

## Original Research Article

# Geriatric assessment as indispensable tool for physicians, what does the future hold?

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### ABSTRACT

**Background:** Despite the notable rise in the elderly population in Mexico, it is imperative to acknowledge and address geriatric syndromes. The employment of geriatric assessment is essential, as it offers a comprehensive evaluation of elderly patients.

**Methods:** A cross-sectional analysis was carried out on hospitalized patients over the age of 65, who underwent geriatric assessment performed by a multidisciplinary team comprising of a geriatrician, nurse, nutritionist, and internist. Descriptive statistics, such as frequency distribution, percentage, mean, median, and standard deviation of geriatric syndromes were obtained.

**Results:** Polypharmacy was identified as the primary geriatric syndrome, with a higher prevalence among males (54.3%), followed by functional impairment, with a slightly higher occurrence in males (52.5%). Among the identified geriatric syndromes, frailty, anxiety, pressure ulcers, incontinence, abuse, and caregiver collapse showed no gender preference. The majority of patients were at risk of malnutrition, as determined by the mini nutritional assessment.

**Conclusions:** The geriatric assessment is a valuable tool in detecting diseases in elderly patients and facilitating alterations to their treatment plans, particularly during hospitalization. However, accurate assessment of this population requires a multidisciplinary team, as it helps prevent geriatric syndromes such as polypharmacy, functional impairment, and malnutrition, which can adversely affect the elderly's quality of life.

**Keywords:** Geriatric assessment, Geriatric syndromes, Functional impairment, Polypharmacy

### INTRODUCTION

The significant surge in the elderly population in recent years necessitates the enhancement of primary care physicians' capacity to identify and address geriatric syndromes. The implementation of geriatric evaluation and management programs has been shown to minimize disability, hospitalization, nursing home placement, and delay death.<sup>1</sup> The geriatric assessment is a vital tool that provides a comprehensive evaluation of elderly patients, addressing their functional status, psychosocial issues,

and environmental concerns. This assessment aids in the timely identification of problems in one or more of these areas, enabling the implementation of appropriate treatment, thereby reducing delayed hospital discharges and recurrent admissions. The physical function assessment is a critical component of geriatric evaluation, as it determines the need for rehabilitation and contributes to discharge planning. The psychological assessment is equally crucial, allowing physicians to identify prevalent conditions in the elderly, such as depression, anxiety, psychosis, and confusion. The social

and environmental assessment provides physicians with an understanding of the patient's social support, including family and related persons, which is essential for successful management.<sup>2</sup> The geriatric assessment remains as gold standard for evaluating and managing older patients, incorporating validated scales that analyze the main geriatric domains, including functional status, social support, comorbidities, nutritional status, polypharmacy, cognition, and mood.<sup>3</sup>

Polypharmacy, a term used to describe the prescription of five or more medications, poses a significant risk to older adults, including adverse drug reactions, impaired cognition, falls, and functional decline. The beers, STOPP (screening tool of older persons' prescriptions), and START (screening tool to alert doctors to right treatment) criteria are reliable tools that help identify possible harmful medical interactions.<sup>4</sup>

Frailty, defined as an increased risk of developing disability and fractures, can be categorized into physical frailty, multimorbidity, and psychosocial frailty. The FRAIL scale, comprising five questions, can be used to measure frailty. A positive response to one or two questions indicates prefrailty, while three or more positive responses indicate frailty. This tool can help identify individuals at risk of frailty and facilitate early intervention to prevent disability and fractures.<sup>5</sup> This scale is validated to Mexican people.<sup>6</sup> The Ensrud scale is another useful tool for identifying frailty. A positive response to one question indicates a prefrail patient, while two or three positive responses indicate a frail patient. This scale provides a quick and reliable way to identify individuals at risk of frailty, enabling early intervention to prevent adverse outcomes.<sup>7</sup>

