

Relationship between physical activity and disability due to pain in seniors: cross-sectional study

Relação entre atividade física e a incapacidade pela dor em idosos: estudo transversal

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ABSTRACT

BACKGROUND AND OBJECTIVES: The practice of physical activities brings benefits to physical and mental health, and in the senior population it can contribute to reducing pain complaints. This study aimed to assess the relationship between the level of physical activity and pain disability in seniors.

METHODS: This is a cross-sectional study carried out with senior people living in the city of Florianópolis, Santa Catarina, Brazil. The selection of the seniors was carried out through simple random sampling, totaling 410 respondents. The Modified Baecke Questionnaire for Seniors (MBQS) was used to classify the level of physical activity, also classifying the seniors as active or sedentary. For the analysis of disability due to pain, the Pain Disability Index (PDI) was used.

RESULTS: Of the 410 seniors participants in this study, 58.5% were female, with a mean age of 72.21±7.0 years. 41% of the seniors were considered active or very active. The sedentary seniors were those who presented greater physical limitations due to pain ($p<0.00$). Network analysis showed that greater pain limitations were related to leisure, social, and vital activities. It was observed that the higher the level of physical activity, the lower the limitation due to pain ($p<0.01$).

CONCLUSION: Physical activity contributes to the seniors' physical health and can avoid greater risks of pain-related disability.

Keywords: Pain, Exercise, Mobility limitation.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A prática de atividade física traz benefícios para a saúde física e mental e, na população idosa, pode contribuir para reduzir as queixas de dor. Neste estudo, foi verificado se o nível de atividade física poderia influenciar a limitação pela dor em indivíduos idosos.

MÉTODOS: Trata-se de um estudo transversal, realizado com idosos residentes no município de Florianópolis, Santa Catarina, Brasil. A seleção dos idosos foi realizada por meio de amostragem aleatória simples, totalizando 410 entrevistados. Para a classificação do nível de atividade física, foi utilizado o Questionário Baecke Modificado para Idosos (QBMI), que classificou os idosos em ativos ou sedentários. Para a análise da incapacidade pela dor, foi utilizado o Índice de Incapacidade Relacionada com a Dor (*Pain Disability Index* – PDI).

RESULTADOS: Dos 410 idosos participantes deste estudo, 58,5% foram mulheres, com média de idade de 72,21±7,0 anos. Foram considerados ativos ou muito ativos 41% dos idosos. Os idosos sedentários foram os que apresentaram maior limitação física pela dor ($p<0,01$). A análise de rede mostrou que maiores limitações pela dor foram relacionadas a atividades de lazer, sociais e para realização de necessidades básicas. Observou-se que quanto maior o nível de atividade física, menor foi a limitação pela dor ($p<0,01$).

CONCLUSÃO: A atividade física contribui para a saúde física dos idosos com dor crônica, podendo evitar riscos maiores de incapacidade relacionada à dor.

Descritores: Dor, Exercício físico, Limitação da mobilidade.

INTRODUCTION

The prevalence of pain among seniors ranges from 37% to 70%, therefore, it is a frequent symptom, and its presence during the aging process produces a negative impact on the quality of life (QoL) and on the productivity of the individuals affected¹. Pain often results in partial or total functional limitations, greatly impacting the activities of daily living. These limitations can lead the seniors to reduce their social and family interaction, and affect their functional performance. In addition, seniors with pain tend to be more sedentary, reclusive and more likely to develop

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HIGHLIGHTS

- The pain limitations showed an inversely proportional relationship to the level of physical activity of seniors, showing that, besides the importance of exercise, it is necessary to have an active life in all aspects.
- Physical activity, besides reducing pain, can improve several aspects of the seniors' life, contributing to their autonomy and better family and social relationships.
- The practice of physical activity showed no relationship with age, proving that even the oldest old should be encouraged to be more active as a way to reduce pain and vulnerability.

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symptoms of anxiety and depression, which, when present, exacerbate the intensity of perceived pain².

Pain can be the cause of physical inactivity in seniors, but the regular practice of exercises contributes to reduce body pain, prevent diseases and improve the general health status, and should be encouraged throughout life³. Moreover, physical activity can promote better QoL and delay processes and losses related to aging, as well as prevent non-transmissible chronic diseases³. The importance of physical activities in the seniors is present into World Health Organization guidelines and into public policies, such as the Brazilian Ministry of Health's prevention and health promotion programs, which aim at encouraging the seniors to be more active as a way to preserve their autonomy for daily tasks and prolong their independence⁴.

