

A simple method for clinical implications of pain; comprehensive geriatric assessment

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SUMMARY

OBJECTIVE: The effect of chronic pain on the elderly population is enormous in terms of both human suffering and cost. This study aimed to investigate the factors associated with chronic low back pain in older adults by performing a comprehensive geriatric assessment.

METHODS: This cross-sectional study included 225 elderly patients admitted to a geriatric outpatient clinic. All participants underwent a comprehensive geriatric assessment, and factors related to chronic low back pain were assessed. Participants were grouped as those with and without chronic pain.

RESULTS: The mean age of the participants was 72.9±6.9 years, and 149 (66.2%) of them had chronic pain complaints. The number of chronic diseases and medications, depressive symptom scores, and sleep quality scores were higher, and quality of life (European Quality of Life-5 Dimensions index and European Quality of Life-5 Dimensions visual analog scale) and nutritional status scores were lower in the chronic pain group. The pain visual analog scale score had a statistically significant moderate negative correlation with the European Quality of Life-5 Dimensions index ($r=-0.440$, $p=0.000$) and European Quality of Life-5 Dimensions visual analog scale ($r=-0.398$, $p=0.000$) scores. The male gender was associated with a reduced risk of chronic pain, while poor sleep quality and number of comorbidities were associated with an increased risk of chronic pain ($p=0.000$, OR 0.20, $p=0.021$, OR 2.54, and $p=0.010$, OR 1.40, respectively).

CONCLUSION: Chronic pain is common and independently associated with poor sleep quality, an increased number of diseases, and female gender. The results of our study may guide pain management in older individuals.

KEYWORDS: Chronic pain. Elderly. Geriatric assessment. Sleep quality.

INTRODUCTION

Chronic pain is a common public health problem which has a detrimental impact on individuals' health and quality of life and poses a significant socioeconomic burden¹. It is defined as pain that persists or recurs for more than 3 months, according to the International Classification of Diseases². The prevalence of chronic pain in older adults ranges from 27–86%³.

Biological and psychological factors associated with the development of chronic pain include genetics, age, sex, depression, anxiety, post-traumatic stress, poor concentration, cognitive impairment, sleep problems, and medication use⁴. The influence of sex hormones and the higher sensitivity of pain receptors have been identified as factors that may mediate a more painful experience in women than in men⁵.

Studies have shown that chronic pain can have negative consequences on health and well-being, such as malnutrition⁶ and poor sleep quality⁷. A previous study reported that most

older adults with chronic pain suffered from at least one sleep problem, and short sleep duration and poor sleep quality were the most common complaints⁸.

Chronic pain has been linked to restrictions on daily activities, anxiety and depressive symptoms, and poor quality of life⁹. Furthermore, it has been reported that measures of physical function, such as grip strength and lower extremity physical performance, and lower skeletal muscle mass, were associated with chronic pain in older adults³.

Few studies have comprehensively evaluated the factors associated with chronic pain in older adults¹⁰. Prevention or treatment of chronic pain has great importance for healthy aging. However, less is known about the causality of chronic pain among older adults.

The purpose of this study was to identify the factors associated with chronic pain by performing a comprehensive geriatric assessment (CGA) on geriatric outpatients.

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METHODS

This cross-sectional study involved 225 geriatric outpatients admitted to a university hospital between November 2020 and November 2021. To provide a more homogeneous study group, participants with only low back pain were included as chronic pain patients. Participants with diseases that affect the assessment of muscle function and pain perception (e.g., cancer, rheumatic diseases, neuromuscular diseases, immobility, neurodegenerative diseases, neuropathy, visual and hearing disorders, and peripheral artery disease) were excluded from the study.

All participants underwent a CGA including screening and evaluation of activities of daily living, depressive symptoms, nutritional status, cognitive functions, sarcopenia, sleep quality, and quality of life¹¹. Participants were asked whether they had low back pain, and those with pain for 3 months or longer were considered patients with chronic pain. A horizontal visual analog scale (VAS) was used to assess pain intensity, with 0 points indicating no pain and 100 points indicating the worst imaginable pain.

Assessment of activities of daily living

The Katz Index of Activities of Daily Living (ADL) was used to assess the dependence on activities such as continence, bathing, toileting, dressing, feeding, and transferring. According to the index, the total score ranges from 0–6, with higher scores indicating greater independence.

Assessment of instrumental activities of daily living

The Lawton & Brody Index of Instrumental Activities of Daily Living (IADL) was used to measure independence on activities such as food preparation, doing laundry, shopping, using the telephone, housekeeping, taking medicine, using transportation, and managing money. The total score ranges from 0–8 and higher scores indicate greater independence.

