

Bibliometric Analysis Of Publications On The Level Of Independence In Elderly Activity Of Daily Living between 2000 and 2022

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Abstract

Background: This study aims to analyze the nursing literature and examine the extent of older people's independence in fulfilling daily living activities.

Main body: A study was conducted with bibliometric analysis of research papers published between 2000 and 2022, which focused on the elderly's level of independence in performing daily living activities. The analysis aimed to identify trends in publications in the fields of nursing, health science, clinical science, and public health. VOSviewer was used to analyze the data and review the results for co-authors and co-occurrence.

There were 8,209 articles obtained from 2000 to 2022 in the health sciences and nursing research fields. The country that conducted the highest amount of research on activities of daily living (ADLs) was China, with topics such as intervention, outcome, improvement, elderly population, prevalence, and proportion being explored. In intervention research, common points of discussion include systematic reviews, measurements, improvements, outcomes, elderly individuals, and patients. The variable of daily activity with the least description pertains to a decrease in ADL, functional disability, and risk factors.

Conclusion: In many nations, particularly developing nations, ADL become concerned about the level of independence of the elderly.

Keywords: Bibliometric, Elderly, Level of Independence, Activity Of Daily Living

Plain English Summary

The research conducted a bibliometric analysis of papers published from 2000 to 2022, focusing on the independence level in elderly activities of daily living (ADL). It identified increasing research trends in nursing, health science, clinical science, and public health, with a significant number of articles published in 2014. The study also highlighted the most cited researchers and articles in this area. The conclusion emphasized the need for more research on instrumental activity and neuropsychiatric symptoms in the elderly. Additionally, the importance of assessing ADL in the elderly and the significance of assessment tools such as the Barthel and Lawton indexes were discussed, with an emphasis on the need for further research to explore understudied variables and keep up with current trends in ADL assessment for the elderly.

Background

Human ageing has been considered a worldwide issue, population pyramids and increasing life expectancy are the main factors of the problem (1). The world's elderly population is increasing. The number and percentage of people over 65

years old in the population is increasing. Rising from 761 million in 2021 to 1.6 billion in 2050. This growth is occurring at an unprecedented rate and is likely to increase further in the coming decades, especially in developing countries (2).

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Indonesia, especially southeast Asia has a high health-adjusted dependency ratio (3).

Daily living activities refer to the basic abilities of individuals to carry out everyday tasks independently. These tasks include bladder control, bowel control, grooming, bathing, using the toilet, dressing, eating, climbing stairs, changing places, and mobility. The term "activity daily living" was first used by Sydney Katz in 1950. When someone is unable to fulfil their ADL needs, it indicates a decline in their quality of life. Therefore, it is crucial to assess ADL in individuals who are in nursing homes, hospitalization, or independent home care. This assessment helps to determine the appropriate intervention required. By 2050, the number of elderly people is expected to triple from 137 million in 2017 to 425 million. A survey conducted in Europe in 2019 revealed that 26.6% of the elderly had difficulty meeting their ADL needs, with moderate dependence at 23.1%. This literature review will examine various studies related to Activity Daily Living in nursing settings (4).

The prevalence of chronic illnesses, disabilities, and functional limitations has risen in recent decades due to ageing populations. Ageing-related traits can also lead to susceptibility, impairment, and increased frailty. The physiological changes that occur with ageing may result in a decline in functional ability among older adults, which can manifest as impairments in basic activities of daily living (ADLs) (5). ADLs are used to assess a person's functional condition. Being unable to perform ADLs results in dependence on others and/or mechanical devices. The inability to carry out routine tasks may have adverse consequences and negatively impact the quality of life of the individual in question (4). ADL impairments in older individuals can manifest in two ways: either 1) a sudden catastrophic event, such as a hip fracture, or 2) a gradual decline in brain function, such as difficulty in doing daily tasks (5).