The use of validated scales, such as the FRAIL and SARC-F scales, can help identify conditions such as frailty and sarcopenia in elderly patients. The FRAIL scale demonstrates good sensitivity and specificity in identifying frailty, while the SARC-F scale is effective in identifying sarcopenia. These tools can assist healthcare professionals in early detection and management of these conditions, potentially improving patient outcomes.<sup>8</sup> The SARC-F scale is a useful tool for identifying individuals with sarcopenia or those at risk of developing it. The scale assesses several factors such as strength, assistance, ability to rise, climb stairs, and falls. Scores above 4 on this scale indicate the presence of sarcopenia. Early identification using the SARC-F scale can help healthcare professionals implement targeted interventions to improve muscle function and prevent further functional decline in older adults.<sup>9</sup>

Cognitive impairment can be assessed using various questionnaires such as the Saint Louis University Mental Status Test (SLUMS), Montreal Cognitive Assessment (MoCA), and Mini-Mental Assessment (MMA). These tools can detect both mild cognitive impairment and dementia, enabling recognition of the severity of

cognitive impairment.<sup>10</sup> The impact of cognitive impairment on elderly individuals affects several domains, particularly the ability to manage treatment regimens and disease control. The Montreal Cognitive Assessment (MoCA) is a widely used tool to assess cognitive impairment in older adults, covering various cognitive domains such as memory, visuospatial skills, executive function, attention, language, and orientation. This scale demonstrates good sensitivity in detecting mild cognitive impairment, particularly in the elderly population, where a score of 24 or below is considered significant.<sup>11</sup>

Delirium is a condition that is characterized by a reduction in awareness, decreased ability to focus, distractibility, and changes in cognition that can develop over a period of hours to days. Clinical diagnosis can be made using the CAM criteria, which consists of four criteria. According to this scale, the presence of three or more of these criteria is considered as delirium.<sup>12</sup>

Depression is a mood disorder that can significantly impact daily life, characterized by feelings of sadness, loss, anger, or frustration. The Geriatric Depression Scale (GDS) is used to diagnose depression, which affects 5% to 10% of the elderly population worldwide. Scores on the GDS range from 0 to 15, with scores between 0 and 5 considered normal, scores between 6 and 9 indicating mild depression, and scores over 10 indicating depression.<sup>13</sup>

Anxiety is a disorder characterized by a state of alertness in response to perceived danger. The identification of anxiety can be achieved through the use of the self-administered beck anxiety inventory, which consists of 21 multiple choice questions. The items in the questionnaire pertain to a range of symptoms including depressive symptoms such as hopelessness and irritability, cognitive symptoms such as guilt, and physical symptoms such as fatigue and loss of appetite. The scale scores between 0 and 63, with scores between 0 to 21 indicating very low anxiety, scores between 22 to 35 indicating moderate anxiety, and scores over 36 indicating severe anxiety.<sup>14</sup>

In the context of fall prevention, the World Health Organization (WHO) defines a fall as any event that causes an individual to unintentionally come to rest on the ground, floor or other lower level. Fall syndrome, on the other hand, is characterized by the occurrence of three or more falls within a year or two or more falls within the last six months, which happen suddenly and involuntarily, and may result in secondary injury.<sup>15</sup>

The Katz index is used to evaluate the independence of elderly patients in performing basic activities of daily living (BADL), while the Lawton and Brody scale assesses their ability to perform instrumental activities of daily living (IADL). The Katz index scores patients from "A" to "G", with lower scores indicating greater

independence in functions such as washing, dressing, using the toilet, and mobilization. Conversely, a score of "G" indicates complete dependence on others for all functions. These scales are useful tools for assessing the functionality of elderly patients.<sup>16</sup> The Lawton and Brody scale is a tool utilized to evaluate the physical autonomy and instrumental activities of daily living (IADL) in both institutionalized and non-institutionalized elderly populations. This scale is considered as one of the most commonly used measurement instruments for assessing IADL, and it includes 8 items that evaluate functional capacity. The final score is determined by summing up the value of all the answers, which ranges between 0 indicating maximum dependence and 8 representing total independence.<sup>17</sup> The Barthel scale is a tool used to evaluate the functionality of basic activities of daily living (BADL). Each patient is assigned a score based on their level of dependence to carry out a series of basic activities, with scores ranging from 0 to 100. A lower score indicates limitations in daily routine activities.<sup>18</sup>

