Physical activity and its association with quality of life in patients with osteoarthritis

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ABSTRACT

Objective: To evaluate the quality of life and its association with daily physical activity in different contexts of life in osteoarthritis patients referred from Basic Health Care Units to a university-affiliated service. **Methods:** This is a cross-sectional, case series study in which physical activity was evaluated by the International Physical Activity Questionnaire (IPAQ), and quality of life was assessed by the Medical Outcomes Study 36 Short-Form Health Survey (SF-36), Western Ontario and McMaster Universities Index (WOMAC), and Australian/Canadian Osteoarthritis Hand Index (AUSCAN). To evaluate pain intensity, a Visual Analogue Scale (VAS) was also used. **Results:** One hundred patients (92 women and eight men; mean age 59.9 ± 9.4 years) were included. The most affected joints were the knees and hands. Ten patients had only a single joint affected, 69 patients had two, eight patients had three, and 13 patients had four joints affected. The IPAQ showed that 70 patients were active or very active, while 30 were insufficiently active or sedentary. Physical activity was positively associated with the SF-36 domains that assess physical health (physical functioning, physical role, pain, general health perceptions). There was an association between physical activity and quality of life assessed by WOMAC, and the more severe the pain, the worse the quality of life. **Conclusion:** In most patients in this population, the physical aspects of the quality of life are worse, but they maintain their daily physical activities.

Keywords: osteoarthritis, motor activity, quality of life.

INTRODUCTION

Osteoarthritis (OA) is a degenerative joint disease that occurs predominantly in female between the fourth and fifth decades of life and in the menopausal period. It affects mainly the following joints: hips, knees, hands, and vertebral column. The prevalence of OA increases with age; it is rarely observed under the age of 40 years and frequently seen after the age of 60 years.[1]

Symptomatic individuals have mechanical pain, nocturnal and referred or radiated to regions distal to the joints involved and morning joint stiffness of short duration or at the beginning of the movements (protokinetic). On clinical examination, palpable crepitation audible upon mobilization and decrease or loss of joint function can be observed, in addition to an increase in joint volume and temperature, adjacent muscle hypotrophy, deformities, and nodules.[2]

Because of these alterations, patients with OA have been reported to gradually reduce their physical activity, and consequently worsen their quality of life.[3,4] A population study with 4,573 patients with OA has assessed Health-Related Quality Of Life (HRQOL) by applying the correspondence version of the Centers for Disease Control and Prevention (CDC) questionnaire. The study has shown that most individuals scored worse in the items related to general health, physical health, limitation of activities, mental health, and sleep disorders.[5]

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Medication can partially control the symptoms, and non-pharmacological measures play an important role in OA treatment. Physical exercises,[6,7] physical therapy, and occupational therapy[8,9] are related to an improvement in physical activity and quality of life.

Due to its high prevalence, OA is usually diagnosed and treated in Basic Health Care Units by general physicians and those of Family Health Programs in Brazil.

Thus, the present study aimed at assessing, by use of general and specific questionnaires, the quality of life and its association with the physical activity of OA patients referred from Basic Health Care Units to specialized treatment at a university-affiliated service.

PATIENTS AND METHODS

This is a cross-sectional, descriptive, case series study assessing the physical activity and quality of life of OA patients being treated at Basic Health Care Units of the West Central region of the state of São Paulo, Brazil. The patients were referred to the Rheumatology Outpatient Clinics of the Hospital das Clínicas of the Medical School of Botucatu, Universidade Estadual Paulista (UNESP), for assessment and specialized therapeutic guidance. The West Central region of the state of São Paulo has a population of approximately 1,650,000 inhabitants. The diagnosis of OA was confirmed by an experienced rheumatologist according to the American College of Rheumatology criteria for OA classification.[10–12] The study has been approved by the Research Ethics Committee of the Medical School of Botucatu (UNESP) (protocol 2430/2007).

