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Original Article

Association between Chronic Pain and Depression among the Elderly of Amirkola City, Northern Iran

Alijan Ahmadi Ahangar [1 *], Seyed Reza Hosseini [2], Farzan Kheirkhah [2], Masoumeh Karimi[3], Payam Saadat [4], Ali Bijani [2], Shayan Alijanpour [5], Hamed Hosseinzadeh [1], Sakineh Faraji [1]

[1.] Mobility Impairment Research Center, Babol University of Medical Sciences, Babol, Iran
[2.] Social Determinants of Health Research Centre, Babol University of Medical Sciences, Babol, Iran
[3.] Student Research Committee, Babol University of Medical Sciences, Babol, Iran
[4.] Ayatollah Rouhani Hospital, Babol University of Medical Sciences, Babol, Iran
[5.] Emergency Medical Service Center, Babol University of Medical Sciences, Babol, Iran

A B S T R A C T

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Introduction: Chronic pain and depression are two of common geriatric disorders. The aim of this study was to investigate the association between chronic pain and depressive symptoms in older people in Amirkola.

Methods: This cross-sectional study is part of Amirkola Health and Aging Project. It is an ongoing cohort project which was being conducted from 2011 on all people aged 60 and above in Amirkola city in northern part of Iran. One thousand six hundred and four older people were included in the study. Data related to chronic pains and their locations were collected using questionnaire by inquiring the elderly while depressive symptoms were gathered based on Geriatric Depression Scale. Data were analyzed by chi-square test and logistic regression in SPSS.

Results: The prevalence of chronic pain, depressive symptoms, and co-occurrence of chronic pain and depressive symptoms among the elderly was respectively 84.4%, 43.5%, and 39.8%. The odds ratio of having chronic pain in depressed people was more than non-depressed people (OR = 2.88; 95% CI = 2.11-3.94). Prevalence of chronic pain in hands, wrists, elbows, shoulders, neck, hip joints, knees, ankles, legs, and back were noticeable in people with symptoms of depression compared to those without depressive symptoms. In regression model, severity of depressive symptoms (OR = 1.73 (1.23 - 2.45)), being female (OR = 2.40 (1.68 - 3.45)), increasing age (OR = 1.03 (1.01 - 1.05) and having chronic diseases (OR = 1.24 (1.13-1.35) were among the important variables that influenced chronic pain.

Conclusion: This study showed, especially in women, significant association between chronic pain and depressive symptoms. It is essential to take prophylactic and treatment measures suitable for their control and treatment.

Keywords: Depression, Chronic Pain, Aged

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Introduction

Increased life expectancy has been one of the great achievements of the new century. About 700 million people of the world's population are the elders above 60 years of age and by 2020, this figure will amount to more than one billion (1). According to the Statistical Center of Iran, it is expected that the number of elders in Iran reaches more than 25 million by 2050 (2). Chronic pain is a major problem in public health. They affect physical and mental health of people and reduce their quality of life (3).

* **Corresponding Author:** Mobility Impairment Research Center, Babol University of Medical Sciences, Babol, Iran. **Tel:** +989111111202**, Email address:** ahmadiahangaralijan@yahoo.com

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The International Association for the Study of Pain has defined chronic pain as a pain with no apparent biological value and without severe tissue lesions that extends beyond the time of the treatment of a disease. Generally, pains lasting more than 3 months are also classified as chronic pain (4). The most common chronic pain in the elderly include musculoskeletal pain (joints, the lower and the lower extremities). Studies also show that the most important mental illness among the elderly is depressive disorder (6). Depression is known as one of the most common sensational and emotional problems among elders (7). There is much controversy over the relationship between depression and chronic pain. Some studies support the idea that depression puts people at the risk of developing chronic pains. On the other hand, depressed patients report significant degrees of pain (8). The prevalence of chronic pain in patients who are under treatment for depression is reported between 51.8 to 59.1% (9). On the other hand, some research supports the theory that depression appears following chronic pains (10). Some other studies assume a mutual relationship between pain and depression. This is because depression and chronic pain interact with each other in a way that worsens the other (11). Some researchers believe that the presence of both pain and depression may be assumed as a pain-depression syndrome rather than the existence of two independent disorders (12). However, depression imposes high burden on patients with chronic pain, their family and care giver, and health systems. In chronic pains, depression increases the costs related to disability and use of health care (13). Having considered that depression, in addition to being one of the diseases associated with chronic pain at least in 13% of the elderly, it also is one of risk factors of chronic pain in elderly (4). The main objective of this study was to assess the association of chronic pains and depression among the elderly of Amirkola City.