As individuals age, numerous factors including biology, environment, and psychosocial factors can impact their physical, mental, and emotional well-being (7). The ability to adapt to these changes is crucial in preventing functional decline, which can lead to decreased capacity to perform daily tasks and increased vulnerability (8). The decline in functioning can result in a higher risk of institutionalization and falls for elders, further decreasing their quality of life and overall well-being (9). Maintaining functional capacity is essential in allowing elders to remain independent and connected with their families, which in turn can improve their quality of life and overall well-being.

Nurses must perform functional assessments on the elderly to determine the appropriate interventions. These assessments can help motivate seniors to increase their independent productivity. The assessments may cover physical, mental, and social skills, with the Barthel index, Lawton index, and Katz index are commonly used tools for this purpose.

Throughout numerous years, researchers have studied topics related to the daily activities of the elderly. These studies have revealed different trends, methodologies, settings, instruments, and research variables. Presently, scientific publications offer an abundance of knowledge on research trends, enabling researchers to identify frequently studied topics as well as those that remain unexplored. This study aimed to identify research trends regarding the topic of daily activities in older individuals that have been published using bibliometric analysis.

The research questions were;

How many studies were published between 2000 and 2022 and their distribution?

What kind of journals have published the highest number of articles?

What kind of journals have published the highest number of articles?

What kind of cooperation exists between authors and between countries?

What are the most cited (most influential) journals, publications, authors, and countries?

What are the most researched topics or concepts based on the keywords used in publications?

What is the trend in the publication of activities of daily living among the elderly?

Main body

In this study, bibliometric analysis techniques were utilized to determine the research objective. Bibliometric analysis is a computer-assisted review methodology used in scientific research to identify key research and authors by analyzing all publications related to the research topic (10). This study was conducted using keywords: 'Activity daily living' AND 'Elderly' OR 'Activity daily living in Elderly', the results were 18.622 publications. Then, the results were filtered using the criteria inclusion started by a range of the years from 2000 to 2022 (with 14.479 publications), the fields of research (health sciences OR nursing) reached 8.497 publications, publication type (article OR proceeding) 8.209 publications. The data were collected from the dimensions ai Web which was screened for related publications from 2000 to 2022. A total of 8,209 publications were obtained from the dimensions of the ai web that met the inclusion criteria, which included publication year between 2000 and 2022, fields of research in health sciences and nursing, and publication type

in article and/or proceeding. All publications contained full articles and abstracts related to elderly daily living activities.

The results of the AI dimensions were analyzed using VOSviewer, which visualized the relationships and network mapping between publications, journals, authors, and countries. The description provided by the Dimensions AI website explains the tables of publications by year, research categories, an overview of researchers and source titles.

Findings

On the website dimensions AI, there were a total of 18,850 articles published about Activity Daily Living in the Elderly. After applying predetermined inclusion criteria, a selection of 8,209 articles was made. The timeframe for the research was from 2000 to 2022, which allowed for an analysis of research trends related to activity daily living in the elderly over the past 20 years.

