Sociodemographic Factors and Risk Indicators for Functional Impairment in Elderly Patients in Primary Care Settings: A Cross-Sectional Study

.

ABSTRACT

|  |
| --- |
| **Aims:** To identify and describe sociodemographic characteristics of elderly subjects with functional impairment and their associated factors.  **Study design:** it was designed a descriptive, and cross-sectional study with an analytical approach.  **Place and Duration of Study:**  Ambulatory Care Medical Unit. The study was conducted from July 1st to December 31st, 2024, with Mexican elderly patients who attended outpatient consultations in the Family Medicine Specialty and General Medicine departments at the "División del Norte" Family Medicine Clinic, ISSSTE, in Mexico City, Mexico. The data was collected from October to December, 2024.  **Methodology:** the data collection was conducted using six questionnaires: 1) a sociodemographic factors questionnaire, 2) the AMAI questionnaire, 3) the Barthel Index for Activities of Daily Living, 4) the Katz Index for Activities of Daily Living, 5) the Lawton and Brody for Activities of Daily Living Scale, and 6) the Geriatric Depression Scale of Yesavage. The questionnaires were interviewer-administered. The protocol was approved by two committees (The Research Committee and the Ethics Committee in Research of the Family Medicine Clinic "División del Norte"). All participants signed the informed consent form.  **Results:** We included 55 patients, mainly females (58.2%). The median age was higher in female patients (76.0 years old, IQR=68.5-85.75) compared to male patients (75.0 years old, IQR=70-81; p=0.767, Median Test between independent groups), but without a statistically significant difference. Females are better represented at the basic education level, while males are more inclined to hold higher education degrees and postgraduate qualifications. Males are more represented in higher socioeconomic levels, particularly Levels A/B, whereas females are more concentrated in Levels C- and E. Less than 10% of participants experienced moderate to severe functional impairment. (3.6% severe functional impairment, and 5.5% moderate functional impairment). At least 90% can bathe themselves, dress independently, use the toilet without assistance, show independence in mobility and all participants are independent in feeding themselves. For instrumental activities of daily living, less than 2% of participants exhibit maximum dependence, 85% maintain some degree of autonomy, and less than 40% achieve full independence. Sedentarism was highly prevalent (58.2%), and healthy eating habits were reported by 83.6%. Hypertension (65.5%), Type 2 Diabetes (56.4%), Overweight/Obesity (50.9%), and Dyslipidaemia (12.7%) demonstrate a significant burden of cardiovascular and metabolic diseases. The regression model indicates that the likelihood of functional dependency increases with age (beta=0.157, OR=1.170; CI 95%= 1.029-1.329, p=0.016). Additionally, elderly individuals with an alcoholism history (beta=2.359, OR=10.576; CI 95% 1.340-83.491, p=0.025) are significantly more likely to experience functional dependency. Similarly, hearing loss (beta=2.255, OR=9.536; CI 95% 1.282-70.923, p=0.028) is a risk factor of functional dependency.  **Conclusion:** Gender disparities are evident in education and socioeconomic status. While most participants maintain functional independence, instrumental activities of daily living present greater challenges. Sedentarism is highly prevalent, despite a majority reporting healthy eating habit. Moreover, cardiovascular and metabolic diseases impose a significant burden on diseases. Functional dependency is strongly associated with increasing age, an history, and hearing loss as well , emphasising the need for targeted interventions to promote healthy ageing and prevent disability. |

*Keywords: Functional impairment; non-communicable diseases; primary care.*

1. INTRODUCTION

Functional impairment is a critical issue among elderly population aged 60 and above, with profound implications for their life quality, autonomy, and overall well-being, therefore, their dependency relationship increases (Torres-de-Araújo et al. 2018, Takele et al. 2024, Lopez-Hernandez et al. 2024a).thus, it encompasses a spectrum of difficulties in performing essential tasks which are necessary for daily living, ranging from basic activities such as bathing, dressing, and eating to more complex instrumental activities like managing finances, cooking, and using transportation (Katz et al. 1970, Successful Aging after Elective Surgery Functional Measures Working Group, SAESFMWG et al. 2015, Guo & Sapra 2022, Rathnayake et al. 2023, Wei & Hodgson 2023, Moreno-Martin et al. 2024). The progression of functional impairment in older adults often results in a marked loss of independence and autonomy, leading to an increasing reliance on the elderly population for assistance with activities of daily life, with several impacts on the life quality of caregivers, and a greater burden on healthcare systems, making it a significant public health concern (Committee on Family Caregiving for Older Adults, CFCOA, et al. 2016, Falck et al. 2022, Lopez-Hernandez et al. 2024a). This condition often emerges due to age-related physiological changes, compounded by chronic illnesses, cognitive decline, and environmental factors (Colita et al. 2024, Kang & Kim 2022) commonly associated to chronic conditions, including diabetes, hypertension, arthritis, and cardiovascular diseases, which can accelerate the deterioration of physical and mental capabilities (Fong 2019, Kang & Kim 2022, Rueda-De-la-Rosa et al. 2024). Furthermore, social determinants such as low educational attainment, poor financial status, and inadequate access to health care exacerbate the risk and impact of functional decline (Jia et al. 2020, Majoka & Schimming 2021, Hwang 2022, Tan & Merchant 2022, Rebok et al. 2023, Santamaria-Garcia et al. 2023, Huang et AL. 2024, Rueda-De-la-Rosa et al. 2024, Zhao et al. 2024).

Additionally, functional impairment also has cascading effects on elderly mental health of (Muramatsu & Hedeker 2010, Hofmann et al. 2020, Reynolds et al. 2022). So, the loss of independence can lead to frustration feelings, anxiety, and depression, further affecting their overall health (Mofatteh 2020). Additionally, family members and caregivers often experience emotional, physical, and financial strain while providing support, highlighting the ripple effects of this condition beyond the individual (Schulz & Sherwood 2008, CFCOA, et al. 2016, Reynolds et al. 2022). In fact, understanding the prevalence, risk factors, and comorbidities associated with functional impairment is crucial for developing effective interventions. Strategies such as early screening, rehabilitation programmes, and community-based support can mitigate the impact of functional decline. Likewise, promoting healthy ageing through physical activity, balanced nutrition, and social engagement can also serve as preventive measures.

Since the rapidly growing elderly population globally (Rueda-De-la-Rosa et al. 2024, López-Hernández et al. 2024b) it is essential to address functional impairment for fostering an environment that supports the dignity, independence, and well-being of older adults. Moreover, integrating multidisciplinary approaches in healthcare and public policy can ensure a more holistic response to the challenges posed by this critical issue (Reynolds et al. 2022, Culberson et al. 2023, Hong et al. 2023). This research seeks to provide insights into the underlying causes of functional impairment and its impact on older adults’ daily lives by identifying and comprehensively characterising elderly subjects with functional impairment and their associated factors. Its findings will contribute to the development of evidence-based strategies to reduce functional decline, promote independence, and improve the quality of care and life for the ageing population.

**1.1 The Aims of the Study.**

This study aims to identify and describe sociodemographic characteristics of elderly subjects with functional impairment and their associated factors.