For this reason, it is believed that physical activity is a fundamental factor for the improvement of pain in seniors and one of the main actions that are allied to the process of healthy and active aging⁵.

Despite the vast worldwide literature on the subject, there are few studies that propose to analyze whether the level of physical activity could influence the limitation associated with pain reported by the seniors. Thus, the objective of this research was to evaluate the relationship between the level of physical activity and disability by pain in seniors.

METHODS

A cross-sectional observational study, carried out with senior residents in the municipality of Florianópolis, Santa Catarina State. The original text was prepared based on STrengthening the Reporting of OBservational Studies in Epidemiology (STROBE)⁶ guidelines. Data collection was carried out in Health Units and fitness centers in the city, during the period from December 2021 to June 2022. The selection of senior individuals was performed by simple random sampling, considering the number of the senior population of Florianópolis (48.423 people), according to the last census conducted by the *Instituto Brasileiro de Geografia e Estatística* (Brazilian Institute of Geography and Statistics – IBGE, 2010). To calculate the sample size, a 95% confidence level was determined, a sampling error of 5% and, considering the population universe of a large city, it was assumed to be a heterogeneous population. Thus, the minimum number of interviewees was set at 382 seniors.

The inclusion criteria were: age over 65 years and residing in Florianópolis/SC. Participants would be excluded if they could not communicate to answer the questionnaires or if they did not accept to answer all the questions.

The study participants were separated into active or sedentary. For this classification, the Modified Baecke Questionnaire for Seniors (MBQS) was used. MBQS is applied in the form of an interview, taking as reference the last 12 months, and is divided into three sections: physical activities at home (PAH), performance in sports activities (PSA) and leisure-time physical activities (LTPA). By summing the specific scores assigned to the questions grouped in each of the sections of the questionnaire, scores equivalent to 16 points are established. The seniors were classified as “very active” when their score was ≥ 16.18 ; “active”

when their score was between 9.12 and 16.17; and “sedentary” when their score was ≤ 9.117 . The present study considered only two groups (active and sedentary), with the very active seniors being included in the active group.

The Pain Disability Index (PDI) was used to analyze pain-related disability, which is a self-administered questionnaire created to assess seven important dimensions of pain-related disability and functional interference. PDI consists of seven items, with 11-point numerical rating scales (zero-10) which assess pain-related disability in family and household responsibilities, leisure activities, social activities, work, sexual behavior, personal care, and life activities.

A weighted, non-directional network analysis was performed to visually explore the relationships between the multiple variables studied using the JASP⁷ software. The network analysis encompassed the relationship of pain limitations in relation to the level of physical activity. The relationship between variables is demonstrated by edges (lines). The thicker the lines, a stronger relationship is demonstrated. White edge lines indicate negative relationships, while dark lines demonstrate positive relationships. Each analyzed variable is presented in a node (graphic structure in the shape of a circle), and the closer the nodes are, the stronger the relationship between them.

The individuals who agreed to participate in the study answered the questionnaires only once, after completing the Free and Informed Consent Term (FICT). This research was approved by the Ethics Committee on Human Research of the *Universidade do Oeste de Santa Catarina* (Western Santa Catarina State University - Unoesc), Opinion Number 5.060.277.

The Shapiro-Wilk normality test was performed and the SPSS 22.0 software was used. Categorical data were analyzed by the Chi-squared test and quantitative data by the independent t-test. Correlation was analyzed using Pearson's test. Significance was considered when $p \leq 0.05$.

RESULTS

A total of 410 seniors participated in the study, with a mean age of 72.21 ± 7.0 years; 58.5% were female, 41% were considered active or very active and 59% were sedentary. There was no difference considering the age of active seniors (mean 72.0 ± 6.9 years) and sedentary seniors (mean 72.3 ± 7.2) ($p=0.71$). There was no difference in physical activity level between men and women ($p=0.84$).

Table 1 shows the relation between pain and the level of physical activity, considering the active or sedentary seniors, in which it is observed that the sedentary individuals had much higher scores in the pain limitation instrument.