Methods

Participants and the study protocol

This cross-sectional descriptive study came from the Amirkola Health and Aging Project (AHAP) which was being conducted from 2011 on all people aged 60 and above in Amirkola city (14). From the total of 2,234 people aged 60 and above, 1616 people participated in this study (response rate = 72.3%). By providing information on the study, people were invited to participate in the study through telephone calls and home visits. With considering exclusion criteria, 1604 older adults consisting of 876 men and 728 women were included in the present study.

All people aged 60 and above in Amirkola who completed all questionnaires regarding study variables were entered in the study. Moreover those who had mental illnesses or cases such as cognitive impairments were excluded.

Measures

The data were collected using a questionnaire composed of demographic characteristics including: age, gender, drugs, and history of various diseases. Chronic musculoskeletal pain and its site were assessed using a questionnaire. The participants were asked whether they had experienced persistent pain (lasting for at least three months) within the past six months (15) in the following sites: hands, wrists, elbows, shoulders, face, jaw, neck, hips, knees, ankles, legs and back. All questionnaires were completed through conducting interviews with the participants. The presence of depressive symptoms in the elderly was examined using a standard Geriatric Depression Scale (GDS) questionnaire validated previously in Iranian population which contains 15 questions and each question rates one point (16-18). Ten questions indicate the presence of depression when answered positively, while the rest (question numbers 1, 5, 7, 11, 13) indicate depression when answered negatively. A cut-off of five or more symptoms was defined as having depressive symptoms. Depressive symptoms were divided into mild (5-8), moderate (9-12), and severe (13-15). Using this cut-off, the test sensitivity was 92% and specificity was 89% (4, 16). The Cronbach's alpha of this questionnaire was 0.81 in the elderly population of Amirkola.

To evaluate cognitive status, we used Mini Mental State Examination. It contains 11 items and evaluates five cognitive functions, including orientation, attention, memory, language and visual-spatial skills. The maximum score is 30 points and individuals with score of 25 or lower indicate the presence of cognitive impairment (19).The validity and reliability of this test for Iranian patients have already been approved (20).

Serum vitamin D levels (25- hydroxy vitamin D) were measured through laboratory evaluation of morning blood samples of the elderly using ELISA test in Cellular and Molecular Biology Research Center, Babol University of Medical Sciences.

Ethical considerations

This study was approved by the Ethics Committee of the Research Institute of Babol University of Medical Sciences(ethic number: 2707).All the elders who participate in AHAP were taken informed consent.

Data analysis

Collected information was entered into SPSS and analyzed by chi-square test to determined possible association between the cases in question. Data were also analyzed using logistic regression to determine the association of chronic pain in different areas with symptoms of depression. P-Value <0.05 was considered significant.