2. material and methods

**2.1 Study design and settings.**

A descriptive, and cross-sectional study with an analytical approach was designed and conducted with Mexican elderly patients who attended outpatient consultations in the Family Medicine Specialty and General Medicine departments at the "División del Norte" Family Medicine Clinic (FMC), ISSSTE, in Mexico City, Mexico. The data was collected from October to December, 2024.

Data collection was conducted using six questionnaires: 1) a sociodemographic factors questionnaire, 2) the AMAI questionnaire, 3) the Barthel Index (BI) for Activities of Daily Living (ADL) (Collin et al. 1988, de Haan et al. 1993, Bouwstra et al. 2019), 4) the Katz Index (KI) of ADL (Arik et al. 2015, Rathnayake et al. 2023), 5) the Lawton and Brody for Instrumental Activities of Daily Living Scale (LB-IADLS) (Wei & Hodgson 2023), and 6) the Geriatric Depression Scale of Yesavage (Y-GDS) (Yesavage et al. 1982, Erazo et al. 2020). The study was conducted from July 1st to December 31st, 2024.

Functional impairment was determined using the BI, KI, and LB Scale. The BI was classified according to the following scores: 80–100 points: slight functional impairment, 60–79 points: mild functional impairment, 45–59 points: moderate functional impairment and <45 points: severe functional impairment. A patient was considered to have functional impairment if they scored 60 or below, indicating mild to severe functional dependence. According to the KI, functional impairment was identified when a patient exhibited dependence in one or more basic activities of daily living. The LB Index employs a scoring system ranging from 0 to 8, where 0 indicates full dependence and 8 signifies full independence in IADL. The classifications were as follows:

1. Dependence: Score 1–3.
2. Partial independence: Score 4, indicating increasing autonomy with some required aassistance, and
3. Independence: Score 5–7.

All individuals who demonstrated any degree of dependence or functional impairment, based on their respective classification, were categorised as having functional impairment.

**2.2 Sampling.**

An intentional sampling method was employed. This method involved selecting individuals who self-reported functional impairment concerns or whose caregivers or clinicians reported functional impairment issues. While this approach ensured the inclusion of individuals relevant to the study's objectives, it also introduced the potential for selection bias. The participants who did not report functional impairment concerns or were less engaged with healthcare services may have been underrepresented, potentially affecting the findings that need to be extrapolated to the broader population of older patients.

**2.3 Study Population, and Data Collection.**

Participants were selected based on the following inclusion criteria: subjects of 60 years old and over, beneficiaries of the “División del Norte” FMC, who agreed to participate in the study voluntarily and signed an informed a consent form. The exclusion criteria aim to ensure the reliability and homogeneity of the sample by eliminating potential confounding factors. The study excluded elderly individuals with cognitive impairment, Parkinson’s disease, sequelae of cerebrovascular disease, or any other neurological condition. Furthermore, those with acute heart failure, chronic pain, or a diagnosis of any geriatric syndrome were also excluded. The collected data was stored in an Excel workbook, which served as the statistical database for subsequent analysis. This procedure ensured the accuracy, quality, and reliability of the extracted data, supporting the integrity of our study’s findings.

**2.4 Statistical analysis.**

We included all complete records, ensuring a comprehensive dataset. The categorical variables are described as absolute frequency and percentage, and quantitative variables as mean, standard deviation (SD), and interquartile range (IQR). Confidence Interval 95% (CI95%) was included. Categorical variables were compared using Yates' corrected chi-square (*X2*) test and likelihood ratio, as appropriate. Besides, quantitative variables were compared using the Mann-Whitney U test or Student's T test as appropriate. A P value < 0.05 (two-tailed test) was considered significant.

**2.4 Ethical Considerations.**

The study was conducted in accordance with the Good Clinical Practice Guidelines of our laws and the Declaration of Helsinki for human experiments. The protocol was approved by two committees: The Research Committee and the Ethics Committee in Research of the FMC "División del Norte". A medical professional informed all participants about the study's objective, its benefits, and potential adverse events. After providing a clear explanation, the signatures of those who voluntarily decided to participate in the study were collected, ensuring that participants had sufficient time to read and sign the corresponding informed consent form. The Data was treated confidentially. In order to guarantee confidentiality, only the principal investigators had access to the complete dataset, including identifiable patient information (e.g., names). The patient names were replaced with unique identification numbers. The assigned number allows the data to be linked to a specific individual without revealing the individual's identity. This approach ensured that all patient data were handled under ethical standards and maintained the highest level of confidentiality throughout the study. This anonymization was conducted before sharing the dataset for statistical analysis with some researchers. After the statistical analysis, only the processed statistical data was available to the rest of the research team.

3. results and discussion.

**3.1 Characteristics of the study population**

We included 55 elderly patients. The majority of the participants are females as shown in Table 1, while men account for less than 42%. The average age was 76.31 years old (SD=8.92, range=34, minimum age=62, maximum age=96 years old, median age=76 [IQR=70-82]) years old. The median age was higher in female patients (76.0 years old, IQR=68.5-85.75, range=34 years old, minimum age=62 years old, maximum age=96 years old) compared to male patients (75.0 years old, IQR=70-81, range=27 years old, minimum age=62 years old, maximum age=89 years old; p=0.767, a median test between independent groups). However, this age difference was not significant, which indicates that the distribution between sexes was homogeneous. Additionally, the average age was similar for both sexes (females=76.88, SD=9.61 years vs. males=75.52, SD=8.01 years).

On the other hand, the most common age group includes individuals aged 65 years and older. Regarding marital status, over half of the participants are married, followed by subjects who are widowed. Less than 20% of the population is single (living in a consensual union, or divorced). This distribution highlights the predominance of long-term partnerships. In terms of occupation, the largest group consists of retirees or pensioners, followed by homemakers. A smaller proportion of participants are employed and a minority population are unemployed. The analysis of educational levels reveals that nearly half of the participants have a basic education where approximately one-quarter of the participants have completed secondary education or hold a higher education degree. However, only a small minority (less than 10%) possess postgraduate qualifications, such as a master’s or doctoral degree. This distribution highlights the limited access to advanced education within this cohort. In terms of housing, the majority of participants are homeowners, with only 3.6% renting and 1.8% residing under alternative arrangements. This suggests a predominantly stable and independent living situation for most individuals in the cohort. Socioeconomic status predominantly falls within the middle-to-lower classes (levels C and D), with at least 20% of participants in each category. Less than 10% belong to the upper socioeconomic class (A/B), while 5.5% are in the lowest socioeconomic level (E). This highlights the study population’s concentration in middle and lower socioeconomic strata (table 1).

