

EVALUATION OF PATIENT CHARACTERISTICS AS PREDICTORS OF HEALTH STATUS IN KNEE OSTEOARTHRITIS PATIENTS REFERRED FOR PHYSICAL THERAPY

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Abstract

Objectives: The purpose of this cross sectional study was to estimate the contributions of patient characteristics to variation in joint-specific and generic health status in knee osteoarthritis (OA) patients referred for physical therapy.

Patients and Methods: The Portuguese Knee injury and Osteoarthritis Outcome Score (KOOS) and Medical Outcomes Study - 36 item Short Form (SF-36) questionnaires, and a form for the patient characteristics (gender, age, body mass index, profession, professional situation, educational level, marital status, duration of knee OA, involved knee and walking aids) were self-administered to 377 subjects with symptomatic knee OA (282 females, 95 males; age: 67.8 ± 8.2 years).

Results: Multiple stepwise regression analyses revealed that patient characteristics explained only 9.4% to 19.7% of the variance in KOOS subscales scores, and only 1.0% to 17.2% of the variance in SF-36 subscales scores.

Conclusion: Therefore, it can be concluded that the patient characteristics studied were limited predictors of joint-specific and generic health status in knee OA patients referred for physical therapy.

Keywords: Knee; Osteoarthritis; Patient Characteristics; Health Status.

Introduction

Knee osteoarthritis (OA) is a chronic problem that

is usually accompanied by pain and functional limitation. This clinical condition has an adverse impact on various dimensions of health status and creates an increased demand for health care¹. Self-reported health status measures focus on the perceived impact of a specific clinical condition on individuals and are therefore extensively used to assess the outcomes of health care interventions^{2,3}. Joint-specific (e.g., Knee injury and Osteoarthritis Outcome Score - KOOS^{4,5}) and generic health status questionnaires (e.g., Medical Outcomes Study - 36 item Short Form - SF-36⁶⁻⁸) are commonly used in knee OA patients.

Physical therapy plays an important role in the management of knee OA⁹. Furthermore, there is increasing evidence that physical therapy reduces pain and improves physical function outcomes in knee OA patients¹⁰ as measured by those self-reported health status questionnaires. However, these measures are still not widely used in clinical practice¹¹. If physical therapists were able to get a broader perspective on the impact of knee OA on patients based on routinely collected information, it might be helpful in prioritizing access to physical therapy services and in designing specific and effective therapeutic interventions for individual patients. Patient characteristics data, which is usually available from physical therapy patient pre-admission records, would be particularly suitable for this purpose.

The objective of this paper was to estimate the contributions of patient characteristics to variation in joint-specific and generic health status in knee OA patients referred for physical therapy.

Patients and Methods

Subjects

The sample consisted of consecutive patients with symptomatic knee OA referred for physical therapy.

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py at 12 Portuguese outpatient health care institutions during a 12-month period. Subjects were selected after obtaining informed consent and checking the inclusion and exclusion criteria. To be included in this cross sectional study, subjects had to have a diagnosis of uni- or bilateral knee OA according to the clinical and radiographic criteria of the American College of Rheumatology¹², to experience knee pain with a visual analogue scale (VAS) score of at least 30 mm in a 0-100 mm scale and to be aged 50 years or older. Subjects were excluded if they had received physical therapy treatments (for the knee) within the previous 30 days, had other lower limb osteoarthropathy, neurological disease, or any other disabling condition (e.g., back problems or widespread pain) or if they were unable to read or write Portuguese fluently. All outpatient health care institutions obtained approval from their respective review boards.

Measurements

Measurements were carried out in the physical therapy departments of the above mentioned outpatient health care institutions. All subjects were assessed during the first physical therapy session. Data were collected in a questionnaire format using the Portuguese versions of the self-reported measures mentioned below.

The KOOS^{4,5}, a joint-specific measure of health status, contains 42 items which cover five subscales: pain, other symptoms, function in daily living, function in sport and recreation, and knee-related quality of life. A score, from 0 (extreme problems) to 100 (no problems), is separately produced for each subscale according to the instructions of the KOOS user's guide¹³. The KOOS was cross-culturally adapted and validated to the Portuguese language¹⁴.

The SF-36⁶⁻⁸, a generic measure of health status, contains 36 items that covers eight subscales: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional and mental health. A score, from 0 (worst possible health status) to 100 (best possible health status), is independently produced for each subscale according to the instructions of the SF-36 manual and interpretation guide¹⁵. The SF-36 was cross-culturally adapted and validated to the Portuguese language^{16,17}.

A form was used to acquire subject information on gender, age (years), body mass index (kg.m⁻²), profession, professional situation, educational le-

vel, marital status, duration of knee OA (years), involved knee (knee with OA) and walking aids.

Statistical analyses

Continuous variables were described using mean and standard deviation values whereas categorical variables were described using frequency and percentage values.

Multiple regression analyses were used to estimate the contributions of different independent variables to variation in a dependent variable. The five KOOS subscales and the eight SF-36 subscales were used as dependent variables. Separate models were run for each dependent variable. The gender, age, body mass index, profession, professional situation, educational level, marital status, duration of knee OA, involved knee (knee with OA) and walking aids were used as independent variables. Independent categorical variables were dummy coded as dichotomous variables: Gender: 1 = female, 0 = male; Profession: 1 = manual, 0 = non-manual; Professional situation: 1 = economically active, 0 = not economically active; Educational level: 1 = complete basic/secondary/superior education level, 0 = only can read and write; Marital status: 1 = married, 0 = not/no longer married; Involved knee: 1 = bilateral, 0 = unilateral; Walking aids: 1 = aids necessary, 0 = no aids necessary. Profession was categorized using the Portuguese National Classification of Professions¹⁸: categories I, II, III, IV and V = non-manual; categories VI, VII, VIII and IX = manual.

