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Role of loneliness in the relationship between chronic pain and analgesic use in the elderly

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■ MAIN POINTS

- Loneliness is a significant determinant of chronic pain among the elderly, with higher loneliness levels strongly associated with increased pain scores.
- Frequent analgesic use is independently linked to loneliness, regardless of age, sex, or current pain intensity, suggesting that psychosocial factors drive medication consumption beyond physical symptoms.
- Integrating psychosocial assessment into elderly care is essential, as addressing loneliness and strengthening social support systems may help reduce unnecessary or excessive analgesic use and improve overall pain management.

■ ABSTRACT

Aim: Loneliness is more frequently observed in older adults than in other age groups and is associated with adverse health outcomes. This study aimed to examine the relationship between loneliness, chronic pain, and analgesic use in the geriatric population.

Materials and Methods: This cross-sectional study included 384 elderly subjects who presented to a family medicine outpatient clinic. The University of California, Los Angeles (UCLA) Loneliness Scale for the Elderly and the Geriatric Pain Measure were used to collect data on the variables.

Results: The mean age of the 384 elderly participants included in the study was 74.91±7.12 years (range: 65–91). Of the participants, 52.9% were women and 11.7% were living alone. Higher frequencies of analgesic use were associated with higher pain and loneliness scores ($p<0.001$). A moderate, positive, and statistically significant correlation was found between pain and loneliness scores ($r=0.478$, $p<0.001$). In the multivariate linear regression analysis, each 1-point increase in the loneliness score led to a 1.72-point increase in the pain score. Female sex and chronic diseases were associated with 4.63- and 9.65-point increases in the pain score, respectively. Multinomial logistic regression analysis showed that, independent of age, sex, and pain score, each 1-point increase in the loneliness scale score was associated with a higher likelihood of using analgesics ≥ 15 times/month (OR=1.29), 8–14 (OR = 1.24), and 2–7 (OR = 1.22) times/month. Age and sex did not have any significant effect on monthly analgesic use.

Conclusion: There is a positive relationship between loneliness, chronic pain, and frequent use of analgesics in the elderly subjects. Psychosocial assessment and support in elderly patients may help reduce excessive analgesic consumption.

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■ INTRODUCTION

Loneliness is described as an emotional state arising from the perception that one's social network is narrower or less satisfying than desired. It reflects a sense of deficiency resulting from the discrepancy between the level of emotional satisfaction an individual seeks and the level they actually experience [1-3]. Today, loneliness is widely recognized as a reality of life—an experience encountered by individuals at various points in their lives and to varying degrees [4]. There is no consensus regarding the relationship between loneliness

and age in the literature. Since loneliness is assessed based on subjective perception, it is suggested that it tends to be higher during adolescence—a period often marked by emotional turbulence—declines in early and middle adulthood and then increases again in older age, thus presenting a U-shaped trajectory across the lifespan [4-6]. Loneliness causes various physical, psychological, and cognitive problems in individuals. It is a significant factor contributing to deteriorated health and reduced health related quality of life (HRQoL). Given that loneliness is observed more frequently among the

elderly—and that additional challenges faced by this population may worsen the situation—addressing loneliness and implementing effective intervention strategies becomes a crucial necessity. Disorders caused by loneliness can also negatively affect physical health [7]. During the aging process, a decline in the function of bodily systems, reduced organ reserves, and weakened adaptation to the environment are observed. These changes increase the susceptibility to diseases and injuries, which in turn lead to higher rates of medication use [8]. Chronic pain is one of the leading causes of diminished HQoL in the geriatric population. The elderly often resort to over-the-counter analgesics without consulting a physician to manage chronic pain [9]. Investigating the impact of loneliness on chronic pain and its influence on analgesic consumption among older adults may offer valuable insights into this issue. This study aimed to examine the relationship between loneliness, chronic pain, and analgesic use in individuals within the geriatric age group.