**Table 1. General characteristics of the study population.**

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Total (N=55)  n, % (95%CI) | Females (n=32)  n, % (95%CI) | Males (n=23)  n, % (95%CI) |
| Sex |  |  |  |
| Male | 23, 41.8 (29.1-54.5) |  |  |
| Female | 32, 58.2 (45.5-70.9) |  |  |
| Marital status\* |  |  |  |
| Single | 6, 10.9 (3.6-20.0) | 5, 15.6 (3.1-28.1) | 1, 4.3 (0-13) |
| Married | 28, 50.9 (38.2-63.6) | 10, 31.3 (15.6-49.9) | 18, 78.3 (60.9-95.7) |
| Divorced | 1, 1.8 (0.0-5.5) | 1, 3.1 (0-9.4) | 0, 0.0 (0.0-0.0) |
| Widowed | 17, 30.9 (20.0-43.6) | 15, 46.9 (31.3-62.5) | 2, 8.7 (0-21.7) |
| Cohabiting | 3, 5.5 (0.0-12.7) | 1, 3.1 (0-9.4) | 2, 8.7 (0-21.7) |
| Occupation\*\* |  |  |  |
| Homemaker | 15, 27.3 (14.5-40.0) | 13, 40.6 (25-59.4) | 2, 8.7 (0-21.7) |
| Retired/Pensioned | 23, 41.8 (29.1-54.5) | 10, 31.3 (15.6-50) | 13, 56.5 (34.8-73.9) |
| Unemployed | 3, 5.5 (0.0-12.7) | 2, 6.3 (0-15.6) | 1, 4.3 (0-13) |
| Employed | 14, 25.5 (14.5-36.4) | 7, 21.9 (9.4-37.5) | 7, 30.4 (13-52.2) |
| Education\*\* |  |  |  |
| Basic | 23, 41.8 (29.1-56.4) | 16, 50 (31.3-65.6) | 7, 30.4 (13-52.2) |
| Secondary | 13, 23.6 (12.7-34.5) | 10, 31.3 (15.6-50) | 3, 13 (0-26.1) |
| Higher | 14, 25.5 (14.5-36.4) | 5, 15.6 (3.1-28.1) | 9, 39.1 (17.4-60.9) |
| Master’s/Doctorate | 5, 9.1 (1.8-16.4) | 1, 3.1 (0-9.4) | 4, 17.4 (4.3-34.8) |
| Housing |  |  |  |
| Owned | 52, 94.5 (87.3-100) | 30, 93.8 (84.4-100) | 22, 95.7 (87-100) |
| Rented | 2, 3.6 (0.0-9.1) | 1, 3.1 (0-9.4) | 1, 4.3 (0-13) |
| Other | 1, 1.8 (0.0-5.5) | 1, 3.1 (0-9.4) | 0, 0.0 (0.0-0.0) |
| Socioeconomic level\* |  |  |  |
| Level A/B | 4, 7.3 (1.8-14.5) | 0, 0.0 (0.0-0.0) | 4, 17.4 (4.3-34.8) |
| Level C | 14, 25.5 (14.5-38.1) | 6, 18.8 (6.3-31.3) | 8, 34.8 (13-52.2) |
| Level C- | 9, 16.4 (7.3-27.3) | 8, 25 (9.4-40.6) | 1, 4.3 (0-13) |
| Level C+ | 7, 12.7 (3.6-21.8) | 3, 9.4 (0-21.9) | 4, 17.4 (4.3-34.8) |
| Level D | 11, 20.0 (10.9-30.9) | 7, 21.9 (9.4-37.5) | 4, 17.4 (4.3-34.8) |
| Level D+ | 7, 12.7 (5.5-21.8) | 5, 15.6 (3.1-28.1) | 2, 8.7 (0-21.7) |
| Level E | 3, 5.5 (0.0-12.7) | 3, 9.4 (0-21.9) | 0, 0.0 (0.0-0.0) |

Source: Prepared by the authors using data from the data base. \* P value <0.01. \*\*P value <0.05, calculated by chi square likelihood ratio.

The comparison of demographic and socioeconomic variables by sex reveals notable differences between males and females in the study population. In terms of marital status, a higher proportion of males are married, while widowed individuals are predominantly female. Besides, single status is more prevalent among females compared to males, and cohabiting arrangements are similarly more common among males than females. Regarding occupation, women are chiefly homemakers, whereas males are more likely to be retired or receive pensions. On the other hand, employment rates are comparable across the sexes, although unemployment remains low in both groups. The educational attainment differs significantly between the sexes; females are better represented at the basic education level, while males are more inclined to hold higher education degrees and postgraduate qualifications. Therefore, this indicates a gender disparity in access to advanced education. Moreover, housing stability is consistent across sexes, with most participants owning their homes where very few participants rent, and even fewer report living under alternative housing arrangements. Additionally, socioeconomic status highlights further disparities, as men are more represented in higher socioeconomic levels, particularly Levels A/B, whereas women are more concentrated in Levels C- and E. This suggests differences in economic opportunities and resources, favouring males.

Overall, these findings reveal gender differences in marital status, occupational roles, educational levels, and socioeconomic status, with females facing greater vulnerability in several domains, particularly education and economic standing. Conversely, males demonstrate greater representation in higher educational and socioeconomic categories. These disparities underscore the need for targeted interventions to promote gender equity in these areas.

**3.2 Functional impairment**

As detailed in Table 2, less than 10% of participants experience moderate to severe functional impairment. Specifically, 3.6% has severe functional incapacity, while 5.5% has moderate incapacity. The majority (90.9%) demonstrate mild functional impairment, indicating that most participants maintain a relatively high level of independence.

On the other hand, a severe functional disability was exclusively observed in females, with no cases reported among males. Moderate functional disability was marginally more common in females than in males, though the difference was minimal. Mild functional disability is the most prevalent category for both sexes, showed a slightly higher occurrence in males compared to females. In summary, severe and moderate functional disabilities were more frequent in females, whereas males predominantly presented with mild functional disability.

**Table 2. Prevalence of functional impairment in the study population.**

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Total (N=55)  n, % (95%CI) | Females (n=32)  n, % (95%CI) | Males (n=23)  n, % (95%CI) |
| Diagnosis |  |  |  |
| SFD | 2, 3.6 (0.0-9.1) | 2, 6.3 (0-15.6) | 0, 0.0 (0.0-0.0) |
| MoFD | 3, 5.5 (0.0-12.7) | 2, 6.3 (0-15.6) | 1, 4.3 (0-13) |
| MiFD | 50, 90.9 (81.8-98.2) | 28, 87.5 (75-96.9) | 22, 95.7 (87-100) |

Source: Prepared by the authors using data from the data base. SFD=severe functional disability, MoFD=moderate functional disability, MiFD=mild functional disability. Prevalence of functional impairment was performed using the Barthel Index. P value calculated by Fisher exact test. There are no statistically significant differences.

**3.3 Independence in Basic Activities of Daily Living**

Most participants remain independent in performing basic ADLs, as shown in Table 3. For instance, at least 90% can bathe themselves, more than 90% can dress independently, 96.4% can use the toilet without assistance, and all participants are independent in feeding themselves. Almost 93% shows independence in mobility. However, 20% experiences partial or total incontinence, which represents a common challenge among older adults.