The immobility syndrome refers to a condition characterized by impaired motor functions that lead to a decreased ability to perform activities of daily living. This condition is associated with reduced tolerance for physical activity, muscle weakness, and, in severe cases, loss of automatisms and postural reflexes. Additionally, acute immobility is defined as a rapid decline in motor functions, which may result in a state of absolute immobility, requiring bed rest and/or minimal postural variability within a period of 72 hours.<sup>19</sup>

Pressure ulcers are a type of skin lesion that occur due to ischemia in the skin and underlying tissues caused by sustained pressure. The Braden scale is used to identify the risk of developing pressure ulcers in patients with impaired mobility. Scores below 13 indicate a high risk of developing pressure ulcers, while scores between 13 and 14 indicate moderate risk, and scores over 15 indicate low risk.<sup>20</sup>

Urinary incontinence is a condition characterized by the involuntary loss of urine from the bladder through the urethra or fistulas that connect to the urinary tract. Its etiology is multifactorial, and it involves physical, cognitive, functional, and psychosocial factors. Urinary incontinence presents in various types, including stress, urge, mixed, overflow, neurogenic, functional, iatrogenic, or idiopathic incontinence.<sup>21</sup> Elder abuse is characterized by repeated acts that cause harm or suffering to older individuals, or the failure to take appropriate measures to prevent harm. Early recognition of this condition is crucial, as it can have a significant negative impact on the clinical outcomes of affected patients.<sup>22</sup>

The caregiver collapse is a term used to describe the negative effects that arise from the care of an older adult, typically a family member, who suffers from a medical condition. This situation can have adverse impacts on the physical, emotional, social, spiritual, or financial well-

being of the caregiver. The Zarit scale is a tool that can be used to identify caregiver collapse. This scale ranges from 7 to 35, and scores below 16 indicate no caregiver overload, while scores above 17 indicate intense overload. It is crucial to recognize and address caregiver collapse to provide appropriate support and minimize its negative impact on the caregiver's health and well-being.<sup>23</sup>

The nutritional assessment of older adults includes weight loss as a major indicator of the risk for hospitalization and mortality. While anorexia is not well recognized as a risk factor for weight loss, sarcopenia, and cachexia due to their physiological and pathological components.

Older adults who experience unintentional weight loss of 5% or more of their body weight in six months or have a low Body Mass Index (BMI) require further evaluation for poor nutrition. Several scales can identify malnutrition in older adults, such as the mini nutritional assessment (MNA), which provides a rapid assessment of nutritional status in outpatient clinics, hospitals, and nursing homes. Scores over 24 indicate satisfactory nutritional status, scores between 17 to 23.5 indicate a risk of malnutrition, and scores below 17 indicate malnutrition.<sup>24,25</sup> Aim of study was to ascertain the incidence of geriatric syndromes among patients admitted to the hospital between October 2021 and October 2022, utilizing the geriatric assessment.

## METHODS

A cross-sectional analysis was carried out on geriatric patients aged 65 years and above, who were hospitalized in the Hospital de Especialidades CMN La Raza Antonio Fraga Mouret from October 2021 to October 2022 including 252 patients with 117 females and 135 males. The assessment of patients was conducted by a multidisciplinary team consisting of a geriatrician, nurse, nutritionist, and internist. The geriatric assessment was used as a tool to evaluate the impact of geriatric syndromes on patients, with the aim of implementing targeted interventions.

We include patients who meet geriatric syndromes including polypharmacy (defined as the prescription and intake of at least 5 drugs), frailty (defined as a FRAIL score of 3 or above), sarcopenia (defined as a SARC-F score of 4 or above), mild cognitive impairment (defined as a MoCA score of 25 or below), delirium (defined according to CAM criteria with 3 or 4 questions answered), depression (defined as a Geriatric Depression Scale score of 6 or above), anxiety (defined as a Beck score of 21 or above), falls (defined as at least 2 episodes during six months or 3 episodes in a year), functional impairment (defined by low scores on the Lawton and Brody, Katz F and G, and/or Barthel scales of 60 or below), immobility (defined as clinical evidence of immobility and bed stay for 3 or above), pressure ulcers

(defined as the evidence of skin lesion in pressure areas during hospitalizations or complicated during the instance, plus a high Braden Risk defined as scores of 13 or below), urinary incontinence (defined as an involuntary urinary output from bladder or any fistula connected to the bladder), abuse (defined as the physical or psychological evidence of abuse during or previous hospitalization), caregiver collapse (defined as Zarit scores of 47 or above), and malnutrition risk (defined as an MNA score of 17 or below). We exclude patients who do not meet any of the previously mentioned definitions from our study cohort.

