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Determinants of Mobility in Elderly Adults with Polypharmacy

Research Article

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Abstract

Introduction: Aging brings about changes across all spheres, affecting various functions of the sensory, respiratory, digestive, and musculoskeletal systems. Elderly adults suffer from multiple diseases, requiring continuous treatment, which can lead to serious problems and limitations affecting well-being and health, resulting in the need for multiple medications that contribute to the loss of functionality in daily activities, gradually diminishing quality of life.

Objective: The aim of this study was to determine the physical performance of individuals aged 65 and older with polypharmacy.

Methodology: An observational, descriptive cross-sectional study was conducted with 21 elderly residents of a nursing home. The Short Physical Performance Battery (SPPB) was applied along with questions regarding sociodemographic information, perceived health status, family coexistence, polypharmacy, BMI, pain with movement, history of falls, confinement characteristics, visual capacity, and social security. The association of factors with low performance was determined by calculating the Odds Ratio (OR) with a 95% confidence interval.

Results: 61.90% exhibited low physical performance, particularly among individuals aged 84 (100%) and those taking 3 or more medications per day (100%). A positive association was found between polypharmacy and low physical performance (OR=9.16, p=0.037) and the perception of poor health (OR=15.75, p=0.025). Conclusion. Polypharmacy affects physical performance in elderly adults. Limitations in physical performance generate self-perception of poor health.

Introduction

Population aging is a major global concern due to its association with various diseases that limit the quality of life, including non-communicable diseases such as hypertension, diabetes, cardiorespiratory conditions, osteoarthritis, and cerebrovascular accidents (CVA),

which lead to a high index of functional dependency in older adults [1]. With aging, changes occur across all spheres, affecting various functions of the sensory, respiratory, digestive, and musculoskeletal systems, limiting functionality and quality of life.

Public health aims to preserve the functionality of older individuals so they can remain active within their environment.

Jaeger [2] states that around 30 to 40% of muscle mass is lost between the ages of 30 and 80, manifesting as fatigue and decreased mobility. Olmos [3] asserts that women lose 40% of bone mass in the spine and 60% in the hip, leading to decreased strength, power, flexibility, and endurance of muscle mass, reduced walking speed, increased risk of falls, and decreased ability to perform daily activities, resulting in a higher risk of disability or dependence.

The ability to carry out basic daily activities is a relevant factor in the quality of life of older adults as it provides physical and functional independence. Elderly adults suffer from multiple diseases and require continuous treatment, which can lead to serious problems and limitations affecting well-being and health [4], resulting in the need for multiple medications, hospitalizations, falls, incontinence, cognitive impairment, and even death due to the loss of functionality in performing daily activities, gradually decreasing quality of life [5]. Payne and Avery [6] found that the multiplicity of treatments causes confusion and conditions the intake of multiple medications, leading to side effects that affect gastric, cognitive, and motor well-being.

Therefore, it is crucial to determine the physical functional capacity of older adults and the factors that determine it to implement preventive measures and maintain that capacity at its maximum potential. The objective of this study was to determine the physical performance of individuals aged 65 and older with polypharmacy in a nursing home in Cuernavaca, Morelos.

Methods and Materials

An observational, descriptive cross-sectional study was conducted with 21 elderly residents of a nursing home in Cuernavaca, Morelos, Mexico. The sample consisted of residents of both sexes chosen through non-probabilistic random sampling. The Short Physical Performance Battery (SPPB) was applied along with questions regarding sociodemographic information, perceived health status, family coexistence, polypharmacy, BMI, pain with movement, history of falls, confinement characteristics, visual capacity, and social security.

The SPPB evaluates three aspects: balance, gait, muscle strength, and endurance, with each test scoring a maximum of 4 points, divided into three parts: balance test (equilibrium), gait speed test (4-meter walk), and sit-to-stand test. The scores of the three parts were summed and divided by 12, the maximum score. Results were interpreted based on the final score, with scores below 8 indicating low physical performance.