The inclusion criteria were as follows: patients of both genders, over the age of 40 years and diagnosed with OA affecting the hips, knees, hands, and/or vertebral column, undergoing or not, according to clinical indication, medication treatment and/or physical therapy, and who signed the written informed consent. The exclusion criteria were as follows: individuals with total or partial prosthesis of any joint assessed; concomitant diagnosis of other osteoarticular/muscular diseases, such as rheumatoid arthritis, fibromyalgia, systemic lupus erythematosus or other rheumatic diseases; severe cognitive alterations; and those who refused to provide written informed consent.

After medical consultations, patients included in the study were interviewed by a physical therapist for assessment of physical activity, quality of life, and pain intensity. Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ).[13] Quality of life was assessed using the following questionnaires: Medical Outcomes Study 36 Short-Form Health Survey (SF-36),[14] Western Ontario and McMaster Universities Index (WOMAC),[15,16] and Australian/Canadian Osteoarthritis Hand Index (AUSCAN).[17,18] For quantifying pain, the patients were also assessed by the Visual Analogue Scale (VAS).[19]

Assessment of physical activity: it was used the IPAQ, version 8, long form, containing questions related to the frequency and duration of physical activities. This instrument allows estimating both the time spent weekly in physical activities in different life contexts (work, domestic chore, transportation, and leisure) and the time spent in passive activities, performed in the sitting position. Patients are classified into four categories: sedentary, insufficiently active, active, and very active.[13]

Assessment of quality of life: it was used a generic instrument, the SF-36, and two specific instruments for OA, the WOMAC and the AUSCAN. The SF-36 contains eight domains, physical functioning, physical role, bodily pain, general health perceptions, vitality, social functioning, emotional role, and mental health. The first four domains (physical functioning, physical role, bodily pain, and general health perceptions) assess physical health, while the last four (vitality, social functioning, emotional role, and mental health) assess mental health. The score of each domain ranges from 0 to 100, where 0 corresponds to the worst health status and 100 to the best. Each domain is analyzed separately and there is no total score.[14]

WOMAC was used for patients with OA of the knee and/or hips, and assesses three domains (pain, stiffness, and physical dysfunction) perceived in the last 72 hours. The final score is obtained by the sum of the points of all domains, and ranges from 0 to 100 points. The lower the value, the better the patient's health status.[15] For assessing patients with OA of the hands, the AUSCAN was used, an instrument that assesses three domains (pain, stiffness, and physical dysfunction) perceived in the last 72 hours. The maximum score possible is 10 for each domain, and the lower the value, the better the patient's health status.[17,18,20]

For assessing the intensity of pain, the VAS was used. It consists of a 10-centimeter line, whose left extremity indicates "no pain" and the right extremity indicates "worst pain possible". The patient is instructed to check the point that indicates his/her pain intensity, and the higher the score, the greater the intensity of the pain.[19]

Statistical analysis

The participants' profile was established by use of descriptive statistics. Measures of position and variability were performed, and the absolute and relative frequencies were calculated. Pearson's linear correlation coefficient was adopted as a measure of the intensity of the association between the SF-36 and WOMAC, between the SF-36 and IPAQ, and between

the SF-36 and VAS. Goodman test was used for the association between the qualitative variables. Student *t* test was used for comparing differences between the active and sedentary groups. Mann-Whitney non-parametric test was used for independent samples whenever the SF-36 domains showed no normal distribution. The association between VAS and IPAQ was performed based on a logistic regression model for ordinal data, considering IPAQ the response variable. The significance level adopted was 5%.[21]

RESULTS

The sample comprised 100 patients (92 women and eight men), whose mean age was 59.9 ± 9.4 years (range 40–85), referred to our service by the Basic Health Care Units. The most affected joints were as follows: knees, 96 patients; hands, 90 patients; hips, 24 patients; and vertebral column, 14 patients. Ten patients had only one joint affected (hand, knee or hips), 69 patients had two joints affected, eight patients had three joints affected, and 13 patients had four joints affected.