Descriptive statistics, including averages, frequency distribution, percentage, mean, median, and standard deviation, were obtained for each geriatric syndrome. The data were reported in a table that included each geriatric syndrome according to sex and age range. The analyses were performed using SPSS 22.0 (SPSS, Inc.). The relationship between geriatric syndromes according to age was graphed using a Sankey plot in the R system.

## RESULTS

The present study conducted a cross-sectional analysis of geriatric patients aged 65 years and above who were hospitalized from October 2021 to October 2022. The aim of the study was to evaluate the prevalence of geriatric syndromes in this population and to identify potential targeted geriatric interventions. The patients were assessed by a team comprised of a geriatrician, nurse, nutritionist, and internist, and the geriatric assessment was used as a measurement tool to evaluate the impact of geriatric syndromes. The study population included 250 patients, with 115 females (72-82 years) and 135 males (72-80 years). The main geriatric syndrome identified in the study was polypharmacy, with a slightly higher prevalence in males (54.3%). The second most frequently identified geriatric syndrome was functional impairment, with a slightly higher prevalence in males (52.5%). Male gender was found to be the most frequently affected except in frailty, anxiety, pressure ulcers, incontinence, abuse, and caregiver collapse (Table 1).

**Table 1: Geriatric syndromes related to sex; MOCA (montreal cognitive assessment); GDS (geriatric depression scale); MNA (mininutritional assessment).**

Geriatric syndrome	Scale	Results		
		Females n (%)	Males n (%)	Total n (%)
Polypharmacy	≤4 Drugs	41 (45.5)	49 (54.4)	90 (35.7)
	≥5 Drugs	76 (47.7)	86 (54.3)	162 (64.3)
Frailty	FRAIL score ≤2	68 (58.1)	90 (66.7)	158 (62.7)
	FRAIL score 3	49 (41.9)	45 (33.3)	94 (37.3)
Sarcopenia	SARC F score ≤3	80 (68.4)	93 (68.9)	173 (68.7)
	SARC F score ≥4	37 (31.6)	42 (31.1)	79 (31.3)
Mild Cognitive Impairment (MCI)	MoCA ≥26	102 (47.44)	113(52.55)	215 (73.12)
	MoCA ≤25	15 (12.8)	21 (15.6)	36 (14.3)
Delirium	CAM ≤2 questions	110 (94)	128 (94.8)	239 (94.4)
	CAM ≥3 questions	7 (6&)	7 (5.2)	14 (5.6)
Depression	GDS ≤5	109 (93)	123 (91.1)	232 (92.1)
	GDS ≥6	8 (6.8)	12 (8.9)	20 (7.9)
Anxiety	Beck ≤20	110 (94)	132 (97.8)	242 (95)
	Beck ≥21	7 (6)	3 (2.2)	10 (4)
Falls	No	110 (94)	121 (89.6)	231 (91.7)
	Yes	7 (6)	14 (10.4)	21 (8.3)
Functional impairment	No	51 (42.6)	62 (45.9)	113 (44.8)
	Yes	66 (47.48)	73 (52.5)	139 (55.1)
Immobility	No	67 (57.3)	80 (58.3)	147 (58.3)
	Yes	50 (42.7)	55 (40.7)	105 (41.7)
Ulcers	Braden score ≤13	114 (97.4)	134 (99.3)	248 (99.4)
	Braden score ≥14	3 (2.6)	1 (0.7)	4 (1.6)
Incontinence	No	94 (80.3)	120 (88.9)	214 (84.9)
	Yes	23 (19.7)	15 (11.1)	38 (15.1)
Abuse	No	113 (96.6)	133 (98.5)	246 (97.6)
	Yes	4 (3.4)	2 (1.5)	6 (2.4)
Caregiver collapse	Zarit score ≤46	115 (98.3)	135 (100)	250 (99.2)
	Zarit score ≥47	2 (1.7)	0 (0)	2 (0.8)
Malnutrition	MNA ≥18	75 (64.1)	100 (74.1)	175 (69.4)
	MNA ≤17	42 (35.9)	35 (25.9)	77 (30.6)