The data obtained were analyzed using Stata 11, generating simple and relative frequencies of the included variables. The association of factors with low performance was determined using the Odds Ratio (OR) with a 95% confidence interval. Factors considered included perceived poor health, intake of more than 7 medications per day, falls, pain with movement, and difficulty seeing.

Results

83.71% were female, 47.96% were widowed, 42.86% had completed primary education, 71.45% were homemakers, 80.95% were retired or receiving pensions, 85.71% received some form of remuneration, and 52.38% had social security. Of the total participants, 67% took 7 or more medications daily, 19% took 4 to 6 medications, and 14% took fewer than 4. The most prevalent disease was Systemic Arterial Hypertension (76.19%), followed by Degenerative Joint Disease (71.4%) (Figure 1).

In relation to physical performance, a higher proportion was also observed among patients diagnosed with cardiovascular disease (85.71%). Low physical performance showed differences by sex, with 33.33% of men exhibiting low performance, while this percentage reached 66.67% among women. (Table1).

The bivariate analysis of low physical performance with the included variables showed that 75% of those with low performance have experienced falls, 66.67% of those with low performance suffer from chronic pain, 70.59% of those with low performance have difficulty seeing, while 90% of those with low performance perceive their health as poor (Table 2).

The logistic regression showed a statistically significant association with the daily intake of more than 7 medications per day OR=9.16 (p=0.037) and with the perception of poor health OR=15.75 (p=0.025), finding no statistical significance with other variables (Table 3).

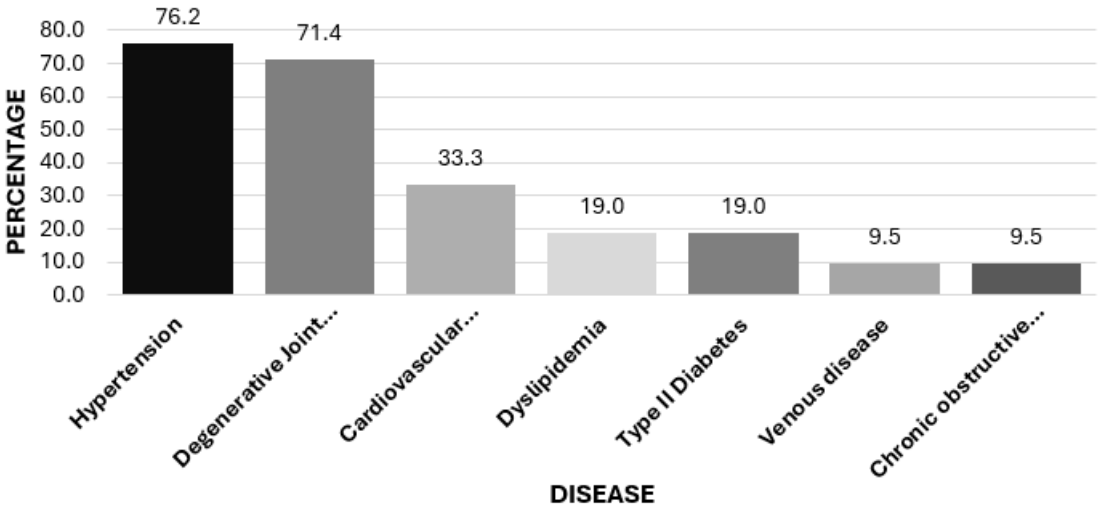

Figure 1: Morbidity in elderly residents of a nursing home.

Table 1 Frequency of Low Physical Performance According to Comorbidity Condition.