**Table 3. Prevalence of functional dependency in elderly study population performing basic activities of daily living.**

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Total (N=55)  n, % (95%CI) | Females (n=32)  n, % (95%CI) | Males (n=23)  n, % (95%CI) |
| Bathing |  |  |  |
| Independent | 50, 90.9 (81.8-98.2) | 28, 87.5 (75-96.9) | 22, 95.7 (87-100) |
| Dependent | 5, 9.1 (1.8-18.2) | 4, 12.5 (3.1-25) | 1, 4.3 (0-13) |
| Dressing |  |  |  |
| Independent | 51, 92.7 (85.5-98.2) | 29, 90.6 (78.1-100) | 22, 95.7 (87-100) |
| Dependent | 4, 7.3 (1.8-14.5) | 3, 9.4 (0-21.9) | 1, 4.3 (0-13) |
| Using the Toilet |  |  |  |
| Independent | 53, 96.4 (90.9-100.0) | 30, 93.75 (84.375-100) | 23, 100 (100-100) |
| Dependent | 2, 3.6 (0.0-9.1) | 2, 6.25 (0-15.625) | 0, 0.0 (0.0-0.0) |
| Mobility |  |  |  |
| Independent | 51, 92.7 (85.5-98.2) | 29, 90.6 (81.3-100) | 22, 95.7 (87-100) |
| Dependent | 4, 7.3 (1.8-14.5) | 3, 9.4 (0-18.8) | 1, 4.3 (0-13) |
| Continence |  |  |  |
| Independent | 44, 80.0 (69.1-90.9) | 25, 78.1 (62.5-90.6) | 19, 82.6 (65.2-95.7) |
| Dependent | 11, 20.0 (9.1-30.9) | 7, 21.9 (9.4-37.5) | 4, 17.4 (4.3-34.8) |
| Feeding |  |  |  |
| Independent | 55, 100 (100-100) | 32, 100 (100-100) | 23, 100 (100-100) |

Source: Prepared by the authors using data from the data base. Prevalence of functional dependency was performed using the Katz Index. P value calculated by Fisher exact test. There are no statistically significant differences.

Most participants were independent in bathing, with a slightly higher prevalence in males than females and vice versa. Regarding dressing, independence was more prevalent in males showing a slightly higher rate than females. Additionally, almost all participants were independent in using the toilet, with males being more independent than females. At least 92% of participants reported independence in mobility, with males showing slightly higher independence than females. Besides, independence in continence was reported in 80% of participants, with males showing a slightly higher per cent compared to females. Males generally showed a slightly higher prevalence of independence across most activities, particularly in using the toilet and continence. What is more, females had a higher prevalence of dependency in bathing, dressing, mobility, and continence. Feeding was the only activity in which all participants were entirely independent.

**3.4 Independence in** **Instrumental Activities of Daily Living**

For IADLs, less than 2% of participants exhibit maximum dependence, 85% maintain some degree of independence, and less than 40% achieve full independence (Table 4). This suggests that while basic self-care is manageable for most participants, more complex tasks requiring cognitive or physical effort pose a challenge for a significant proportion.

**Table 4. Prevalence of dependency in elderly population performing instrumental activities of daily living.**

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Total (N=55)  n, % (95%CI) | Females (n=32)  n, % (95%CI) | Males (n=23)  n, % (95%CI) |
| Full Dependence | 1, 1.8 (0.0-5.5) | 1, 3.1 (0-12.5) | 0, 0.0 (0.0-0.0) |
| Dependence | 7, 12.7 (5.5-21.8) | 4, 12.5 (3.1-25) | 3, 13 (0-26.1) |
| Partial Independence | 5, 9.1 (1.8-18.2) | 5, 15.6 (6.3-28.1) | 0, 0.0 (0.0-0.0) |
| Independence | 22, 40.0 (27.3-54.5) | 12, 37.5 (21.9-53.1) | 10, 43.5 (21.7-65.2) |
| Full Independence | 20, 36.4 (21.9-49.1) | 10, 31.3 (15.6-50) | 10, 43.5 (26.1-65.2) |

Source: Prepared by the authors using data from the data base. Prevalence of dependency was performed using the Lowton-Brody Index. P value calculated by chi square likelihood ratio. There are no statistically significant differences.

Regarding the prevalence of dependency in the elderly population by sex, complete dependence and partial independence were observed exclusively in females. The dependence category showed similar prevalence between sexes. However, both independence and full independence were more frequently observed in males.

**3.5 Analysis of Health Conditions and Lifestyle Factors in Elderly Population**

In the study population, our findings highlight high rates of cardiovascular risk factors, metabolic disorders, and musculoskeletal conditions, as well as a significant burden of multimorbidity. Current smoking was reported by only 5.5% of individuals, whereas a history of smoking was significantly higher (40.0%), suggesting that many former smokers may have quite due to health concerns. Similarly, current alcohol consumption was lower (12.7%) compared with the history of alcoholism (50.9%), indicating that alcohol-related health risks may have influenced behavioural changes over time. Sedentarism was highly prevalent (58.2%), reinforcing the importance of promoting physical activity in this population.

Healthy eating habits were reported by 83.6%, yet the high prevalence of metabolic disorders suggests potential dietary imbalances or other contributing risk factors. Hypertension (65.5%), Type 2 Diabetes (56.4%), Overweight/Obesity (50.9%), and Dyslipidaemia (12.7%) demonstrate a significant burden of cardiovascular and metabolic diseases, reinforcing the need for lifestyle interventions and preventive care. Chronic venous insufficiency (49.1%) and ischaemic heart disease (9.1%) further highlight circulatory issues in this population. Arrhythmias (9.1%) and chronic heart failure (1.8%) reflect the presence of structural and functional cardiac disorders. Knee osteoarthritis (41.8%) and osteoporosis (9.1%) indicate a high prevalence of degenerative joint and bone conditions, which can impair mobility and quality of life. Gait disorders, lumbar spondylolisthesis (1.8%), and lumbar pain (1.8%) suggest additional musculoskeletal limitations affecting functional independence. Chronic obstructive pulmonary disease (COPD) (7.3%), bronchitis (1.8%), and asthma (1.8%) indicate a notable burden of respiratory illnesses, likely linked to past smoking habits. Gastroesophageal reflux disease (18.2%) and colitis (18.2%) are common gastrointestinal conditions, potentially influenced by dietary factors and lifestyle. Moreover, hearing loss (40.0%), cataracts (7.3%), and glaucoma (3.6%) highlight the importance of sensory impairment screening in the elderly. Retinitis pigmentosa (1.8%) and presbyopia (1.8%) further indicate vision-related issues that could impact daily functioning. The prevalence of depression, according to Y-GDS was 12.7%, and the medical history of depression and anxiety were 7.3%. Benign prostatic hyperplasia (1.8%), urinary incontinence (1.8%), and thyroid disorders (1.8%) were also noted, reflecting common ageing-related conditions.

This analysis highlights a high prevalence of cardiovascular, metabolic, musculoskeletal, and sensory impairments, as well as significant lifestyle risk factors, particularly sedentarism and a history of smoking and alcohol consumption. Thus, these findings emphasise the need of preventive healthcare strategies, multidisciplinary management, and targeted interventions to improve health outcomes and life quality in the elderly population.