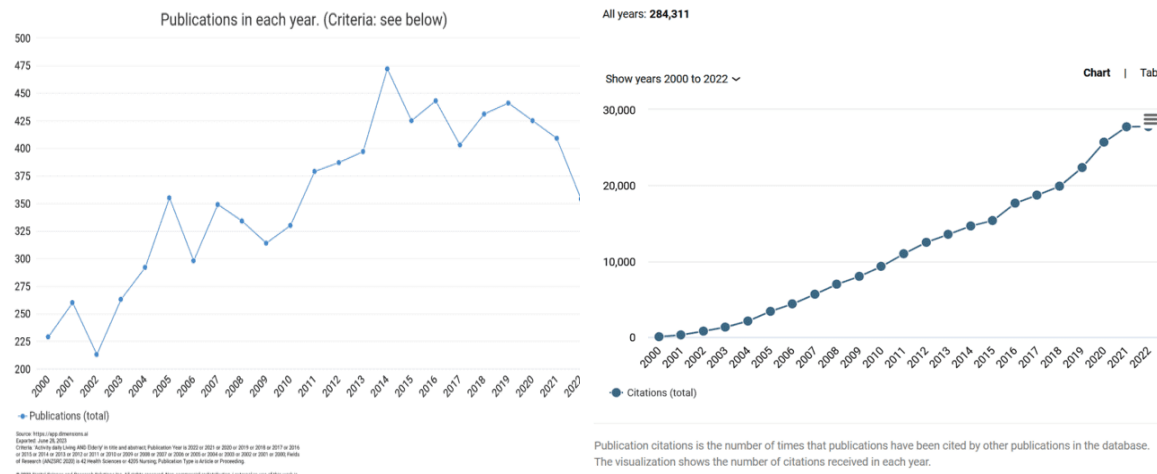


Figure 1. The number of Activity Daily Living in Elderly publications and citations from 2000 to 2022 (source: <https://app.dimensions.ai/>)

Figure 1 reveals that 2014 had the highest number of publications on ADL, with a total of 475 articles. While there have been fluctuations in the trend of ADL research over the 22 years, there has been a gradual increase since 2000. However, in 2022, the number of articles decreased from 410 to 350. The citation graph for 20 years shows a significant increase, which

differs from the publication chart in the previous graph. This increase in citations suggests that numerous studies reference ADL in elderly research topics. Several journals publish articles related to various topics. Health sciences journals publish the most articles with a total of 8,209, followed by biomedical and clinical sciences journals with a total of 2,953.

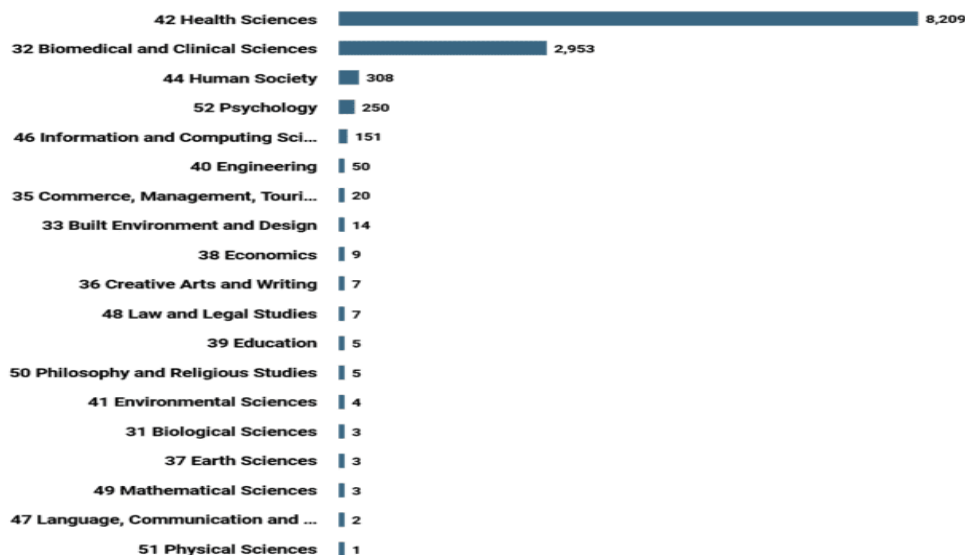


Figure 2. The number of publications based on the highest journal category that discusses ADL in the Elderly (sumber: <https://app.dimensions.ai/>)