Table 1 shows the descriptive measures in each of the domains of the SF-36 and AUSCAN, as well as the total scores of the WOMAC and VAS. In the SF-36, applied to all patients, the "social functioning" and "emotional role" domains achieved the highest scores, while the "physical role" domain achieved the lowest score. The mean score of WOMAC, applied to 98 patients with knee and/or hip impairment, was low, as were the mean scores in the three AUSCAN domains, applied to 90 patients with OA of the hands. In the subjective assessment of the intensity of joint pain referred by use of VAS, 75 patients indicated more than 80 mm in the analogue scale, and, thus, severe pain.

By applying the IPAQ to all patients, eight were identified as very active, 62 as active, 26 as insufficiently active, and four as sedentary. For the purpose of statistical analysis, the patients were grouped into two categories as follows: the active group, comprising active or very active patients (n = 70), and the sedentary group, comprising insufficiently active or sedentary patients (n = 30). No statistically significant difference was observed between the mean ages of the two groups (58.6 ± 9.1 *vs.* 62.8 ± 9.6). Regarding the number of joints impaired, the active group had 48 patients with two joints involved, 12 patients with three, and 10 patients with one single joint affected. In the sedentary group, 21 patients had two joints involved, nine patients had three, and there was no patient with one single joint involvement (Table 2).

The comparison between the active and sedentary groups, the mean values of the SF-36 and AUSCAN domains, and the score of the WOMAC are shown in Table 3. The sedentary group had the worst results in the quality of life assessed by WOMAC, by the "physical functioning", "physical role" and "bodily pain" domains of the SF-36, and by the "joint function" domain of the AUSCAN, showing that worsening in quality of life is related to physical role.

The VAS assessment showed that 75 patients indicated 80 mm or more, i.e., severe pain. In the assessment using the SF-36, pain was considered an important factor in decreased quality of life (Tables 1, 3, 4, and 5). When adjusting the logistic

Table 1
Descriptive measures of quantitative variables. Means ± SD of the scores obtained with the WOMAC, in the domains of the SF-36 and AUSCAN, and in the VAS in patients with OA

Variable	Mean ± SD	Variation
WOMAC	27.1 ± 18.9	0–66.7
SF-36-PhF	37.9 ± 30.9	0–100
SF-36-PhR	29.3 ± 42.8	0–100
SF-36-Pain	39.6 ± 23.6	0–100
SF-36-GHP	64.1 ± 26.3	0–100
SF-36-Vit	52.3 ± 28.1	0–100
SF-36-SF	71.5 ± 31.9	0–100
SF-36-ER	71.3 ± 44.2	0–100
SF-36-MH	54.8 ± 28.1	0–100
AUSCAN-pain	2.8 ± 2.9	0–9.5
AUSCAN-stiff	3.3 ± 3.2	0–10
AUSCAN-PhD	2.9 ± 3.2	0–9.2
VAS	55.1 ± 3.2	0–100

PhF: physical functioning; PhR: physical role; GHP: general health perceptions; Vit: vitality; SF: social functioning; ER: emotional role; MH: mental health; stiff: stiffness; PhD: physical dysfunction.

Table 2
Number of joints affected in OA patients classified according to the IPAQ in sedentary or active individuals

IPAQ	Number of joints involved			Total
	One	Two*	Three	
Sedentary	0 (0)	21 (70%)	9 (30%)	30
Active	10 (14.3%)	48 (68.6%)	12 (17.1%)	70
Total	10	69	21	100

*P < 0.0001.

model, considering IPAQ as the ordinal response variable and VAS as the explanatory variable, no association was observed between them (P = 0.4097).

Associations between the SF-36 domains, the score of the WOMAC, and VAS are listed in Table 4, which shows that a decrease in quality of life is detected when assessed by use of both a generic instrument and one specific for OA of the hips and knee. Pain assessed by use of the VAS was significantly associated with the different aspects of quality of life, i.e., the more intense the pain, the worse the quality of life.