MATERIALS AND METHODS

Study design, sample, and ethics

This cross-sectional study was conducted in 2025 among patients aged 65 years who presented to the Family Medicine Outpatient Clinic of the Faculty of Medicine, Izzet Baysal Training and Research Hospital, Bolu Abant Izzet Baysal University. The required sample size was calculated using the formula $n = [DEFF \times N \times p(1-p)] / [(d^2 / Z^2_{1-\alpha/2} \times (N-1)) + p(1-p)]$ * with 80% power, 95% confidence interval, $d = 50\%$, and $DEFF = 1$. Accordingly, the minimum sample size was determined to be 384 individuals. Participants were recruited through convenience sampling. Data were collected through face-to-face interviews with patients who presented to the Family Medicine Clinic between April and June 2025. All participants were informed about the study procedures and provided written informed consent. After completing the data collection tools, the researcher reviewed the responses and provided necessary clarifications. Ethical approval for the study was obtained from the Ethics Committee of Bolu Abant Izzet Baysal University Faculty of Medicine, Izzet Baysal Training and Research Hospital (Decision No: 2025/150, Date: 08.04.2025).

Exclusion criteria

- Participants with cognitive impairments (e.g., advanced dementia, delirium) or neurological conditions (e.g., aphasia) that prevent them from understanding or responding to the questionnaire.
- Severe hearing impairment or speech disability precluding verbal or written communication despite assistance.
- Individuals younger than 65 years.

Data collection

Data were collected from 384 patients who visited the Family Medicine Outpatient Clinic of Bolu Abant Izzet Baysal University between April and June 2025. The data collection form consisted of the following three sections:

- Demographic information (age, gender, marital status, and analgesic use).
- UCLA Loneliness Scale for the Elderly.
- Geriatric Pain Measure.

The University of California, Los Angeles Loneliness Scale for the Elderly

Originally developed in 1985 by De Jong Gierveld and Kamphuis to assess emotional loneliness and revised in 1999 by Van Tilburg and De Jong Gierveld, the UCLA Loneliness Scale for the Elderly is based on the cognitive-behavioral framework [10]. Akgül et al. conducted the Turkish validity and reliability study in 2015. The Cronbach's alpha of the scale is $\alpha = .85$. The test-retest result of the scale is $r = .93$ [11]. The scale employs a 3-point Likert-type response format (0 = Yes, 1 = Maybe, 2 = No) to determine the extent to which each item describes the experience of the respondents. Respondents were asked to select the option that best reflected their current state. The scale consists of 11 items, of which 6 are positively worded and 5 are negatively worded. Items 1, 4, 7, 8, and 11 are scored as follows: 0 = Yes, 1 = Maybe, and 2 = No. Items 2, 3, 5, 6, 9, and 10 are reverse-coded: 2 = Yes, 1 = Maybe, and 0 = No. The total score ranges from 0 to 22, with higher scores indicating higher loneliness levels.

Geriatric Pain Measure

The Geriatric Pain Measure (GPM) was developed by Bruce A in 2000. Ferrell et al. comprehensively assessed the functional, psychological, and social effects of pain in older individuals [12]. The Turkish adaptation and validation study was conducted by Dursun et al. in 2017, yielding a Cronbach's alpha of 0.85 [13]. Item content and cultural adaptations were based on expert opinions. The scale consists of five dimensions: pain-related withdrawal (Items 6, 17, 18, 19, 20, 21, and 24), pain intensity (Items 1, 2, 3, 4, 5, 22, and 23), pain with movement (Items 9, 10, 11, and 12), pain with strenuous activities (Items 8, 13, and 14), and pain with other activities (Items 7, 15, 16, 17, and 22). Two items (17 and 22) are included in more than one subscale. The scale also contains three open-ended questions about pain. Of the 24 items, 22 are scored dichotomously (Yes/No), while the remaining 2 items are rated on a 0-10 scale. The total score is calculated by summing the number of "Yes" responses, resulting in a raw score ranging from 0 to 42. Each item score is then multiplied by 2.38 to convert it to a scale of 0–100. The final score of the Geriatric Pain Measure is calculated based on this 0-100 scale. Scores between 0 and 30 indicate mild pain, scores between

31 and 69 indicate moderate pain, and scores of 70 or above indicate severe pain. The Geriatric Pain Measure evaluates the manner in which patients describe their pain and assesses the physical, emotional, cognitive, and behavioral responses associated with pain [12,13].