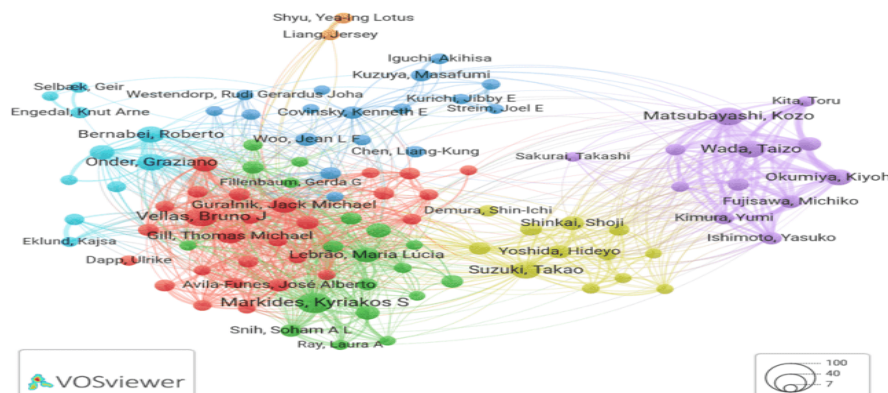


Figure 3: Network visualization (source: VOSviewer)

Table 1. Most cited researchers and articles

No.	Researcher	Public ations	Citati ons	Title (the most cited among other publications)	Author(s), year	Journal	Total Citation
1.	Kyriakos S Markides	53	4961	Lower Extremity Function and Subsequent Disability: Consistency Across Studies, Predictive Models, and Value of Gait Speed Alone Compared with the Short Physical Performance Battery	(11)	The Journal of Gerontology Series A	2.2k
2.	Bruno J Vellas	47	4730	The I.A.N.A task force on frailty assessment of older people in clinical practice	(12)	The Journal of nutrition, health, and ageing	766
3.	Kozo Matsubayashi	40	1382	Evaluation of chewing ability with CGA	(13)	Geriatrics and Gerontology International	133
4.	Taizo Wada	36	1232	Evaluation of chewing ability with CGA	(13)	Geriatrics and Gerontology International	133
5.	Takao Suzuki	35	1157	Impact of physical frailty on disability in community-dwelling older adults: a prospective cohort study	(14)	BMJ Open	216
6.	Graziano Onder	35	4984	Gait speed at usual pace as a predictor of adverse outcomes in community-dwelling older people an International Academy on Nutrition and Aging (IANA) Task Force	(15)	The journal of nutrition, health, & ageing	1,4k
7.	Roberto Bernabei	34	3772	Sarcopenia and mortality risk in frail older persons aged 80 years and older: results from ilSIRENTE study	(16)	Age and Ageing	470
8.	Kiyohito Okumiya	32	1029	Evaluation of chewing ability with CGA	(13)	Geriatrics and Gerontology International	133
9.	Jack Michael Guralnik	32	8592	Patterns of Functional Decline at the End of Life	(17)	JAMA	1k
10.	Matteo Cesari	29	3496	Anaemia is Associated with Disability and Decreased Physical Performance and Muscle Strength in the Elderly	(18)	Journal of the American Geriatrics Society	421

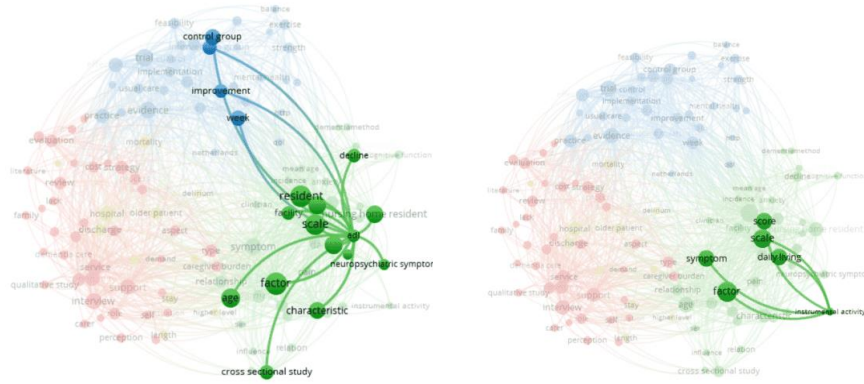


Figure 4: Network Visualization of Activity Daily Living in Elderly (source: VOSviewer)

The ADL network visualization description shows various correlations and variables commonly used or associated with ADL research. These include characteristics, factors, age, neuropsychiatric symptoms, decline, and scales for ADL instrument measurements. However,

there is no specific link provided to explain the scale used. The instrumental activity network visualization depicts variable factors, symptoms, scales, scores, and daily living. The green colour used in the layout indicates that there has been limited research on instrumental activity.