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Results

Of 1604 older adults were studied, 876 males (54.6%) and 728 were females (45.3%). The mean age of respondents was 69.35 ± 7.41 years (the range of 60 to 92), and the majority of people were in the age group of 60 to 64 years. The prevalence of chronic pain among the elderly of Amirkola was 84%. The prevalence of chronic pain by sex was statistically significant (684 (78.1 %) male vs. 670 (92 %) female, $p < 0.001$). The prevalence of depressive symptoms among the elderly was 43% and significant difference with sex (256 (29.2 %) male vs. 441(60.6 %) female, $p < 0.001$). Moreover, associated chronic pain with depressive symptoms among the elderly of Amirkola was 638 (39.8%) and difference was significant by sex (222 (25.3%) male vs. 416 (57.1%) female ($p = 0.000$). The risk of chronic pain in older adults with depressive symptoms, both in general and in each of the two genders, was significantly higher than non-depressed elders. In general, the risk of chronic pain among depressed people was 2.88 times higher than non-depressed ones (CI = 2.11-3.93, $p < 0.001$). This risk was 2.16 (CI = 1.25 - 3.72, $p = 0.005$) in female and 2.23 (CI = 1.49 - 3.34, $p < 0.001$) in men. The Results showed that with increase in depression scale, prevalence of chronic pain increases in total and female (Table 1). There was a significant association between the prevalence of chronic pain in different parts of the body and symptoms of depression (except in chronic pain where the information was insufficient). The risk of chronic pain in any of these areas among depressed people was higher than non-depressed people. For example, the risk of chronic pain in hand among depressed patients was 2.34 times higher than those without depressive symptoms (CI = 1.85 - 2.96, $p < 0.001$) (Table 2).

The logistic regression analysis confirmed that having depressive symptoms, being female, age and number of chronic diseases were risk factors and vitamin D had protective effect for chronic pain (Table 3).

Discussion

The prevalence of chronic pain among the elderly of Amirkola was 84.4 % that statistically significant in female while this trend was less significant in European studies (31.8% to 69.8%) (21-22). This sexual disproportionality can be attributed to sex hormones, endogenous pain modulation system, and cognitive/emotional factors between male and female.

In this study, the chronic pain was associated with depression in 39.8% cases which was statistically more prominent in females than males (57.1% versus 25.3%). Also in this study, with increasing in severity of depressive symptoms, prevalence of chronic pain increased that was statistically significant in females. In other studies, the prevalence of chronic pain increased in accordance with increasing depression scale (21-22).

Differences between female and male regarding the prevalence of chronic pain and associated depression obtained in this study were consistent with Calvo et al. study (22). Females may express symptoms more than males. This causes psychological distress and raises the risk of chronic pain and associated depression (22). Chronic knee pain (63%), back pain (45.4%), and pain in legs (43.5%) had the highest prevalence, because of most people are farmer that is considered as a heavy activity in this area.

Furthermore, the results indicate a significant association between depression and chronic pain in the studied areas (except jaw and face), and the risk of chronic pain in these areas among people with depression symptoms was higher than non-depressed people. As the results show, 71.3% of people with depressive symptoms had chronic knee pain such that the risk of chronic knee pain in people with depressive symptoms was 1.91 times higher than individuals without symptoms of depression that consistent with Han study (23).

Table 1. Distribution of chronic pain in the Amirkola elderly, according to subgroups of GDS score by gender

GDS Score		Without chronic pain N (%)	With chronic pain N (%)	P
Total GDS score	**Normal**	191 (21.1)	716 (78.9)	< 0.001
	Mild depression	40 (9.1)	398 (90.9)	
	Moderate depression	14 (7.9)	163 (92.1)	
	Severe depression	5 (6.1)	77 (93.95)	
Female	**Normal**	33 (11.5)	254 (88.5)	0.021
	Mild depression	18 (7.1)	237 (92.9)	
	Moderate depression	5 (4.15)	116 (95.9)	
	Severe depression	2 (3.1)	63 (96.9)	
Male	**Normal**	158 (25.5)	462 (74.5)	< 0.001
	Mild depression	22 (12)	161 (88)	
	Moderate depression	9 (16.1)	47 (73.9)	
	Severe depression	3 (17.6)	14 (82.4)	

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Table2. The risk of chronic pain in different parts of the body in terms of depressive symptoms among the elderly of Amirkola, Northern Iran

