psychometrics properties offering a tool to assess daily activity frequency, a topic not included in previously developed measures such as the Barthel Index [22], the Lawton-Brody IADL [23], or the Activities of Daily Living Scale [42], that focus on activities complexity. So, beyond identifying how an older adult can perform an activity, we can now describe the presence of this activity in their life.

In descriptive terms, personal and home care appear as the most frequent activities. This is complex because as the dependence of older adults increases, bathing, dressing, and going to the bathroom are the activities that most require support [43].

Caring for others is the least frequent, but it is not absent. Eventually, it is less frequent due to the decrease in cognitive and physical abilities which means that the challenges associated with aging itself add to those of caring for others [44]. This is especially because taking care of the needs of another implies getting involved in the ADLs of a third party, and helping them to bathe, go to the bathroom, move around, or eat, can increase the caregiver's burden [43].

Health care follows, but this may be because the factor is more closely associated with interaction with the medical system and not with wellness-promoting practices such as physical activity, eating healthy, or having hobbies. Interaction with the medical system is essential considering that many older adults in Chile have chronic non-communicable diseases, which require periodic monitoring and pharmacological attention. Most older adults with at least one chronic disease consume more than four types of medication simultaneously [45]. Unfortunately, hobbies are the third least frequent type of activity, which is worrisome given that having fewer leisure activities is associated with reduced physical and mental well-being [46,47].

The results showed that there were no differences between men and women in the frequency they performed home care and moved around, but women spent more time on personal care, social activities, communication using technologies, hobbies, and caring for others. This could explain how men, and not women, tend to experience an increase in mental health problems such as depression or distress after retirement [48,49].

It was also women who performed more personal care, health care, and care for others. Socially, women tend to assume the role of informal caregiver more often [50] due to stereotypes about the role of women as caregivers, the gender division of work in the family, and even due to the reinforcement of these stereotypes by public policy [46],contrary to men who are usually less involved in caring for others and delegate vital actions for their own care to their partner or other relatives.

On the other hand, the age of older adults was not associated with personal care, household or health activities, or with mobility. This coincides with studies that show that actions such as food preparation do not vary in older adulthood, except in the case of people with disabilities [51]. The oldest older adults engaged in fewer social activities, communicated less with technology, and had fewer hobbies. This is to be expected considering that more visible physical and cognitive deterioration at an older age can hinder older adults from performing other activities and communicating. Similarly, at an older age, the technological gap can make it even more difficult for older adults to interact with technology [52], often due to social prejudices and ageism that older adults themselves internalize [53]. In addition, older adults spent less time taking care of their health, which may be associated with the fact that these activities begin to be developed mainly by caregivers as people get older and face more functional problems.

Older adults with higher educational levels, as well as those with higher incomes, spent more time on trips, communicating using technologies and hobbies, and less on personal and health care activities. The educational level favors a more diverse interaction with the surroundings, and also delays cognitive deterioration, facilitating activities that are beyond mere subsistence. This explains why it is associated with fewer mental health problems such as depression in older adults [54] and a lower cognitive decline [55] On the other hand, although mental and physical health may decline with age, this decline is less in people that have a high socioeconomic status [56].

A similar phenomenon was observed in the performance of paid jobs. In Chile, legal retirement is at 65 for men and 60 for women, although in practice women retire on average at 67.2 and men at 71 [57], which explains why 17.8 % had a paid job. This group performed more self-care activities, which may be associated with the external demands of greater social exposure due to work. Similarly, they used more technologies to communicate, understanding that engagement with the working world is accompanied by greater exposure and the need to use technologies and stay updated as a user. Finally, they performed fewer caregiving activities, expected due to the temporary restrictions work entails and less time to be able to act as a caregiver.

The most stimulating environments did not depend only on income, staying in work, or a higher educational level. This also happened in older adults who participated in clubs for their age. This coincides with studies such as that of Cherry et al. (2013) [58] where it was found that participating in clubs and having activities outside the home was a better predictor of health status, even more than healthy behaviors [58]. In this sense, participating in clubs is a coping strategy to reduce isolation and social support problems, favoring the well-being of individuals [59] and is particularly useful to support older adults, for whom it is very difficult to change their income and educational level, but who can more easily get involved in occupations that do not require work, but rather have social purposes.

Older adults with children performed fewer home care activities. This leads to the need to explore whether children become a support that frees older adults from these tasks, whether this depends on the fact of sharing the home and, therefore, the tasks, or other factors associated with having extended families. In the same way, they made fewer trips. Unfortunately, the parents were not asked if they shared a residence with these children.