Table 1. Pain limitation in sedentary and active seniors.

Variables	Pain limitation (mean \pm SD)	p-value
Active	3.74 \pm 0.4	$\leq 0.004^*$
Sedentary	5.67 \pm 0.4	

Data expressed as mean \pm standard deviation (SD); *Independent t-test.

When analyzing the total pain score correlation with physical activities at home, sports activities and free time activities, it was

found that the practice of sports activities had a negative and significant correlation ($r=-0.134$; $p<0.01$), showing that the more time dedicated to the practice of sports, the less pain complaints the seniors reported (Table 2). Table 2 also shows that the level of physical activity, that is, the sum of all activities performed by the seniors, in addition to physical exercise, had an inverse correlation with pain limitation. Thus, the more active the senior individual was, the lower was their PDI score.

Table 2. Relationship of pain limitation with physical activities at home, performance of sports activities, and leisure time activities.

Variables	Pain limitation	p-value
Household Activities	$r= 0.007$	0.895
Free-time activities	$r= - 0.071$	0.154
Sports activities	$r= - 0.134$	$\leq 0.01^*$
Total sum of physical activities performed	$r= - 0.2$	$\leq 0.01^{**}$

*Pearson's Correlation (r).

Table 3. Scores of home physical activities, sports activities and leisure time activities, classified as sedentary and active.

Variables	Active	Sedentary	p-value*
Physical activities at home	1.4 ± 0.8	1.3 ± 0.0	≤ 0.413
Performance in sports activities	4.7 ± 0.3	0.9 ± 0.1	≤ 0.001
Leisure-time physical activities	8.6 ± 0.4	1.1 ± 0.1	≤ 0.001

*Independent t-test.

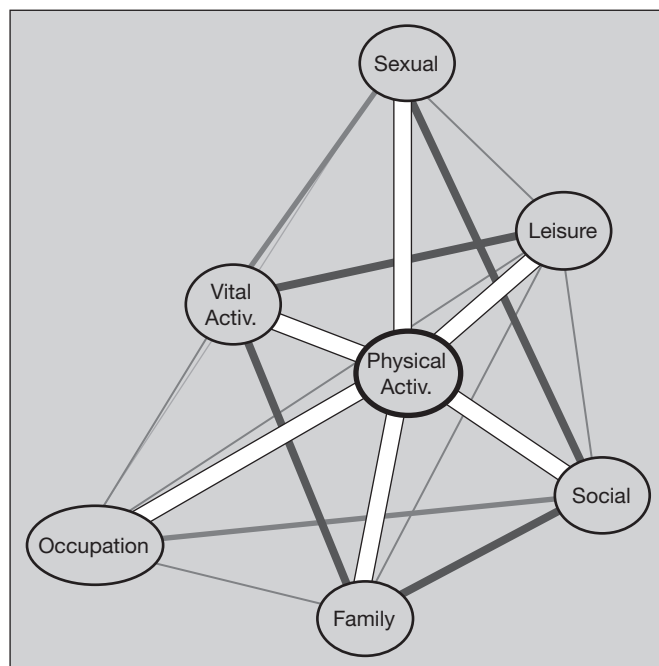


Figure 1. Weighted, non-directional network analysis of pain limitations in relation to physical activity level.

The white edge lines indicate negative relationships and dark lines show positive relationships. The thicker the line, the stronger the relationship.

Table 3 shows the relationship between the scores of physical activities at home and sports, considering the seniors as sedentary and active. It is noteworthy that the active seniors perform not only many more sports activities, but also more leisure activities and free time. In Figure 1, the network analysis showed that major limitations associated with pain were related to leisure, social, and vital activities (basic needs), and important limitations were observed for work-related activities (occupation), sexual activity, and family activities.

DISCUSSION

The main results in this study show that most senior individuals were sedentary, even when any type of physical activity was considered (household activities, leisure or sports), and not exclusively the practice of physical exercise. Sedentarism has been reported in several studies on the senior population, and some causes include frailty, fear of falling, lack of guidance and encouragement from the family, community or health professionals⁴. In this study, sedentary senior individuals were the ones who presented the greatest physical limitations due to pain. Physical activity reduces pain through the release of endorphins, which increase pain tolerance, and this points to the importance of adherence and engagement of seniors in some type of physical activity, which must be practiced regularly⁸.