Assessment of quality of life

The European Quality of Life-5 Dimensions (EQ-5D) questionnaire was used to assess the quality of life. In the questionnaire, individuals were asked to self-assess the status of their health (including five dimensions, namely, usual activities, self-care, mobility, anxiety/depression, and pain/discomfort). The index score is calculated according to the scores of the dimensions, and a score of 0 indicates death, 1 indicates perfect health, and negative values indicate someone is bedridden, dependent, and unconscious. The EQ-5D VAS is the second part of the questionnaire, indicating the individual's overall health on a vertical scale ranging from 0–100.

Assessment of depressive symptoms

The Geriatric Depression Scale (GDS) was used to evaluate depressive symptoms. A score of 14 and above is considered depression according to the scale.

Assessment of nutritional status

The Mini Nutritional Assessment Tool (MNA) was used to assess the nutritional status of the individuals. According to the tool, a score of <17 indicates malnutrition, 17–23.5 indicates malnutrition risk, and ≥ 24 indicates adequate nutritional status.

Assessment of cognitive functions

The Mini-Mental State Examination (MMSE) test was used. The reliability and validity of the test have been confirmed, and the cutoff point for the diagnosis of mild dementia in the Turkish population was found to be 23/24 over 30 points.

Assessment of sleep quality

The Pittsburgh Sleep Quality Index (PSQI) scale was used. The scale has 7 components, and each component is rated between 0 and 3 points. A total score of 5 and above indicates poor sleep quality.

Assessment of Sarcopenia

The European Working Group on Sarcopenia in Older People (EWGSOP2) criteria was used to diagnose sarcopenia. According to the EWGSOP2 criteria, low muscle strength and mass are required for the diagnosis¹². Muscle strength was determined by measuring handgrip strength with a hydraulic hand dynamometer. A bioelectrical impedance analyzer was used to measure muscle mass.

Statistical analysis

The normality of the distribution of continuous variables was checked using the Shapiro-Wilk test. The Mann-Whitney U-test and the independent samples t-test were used to compare two independent groups. The relationship between categorical variables was assessed using the chi-square test. The correlations between continuous variables were measured using the Spearman's rank correlation coefficient. Multivariate logistic regressions were performed to determine the independent variables on chronic low back pain. SPSS version 22.0 was used and a p-value of <0.05 was considered statistically significant.

RESULTS

The mean age of the participants was 72.9±6.9 years, 61.3% were female, and 149 (66.2%) of them suffered from chronic

low back pain. The proportion of female participants and those with sarcopenia and hypertension was higher in the chronic pain group. The number of comorbidities and medications, GDS, and PSQI scores were higher, while ADL, EQ-5D index, EQ-5D VAS, and MNA scores were lower in the chronic pain group. Table 1 shows the geriatric assessment results and socio-demographic characteristics of the patients.

The pain VAS score had a statistically significant moderate negative correlation with the EQ-5D index ($r=-0.440$, $p=0.000$), EQ-5D VAS ($r=-0.398$, $p=0.000$), and skeletal muscle mass index ($r=-0.316$, $p=0.000$) scores, and a statistically significant moderate positive correlation with the GDS ($r=0.316$, $p=0.000$) and PSQI ($r=0.357$, $p=0.000$) scores (Table 2).

Variance inflation factor was calculated and the number of medications was excluded from models. The male gender was associated with a decreased risk of chronic pain, while poor sleep quality and the number of comorbidities were associated with

an increased risk of chronic pain ($p=0.000$, OR 0.20, $p=0.021$, OR 2.54, and $p=0.010$, OR 1.40, respectively) according to multivariate logistic regression analysis (Table 3).

DISCUSSION

This study has shown that older adults with chronic low back pain are more likely to have impaired functional status, malnutrition, sarcopenia, depressive symptoms, poorer quality of life, and sleep quality. Poor sleep quality has also been found to be an independent risk factor for chronic pain.

Similar to our results, previous studies have shown that chronic pain impairs ADL¹³, sleep quality¹⁴, and quality of life¹⁵. A study investigating chronic pain and sleep difficulties in older adults reported strong and consistent associations between chronic pain and heterogeneous sleep complaints¹⁶. It has been shown that poor sleep quality is associated

Table 1. Participants' sociodemographic characteristics and comprehensive geriatric assessment results (n=225).