Finally, people who perceive their health more positively spent less time on personal and health care. Better health may require less time spent on care. But this may also be due to self-reporting, where sicker older adults have a magnified perception of the importance and time it takes to take care of themselves. Similarly, a worse state of health is associated with physiological and psychological

difficulties that can make self-care more difficult, and therefore make it take longer.

On the contrary, people who said they had better health, moved more frequently, dedicated more time to direct or technology-mediated social life, and spent more time on hobbies, maintaining a much more stimulating life that could generate a virtuous cycle with their own health. Better health helps to maintain a more stimulating setting and this would favor better health.

4.1. Limitations and impact on findings

This study offers novel insights into the daily activity patterns of older adults residing in Chile's Biobío Region. Our findings reveal a pronounced emphasis on personal care and household tasks, while social activities, healthcare, and caregiving occupy a smaller proportion of older adults' time. These patterns are intricately linked to sociodemographic factors, with gender and age emerging as particularly influential determinants. Moreover, a higher socioeconomic status is associated with more stimulating lifestyles, although engagement in occupations or social groups can also enrich the lives of older adults irrespective of socioeconomic background.

This research represents the first comprehensive examination of daily living activities in a representative sample from Chile's second most populous and developed region. Beyond descriptive findings, the study provides robust psychometric evidence supporting the validity and reliability of the measurement instrument, a critical contribution to the field given the scarcity of such tools.

While this study offers valuable insights, several limitations warrant consideration. The classification of daily activities based on purpose rather than difficulty, Among the limitations of the study, it is necessary to identify that the classification of daily activities that guide the questionnaire arises from their purpose [17] and not from their difficulty, which is the main medical concern, due to their role in people's functionality, although aligned with the older adults' perspective, may obscure challenges related to functional independence. For instance, an individual might prioritize showering for hygiene reasons while simultaneously experiencing difficulty with the task. Among the limitations of the study, it is necessary to identify that the classification of daily activities that guide the questionnaire arises from their purpose [17] and not from their difficulty, which is the main medical concern, due to their role in people's functionality. Understanding them from their goals is more closely linked to the older adult's vision of their reality and can support preventive and health-promoting interventions that are more coherent with their world of meanings.

Future research could benefit from incorporating both dimensions to provide a more comprehensive understanding of activity [60] Additionally, the reliance on self-reported data introduces potential bias, as older adults may overestimate or underestimate their activity levels. Although these techniques are useful for collecting data on a mass scale, they should be complemented whenever possible, especially for clinical studies, with direct observations of the patient and triangulated with other types of reporting techniques, such as the "A day in the Life of …" interview by Sanders&Stappers (2012) [60] in Briede&Pérez (2019) [17]or the report of the people who live with older adults.

Triangulating self-reported data with observational methods or caregiver reports could enhance data accuracy. Furthermore, while the instrument demonstrated adequate internal consistency, additional validity evidence, such as convergent and discriminant validity, is required to strengthen its psychometric properties.

The findings underscore the importance of daily activity frequency in understanding the well-being of older adults. Social activities, hobbies, and technology use are associated with more fulfilling lives. Policymakers should prioritize initiatives that promote these activities, such as establishing social clubs or expanding access to technology. Moreover, fostering intergenerational interactions can yield significant benefits for older adults.

However, the generalizability of these findings is limited by the specific sample and study design. Future research should expand the participant pool to enhance representativeness and employ mixed methods to capture a more comprehensive picture of daily activity patterns. By addressing these limitations and building upon the current findings, researchers can contribute to the development of evidence-based interventions aimed at improving the quality of life for older adults.

This study highlights the importance of daily activity frequency in understanding well-being in older adults. The findings suggest that social activities, hobbies, and technology use are associated with a more stimulating life for older adults. Policymakers should consider initiatives that promote these activities, such as funding social clubs for older adults or providing resources to bridge the technological gap. Additionally, the study points to the potential support role that children can play. Social programs that encourage intergenerational interaction could be beneficial.

Ethics approval and consent to participate

Consent for publication

Not Applicable.

Competing interests

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Data availability statement'

The datasets used during the current study are available from the corresponding author on reasonable request.

CRediT authorship contribution statement

Juan Carlos Briede-Westermeyer: Writing – review & editing, Writing – original draft, Visualization, Project administration. **Martín Fuentes-Sepúlveda:** Writing – original draft, Investigation. **Francisca Lazo-Sagredo:** Writing – original draft, Investigation, Conceptualization. **Alonso Molina-Reyes:** Writing – original draft, Investigation, Conceptualization. **Valentina Lagos-Huenuvil:** Writing – original draft, Investigation, Conceptualization. **Cristhian Pérez-Villalobos:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Conceptualization.

Declaration of Competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:Juan Carlos Briede Westermeyer reports financial support was provided by the National Research and Development Agency (ANID) through the Fondecyt Project N°1201987. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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