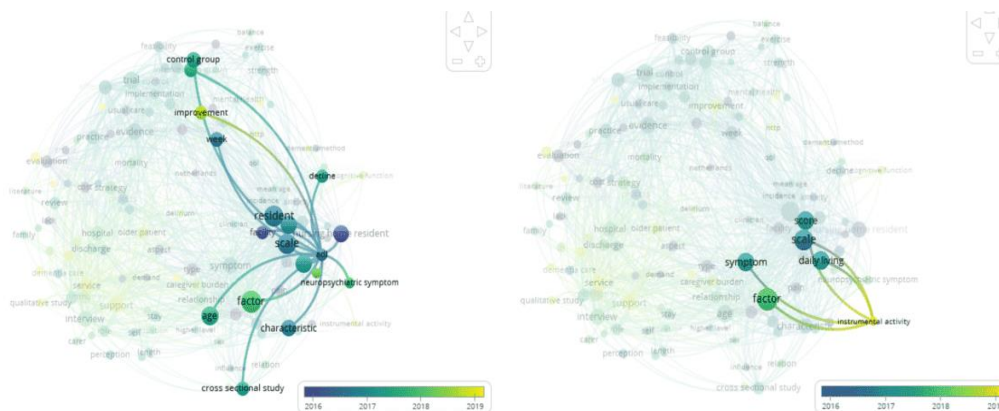


Figure 5 Overlay Visualization of Activity Daily Living in Elderly (source: VOSviewer)

According to the ADL overlay visualization, a significant amount of research has been conducted on ADL topics in 2016. Currently, there is a lot of research on improvement-related variables which are indicated by the yellow

colour, and this research was primarily conducted in 2019. The instrumental activity overlay shows that there has been a lot of research done since 2019.

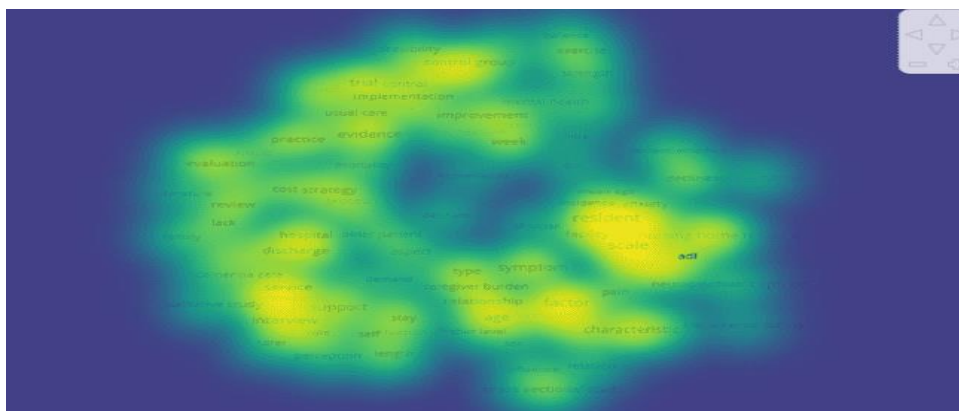


Figure 6: Density Visualization of Activity Daily Living in Elderly (source: VOSviewer)

Focusing on the density visualization of the ADL topic, the yellow colour spectrum is not too broad, which suggests that there is still a gap for researchers to research ADL topics. Specifically,

there are many opportunities for research on topics related to instrumental activity and neuropsychiatric symptoms.