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics version 21.0 (Armonk, NY: IBM Corp.) and JAMOVI 2.6.17 version software. The Kolmogorov–Smirnov test was used to assess normality of the test. Multivariable linear regression, one-way analysis of variance, multinomial logistic regression, and Pearson correlation analyses were conducted. The Bonferroni test was used in the post-hoc tests. A p-value of <0.05 was considered statistically significant.

RESULTS

The mean age of the 384 older adults included in the study was 74.91 ± 7.12 years (min: 65, max: 91). Among the participants, 52.9% were female, 30.7% were single or widowed, and 81.3% had at least one chronic illness. Regarding living arrangements, 11.7% of the older adults lived alone, 65.4% lived with their spouse, and 20.3% lived with their children.

Table 1 presents the sociodemographic characteristics of the participants.

When examining the correlation between the scores obtained from the pain and loneliness scales among elderly subjects was statistically significant and moderately positive (r = 0.478) (Figure 1).

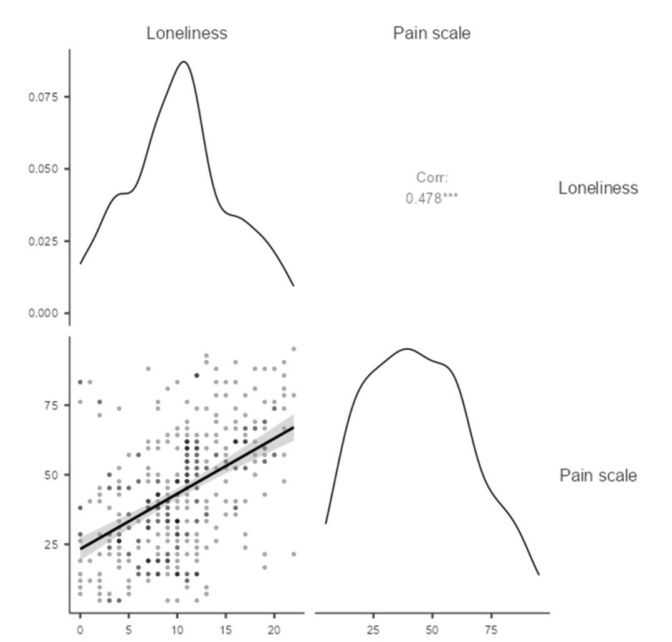


Figure 1. Correlation analysis.

The average score of the participants on the loneliness scale was 10.13±5.20 (min: 0-max: 22), and the average score on the geriatric pain scale was 43.42±21.64 (min: 4.76-max:

Table 1. Sociodemographic characteristics of participants.

		n	%
Sex	Male	181	47.1
	Female	203	52.9
Marital Status	Married	266	69.3
	Single	10	2.6
	Widowed	108	28.1
Educational Level	Literate (no formal education)	155	40.4
	Primary School	127	33.1
	Secondary School	50	13.0
	High School	36	9.4
	University	13	3.4
	Master's Degree	3	.8
Income Status	Income is less than expenses	105	27.3
	Income equals expenses	213	55.5
	Income is more than expenses	66	17.2
Presence of Chronic Illity	Yes	312	81.3
	No	72	18.8
Cardiovascular Disease	Yes	236	61.5
	No	148	38.5
Endocrine Disease	Yes	97	25.3
	No	286	74.7
Neurological Disease	Yes	61	15.9
	No	323	84.1
Psychiatric Disorder	Yes	25	6.5
	No	359	93.5
Respiratory Disease	Yes	31	8.1
	No	353	91.9
Cancer	Yes	11	2.9
	No	373	97.1
Musculoskeletal Disorder	Yes	38	9.9
	No	346	90.1
Urological Disease	Yes	36	9.4
	No	348	90.6
Renal Failure	Yes	15	3.9
	No	369	96.1
Other Diseases	Yes	33	8.6
	No	351	91.4
Living Arrangement	With spouse	251	65.4
	With children	78	20.3
	With relatives or friends	10	2.6
	Alone	45	11.7
Has a Caregiver	Yes	27	7.0
	No	357	93.0
Frequency of analgesic use	15 times or more per month	82	21.4
	8-14 times per month	100	26.0
	2-7 times per month	151	39.3
	Once a month or less	51	13.3