**3.6 Analysis of association among functional dependency and sociodemographic and clinical factors**

For the association analysis among functional dependency and sociodemographic and clinical variables, functional dependency was defined as the presence of any degree of dependency based on the criteria of three validated scales that assess the ability to perform basic and instrumental activities of daily living (BIADL): the Katz Index, the Barthel Index, and the Lawton & Brody Scale. Based on this definition, it was observed that 14 patients (25.5%, CI 95% 14.5-36.4) exhibited some degree of functional dependency in performing BIADL. Multiple multivariate logistic regression models were conducted; however, it is only presented the model that demonstrated statistical significance.

Table 5 presents the multivariate logistic regression model examining the association between sociodemographic and clinical factors with functional dependency in the elderly study population. The model indicates that the likelihood of functional dependency increases with age. Additionally, elderly individuals with a history of alcoholism are significantly more likely to experience functional dependency, highlighting the potential long-term impact of alcohol consumption on health and functional status. Similarly, hearing loss remains a strong predictor of functional dependency. Employment status is not directly associated with functional dependency; however, its interaction with other variables in the model is important and warrants further analysis.

**Table 5. Logistic Regression Model for Functional Dependency in the Elderly Study Population.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variables | B | OR | CI 95% | P value |
| Age | 0.157 | 1.170 | 1.029-1.329 | 0.016 |
| History of alcoholism (1) | 2.359 | 10.576 | 1.340-83.491 | 0.025 |
| Hearing loss (1) | 2.255 | 9.536 | 1.282-70.923 | 0.028 |
| Employment (1) | 2.274 | 9.722 | 0.780-121.136 | 0.077 |
| Constant | -14.044 | 0.000 |  | 0.010 |

Source: Prepared by the authors using data from the data base. Data variables in the model: age (numeric), History of alcoholism: presence= 1. absence= 0. Hearing loss: presence= 1. absence= 0. Employment: presence= 1. absence= 0.

**3.7 Discussion.**

This study provides a comprehensive analysis of the demographic, socioeconomic, and health characteristics of an elderly population, highlighting key gender differences, functional impairments, and the burden of multimorbidity. The findings underscore critical public health concerns and the need for targeted interventions to improve well-being in this population.

**3.6.1 Demographic and Socioeconomic Disparities**

The higher proportion of females in the study reflects global demographic trends, where females typically have a longer life expectancy than men (Baum et al. 2021). Marital status also differed by sex where males were more likely to be married, and females were predominantly widowed. These differences reflect known demographic patterns, where older females have a higher likelihood of widowhood. This pattern can be attributed to higher male mortality rates and traditional age differences in marriage, where males often marry younger partners (Baum et al. 2021, Jia & Lubetkin 2020). Furthermore, socioeconomic disparities were notable, particularly regarding education and income levels. Males were more likely to have completed higher education and belonged to higher socioeconomic strata, whereas females were overrepresented in lower economic levels. Hence, this gender gap in education and economic status highlights historical inequalities that may influence access to healthcare, resources and opportunities, financial independence, and overall quality of life (Malmusi et al. 2014, Azad et al. 2020, Abdulkadri et al. 2022), which can influence their vulnerability.

**3.6.2 Functional Impairment and Independence in Basic and Instrumental Activities of Daily Living**

The study found that while most participants maintained mild functional impairment, moderate to severe disability was more prevalent in females, whereas males demonstrated higher levels of independence across most ADLs. This aligns with previous findings suggesting that females experience greater disability in later life due to increased longevity, higher rates of musculoskeletal disorders, and a greater burden of chronic conditions (Mudrick 1988, Leveille et al. 2000, Wu et al. 2020, Takele et al. 2024). Despite high levels of independence in basic ADLs, nearly 20% of the population experienced partial or total incontinence, which is a common issue among older adults. In contrast, independence in more complex instrumental activities was significantly lower, with fewer than 40% achieving full independence. This indicates that while basic self-care abilities are largely maintained, tasks requiring greater cognitive and physical effort present significant challenges. Furthermore, these findings highlight the need for early functional assessments and targeted interventions to support autonomy in ageing populations (CFCOA et al. 2016, Culberson et al. 2023, Maresova et al. 2023). Notably, the observed differences in functional impairment for performing BIADL suggest the need for support and training strategies that strengthen autonomy and self-management during the aging process, particularly for older women, and for activities that improve the performance of basic and complex daily tasks.

**3.6.3 Chronic Diseases and Lifestyle Factors**

From a clinical perspective, the high prevalence of chronic diseases reinforces the importance of prevention programmes and the control of cardiovascular risk factors (which has been discussed since the 1980s [Zimmet et al. 1986, Yu et al. 2018, Soltani et al. 2021]). The high prevalence of cardiovascular and metabolic conditions is a significant public health concern (Rus et al. 2023). Hypertension, Type 2 Diabetes, and Overweight/Obesity were among the most common conditions, highlighting the urgent need for effective preventive strategies. Likewise, sedentary behaviour, identified in more than half of the study population, represents a modifiable risk factor that can be addressed through interventions aimed at promoting physical activity (Lavie et al. 2019). In addition, urinary incontinence, emerges as a factor that significantly affects life quality and requires specific clinical attention. Therefore, the significant history of smoking and alcohol use among participants further emphasises the importance of early behavioural interventions to mitigate long-term health risks. Despite 83.6% of participants reporting healthy eating habits, the high burden of metabolic disorders suggests potential gaps in dietary quality or other contributing lifestyle factors. Thus, these findings call for targeted lifestyle interventions, including physical activity promotion and dietary education, to reduce disease burden and improve overall health outcomes.

Above all, the study highlights the substantial impact of musculoskeletal conditions on this population, with knee osteoarthritis and osteoporosis being prevalent. These conditions are major contributors to disability and reduced mobility in older adults, needing proactive management strategies such as physiotherapy, pain management, and fall prevention programmes. Moreover, chronic musculoskeletal (MSK) pain is a major contributor to disability and functional impairment in elderly population, imposing significant personal and societal burdens (Adogwa et al. 2023).

Similarly, sensory impairments, including hearing loss, cataracts, and glaucoma, were also notable, reinforcing the importance of routine screening and timely interventions in order to preserve functional capacity and quality of life (Zhou & Wu 2023). In the same way, mental health disorders, including depression and anxiety-related conditions, were identified, though the true prevalence may be underestimated due to underdiagnosis or stigma associated with mental health issues in older populations.