	Chronic pain (-) (n=76)	Chronic pain (+) (n=149)	p-value	Total (n=225)
Gender				
Female (%)	32 (42.1)	106 (71.1)	<0.001*	138 (61.3)
Male (%)	44 (57.9)	43 (28.9)		87 (38.7)
Age [†]	72.9±6.0	72.9±7.2	0.572	72.9±6.9
Number of comorbidities [#]	2 (1)	3 (2)	<0.001*	3 (2)
Number of medications [#]	4 (3)	5 (4)	0.042*	5 (4)
Comorbidities				
Hypertension (%)	38 (50.0)	100 (67.1)	0.013*	138 (61.3)
Diabetes mellitus (%)	39 (51.3)	88 (59.1)	0.268	127 (56.4)
Coronary artery disease (%)	16 (21.1)	50 (33.6)	0.051	66 (29.3)
Asthma/COPD (%)	11 (14.5)	32 (21.5)	0.206	43 (19.1)
ADL [#]	6 (1)	5 (2)	0.025*	6 (1)
IADL [#]	6 (3)	7 (3)	0.435	7 (3)
EQ-5D index [#]	0.84 (0.67)	0.42 (0.39)	<0.001*	0.53 (0.60)
EQ-5D VA [§] #	80 (25)	60 (30)	<0.001*	60 (30)
GDS [#]	7.5 (9)	12 (10)	0.001*	10 (10)
MNA [#]	24 (6)	22 (7.5)	0.002*	23 (7.1)
MMSE [#]	24 (11)	25 (10)	0.799	25 (10)
PSQI [#]	4 (4)	6 (4)	<0.001*	6 (4)
Sarcopenia (%)	16 (21.1)	66 (44.3)	0.002*	82 (36.4)
Gait speed (m/s) [†]	0.83±0.29	0.77±0.30	0.155	0.79±0.30

COPD: chronic obstructive pulmonary disease; ADL: Katz Index of Activities of Daily Living; IADL: Lawton & Brody Index of Instrumental Activities of Daily Living; EQ-5D: European Quality of Life-5 Dimensions; VAS: visual analog scale; GDS: Geriatric Depression Scale; MNA: Mini Nutritional Assessment Tool; MMSE: Mini-Mental State Examination; PSQI: Pittsburgh Sleep Quality Index. * $p<0.05$; †Data are presented as mean±SD. #Data are presented as median (interquartile range).

Table 2. Correlation analysis results between the variables.

	VAS	Age	Number of diseases	Number of medications	ADL	IADL	EQ-5D index	EQ-5D VAS	GDS	MNA	MMSE	PSQI	HGS	SMMI	Gait speed
VAS	r	-0.017	0.289	0.180	-0.133	-0.078	-0.440	-0.398	0.316	-0.276	0.066	0.357	-0.212	-0.316	-0.125
	p	0.802	0.000**	0.007**	0.046*	0.243	0.000**	0.000**	0.000**	0.000**	0.325	0.000**	0.002**	0.000**	0.075
Age	r		0.029	0.096	-0.252	-0.375	-0.284	-0.132	0.121	-0.074	-0.330	0.024	-0.262	-0.026	-0.439
	p		0.665	0.150	0.000**	0.000**	0.000**	0.048*	0.069	0.272	0.000**	0.724	0.000**	0.713	0.000**
Number of diseases	r			0.681	-0.239	-0.285	-0.376	-0.321	0.287	-0.157	-0.085	0.168	-0.138	-0.196	-0.161
	p			0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.019*	0.206	0.013*	0.041*	0.005**	0.021*
Number of medications	r				-0.306	-0.286	-0.326	-0.197	0.219	-0.185	-0.152	0.100	-0.140	-0.089	-0.205
	p				0.000**	0.000**	0.000**	0.003**	0.001**	0.006**	0.023*	0.139	0.040*	0.205	0.003**
ADL	r					0.535	0.513	0.445	-0.390	0.204	0.330	-0.220	0.195	0.017	0.169
	p					0.000**	0.000**	0.000**	0.000**	0.002**	0.000**	0.001**	0.004**	0.808	0.016*
IADL	r						0.641	0.444	-0.501	0.242	0.572	-0.157	0.462	0.129	0.501
	p						0.000**	0.000**	0.000**	0.000**	0.000**	0.020*	0.000**	0.067	0.000**
EQ-5D index	r							0.631	-0.620	0.344	0.325	-0.369	0.442	0.310	0.440
	p							0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**
EQ-5D VAS	r								-0.628	0.270	0.232	-0.294	0.339	0.232	0.324
	p								0.000**	0.000**	0.000**	0.000**	0.000**	0.001**	0.000**
GDS	r									-0.345	-0.274	0.448	-0.378	-0.177	-0.253
	p									0.000**	0.000**	0.000**	0.000**	0.012*	0.000**
MNA	r										0.045	-0.309	0.120	0.013	0.198
	p										0.508	0.000**	0.079	0.858	0.005**
MMSE	r											-0.088	0.342	0.041	0.323
	p											0.196	0.000**	0.559	0.000**
PSQI	r												-0.180	-0.193	-0.118
	p												0.009**	0.007**	0.098
HGS	r													0.600	0.532
	p													0.000**	0.000**
SMMI	r														0.386
	p														0.000**
Gait speed	r														
	p														