Note: The total number of chronic diseases exceeded 385 because some participants had more than one chronic condition.

95.20). A statistically significant difference was observed when the scores from the loneliness and pain scales were compared according to the frequency of analgesic use among older adults. An increased frequency of analgesic use was associated

Table 2. Comparison of loneliness and pain scores at analgesic use frequency.

	Loneliness	Pain
	Mean±SD	Mean±SD
15 times or more per month ^{a,b,c}	13.39±4.93	62.02±17.86
8-14 times per month ^a	10.88±4.38	47.71±16.93
2-7 times per month ^b	9.43±4.63	35.79±19.36
Once a month or less ^c	5.51±4.87	27.67±18.55
p	<0.001	<0.001

Different superscript letters (a, b, c) indicate significant differences between groups according to Bonferroni post hoc test ($p < 0.05$).

with higher scores on both scales. People who used 15 or more painkillers per month had statistically higher scores on both scales (Table 2).

Multivariable linear regression analysis was conducted to predict pain scores among older adults, and the model was found to be statistically significant ($p < 0.001$). The coefficient of determination for the model was $R^2 = 0.283$. The dependent variable in the model was the total score from the pain scale, whereas the independent variables were the loneliness scale score, age, gender (reference: male), and presence of chronic illness (reference: no). Among the variables included in the model, loneliness score, gender, and presence of chronic illness significantly contributed to the prediction. It was found that A one-point increase in the loneliness scale score was associated with a 1.72-point increase in the pain score. Female sex was associated with a 4.63-point increase in the pain score compared to male sex. Having a chronic illness was associated with a 9.65-point increase in the pain score compared with those without a chronic illness (Table 3).

A multinomial logistic regression analysis was performed to estimate the frequency of monthly analgesic use. The results indicated that the model was significant (*model fitting information*, $*p^* < 0.001$), exhibited adequate data fit (deviance, $*p^* = 0.393$), and demonstrated sufficient goodness-of-fit (*Cox and Snell* = 0.396). Independent of age, sex, and pain score, each one-unit increase in the loneliness scale raised the risk of using analgesics 15 or more times per month by 1.29-fold, the risk of using analgesics 8–14 times per month by 1.24-fold, and the risk of using analgesics 2–7 times per month by 1.22-fold, compared to the group using one or fewer analgesics per month. Similarly, a one-unit increase in pain score increased the risk of using analgesics 15 or more times per month by 1.073-fold and the risk of using analgesics 8–14 times per month by 1.035-fold, again relative to the group using one or fewer analgesics per month. Additionally, the presence of chronic disease elevated the risk of using analgesics 15 or more times per month by 8.51-fold, the risk of using analgesics 8–14 times per month by 9.95-fold, and the risk of using analgesics 2–7 times per month by 2.77-fold, compared to the group using one or fewer analgesics per month. Finally, sex and age had no significant effect on monthly anal-

gesic use (Table 4).

