

O R I G I N A L
Research

Natalia Cristina de Oliveira, PhD, Fabio Marcon Alfieri, PhD,
Alessandra Rodrigues Souto Lima, MSc,
and Leslie Andrews Portes, MSc

Lifestyle and Pain in Women With Knee Osteoarthritis

Abstract: Osteoarthritis (OA) is the main cause of pain and disability in the elderly. The disease leads to chronic musculoskeletal pain, characterized by an abnormal excitability of pain conduction pathways, and lifestyle may interfere in this pathophysiological aspect. Thus, the aim of this study was to compare perceived pain, pressure pain threshold, and lifestyle of adult and elderly women with and without knee OA. A total of 143 women were recruited and divided into 2 groups: OA ($n = 68$) and control ($n = 75$). Volunteers were evaluated for pressure pain tolerance (algometry in vastus medialis and vastus lateralis muscles), perceived pain (visual analogue scale) and lifestyle (FANTASTIC questionnaire). Patients with OA of the present study presented higher weight ($P = .001$) and body mass index ($P < .001$) than controls. Results also revealed less tolerance to pressure pain ($P < .001$) and higher pain perception ($P < .001$) in patients with OA. OA group scored significantly lower in lifestyle questionnaire than controls ($P = .03$). Patients with OA in the present study who presented lifestyle scores below median presented significantly higher values of pain perception than the ones above it ($P = .03$). In conclusion, patients with OA present more sensitivity to pain, more

perceived pain, and worse lifestyle than healthy individuals.

Keywords: osteoarthritis; aged; pain; lifestyle

Osteoarthritis (OA) is the most common joint disease in the world, affecting 50% or more of the elderly population.¹⁻³ It impairs the knees of around 10% of women older

sensitization,⁷ which in turn may lead to a reduction in pain threshold or increase in stimuli response.¹ Concurrent to that, the neuroplasticity process and subsequent sensitization of the nervous system is influenced by altered chemical and electrophysiological mechanisms, causing increase in pain perception, known as hyperalgesia.^{1,8,9} Thus, there is evidence that, in chronic conditions such as knee OA, a high pain sensitization towards painful stimuli might exist.

... [osteoarthritis] is the main cause of pain, disability, and prejudice in quality of life of the elderly.

than 60 years⁴ and is the main cause of pain, disability, and prejudice in quality of life of the elderly.²⁻⁵

Although OA is related to joint abnormalities, it is also characterized by an abnormal excitability of pain conduction pathways, both central and peripheral.¹ Chronic musculoskeletal pain present in OA is characterized by augmented nociception transmission, known as central sensitization.⁶ Traumatic or nontraumatic local musculoskeletal conditions may serve as new sources of nociceptive input, aggravating the process of central

However, there is still little information on nociceptor sensitization in humans, due to the difficulties in direct assessment of pain receptors. Therefore, indirect tests have been used to assess peripheral pain,⁹ such as questionnaires and the visual analogue scale (VAS). Hyperalgesia is a manifestation of central sensitization, and can be quantitatively assessed in a standardized way by means of sensorial tests, such as pressure algometry.¹⁰ This method assesses pain sensitization to a minimum pressure that causes pain or discomfort in a given region of the body.^{10,11}

DOI: 10.1177/1559827617722112. Manuscript received March 23, 2017; revised June 28, 2017; accepted July 3, 2017. From the Adventist University of São Paulo, UNASP, São Paulo, SP, Brazil. Address correspondence to Natalia Cristina de Oliveira, PhD, Master Program in Health Promotion, Adventist University of São Paulo, UNASP, Estrada de Itapeperica, 5859, University Clinic, Sao Paulo, SP 05858-001, Brazil; e-mail: natalia.silva@ucb.org.br

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Algometry allows the determination of pressure pain thresholds (PPT) in individuals with knee OA.^{12,13}

Although pain is a very common feature in OA, little is known about its mechanisms and etiological factors.¹⁴ Still, as a recent review study about this issue¹⁰ points out, although literature provides evidences about central sensitization in OA, clinical identification and treatment of this condition are still under study.

The disparity between the degree of pain perception and the extent of the articular lesion in OA, the multiple central mechanisms involved in pain processing,³ as well as biopsychosocial aspects of pain^{4,5} are important issues that deserve attention.