A study on the interference of pain in different aspects of life conducted with 529 senior individuals showed that pain interfered mainly with professional life and sexual activity, but losses in daily life and functional activities were also mentioned⁹. Another study involving senior groups presented results indicating that senior women with chronic pain present significantly lower volumes of physical activity practice than those who do not have it¹⁰. Chronic pain is directly linked to an important disability of movements and activities, difficulties to sleep, cases of anxiety and depression, falls and isolation. Therefore, the impacts of chronic pain are not limited only to the individuals living with pain, but also affect the people around them, because it puts the seniors in a situation of dependence on others to perform his activities¹¹. In the network analysis of this study, this was also demonstrated, since pain interferes in several activities of daily life, compromising the seniors' QoL and possibly interfering in the family dynamics. Additionally, there is an association between pain and emotional suffering, and studies show that seniors with depression report a greater intensity of chronic pain in relation to those who are not depressed^{12,13}.

Senior individuals with chronic pain, of mild and moderate intensity, seek physical activities with the objective of minimizing pain, especially those arising from postural alterations. A study comparing QoL of seniors with pain and others without pain found that among those older than 71 years, the presence of chronic pain, associated with the presence of comorbidities, were factors that decreased QoL¹⁴. In the present study, no age difference was observed between the active and sedentary seniors; however, it is known that an advanced age can be accompanied by a greater number of chronic diseases, which can limit the practice of physical activities. The comparison of level of physical activities with pain intensity showed that sedentary or insufficiently active senior people had a higher pain intensity than active people, and results of the corre-

lation between the variables indicate that the volume of physical activity decreases with the increase in pain intensity, although this correlation was considered weak¹⁵.

A study carried out with 30 seniors showed that 33.30% of them had some osteomyoarticular disease; 80% of the seniors joining the program could not perform any or all of the daily activities that involved some physical effort. After going through a physical activity program, the seniors stated that they had a significant improvement as soon as they started the proposed activities¹⁶.

The network analysis showed that greater limitations associated with pain were related to leisure, social and vital activities. It was observed that vital activities interfere negatively in the development of other aspects, such as leisure and family activities. In general, with the network analysis it was possible to demonstrate that physical activity can improve several aspects of the life of seniors, and that these aspects are interrelated and interfere in individual QoL.

In Brazil, the total prevalence of physical inactivity in the senior population was 62.7%, being an important risk factor for non-transmissible chronic diseases and, consequently, generating an impact on the Brazilian health system due to increased number of hospitalizations¹⁷. The limitation of movement caused by overweight and osteoarticular diseases, which cause discomfort and pain, ends up hindering the practice of physical activity¹⁸, and pain also impacts the performance of daily life activities, because it leads to a feeling of disability, social isolation, and loss of self-confidence¹⁹.

Finally, it is important to highlight that the differential of this study was to analyze if the level of physical activity interfered in pain complaints. Only the seniors who met MBQS requirements were considered active, not taking into account just the participant's answer about performing or not performing physical exercises. Another highlight refers to the analysis used, considering that it is not only exercise that characterizes the seniors as active, but the set of activities they perform, including the number of weekly hours dedicated to a certain activity and how long they have been performing such activity. The limitations of this study are its cross-sectional design, which did not consider the causal relation between pain and sedentariness, and the scarcity of studies in the literature, which limits further comparisons.

With the results of this research, the expectation is to contribute to awareness that seniors should be more active, whether performing domestic activities, leisure activities, or exercises, and to encourage health professionals to act as motivators in this population, highlighting the importance of a more active life at all ages.

CONCLUSION

The level of physical activity was related to pain complaints, and the sedentary seniors reported greater limitations related to pain, especially those associated with leisure, social and vital activities. The seniors who are more active had fewer complaints of pain, as well as those who exercise regularly.

AUTHORS' CONTRIBUTIONS

Fabiana Meneghetti Dallacosta

Statistical Analysis, Project Management, Methodology, Writing - Preparation of the Original, Writing - Review and Editing, Supervision

Luis Henrique Silva de Oliveira

Data Collection, Conceptualization, Methodology, Writing - Preparation of the Original, Writing - Review and Editing

Gracielle Fin

Statistical Analysis, Project Management, Writing - Preparation of the Original, Writing - Review and Editing

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