DISCUSSION

The high prevalence of multiple chronic conditions (comorbidities) among older adults is a primary factor contributing to increased polypharmacy. Pietraszek et al. reported that analgesics ranked second among the most frequently used medications in elderly subjects, with a usage rate of 46.0% [14]. This study investigated the relationships among loneliness, chronic pain, and analgesic use in the elderly subjects. Our findings demonstrated a moderate, positive, and significant correlation between loneliness and pain levels. Each one-unit increase in the loneliness scale score corresponded to a 1.72-unit increase in the pain score. The significance of this finding, coupled with the lack of prior studies directly comparing these two conditions (loneliness and pain), underscores the importance of this research and highlights the need for further detailed investigations. Independent of age, sex, and pain score, each unit increase in the loneliness score increased the risk of using analgesics ≥ 15 times per month by 1.29 times; 8–14 times per month by 1.24 times; and 2–7 times per month by 1.22 times. In a study by Vyas et al. involving 15,302 older adults, the prevalence of loneliness was 13.7%. Those living alone had higher rates of opioid (odds ratio [OR] = 1.61) and benzodiazepine (OR = 1.66; 95% confidence interval [CI]: 1.21–2.28) use, whereas no significant difference was observed for non-opioid analgesics (OR = 1.05; 95% CI: 0.92–1.19). Additionally, loneliness was significantly associated with intermittent medication use (OR = 1.27) [15]. Various studies in the literature have also reported that feelings of loneliness in this age group are particularly linked to the regular use of opioids and benzodiazepines [16,17]. International studies present mixed findings: for instance, in the United States, living alone was not significantly associated with increased use of these medications [18], whereas a positive correlation was observed between loneliness and analgesic use frequency in Germany [19]. However, these studies generally report the relationship mainly for opioid analgesics, with nonopioid analgesics showing less clear associations. Our study did not differentiate analgesic use by opioid versus non-opioid categories; however, non-opioid analgesics are presumed to be more commonly used given that health policies in our country discourage opioid use unless strictly necessary. Therefore, we believe that non-opioid medications also contributed to the significant findings of our study. Differences in findings across studies may reflect varying national drug use policies. Im et al. analyzed the relationship between loneliness and polypharmacy by sex in a study including 2,348 older adults, revealing a stronger association in women. The prevalence of polypharmacy was highest in the severe loneliness group among women (44.1%) and men (42.5%). Moreover, antidepressant use was reported to be more common in lonely women [20]. Sönmez et al. also found that elderly individuals with polypharmacy had

Table 3. Multivariate linear regression analysis for predicting pain scores.

Predictor	Estimate	SE	t	p	Collinearity Statistics	
					VIF	Tolerance
Intercept ^a	-0.0842	10.001	-0.00842	0.993		
Loneliness score	1.7201	0.191	8.98785	<.001	1.12	0.892
Age	0.2107	0.140	1.50156	0.134	1.13	0.886
Sex						
Female--Male	4.6339	1.911	2.42494	0.016	1.03	0.971
Chronic Disease						
Yes--No	9.6565	2.502	3.86001	<.001	1.08	0.927

Table 4. Multinomial logistic regression analysis for estimating the frequency of analgesic use.

Frequency of analgesic use		B	p	O.R.	95 percent CI for O.R.	
					Lower Bound	Upper Bound
15 times or more per month	Intercept	-11.331	<0.001			
	Age	.063	0.067	1.065	.996	1.139
	Loneliness	.262	<0.001	1.299	1.168	1.446
	Pain score	.071	<0.001	1.073	1.046	1.102
	[Sex=female]	-.220	.629	.803	.329	1.959
	[Sex=male, ref]	0 ^b	.	.	.	.
	[Chronic disease=yes]	2.142	0.001	8.515	2.348	30.883
	[Chronic disease=no, ref]	0 ^b	.	.	.	.
8-14 times per month	Intercept	-6.367	0.008			
	Age	.031	0.327	1.032	.969	1.099
	Loneliness	.218	<0.001	1.244	1.126	1.374
	Pain score	.035	.003	1.035	1.012	1.059
	[Sex=female]	-.119	.771	.888	.399	1.977
	[Sex=male, ref]	0 ^b	.	.	.	.
	[Chronic disease=yes]	2.298	<0.001	9.952	3.380	29.303
	[Chronic disease=no, ref]	0 ^b	.	.	.	.
2-7 times per month	Intercept	-2.008	.348			
	Age	.011	.709	1.011	.954	1.071
	Loneliness	.206	<0.001	1.229	1.120	1.347
	Pain score	.006	.566	1.006	.985	1.027
	[Sex=female]	-.087	.812	.917	.448	1.876
	[Sex=male, ref]	0 ^b	.	.	.	.
	[Chronic disease=yes]	1.022	.007	2.779	1.319	5.857
	[Chronic disease=no, ref]	0 ^b	.	.	.	.