The association between quality of life assessed using a generic instrument, the SF-36, and using a specific instrument for OA of the hands, AUSCAN, is shown in Table 5. Pain, stiffness, and worsening of the joint function of the hands, detected with the specific questionnaire, were associated with worsening of the physical role, general health perceptions, and vitality in the generic questionnaire. However, no association was observed with three of the SF-36 domains related to mental health (social functioning, emotional role, and mental health).

Table 3
Descriptive measures of the variables of the SF-36, the WOMAC, and the AUSCAN in OA patients classified as sedentary or active, according to the IPAQ

Variable	Group		P
	Sedentary	Active	
WOMAC	32.8 ± 19.8	24.7 ± 18.1	< 0.05*
SF-36-PhF	21.5 ± 20.9	44.7 ± 32	< 0.001*
SF-36-PhR	9.2 ± 24.1	37.9 ± 49.1	< 0.005*
SF-36-Pain	35 ± 15.6	41.5 ± 26.1	< 0.01*
SF-36-GHP	54.3 ± 26.9	68.3 ± 25.0	> 0.05
SF-36-Vit	48 ± 26.1	54.6 ± 28.8	> 0.05
SF-36-SF	64.2 ± 32.3	74.6 ± 31.5	> 0.05
SF-36-ER	66.7 ± 47.9	73.3 ± 42.7	> 0.05
SF-36-MH	51.1 ± 25.5	56.5 ± 29.1	> 0.05
AUSCAN-pain	3.4 ± 3.1	2.5 ± 2.8	> 0.05
AUSCAN-stiff	3.7 ± 3.1	3.1 ± 3.2	> 0.05
AUSCAN-PhD	4.3 ± 2.6	2.2 ± 2.5	< 0.05*

PhF: physical functioning; PhR: physical role; GHP: general health perceptions; Vit: vitality; SF: social functioning; ER: emotional role; MH: mental health; stiff: stiffness; PhD: physical dysfunction. *P < 0.05 = significant.

Table 4
Measures of linear association between the domains of the SF-36, the WOMAC, and the VAS in OA patients

Variable	PhF	PhR	Pain	GHP	Vit	SF	ER	MH
WOMAC	-0.719*	-0.446*	-0.624*	-0.379*	-0.513*	-0.393*	-0.282**	-0.397*
VAS	-0.539*	-0.343*	-0.507*	-0.360*	-0.428*	-0.273*	-0.239*	-0.416*

PhF: physical functioning; PhR: physical role; GHP: general health perceptions; Vit: vitality; SF: social functioning; ER: emotional role; MH: mental health.
*P < 0.001; **P < 0.01.

Table 5
Measures of linear association between the domains of the SF-36 and of the AUSCAN in OA patients

Domains	PhF	PhR	Pain	GHP	Vit	SF	ER	MH	AUSCAN-Pain	AUSCAN-stiff	AUSCAN-PhD
SF-36-PhF	—	0.603****	0.587****	0.438****	0.444****	0.313***	0.192	0.318***	-0.535****	-0.405****	-0.588****
SF-36-PhR		—	0.590****	0.435****	0.388****	0.401***	0.363****	0.349***	-0.296****	-0.203	-0.325****
SF-36-Pain			—	0.432****	0.505****	0.358****	0.207	0.420****	-0.283**	-0.159	-0.311***
SF-36-GHP				—	0.477****	0.435****	0.252*	0.457****	-0.256*	-0.216	-0.337***
SF-36-Vit					—	0.524****	0.419****	0.725****	-0.237*	-0.147	-0.314***
SF-36-SF						—	0.489****	0.623****	-0.172	-0.143	-0.218
SF-36-ER							—	0.571****	-0.131	-0.162	-0.122
SF-36-MH								—	-0.121	-0.110	-0.151
AUSCAN-Pain									—	0.780****	0.855****
AUSCAN-stiff										—	0.681****
AUSCAN-PhD											—

PhF: physical functioning; PhR: physical role; GHP: general health perceptions; Vit: vitality; SF: social functioning; ER: emotional role; MH: mental health; stiff: stiffness; PhD: physical dysfunction.
*P < 0.05; **P < 0.01; ***P < 0.005; ****P < 0.001.