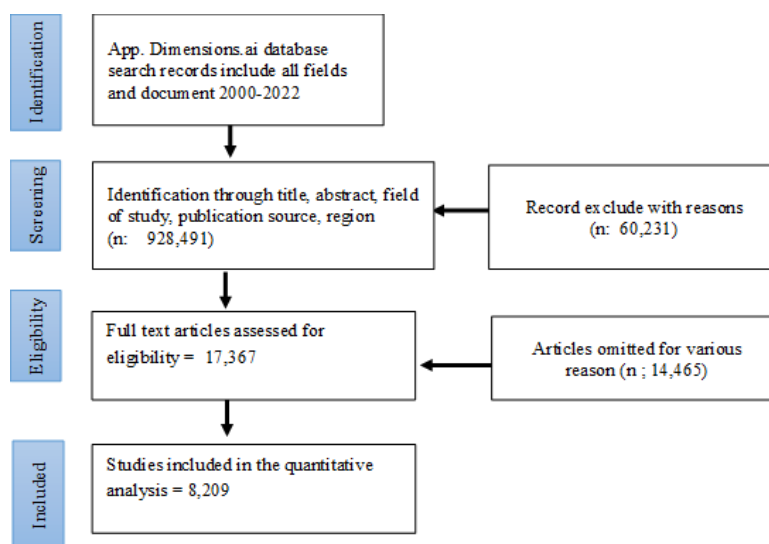


Figure 7. PRISMA flow diagram

According to Figure 7, the Prisma process is composed of four distinct stages: identification, screening, eligibility, and inclusion. In the identification stage, various methods are utilized to source articles, including manual searches through reference lists or search engines like Google Scholar. The total number of records from each source type is entered into the box on the top right of the flow diagram. Screening involves reviewing the title, abstract, and full text, and excluding variables that do not relate to the topic or inclusion criteria. In the eligibility stage, the full text of each identified article is carefully assessed to determine whether it meets the requirements for the systematic review. The final step is the inclusion stage, which involves subtracting the number of records excluded during the eligibility review of full-texts.

Discussion

Performing activities of daily living is something everyone engages in. It's a way to measure how well an elderly person is functioning. When an elderly person becomes unable to perform these activities, they become reliant on others for assistance. This decline in their ability to perform daily activities is typically associated with ageing, but if it persists, it can have a detrimental effect on their quality of life. As a function, of ageing, and cognitive decline decrease in the elderly, ADL levels are measured (19). Bibliometric analysis indicates that research on ADLs in the elderly has fluctuated over the years, but there is still a gradual increase in interest. This topic has been widely published in the gerontology and gerontic nursing fields. The increase in research

and articles on ADLs in the elderly follows the global trend of an ageing population. In 2020, there were 727 million people aged 65 years, and it is projected to increase to 1.5 billion in 2050 (20).

One of the most highly cited articles on Scopus is a study by Guralnik et al., that examines a device for measuring lower limb function (11). The study suggests that this device can effectively identify individuals at risk of developing disabilities in their community. This article has been cited over 2,200 times on the web dimension of ai. Another highly cited article on the web dimension of ai is "Evaluation of chewing ability using color-changeable chewing gum " by Kimura et al. (21). The study explores the strength and ability to chew among elderly populations using various measures, including ADL, QOL, MMSE, Hasegawa Dementia Scale-Revised, and Frontal Assessment Battery. The majority of the top ten most cited articles on Scopus also utilize ADL as a measure of functional capacity in the elderly, which aligns with Vosviewer's findings on instrumental activity related to daily living in this population.