Region	Subgroup	Individuals with chronic pain N (%)	Individuals without chronic pain N (%)	Odds ratio	95%Cl	P
Hand	**Depressed**	226 (32.4)	471 (67.6)	2.34	(1.85-2.96)	
	Non-depressed	154 (17)	753 (83)	1	-	< 0.001
Wrist						
	Depressed	81 (11.6)	616 (88.4)	2.16	(1.50 -3.10)	< 0.001
	Non-depressed	52 (5.7)	855 (94.3)	1	-	
Elbow						
	Depressed	105 (15.1)	592 (84.9)	3.65	(2.51-5.30)	< 0.001
	Non-depressed	42 (4.6)	865 (95.4)	1	-	
Shoulder						
	Depressed	320 (45.9)	377 (54.1)	1.87	(1.52 -2.29)	< 0.001
	Non-depressed	283 (31.2)	624 (68.8)	1	-	
Face						
	Depressed	5 (0.7)	692 (99.3)	1	(1.01-1.02)	0.011
	Non-depressed	0 (0)	907 (100)		-	
Neck						
	Depressed	222 (31.9)	475 (68.1)	1	(1.65-2.63)	<0.001
	Non-depressed	166 (18.3)	741 (81.7)	-	-	
Hip joints						
	Depressed	215 (30.8)	482 (69.2)	2.08	(1.64 -2.63)	< 0.001
	Non-depressed	160 (17.6)	747 (82.4)	1	-	
Knees						
	Depressed	497 (71.3)	200 (28.7)	1.90	(1.54 -2.35)	< 0.001
	Non-depressed	513 (56.6)	394 (43.4)	1	-	
ankles						
	Depressed	90 (12.9)	607 (87.1)	1.82	(2.54-1.31)	< 0.001
	Non-depressed	68 (7.5)	839 (92.5)	1	-	
Legs						
	Depressed	357 (51.2)	340 (48.8)	1.74	(1.42-2.12)	< 0.001
	Non-depressed	341 (37.6)	566 (62.4)	1	-	
Back						
	Depressed	368 (52.8)	329 (47.2)	1.69	(2.06-1.38)	< 0.001
	Non-depressed	361 (39.8)	546 (60.2)	1	-	

Table 3. Odds ratio and 95% confidence interval for associations between depressive symptoms and chronic pain in older people in Amirkola

variables	OR	95%CI	P
Depressive symptoms	1.73	1.23-2.45	0.002
Gender	2.40	1.68-3.45	< 0.001
Age	1.02	1.01-1.04	0.026
Cognitive impairment	1.02	0.67-1.07	0.312
Social support	0.95	0.90-1.01	0.061
Vitamin D level	0.49	0.26-0.90	0.023
Number of chronic diseases	1.23	1.12-1.35	< 0.001

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Phyomaung study showed a strong association between depression and knee pain and indicated that depression plays a major role in knee pain (24). In Kroenke study change in depression severity was diagnosed as a strong predictor of knee pain severity following that (25). Moreover, 52.8% of people with symptoms of depression suffered chronic back pain. Hence, the risk of chronic back pain in people with depressive symptoms versus those without such symptoms was 1.692. The results are consistent with other studies in this field. Glombiewski study showed higher degrees of depression were associated with more severity of pain and pain-related disability and more than one third (36.4%) of them had depression and pain comorbidity (26). In Stubbs study there was a significant association between severity of depression and back pain (OR = 2.21) (27). Pinheiro study showed that depressive symptoms increase the risk of developing back pain (OR = 1.59; 95% CI = 1.26-2.01) (9, 28-29). In Gerrits study there was a significant difference between pain in the face, mouth and depression (11).

Conclusion

In conclusion, there was a strong association between chronic pain and depression. In addition, the prevalence of chronic pain, depression, and chronic pain and depression in female was significantly higher than men. Given the high prevalence of depression, pain and comorbidity among the elderly of Amirkola compared to the international community, it is necessary to take measures and treatment procedures to control and treat them.

Study limitations

This study has a few limitations that should be mentioned. The cross-sectional nature of the study that makes difficult to find causal relationships. Data about variables were not based on clinical findings and self-reported data might lower its accuracy.

Conflict of interest

There was no conflict of interest.

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Authors' contribution

Study design: AAA, SRH, FK, PS

Interpretation of data: AAA, SRH, PS, AB, SA

Acquisition of data: SRH, FK, MK, SA, HH, SF

Revising the article: AAA, SRH, FK, MK, SA, HH, SF

Analysis: AB

Final approval: AAA, SRH

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