Accordingly, it is well established that functional disability is common in older adults, often episodic, and associated with a heightened risk of subsequent health decline (Colón-Emeric et al. 2013). The severity of disability is determined by physical impairments caused by underlying medical conditions, external factors such as social and financial support and environmental influences (Colón-Emeric et al. 2013). When several health conditions coexist, they often intensify disability beyond what would be anticipated from each condition alone, as the capacity to compensate for one impairment is reduced by the presence of others. However, in our study population the multivariant models identified age, history of alcohol consumption, and hearing loss as a significant risk factors for functional impairment. Therefore, as age increases, so does the likelihood of functional independence decline. Moreover, a history of alcoholism and hearing loss increases the likelihood of functional impairment by 10 and 9 times, respectively, compared to individuals without these conditions. This is consistent with the understanding that aging is a primary risk factor for functional impairment (Castellanos-Perilla et al. 2020, Hajek et al. 2017a), highlighting the need for targeted interventions in older populations. However, these findings contrast with those reported by other authors. Castellanos et al., reported that factors such as financial status, educational level, pain, and the number of comorbidities were associated to the occurrence of a decline in functional status in Mexican population (Castellanos-Perilla et al. 2020). However, in German population, the functional impairment increased significantly with ageing (similar to our data), loss of a spouse, not living alone in a private household, depression and dementia (Hajek et al. 2017a), being female, higher age, low education (compared to high education), income poverty, higher cognitive impairment, and a higher number of chronic conditions (Hajek & König 2022). In contrast to our findings, we did not observe an association among functional impairment and depression, dementia, socioeconomic status, or educational level. Therefore, our findings between the health-related factors (depression, and chronic conditions) and functional impairment are not in accordance with existing studies (McCusker et al. 2002, Ryan et al. 2015, Hajek et al. 2017b, Hajek & König 2022). However, regarding other variables, we did not include all the variables that have been associated with functional impairment in other studies.

**3.6 Implications and Future Directions**

Future research should investigate the long-term impact of factors associated with functional impairment and assess the effectiveness of targeted interventions in order to promote healthy ageing. Additionally, it should emphasise the evaluation of interventions aimed at enhancing functional independence and improving life quality in older adults, adopting an approach that considers both clinical aspects and the social determinants of health, while addressing gender differences and prevalent health conditions within this population.

**3.7 Limitations and applications.**

A descriptive, cross-sectional and prolective study with an analytical approach can establish an epidemiological association but cannot be used to establish cause-and-effect relationships (Lopez-Hernandez et al. 2024a). Additionally, to minimise the information and selection bias due to the subjective nature and non-random selection process of the intentional sampling, a healthcare professional conducted all the assessments of functional impairment. This professional underwent training to ensure standardisation and reliability in test administration and scoring. However, this method involved selecting individuals who either self-reported functional impairment or whose caregivers or clinicians reported functional issues. Therefore, the participants who did not report functional impairment or who were less engaged with healthcare services may have been underrepresented, potentially affecting the findings to be extrapolated to the broader population of the elderly population (Rueda-De-La-Rosa et al. 2024). Despite these limitations, the study was able to establish an epidemiological association between various sociodemographic and clinical factors and functional impairment through univariate logistic regression models. Additionally, it determined the prevalence of functional impairment in the study population and characterised their sociodemographic and clinical conditions.

4. Conclusion.

This study underscores the need to address gender inequalities and the implement comprehensive health programmes that support active and healthy ageing, with policies focusing on physical activity, lifelong learning, and psychosocial support, as well as strengthening support networks, which enhance autonomy and quality of life for the elderly population.

DISCLAIMER.

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

Consent.

A medical professional informed all participants about the study's objective, its benefits, and potential adverse events. Thus, after providing a clear explanation, the signatures collection of those who voluntarily decided to participate in the study, and to ensure that participants had sufficient time to read and sign the corresponding informed consent form.

Ethical approval.

The protocol was approved by two committees: The Research Committee and the Ethics Committee in Research of the FMC "División del Norte", ISSSTE. The Data was treated confidentially.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1.

2.

3.