a. The reference category is: Once a month or less. b. 0^b indicates the reference category used in the multinomial logistic regression model.

higher loneliness levels, with loneliness being more prevalent in women [21]. In contrast, our study found that the relationship between loneliness and analgesic use was independent of sex. Because our study assessed only analgesic use, the lack of a sex effect might be due to this narrower scope. Svensson et al. investigated the impact of polypharmacy on loneliness and reported that individuals with polypharmacy had a significantly higher likelihood of developing loneliness than those without polypharmacy (odds ratio [OR]: 1.37). The probability of loneliness was 28% and 35% in those without and with polypharmacy, respectively, indicating that polypharmacy increases the risk of loneliness and social isolation in older adults [22]. These findings support the existence of a relationship between polypharmacy and loneliness. While aging is an important risk factor for loneliness, polypharmacy is more com-

mon in older age. Although age could be a confounding factor, our results indicate that loneliness is strongly associated with increased use of analgesics regardless of age. Thus, the hypothesis that polypharmacy triggers loneliness is less clinically plausible than loneliness influencing medication use. Higher frequency of analgesic use correlates with higher loneliness scores. Loneliness may induce prolonged use of medications, including those with high addiction potential, among older adults individuals. Clinicians should consider loneliness as a significant factor when evaluating elderly patients and exercise caution when prescribing medications. Comprehensive research is needed to elucidate the effect of loneliness on medication-taking behaviors, with particular emphasis on psychosocial factors.

Limitations

This study has several limitations. First, the regression models classified chronic diseases as a single variable. This grouping included musculoskeletal conditions, which may independently increase the use of analgesics and could have acted as a confounding factor in the analysis. Second, the data were collected between April and June 2025, which may not capture seasonal variations in loneliness and pain—both of which may be more pronounced during the winter months. Finally, we did not collect data on mood status and polypharmacy, which represents an additional limitation and suggests the need for further, comprehensive studies on this topic

CONCLUSION

This study revealed a significant positive association between loneliness and chronic pain. The data indicate that as loneliness levels increase, self-reported pain scores also rise. Moreover, loneliness increases the frequency of analgesic use independently, regardless of age, sex, and current pain intensity. These results suggest that loneliness is not merely a psychological condition but may be a critical determinant in the management of chronic pain. Elevated loneliness levels may lead to more frequent and potentially unnecessary analgesic use in older adults coping with chronic pain. Therefore, assessing loneliness and strengthening social support mechanisms in elderly populations may mitigate the indirect effects of loneliness and promote more rational pain management. Integrating psychosocial evaluations into standard clinical practice is crucial for preventing inappropriate medication use. In conclusion, loneliness, chronic pain, and excessive analgesic use have a multifaceted and complex relationship. Prospective studies with large sample sizes are needed to better understand the underlying mechanisms of these associations. Such research can provide valuable insights that may guide both clinical practice and health policy development.

Ethics Committee Approval: This study was approved by the Ethics Committee of Bolu Abant İzzet Baysal University Faculty of Medicine, İzzet Baysal Training and Research Hospital (Decision No: 2025/150, Date: 08.04.2025).

Informed Consent: Written informed consent was obtained from all participants included in the study.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors declare that they have no conflict of interest.

Author Contributions: A.T.Ö.; Conception, Design, Fundings, Materials, Analysis and/or Interpretation, Literature Review, Writing. Y.K.; Conception, Design, Supervision, Fundings, Materials, Critical Review. M.B.; Conception, Design, Supervision, Fundings, Materials. M.K.; Supervision, Data Collection and/or Processing, Literature Review Writing, Critical Review.

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