VAS: visual analog scale pain score; ADL: Katz index of activities of daily living; IADL: Lawton & Brody index of instrumental activities of daily living; EQ-5D: European quality of life-5 dimensions; GDS: geriatric depression scale; MNA: mini nutritional assessment tool; MMSE: mini-mental state examination; PSQI: Pittsburgh sleep quality index; HGS: handgrip strength; SMMI: skeletal muscle mass index. r: Spearman rank correlation coefficient; *: Significant at 0.05 level; **: Significant at 0.01 level.

Table 3. Multivariate logistic regression analysis results of the independent variables for chronic pain.

Variable	Chronic pain	
	OR [95%CI]	p-value
Age	0.97 [0.91–1.03]	0.344
Gender (male vs. female)	0.20 [0.09–0.45]	0.000*
Number of comorbidities	1.40 [1.09–1.82]	0.010*
ADL score	0.87 [0.61–1.22]	0.411
Malnutrition	1.06 [0.49–2.29]	0.884
Depression	1.12 [0.44–2.92]	0.802
Sarcopenia	1.04 [0.94–1.07]	0.916
Poor sleep quality	2.54 [1.15–5.58]	0.021*

CI: confidence interval; OR: odds ratio; ADL: Katz index of activities of daily living. *p<0.05 according to multivariate binary logistic regression analysis.

with increased pain complaints in older adults¹⁷. In a study investigating the relationship between sleep disorders and pain, sleep deprivation has been shown to increase neuronal response that causes hyperexcitability and a decrease in pain thresholds. Sleep deprivation has also been found to induce a low-grade inflammatory response, resulting in increased sensitivity to pain¹⁸.

In our study, older adults with chronic pain had a statistically significantly higher prevalence of sarcopenia. The mean gait speed was also lower in the chronic pain group, although there was no statistically significant difference. Several studies have shown that sarcopenia can cause chronic pain^{19,20}. A study conducted in Japan has reported that elderly patients with chronic pain had significantly lower skeletal muscle mass than those without chronic pain²¹.

We also found that older adults with chronic pain were more likely to be malnourished. This may be explained by the fact that chronic pain is associated with decreased food intake and appetite²². A recent study showed that suffering from chronic pain was a predictor of malnutrition among older adults⁶.

The prevalence of chronic pain in our study (66.2%) was significantly higher than that reported in previous studies^{7,23}. The reason for the higher prevalence in our study may be due to the fact that it was performed in a tertiary referral hospital. In addition, different definitions of chronic pain in some studies may have led to differences in the prevalence.

Moreover, we found that chronic pain was associated with a number of comorbidities and medications in older adults. Multimorbidity, defined as two or more chronic diseases, is present in approximately 65% of older adults and it complicates pain management in individuals²⁴. Therefore, coordinated management of comorbid conditions is critical for reducing chronic pain in the elderly.

Another significant finding of our study was that the female gender was an independent risk factor for chronic pain. Most previous studies revealed that women were more likely to have chronic pain, which was consistent with our study^{7,25}. It is thought that women are more sensitive to pain due to differences in biological or psychological mechanisms.

Our study has some limitations. First, due to the cross-sectional nature of the study, no conclusions can be drawn about causal relationships. Second, the study was conducted on a population that may not be fully representative of the general population. Third, the classification of the pain was not done (neuropathic, nociceptive, etc.). The strengths of our study are that all the participants underwent CGA using valid tools and the exclusion of participants having diseases that may complicate the assessment of pain.

CONCLUSIONS

In this study, poor sleep quality, increased number of diseases, and female gender were found to be independent risk factors for chronic pain. We also showed that older adults with chronic pain are more likely to suffer from impaired functional status, depressive symptoms, malnutrition, sarcopenia, and poorer quality of life.

Our findings highlight the close relationship between chronic pain and other geriatric syndromes. Performing comprehensive assessment of factors that may cause pain and planning treatment strategies are important in order to ensure healthy aging and to prevent possible negative consequences.

AUTHORS' CONTRIBUTIONS

EME: Conceptualization, Writing – original draft. **AC:** Data curation, Formal Analysis. **ZAÖ:** Writing – review & editing.

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