References

1. Abdulkadri, A., John-Aloye, S., Mkrtchyan, I., Gonzales, C., Johnson, S., & Floyd, F. (2022) Addressing gender disparities in education and employment: a necessary step for achieving sustainable development in the Caribbean, Studies and Perspectives series-ECLAC Subregional Headquarters for the Caribbean, No. 109 (LC/TS.2022/114, LC/CAR/TS.2022/3), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2022.
2. Adogwa, O., Reid, M. C., Chilakapati, S., & Makris, U. E. (2023). Clin-STAR corner: 2021 update in musculoskeletal pain in older adults with a focus on osteoarthritis-related pain. Journal of the American Geriatrics Society, 71(8), 2373–2380. <https://doi.org/10.1111/jgs.18369>
3. Arik, G., Varan, H. D., Yavuz, B. B., Karabulut, E., Kara, O., Kilic, M. K., et al. (2015). Validation of Katz index of independence in activities of daily living in Turkish older adults. Archives of gerontology and geriatrics, 61(3), 344–350. <https://doi.org/10.1016/j.archger.2015.08.019>
4. Azad, A. D., Charles, A. G., Ding, Q., Trickey, A. W., & Wren, S. M. (2020). The gender gap and healthcare: associations between gender roles and factors affecting healthcare access in Central Malawi, June-August 2017. Archives of public health = Archives belges de sante publique, 78(1), 119. <https://doi.org/10.1186/s13690-020-00497-w>
5. Baum, F., Musolino, C., Gesesew, H. A., & Popay, J. (2021). New Perspective on Why Women Live Longer Than Men: An Exploration of Power, Gender, Social Determinants, and Capitals. International journal of environmental research and public health, 18(2), 661. <https://doi.org/10.3390/ijerph18020661>
6. Bouwstra, H., Smit, E. B., Wattel, E. M., van der Wouden, J. C., Hertogh, C. M. P. M., Terluin, B., et al. (2019). Measurement Properties of the Barthel Index in Geriatric Rehabilitation. Journal of the American Medical Directors Association, 20(4), 420–425.e1. <https://doi.org/10.1016/j.jamda.2018.09.033>
7. Castellanos-Perilla, N., Borda, M. G., Fernández-Quilez, Á., Aarsland, V., Soennesyn, H., & Cano-Gutiérrez, C. A. (2020). Factors associated with functional loss among community-dwelling Mexican older adults. Factores asociados con el deterioro funcional en adultos mayores mexicanos. Biomedica : revista del Instituto Nacional de Salud, 40(3), 546–556. <https://doi.org/10.7705/biomedica.5380>
8. Colita, E., Mateescu, V. O., Olaru, D. G., & Popa-Wagner, A. (2024). Cognitive Decline in Ageing and Disease: Risk factors, Genetics and Treatments. Current health sciences journal, 50(2), 170–180. <https://doi.org/10.12865/CHSJ.50.02.02>
9. Collin, C., Wade, D. T., Davies, S., & Horne, V. (1988). The Barthel ADL Index: a reliability study. International disability studies, 10(2), 61–63. <https://doi.org/10.3109/09638288809164103>
10. Colón-Emeric, C. S., Whitson, H. E., Pavon, J., & Hoenig, H. (2013). Functional decline in older adults. American family physician, 88(6), 388–394.
11. Committee on Family Caregiving for Older Adults; Board on Health Care Services; Health and Medicine Division; National Academies of Sciences, Engineering, and Medicine; Schulz R, Eden J, editors. Families Caring for an Aging America. Washington (DC): National Academies Press (US); 2016 Nov 8. 3, Family Caregiving Roles and Impacts. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK396398/>
12. Culberson, J. W., Kopel, J., Sehar, U., & Reddy, P. H. (2023). Urgent needs of caregiving in ageing populations with Alzheimer’s disease and other chronic conditions: Support our loved ones. Ageing Research Reviews, 90, 102001. <https://doi.org/10.1016/j.arr.2023.102001>
13. de Haan, R., Limburg, M., Schuling, J., Broeshart, J., Jonkers, L., & van Zuylen, P. (1993). Klinimetrische evaluatie van de Barthel-index, een maat voor beperkingen in het dagelijks functioneren [Clinimetric evaluation of the Barthel Index, a measure of limitations in dailly activities]. Nederlands tijdschrift voor geneeskunde, 137(18), 917–921.
14. Erazo, M., Fors, M., Mullo, S., González, P., & Viada, C. (2020). Internal Consistency of Yesavage Geriatric Depression Scale (GDS 15-Item Version) in Ecuadorian Older Adults. Inquiry : a journal of medical care organization, provision and financing, 57, 46958020971184. <https://doi.org/10.1177/0046958020971184>
15. Falck, R.S., Percival, A.G., Tai, D. & Davis, J.C. (2022). International depiction of the cost of functional independence limitations among older adults living in the community: a systematic review and cost-of-impairment study. BMC Geriatr 22, 815 <https://doi.org/10.1186/s12877-022-03466-w>
16. Fong J. H. (2019). Disability incidence and functional decline among older adults with major chronic diseases. BMC geriatrics, 19(1), 323. <https://doi.org/10.1186/s12877-019-1348-z>
17. Guo HJ, Sapra A. Instrumental Activity of Daily Living. [Updated 2022 Nov 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK553126/>
18. Hajek, A., Luck, T., Brettschneider, C., Posselt, T., Lange, C., Wiese, B., et al. (2017a). Factors affecting functional impairment among elderly Germans — Results of a longitudinal study. The Journal of Nutrition, Health and Aging, 21(3), 299-306. <https://doi.org/10.1007/s12603-016-0771-5>
19. Hajek, A., Brettschneider, C., Eisele, M., Lühmann, D., Mamone, S., Wiese, B., et al. (2017b). Disentangling the complex relation of disability and depressive symptoms in old age - findings of a multicenter prospective cohort study in Germany. International psychogeriatrics, 29(6), 885–895. https://doi.org/10.1017/S1041610216002507
20. Hajek, A., & König, H. H. (2022). What factors are associated with functional impairment among the oldest old?. Frontiers in medicine, 9, 1092775. <https://doi.org/10.3389/fmed.2022.1092775>
21. Hofmann, A., Khalid, A., Mao, Y. H., Al-Nakeeb, S., Obi, I., Essem, J., et al. (2020). Prescribing cascade in mental health: The older person at risk. Progress in Neurology and Psychiatry, 24(2), 17-20. <https://doi.org/10.1002/pnp.665>
22. Hong, A., Welch-Stockton, J., Kim, J. Y., Canham, S. L., Greer, V., & Sorweid, M. (2023). Age-Friendly Community Interventions for Health and Social Outcomes: A Scoping Review. International journal of environmental research and public health, 20(3), 2554. <https://doi.org/10.3390/ijerph20032554>
23. Huang, Z., Lai, E. T., Luo, Y., & Woo, J. (2024). Social determinants of intrinsic capacity: A systematic review of observational studies. Ageing Research Reviews, 95, 102239. https://doi.org/10.1016/j.arr.2024.102239
24. Hwang, E.J. (2022). Analysis of factors associated with subjective mild cognitive impairment (MCI) among older adults resident in the community. Int J Environ Res Public Health, 19(16):10387. doi: 10.3390/ijerph191610387
25. Jia, H., & Lubetkin, E. I. (2020). Life expectancy and active life expectancy by marital status among older U.S. adults: Results from the U.S. Medicare Health Outcome Survey (HOS). SSM - population health, 12, 100642. <https://doi.org/10.1016/j.ssmph.2020.100642>
26. Jia, L., Du, Y., Chu, L., Zhang, Z., Li, F., Lyu, D., et al. (2020). Prevalence, risk factors, and management of dementia and mild cognitive impairment in adults aged 60 years or older in China: a cross-sectional study. The Lancet. Public health, 5(12), e661–e671. <https://doi.org/10.1016/S2468-2667(20)30185-7>
27. Katz, S., Downs, T. D., Cash, H. R., & Grotz, R. C. (1970). Progress in development of the index of ADL. The Gerontologist, 10(1), 20–30. <https://doi.org/10.1093/geront/10.1_part_1.20>
28. Leveille, S. G., Penninx, B. W., Melzer, D., Izmirlian, G., & Guralnik, J. M. (2000). Sex differences in the prevalence of mobility disability in old age: the dynamics of incidence, recovery, and mortality. The journals of gerontology. Series B, Psychological sciences and social sciences, 55(1), S41–S50. <https://doi.org/10.1093/geronb/55.1.s41>
29. Lopez-Hernandez, D., Brito-Aranda, L., Flores-Morales, G.J., Ham-Olvera, M.C., Beltran-Lagunes, L., Vazquez-Sanchez, A., et al. (2024a). Health Status and Demographic Characteristics of Patients Attending a Primary Care Unit in Mexico City: A Descriptive Study. Current Journalof Applied Science and Technology 43 (12):12-26. <https://doi.org/10.9734/cjast/2024/v43i124455>