As chronic pain seems to be related to lifestyle¹⁵ and research about this relationship is still scarce,¹⁵ we hypothesize that lifestyle of OA patients might be related to hyperalgesia in these individuals, hence, investigating it may convey important information. Due to the need of advancement in knowledge on the pathophysiological mechanisms of OA, this study aimed at comparing perceived pain, PPT, and lifestyle of adult and elderly women with and without knee OA.

Methods

This was an observational transversal study that enrolled 143 adult and elderly women, recruited in social activities programs (controls) and among the ones referred to the physical therapy service of a private university in the city of Sao Paulo (patients with OA). All participants were residents of a peripheral region, characterized by the predominance of low social economic status population. The study was approved by the local ethics committee (protocol number 1.063.539). All volunteers gave informed written consent.

The control group (CG, n = 75) included healthy women who had no psychiatric disorders or chronic diseases (such as OA, fibromyalgia, or rheumatoid arthritis), and were not in chronic use of anti-inflammatory or analgesic drugs.

The experimental group (OA, n = 68) was composed by women with diagnosis of OA, medical referral to participate in an exercise program and no other chronic disease. Volunteers with OA presented arthralgia with pain intensity equal to or superior to 4 on the VAS.¹⁶

Individuals with total or partial prosthesis in one or both knees or hips, heart diseases, decompensated hypertension, or neurological disorders that would affect locomotion were excluded from the sample. Patients in the OA group were oriented not to make use of anti-inflammatory or analgesic drugs in the 12 hours prior to the evaluation.

PPTs were assessed by the J Tech algometer (Salt Lake City, UT, USA). The algometer is a digital handheld device consisting of a piston that has at its end a 1 cm² rubber which registers the pressure applied to a surface. The reliability of this device has already been demonstrated.^{17,18} The test was interrupted once the volunteer indicated the onset of pain, and the final amount of force applied was recorded. The sites of application were vastus medialis and vastus lateralis muscles, as described by Imamura et al.¹²

For the evaluation of perceived pain, VAS was employed. It consisted of a straight line of 10 cm in which each participant marked a dash indicating the location that best defined her pain. The closer the mark to the end of the line, the more unbearable the pain was.¹⁵

Lifestyle was assessed by the FANTASTIC questionnaire, an instrument that considers behaviors of individuals in the past month.¹⁹ The instrument has 25 questions divided into 9 domains: (1) family and friends; (2) physical activity; (3) nutrition; (4) cigarette and drugs; (5) alcohol; (6) sleep, seat belt, stress, and safe sex; (7) type of behavior; (8) introspection; and (9) career. Questions are disposed in a Likert-type scale. The sum of points of all questions gives a total score that classifies an individual's lifestyle into 5 categories: excellent (85-100 points), very good (70-84 points), good (55-69 points), regular (35-54 points), and needs improvement (0-34 points).^{19,20}

Data Analysis

Data were analyzed using the statistical package SPSS version 22, and results were expressed as means \pm standard deviations. Comparisons between groups were made through Student's *t* test (numerical variables) or Fisher's exact test (chi-square) for the categories of the FANTASTIC instrument. The significance level was set at 5% ($P < .05$). To assess the consistency of the lifestyle questionnaire (FANTASTIC) for the study sample, Cronbach's α was calculated. The sum of all items of the instrument (n = 25) was considered to be a representative value of the variable "lifestyle."

Results

Groups were similar with regard to age and height, but weight and body mass index (BMI) were higher in the OA group (Table 1).

When comparing perceived pain (VAS) and PPT (algometry), results revealed less tolerance to pressure pain and higher pain perception in OA patients than in controls, as shown in Table 2.

As for lifestyle, OA group scored significantly lower than CG (Table 3); however, when analyzing the prevalence of patients in each category of the FANTASTIC instrument, although there were more healthy individuals in the top 2 categories and more patients with OA in the lower three ones, no differences were found.

The lifestyle instrument (FANTASTIC) showed a good consistency for this study sample ($\alpha = .71$ for OA and $\alpha = .73$ for CG). Participants were split according to the median of FANTASTIC (71.5) and, in the OA group, the ones below this value presented a significantly higher VAS than the ones above it ($P = .03$), which was not observed for the persons in CG ($P = .51$).

Discussion

The aim of this study was to compare perceived pain, PPT, and lifestyle of adult and elderly women with and without knee OA. Patients with OA had a significantly lower PPT (more sensitivity to pain) and higher pain perception than controls. They

Table 1.