**Table 2: Geriatric syndromes scales according to sex and range of age; MOCA (montreal cognitive assessment).**

		Sex		Range			
		Female	Male	60 to 69 years	70 to 79 years	80 to 89 years	90 to 100 years
<b>Number of drugs</b>	<2	23	36	1	41	15	2
	>3	16	17	0	22	11	0
	>5	36	44	4	57	16	3
	>7	36	37	5	47	18	3
	>10	4	1	1	2	2	0
<b>FRAIL scale</b>	Frail	28	32	6	38	16	0
	Prefrail	87	103	5	131	46	8
<b>Ensrud scale</b>	Frail	32	35	7	42	18	0
	Prefrail	83	100	4	127	44	8
<b>MoCA memory</b>	0	7	7	0	6	7	1
	3	16	19	2	20	10	3
	4	71	70	7	98	33	3
	5	21	39	2	45	12	1
<b>MoCA visual capacity</b>	0	7	7	0	6	7	1
	2	0	1	0	1	0	0
	3	15	19	2	27	5	0
	4	52	59	5	73	28	5
	5	41	49	4	62	22	2
<b>MoCA ejecutive function</b>	0	7	7	0	6	7	1
	3	20	32	2	34	15	1
	4	43	46	4	65	16	4
	5	45	50	5	64	24	2
<b>MoCA attention</b>	0	7	7	0	6	7	1
	2	0	1	0	1	0	0
	3	12	21	2	24	6	1
	4	59	57	4	80	30	2
	5	37	49	5	58	19	4
<b>MoCA lenguaje</b>	0	7	7	0	6	7	1
	3	10	18	0	21	7	0
	4	35	48	3	59	19	2
	5	63	62	8	83	29	5
<b>MoCA orientation</b>	0	7	7	0	6	7	1
	3	13	17	0	23	7	0
	4	45	43	5	57	22	4
	5	50	68	6	83	26	3
<b>Lawton and brody</b>	2	10	16	3	17	6	0
	3	24	20	4	28	10	2
	4	14	12	1	13	11	1
	5	15	24	1	28	8	2
	6	29	34	1	47	14	1
	7	23	29	1	36	13	2
<b>Katz index</b>	A	19	18	1	25	10	1
	B	19	28	1	33	12	1
	C	35	41	2	56	15	3
	D	32	35	4	40	20	3
	F	5	10	3	10	2	0
	G	5	3	0	5	3	0
<b>Barthel scale</b>	Low	45	60	5	73	25	2
	Moderate	67	74	5	94	36	6
	High	3	1	1	2	1	0
<b>Mininutritional assessment</b>	Risk	47	76	4	83	33	3
	Malnutrition	53	43	5	64	24	3

Continued.