30. Lopez-Hernandez, D., Beltran-Lagunes, L., Soto-de-la-Cruz, P., Brito-Aranda, L., Pavon-Delgado, E., Castro-Diaz, A.M., et al. (2024b). Associated Factors of Polypharmacy Among Elderly Patients Attended at Primary Care Setting. Current Journal of Applied Science and Technology 43 (8):73-87. <https://doi.org/10.9734/cjast/2024/v43i84423>
31. Majoka, M. A., & Schimming, C. (2021). Effect of Social Determinants of Health on Cognition and Risk of Alzheimer Disease and Related Dementias. Clinical Therapeutics, 43(6), 922-929. <https://doi.org/10.1016/j.clinthera.2021.05.005>
32. Malmusi, D., Vives, A., Benach, J., & Borrell, C. (2014). Gender inequalities in health: exploring the contribution of living conditions in the intersection of social class. Global health action, 7, 23189. <https://doi.org/10.3402/gha.v7.23189>
33. Maresova, P., Krejcar, O., Maskuriy, R., Abu Bakar, N. A., Selamat, A., Truhlarova, Z., et al. (2023). Challenges and opportunity in mobility among older adults – key determinant identification. BMC Geriatrics, 23, 447. <https://doi.org/10.1186/s12877-023-04106-7>
34. McCusker, J., Kakuma, R., & Abrahamowicz, M. (2002). Predictors of functional decline in hospitalized elderly patients: a systematic review. The journals of gerontology. Series A, Biological sciences and medical sciences, 57(9), M569–M577. <https://doi.org/10.1093/gerona/57.9.m569>
35. Moreno-Martin, P., Minobes-Molina, E., Carbó-Cardeña, A., Masó-Aguado, M., Solé-Casals, M., Torrents-Solé, M., et al. (2024). Exploring Early, Middle, and Late Loss in Basic Activities of Daily Living among Nursing Home Residents: A Multicenter Observational Study. Healthcare, 12(8), 810. <https://doi.org/10.3390/healthcare12080810>
36. Mudrick N. R. (1988). Predictors of disability among midlife men and women: differences by severity of impairment. Journal of community health, 13(2), 70–84. <https://doi.org/10.1007/BF01364202>
37. Muramatsu, N., Yin, H., & Hedeker, D. (2010). Functional declines, social support, and mental health in the elderly: does living in a state supportive of home and community-based services make a difference?. Social science & medicine (1982), 70(7), 1050–1058. <https://doi.org/10.1016/j.socscimed.2009.12.005>
38. Rathnayake, N., Karunadasa, R., Abeygunasekara, T., De Zoysa, W., Palangasinghe, D., & Lekamwasam, S. (2023). Katz index of activities of daily living in assessing functional status of older people: Reliability and validity of Sinhala version. Dialogues in health, 2, 100134. <https://doi.org/10.1016/j.dialog.2023.100134>
39. Rebok, G. W., Gellert, A., Coe, N. B., Clay, O. J., Wallace, G., Parisi, J. M., et al. (2023). Effects of Cognitive Training on Alzheimer's Disease and Related Dementias: The Moderating Role of Social Determinants of Health. Journal of aging and health, 35(9\_suppl), 40S–50S. <https://doi.org/10.1177/08982643231203755>
40. Reynolds, C. F., 3rd, Jeste, D. V., Sachdev, P. S., & Blazer, D. G. (2022). Mental health care for older adults: recent advances and new directions in clinical practice and research. World psychiatry : official journal of the World Psychiatric Association (WPA), 21(3), 336–363. <https://doi.org/10.1002/wps.20996>
41. Rueda-De-la-Rosa, M.R., Lopez-Hernandez, D., Herrera-Cruz, M., Martinez-Meraz, M., Pavon-Delgado, E., Velez-Resendiz, J.M., et al. (2024). Investigating the Prevalence and Determinants of Mild Cognitive Impairment in the Elderly Population at Primary Care Facilities. Current Journal of Applied Science and Technology 43 (9):7-19. <https://doi.org/10.9734/cjast/2024/v43i94426>.
42. Rus, M., Crisan, S., Andronie-Cioara, F. L., Indries, M., Marian, P., Pobirci, O. L., & Ardelean, A. I. (2023). Prevalence and Risk Factors of Metabolic Syndrome: A Prospective Study on Cardiovascular Health. Medicina (Kaunas, Lithuania), 59(10), 1711. <https://doi.org/10.3390/medicina59101711>
43. Ryan, A., Wallace, E., O'Hara, P., & Smith, S. M. (2015). Multimorbidity and functional decline in community-dwelling adults: a systematic review. Health and quality of life outcomes, 13, 168. <https://doi.org/10.1186/s12955-015-0355-9>
44. Santamaria-Garcia, H., Moguilner, S., Rodriguez-Villagra, O.A., Botero-Rodriguez, F., Pina-Escudero, S.D., O’Donovan, G. et al. The impacts of social determinants of health and cardiometabolic factors on cognitive and functional aging in Colombian underserved populations. GeroScience 45, 2405–2423 (2023). https://doi.org/10.1007/s11357-023-00755-z
45. Schulz, R., & Sherwood, P. R. (2008). Physical and mental health effects of family caregiving. The American journal of nursing, 108(9 Suppl), 23–27. <https://doi.org/10.1097/01.NAJ.0000336406.45248.4c>
46. Soltani, S., Saraf-Bank, S., Basirat, R., Salehi-Abargouei, A., Mohammadifard, N., Sadeghi, M., et al. (2021). Community-based cardiovascular disease prevention programmes and cardiovascular risk factors: a systematic review and meta-analysis. Public health, 200, 59–70. <https://doi.org/10.1016/j.puhe.2021.09.006>
47. Successful Aging after Elective Surgery Functional Measures Working Group, Fong, T. G., Gleason, L. J., Wong, B., Habtemariam, D., Jones, R. N., et al. (2015). Cognitive and Physical Demands of Activities of Daily Living in Older Adults: Validation of Expert Panel Ratings. PM & R : the journal of injury, function, and rehabilitation, 7(7), 727–735. <https://doi.org/10.1016/j.pmrj.2015.01.018>
48. Takele, M.D., Eriku, G.A., Merawie, D.M. Zinabu, F.S., Fentanew, M., Belay, G.J., et al. (2024). Functional disability and its associated factors among community- dweller older adults living in Gondar Town, Ethiopia: a community-based cross-sectional study. BMC Public Health 24, 647. <https://doi.org/10.1186/s12889-024-18110-y>
49. Tan, V., Chen, C., & Merchant, R. A. (2022). Association of social determinants of health with frailty, cognitive impairment, and self-rated health among older adults. PLOS ONE, 17(11), e0277290. <https://doi.org/10.1371/journal.pone.0277290>
50. Torres-de-Araújo, J.R., Tomaz-de-Lima, R.R., Ferreira-Bendassolli, I.M., & Costa-de Lima, Kenio. (2018). Functional, nutritional and social factors associated with mobility limitations in the elderly: a systematic review. Salud Pública de México, 60(5), 579-585. <https://doi.org/10.21149/9075>
51. Wei, L., & Hodgson, C. (2023). Clinimetrics: The Lawton-Brody Instrumental Activities of Daily Living Scale. Journal of physiotherapy, 69(1), 57. <https://doi.org/10.1016/j.jphys.2022.06.007>
52. Wu, A., March, L., Zheng, X., Huang, J., Wang, X., Zhao, J., et al. (2020). Global low back pain prevalence and years lived with disability from 1990 to 2017: estimates from the Global Burden of Disease Study 2017. Annals of translational medicine, 8(6), 299. <https://doi.org/10.21037/atm.2020.02.175>
53. Yesavage, J. A., Brink, T. L., Rose, T. L., Lum, O., Huang, V., Adey, M., et al. (1982). Development and validation of a geriatric depression screening scale: a preliminary report. Journal of psychiatric research, 17(1), 37–49. <https://doi.org/10.1016/0022-3956(82)90033-4>
54. Yu, E., Malik, V. S., & Hu, F. B. (2018). Cardiovascular Disease Prevention by Diet Modification: JACC Health Promotion Series. Journal of the American College of Cardiology, 72(8), 914–926. <https://doi.org/10.1016/j.jacc.2018.02.085>
55. Zhao, B., Liu, Z., Fu, Y., Zhang, H., Wu, J., Lai, C., et al. (2024). Social Determinants of Intrinsic Capacity: A National Cohort Study. American journal of preventive medicine, 66(3), 559–567. <https://doi.org/10.1016/j.amepre.2023.10.008>
56. Zhou, X., & Wu, H. (2023). The impact of sensory impairments and eye diseases on cognitive function in elderly Chinese: The mediating effects of social participation. Journal of global health, 13, 04068. <https://doi.org/10.7189/jogh.13.04068>
57. Zimmet, P. Z., King, H. O., & Björntorp, S. P. (1986). Obesity, hypertension, carbohydrate disorders and the risk of chronic diseases. Is there any epidemiological evidence for integrated prevention programmes?. The Medical journal of Australia, 145(6), 256–262. <https://doi.org/10.5694/j.1326-5377.1986.tb101119.x>