Demographic Data.^a

	OA	CG	P
n	68	75	
Age, years	64.2 ± 11.6	66.7 ± 4.6	.09
Height, cm	155.6 ± 7.1	155.6 ± 7.1	.95
Weight, kg	78.6 ± 16.2	70.2 ± 12.4	.001
BMI, kg/cm ²	32.5 ± 5.9	29.0 ± 5.0	<.001

Abbreviations: BMI, body mass index; OA, osteoarthritis group; CG, control group.

^aData are expressed as means ± standard deviations. Comparisons were made through Student's *t* test.

Table 2.

Comparison of Pain Perception and Pressure Pain Thresholds in the Study Groups.^a

	OA	CG	P
n	68	75	
VAS	7.9 ± 2.4	1.1 ± 0.9	<.001
Algometry VM (kgf)	2.1 ± 1.2	5.4 ± 1.7	<.001
Algometry VL (kgf)	2.4 ± 1.1	5.1 ± 1.7	<.001

Abbreviations: VAS, visual analogue scale; kgf, kilogram-force; VM, vastus medialis; VL, vastus lateralis; OA, osteoarthritis group; CG, control group.

^aData are expressed as means ± standard deviations. Comparisons were made through Student's *t* test.

Table 3.

Comparison of Lifestyle in the Study Groups.^a

	OA	CG	P
n	64	75	
FANTASTIC score	70.0 ± 12.5	74.3 ± 11.1	.03
Excellent	7	14	.23
Very good	30	40	
Good	19	18	
Regular	7	3	
Needs improvement	1	0	

Abbreviations: OA, osteoarthritis group; CG, control group.

^aFANTASTIC scores are expressed as means ± standard deviations. Data from each category of the instrument are expressed by the number of individuals in them. Comparisons were made through Fisher's exact test (chi-square).

also presented a worse lifestyle when compared with healthy controls.

Pain perception in patients with OA of this study (assessed by VAS) was also significantly worse in OA than in controls. The mean score of 7.9 found in patients with OA was similar to the values recorded by other studies^{21,22} and indicates strong to severe pain.²³ Although VAS has been widely employed to assess pain in rheumatic patients, it is a rather subjective measure, and older patients may have difficulty understanding and completing the scale.²⁴ However, results of algometry confirmed pain perception of our sample: patients with OA presented a significantly lower PPT than controls.

Algometry is an objective measure of pain, largely used for diagnostic purposes in conditions involving hyperalgesia.¹⁷ As PPT results revealed more pain sensitivity in patients with OA, this finding reinforces the idea that the intense and continued nociceptive input from the knee with OA may cause central sensitization in these patients.²⁵

Besides exhibiting more pain, our data revealed a poorer lifestyle in patients with OA in comparison with controls. Although lifestyle changes are recommended for the management of OA,²⁶ studies in this area are still scarce in current literature. After assessing the lifestyle of 197 persons with knee OA, Connelly et al²⁷ noticed that modifiable factors associated with pain included BMI, physical activity, use of medication, and supplements.

BMI was higher in OA group than in healthy participants. As observed by other authors, obesity is a risk factor for the development and progression of OA.²⁸ This has also been observed by other studies.^{29,30} We corroborate with Connelly et al²⁷ that patients with OA must maintain a healthy weight, so a diet rich in fruits and vegetables must be encouraged, as well as the practice of at least 150 minutes per week of physical exercise.

Lifestyle seems to be related to pain perception in OA, as patients below median value of lifestyle presented significantly higher pain perception than the ones above it. This was not observed in controls. It is worth noting that a poor

lifestyle also reflects issues beyond individual responsibility: genetics, socioeconomic status, and other factors represent important barriers for a healthy lifestyle,³¹ especially in developing countries. The adoption of a healthy lifestyle may be beneficial to patients with OA, and possible intervention programs should focus on modifiable lifestyle aspects, preferably more than one, as better results can be achieved when focusing on several components when compared with diet or exercise only.³² Research and clinical practice must focus on comprehensive lifestyle changes in order to promote pain relief in patients with OA.³³


This study has limitations. The relatively small sample prevents generalization of our results. Moreover, the population studied was very specific (participants of social activities and patients referred to a physical therapy service); however, they were recruited among residents of the largest metropolitan region of the country.

In conclusion, patients with OA in the present study presented more sensitivity to pain, more perceived pain, and worse lifestyle than healthy individuals. Patients with OA with lower lifestyle scores presented higher values of pain perception.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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