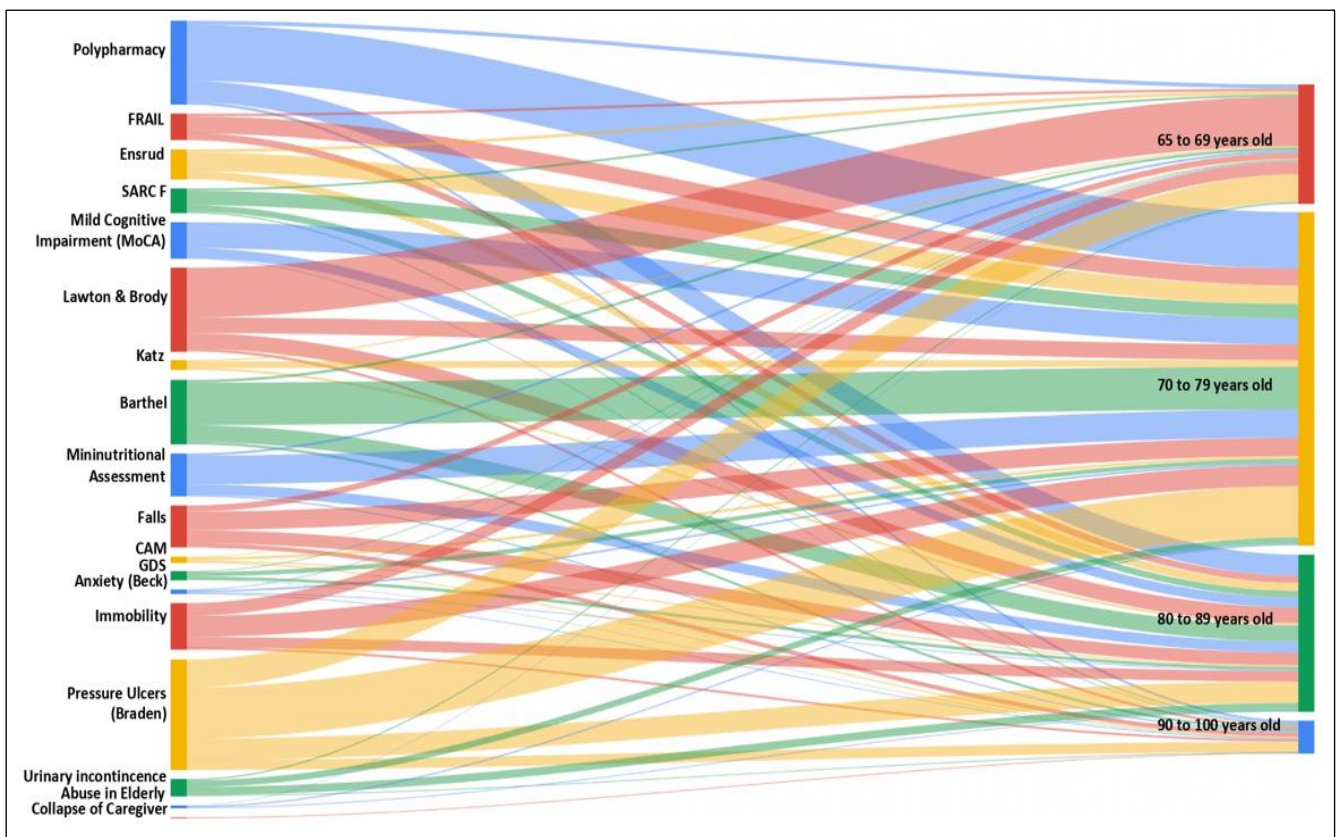


	Sex		Range			
	Female	Male	60 to 69 years	70 to 79 years	80 to 89 years	90 to 100 years
Satisfactory	15	16	2	22	5	2

In this study, the use of 5 or more drugs was found to be the main condition affecting the study population. However, there was not a high prevalence of frailty, although there was a rising tendency to prefrailty. In the evaluation of cognitive impairment, the main domains affected were memory, executive function, and orientation in the MoCa scale.

Moreover, the prevalence of dependency was high, although the main Katz classifications were found as Katz C and Katz D. Most patients had a moderate risk of developing pressure ulcers according to the Barthel scale, but only a few of them developed ulcers during hospitalization due to early identification and treatment

(Table 2). Finally, the study found that most of the patients were at risk of malnutrition or were currently suffering from malnutrition, with only 15 patients having satisfactory nutrition according to the Mini Nutritional Assessment. The results of this study provide valuable information on the prevalence of geriatric syndromes in the studied population (Figure 1) and can help identify potential targeted geriatric interventions to improve the quality of life of geriatric patients. The study highlights the importance of geriatric assessment and the need for interdisciplinary teams to evaluate and manage geriatric patients. The findings of this study can contribute to the development of evidence-based interventions to improve the care and treatment of geriatric patients.