Characteristic	Low performance	
	N	%
SEX		
Male	1	33.33
Female	12	66.67
AGE GROUP		
65-69	1	7.6
70-74	0	0
75-79	3	23.07
80-84	3	23.07
85-89	5	38.46
90-94	1	7.6
POLYPHARMACY		
0 a 2 medications	0	0
3 a 6 medications	2	15.38
7 or more	11	84.61
CHRONIC DISEASE		
Hypertension + Degenerative Joint Disease + Cardiovascular Disease	5	38.46
Hypertension + Degenerative Joint Disease + Other	2	15.38
Hypertension + Other	2	15.38
Hypertension + Degenerative Joint Disease + Type II Diabetes	1	7.6
Hypertension + Cardiovascular Disease	1	7.6
Degenerative Joint Disease + Other	2	15.38
Obesity	2	50
Overweight	0	0
Underweight	7	100

Table 2 Low physical performance and other conditions.

	Total		Female		Male	
Variable	N	%	N	%	N	%
Falls	9	75	8	66.67	1	100
Pain	12	66.67	11	91.67	1	100
Difficulty reading	12	70.59	11	91.67	1	100
Perceptin of poor health	9	90	9	75	0	0
Depression	1	100	1	100	0	0
Personality disorder	1	100	1	100	0	0
Underweight	7	100	7	100	0	0

Table 3 Association of Factors with Low Physical Performance

Associated factor	OR	P>z	I.C. 95%
Perception of Poor Health	15.75	0.025	1.423632 - 174.2462
Intake of More than 7 Medications per Day	9.16	0.037	1.147308 - 73.2391
Falls	3.74	0.162	0.5874985 - 23.93623
Pain	4	0.295	0.2992445 - 53.46798
Difficulty Seeing	7.2	0.121	0.5957239 - 87.02018
Pain with Movement	4	0.295	0.2992445 53.46798

Conclusion

The results reflect that polypharmacy affects physical performance in older adults, leading to the belief that the side effects of medications impact this performance [7]. These effects can be attributed to toxicity, decreased sensitivity, or drowsiness. Adverse events are a consequence of medication administration, and the potential to affect the physical well-being of older adults should always be considered when evaluating their health status and seeking alternatives to non-pharmacological treatment.

Although older adults have multiple ailments, these do not inherently affect physical performance. The most prevalent condition was Systemic Arterial Hypertension (76.19%), followed by Degenerative Joint Disease (71.4%), alongside other chronic degenerative conditions. Over 85% of participants consume more than three medications daily as part of their treatment. Low physical performance is more common in women, where obesity is more observable, while in men, underweight conditions are noted. However, these characteristics did not show significant association.

Discussion

The prescription of medications in older adults poses challenges. While they can alleviate discomfort and maintain functional conditions, they also present undesirable effects, including impacts on physical performance. Medications should be used with caution, particularly in older adults, due to the changes that occur with advanced age. It is necessary to consider pharmacokinetics and pharmacodynamics, as well as ensure the appropriate use of medications to achieve improvements in patients' health status.

The association with the perception of poor health raises the question of whether limitations in physical performance lead older adults to perceive their health as poor or if this perception contributes to low performance. The positive association between low performance and the perception of poor health may indicate that if older adults do not feel physically capable of performing their activities, they perceive their health as poor, which, according to Soberanes [8], relates to the quality of life of individuals. It is vital to consider that this aspect may impact the psychological and emotional well-being of older adults, representing a risk for the development of depressive states that affect their health.

Limitations

The present study was conducted with institutionalized older adults, with a limited number of participants. It would be beneficial to conduct similar studies with a larger number of participants in different conditions to obtain information that allows for the development of improvement strategies for this population group.

Clinical relevance

The identification of polypharmacy as an associated factor for low performance highlights the need to assess the appropriateness of the number of medications administered to older adults. It also underscores the importance of planning gerontological care with a greater emphasis on patients who, due to multiple illnesses, are subjected to a high intake of medications. The side effects of these medications could lead to quicker and greater deterioration than would occur without them. It is essential to consider that the functional state of older adults affects physical, cognitive, emotional, and social aspects, thus care should focus on maintaining functionality and developing tailored care plans. Healthcare personnel must face the challenges of an aging population, which requires special attention to ensuring and maintaining functional capacity and healthy aging, viewing old age as another stage of life.

Conflict of interest

The authors declare that there is no conflict of interest.

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