DISCUSSION

This case series is formed by patients treated in Basic Health Care Units of the West Central region of the São Paulo state, from where they were referred to assessment and specialized therapeutic instruction. It reflects, thus, a universe of patients with OA cared for at the primary health care by general physicians and/or physicians from the Family Health Program.

The results of the present study are consistent with those widely reported in the literature, according to which, the reduction of physical activity in OA is related to joint impairment and, consequently, to worse quality of life, including mental health.[5,22–24] Differently from the findings by Dominick et al.,[5] our patients had no impairment of the emotional role, maybe because they were younger and had a shorter disease duration.

Generic and specific questionnaires were used in assessing quality of life to reduce possible discrepancies in the results, as the specific instruments were more sensitive than the generic ones.[25,26] In this series, the worse quality of life was detected by both instruments, suggesting that they might be useful in routine clinical care of basic attention.

Although most of the patients of this study were considered active when assessed by use of the IPAQ, both active and sedentary patients had a reduction in quality of life identified in the domains directly related to physical function (physical functioning, physical role, and bodily pain). Pain was evidenced specially in patients with knee and/or hip impairment, as frequently described for load-bearing joints,[27,28] while patients with involvement of the joints of the hands had a greater impairment of joint function, possibly due to the characteristics of more refined movements that do not depend on load.

The results obtained in pain assessment by use of the VAS were discrepant in relation to those obtained by use of the questionnaires, i.e., pain reported in VAS was much more intense than that reported in questionnaires. That discrepancy might be associated with the methodology used for assessing the symptom of pain, either by a graphic signal, or by questions. In addition, pain according to VAS is reported at the time of interview, while WOMAC relates to pain in the last 72 hours. It is worth emphasizing the subjective character of VAS, as well as the patients' capacity of understanding the objectives and the correct manner to answer to the visual assessment. Such considerations suggest a limitation in the use of VAS for quantifying pain in the population studied. In addition, our data showed no association between pain intensity and physical activity (VAS *vs*. IPAQ, P = 0.4097), because, even in the presence of severe joint pain, the patients maintained their work activities, domestic chores, transportation, and leisure.

If in a logical manner the number of impaired joints was related to the degree of physical activity, since all patients classified as sedentary had more than two impaired joints, on the other hand no association could be observed between physical activity and the type of joint impaired, because most patients studied (97) had impairment of the joints of the hands and of at least one of the lower limb joints. This finding is similar to the results of studies on OA prevalence showing multiple joint impairment, which increases with age.[29]

One limitation of the present study is the fact that patients were on medication therapy according to their individual needs. However, the objective of the present study was to assess the association between physical activity and quality of life in OA patients of the primary health care, with no intervention of the specialized service.

Briefly, it was observed that the profile of OA patients referred from the Basic Health Care Units to a university-affiliated service is that of active individuals in different life contexts, with two joints affected, severe joint pain, and a greater impairment of the physical aspects of quality of life as compared with the emotional ones. This is similar to the other series described in the literature, although with a slightly lower mean age.

It is worth emphasizing the epidemiological importance of the present study because it is a series of 100 OA patients treated at the Basic Health Care Units in the West Central region of the state of São Paulo, whose results show profiles of physical activity for daily routine maintenance (work, domestic chores, transportation and leisure) and quality of life similar to those described in the literature.

CONCLUSION

In most patients with OA referred from Basic Health Care Units to a university-affiliated service, the physical aspects of the quality of life are worse, but they maintain their daily physical activities.

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