**Figure 1: Sankey plot which shows geriatric syndromes in elderly people according to age.**

**DISCUSSION**

The primary objective of our study was to determine the prevalence of geriatric syndromes using a geriatric assessment and to identify older adults who are at risk of complications as a secondary objective. This study is particularly relevant in our community due to the increasing elderly population in Mexico. Although only geriatricians typically identify these conditions, it is essential for all physicians to do so given the current population burden. The geriatric assessment offers an

opportunity to review medical care preferences, such as maintaining independence, preventing illness, prolonging life, relieving suffering, and maximizing time with family and friends. In addition, the assessment includes various domains such as physical, psychological, social, nutritional, and familial support, all of which are essential in decision-making and prolonged hospital stay.

The geriatric assessment conducted in our study revealed that most patients suffered from at least one geriatric syndrome, with polypharmacy being the most prevalent. This finding can be attributed to the high burden of

pathologies observed in our population, particularly diabetes and hypertension. The second most frequent geriatric syndrome identified was functional impairment, which can be attributed to poor adherence to treatment regimens among the majority of patients. Mild cognitive impairment was also noted as a contributing factor, resulting from drug interactions and previous hospitalizations. Malnutrition emerged as the third most prevalent domain affected in our study, and is particularly important to consider during rehabilitation and recovery from hospitalization. Our findings are consistent with previous studies and highlight the need for greater attention to be paid to the issue of malnutrition in elderly patients. This condition is recognized as a predictor of mortality, and as such, efforts must be made to improve nutritional support and monitoring for this population. Overall, our study emphasizes the importance of geriatric assessment in identifying and addressing the multiple domains of health that affect elderly patients, particularly in light of the increasing burden of geriatric syndromes in our aging population. A total of twenty-two trials involving 10,315 participants across six countries were identified for analysis. The results demonstrated that patients receiving comprehensive geriatric assessment (CGA) had higher likelihoods of being alive and residing in their own homes at up to six months (odds ratio [OR] 1.25, 95% confidence interval [CI] 1.11 to 1.42,  $P = 0.0002$ ) as well as at the end of the scheduled follow-up period (median 12 months) (OR 1.16, 95% CI 1.05 to 1.28,  $P = 0.003$ ) compared to those receiving general medical care.<sup>26</sup> The implementation of geriatric assessment is essential for identifying possible complications related to ageing, and the avoidance of potentially harmful treatments. Our study, however, has several limitations. Firstly, the majority of participants were inpatients, thus potentially skewing the results as they were likely more ill than the general population. As a result, we were unable to evaluate the sensitivity and specificity of the scales utilized to predict or identify geriatric syndromes in our specific population. Additionally, the impact of subsequent interventions, prompted by the results of the assessment, was not assessed. Despite these limitations, the implementation of geriatric assessments is a valuable tool in improving patient outcomes and ensuring optimal care for older adults.

## CONCLUSION

In conclusion, the geriatric assessment is a crucial tool in identifying and changing treatment plans for hospitalized elderly patients. It is essential for medical practitioners to utilize this assessment as it is becoming increasingly relevant in geriatric care. Physicians play a key role in the assessment process, but a multidisciplinary team is required to ensure a comprehensive assessment of this population, which can help to avoid the prevalence of geriatric syndromes such as polypharmacy, functional impairment, and malnutrition.

Our study highlights the importance of geriatric assessment in the current context of Mexico's growing elderly population, emphasizing the need for better assessments and a multidisciplinary approach. We believe that the geriatric assessment plays a critical role in the diagnosis and management of patients, and therefore, it should be integrated into medical training for all physicians. The incidence and prevalence of geriatric syndromes are likely to continue to rise, and this underscores the urgency of embracing and utilizing geriatric assessment tools.

The present study has several limitations that should be acknowledged. Firstly, the study design was cross-sectional, which limits the ability to establish causal relationships between geriatric syndromes and patient outcomes. Future longitudinal studies are needed to provide more robust evidence in this regard. Moreover, our study was conducted in a single hospital setting, which may limit the generalizability of the findings to other healthcare settings and populations. Replication of the study in diverse healthcare settings and larger sample sizes is warranted.

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