Vosviewer described the network related to ADL including neuropsychiatric symptoms, characteristics, factors, age, as well as improvement and decline. Neuropsychiatric syndrome in the elderly is characterized by hyperactivity (such as agitation, euphoria, disinhibition, irritability and aberrant motor behaviour), psychosis (including delusions, hallucinations, and sleep disturbances), affective symptoms (such as depression and anxiety), and apathy (which can cause eating abnormalities)

(22). A study has examined the characteristics of elderly individuals, including their gender, education level, marital status, employment status, physical health, motivation, self-efficacy, life satisfaction, and locus of control, which are all considered influential in determining physical activity levels in the elderly. This research has found that higher motivation and self-efficacy levels in the elderly are correlated with improved functional ability in physical activity, as is higher education. Meanwhile, in terms of gender, both male and female elderly individuals engage in physical activities, with female elderly individuals being more active in taking care of the house and gardening, while male elderly individuals are more active in higher-energy activities (23). Additionally, there are interesting points that correlate with ADL, specifically improvement and decline, which are contradictory points. Improvement indicates an increase in the elderly's health and abilities, which can occur due to factors such as physical activity and social environments that affect health opportunities, decisions, and behaviours. A supportive environment for the elderly is crucial in maintaining their health and decreasing their dependence on others, which can be achieved through healthy behaviours such as eating nutritious food, not smoking, and reducing the risk of infection. These factors can improve physical and mental health and reduce the number of elderly individuals who are dependent on others.

This study examines different ADLs that have been utilized in various publications. The Barthel index is one such ADL, consisting of ten items that assess bladder control, bowel control, grooming, bathing, using the toilet, dressing, eating, climbing stairs, changing places, and mobility. The Barthel index score ranges from 0-100, with 0 indicating total dependence and 100 indicating independence (24). Additionally, the Lawton index is also used as an ADL instrument in research. This assessment tool is more comprehensive than the Barthel index, covering 8 aspects such as the ability to use a telephone, shop, prepare food, look after the house, wash, independently use transportation, take medication, and manage finances. The total score on the Lawton index ranges from 0-8, with 0 indicating low functional ability and dependence, and eight indicating good functional ability and independent movement. The Lawton index is an instrument that evaluates the cognitive or thinking abilities of elderly individuals (25).

The assessment of basic activities of daily living (BADL) and instrumental activities of daily living (IADL) is commonly done through the Barthel index and Lawton index in various research

articles. These assessment tools are used to measure the ability of elderly individuals to perform daily activities. The results of these studies show that many elderly people are either partially or fully dependent. In most cases, the BADL and IADL instruments are used as additional variables in the assessment. These indexes are ideal for assessing the daily activities of elderly individuals in the community as they provide objective results (26). The ADL assessment is crucial in determining whether the elderly need further rehabilitation or assistance. For instance, if an elderly individual is unable to walk, they may be at a higher risk of falling. Therefore, conducting an ADL assessment is essential in maintaining the elderly's independence and increasing their functional capacity in daily life (9).

Conclusion

Based on the results and discussion, it is evident that there are still various opportunities for researchers to explore variables that have not been widely studied and to keep up with current research trends. ADL remains a fundamental concept for conducting quantitative, qualitative, and systematic review research on the elderly. To aid in the discovery of references and citations, it is crucial to identify the gaps between different topics. Fortunately, many published articles related to ADL in the elderly can be used as references for more in-depth research. Measuring instruments such as the Barthel and Lawton indexes are available to researchers. For determining daily activities and functional capacity levels, it is necessary to conduct further studies using the Lawton index instrument, which measures not only functional capacity but also the ability to perform specific daily activities.

List of Abbreviations

ADL: activities of daily living
BADL: basic activities of daily living
IADL: instrumental activities of daily living

Declarations

Ethical Approval and Consent to Participate
None

Consent for publication

All the authors gave consent for the publication of the work under the Creative Commons Attribution- Non-Commercial 4.0 license.

Availability of data and materials

The data and materials associated with this research are available in the public domain.

Competing interests

The authors declare that they have no competing interests.

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Author contributions

SE and BAS conceived the original idea. AMN wrote the preliminary draft. NN and PS revised the original draft. SE performed an extensive literature search. All authors were involved in the entire revision process and final approval.

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