The multiple regression analyses were carried out in two phases. In the first phase, Pearson's correlations and independent samples t-tests were used, as appropriate, to perform univariate analyses between all independent variables and each dependent variable. A *P* value of 0.20¹⁹ was accepted as the level of significance to assure that potentially relevant independent variables were not excluded at this phase. In the second phase, all independent variables that were significantly univariately associated with each dependent variable were entered into multiple stepwise regression models (with stepping method criteria of probability of *F* to enter ≤ 0.05 and *F* to remove ≥ 0.10). All models met the assumptions of multiple regression in terms of linearity, homoscedasticity, normality, independence and non-multicollinearity.

All statistical analyses were conducted using Statistical Package for the Social Sciences, SPSS® 15.0 for Windows® (SPSS Inc., Chicago, IL, USA).

Results

A total of 377 patients participated in this study. The descriptive statistics are presented in Tables I and II. A total score could be obtained for all KOOS and SF-36 subscales for all patients.

Tables III and IV display the associations between health status and patient characteristics and highlight the potentially relevant patient characteristics that were statistically significantly associated with each of the KOOS and SF-36 subscales and, consequently, were entered into multiple stepwise regression models.

Table V shows the multiple stepwise regression models of knee-specific health status. In the final models, the values of adjusted R^2 indicated that patient characteristics explained only 9.4% to 19.7% of the variance in KOOS subscales scores. Longer duration of knee OA (negative), need for walking aids (negative) and complete basic/secondary/superior education level (positive) accounted for 9.4% of the variance in the KOOS pain subscale score, while longer duration of knee OA (negative) and need for walking aids (negative) accounted for 10.0% of the variance in the KOOS other symptoms subscale score. Need for walking aids (negative), longer duration of knee OA (negative), higher body mass in-

dex (negative), complete basic/secondary/superior education level (positive) and older age (negative) accounted for 19.7% of the variance in the KOOS function in daily living subscale score, while need for walking aids (negative), longer duration of knee OA (negative), complete basic/secondary/superior education level (positive) and higher body mass index (negative) accounted for 16.2% of the variance in the KOOS function in sport and recreation subscale score. Need for walking aids (negative), higher body mass index (negative), longer duration of knee OA (negative) and manual profession (negative) were significant predictors of the KOOS knee-related quality of life subscale score; the four variable accounted for 15.3% of the variance.

Table VI shows the multiple stepwise regression models of generic health status. In the final models, the values of adjusted R^2 indicated that patient characteristics explained only 1.0% to 17.2% of the variance in SF-36 subscales scores. Need for walking aids (negative), manual profession (negative), being economically active (positive) and being female (negative) accounted for 17.2% of the variance in the SF-36 physical functioning subscale score, while complete basic/secondary/superior education level (positive), need for walking aids (negative) and higher body mass index (negative) accounted

Table I. Patients' characteristics (N = 377)

Characteristics	Data
Gender	
Female	282 (74.8)
Age (years)	67.8 ± 8.2
Body mass index (kg.m ⁻²)	29.2 ± 4.4
Profession	
Manual	299 (79.3)
Professional situation	
Not economically active	310 (82.2)
Educational level	
Only can read and write	308 (81.7)
Marital status	
Married	271 (71.9)
Duration of knee OA (years)	10.6 ± 8.6
Involved knee (knee with OA)	
Bilateral	209 (55.4)
Walking aids	
No aids necessary	272 (72.1)

Continuous variables: mean ± standard deviation; Categorical variables: frequency (percentage).

Table II. Knee-specific and generic health status (N = 377)

Questionnaires subscales scores	Mean ± SD
KOOS (points)	
Pain (PA)	36.7 ± 15.2
Other symptoms (OS)	40.2 ± 17.9
Function in daily living (DL)	37.4 ± 16.4
Function in sport and recreation (SR)	15.2 ± 18.5
Knee-related quality of life (QL)	28.6 ± 18.1
SF-36 (points)	
Physical functioning (PF)	31.7 ± 20.5
Role-physical (RP)	39.1 ± 23.6
Bodily pain (BP)	26.6 ± 16.7
General health (GH)	43.2 ± 17.8
Vitality (VT)	34.8 ± 18.9
Social functioning (SF)	60.2 ± 26.4
Role-emotional (RE)	56.2 ± 28.9
Mental health (MH)	55.2 ± 23.5

KOOS and SF- 36 are 0-100 points, worst to best.

Table III. Significance of differences in health status between groups based on patients' characteristics (N = 377)

Patients' characteristics	Health status													
	N	KOOS subscales					SF-36 subscales							
		PA	OS	DL	SR	QL	PF	RP	BP	GH	VT	SF	RE	MH
Gender (P)		0.420	0.821	0.213	0.999	0.820	0.025	0.265	0.027	0.005	0.106	0.128	0.180	0.000
Female (Mean±SD)	282	36.3±15.4	40.1±17.6	36.8±16.4	15.2±18.7	28.5±17.9	30.3±19.7	38.3±23.1	25.5±16.7	41.7±17.2	33.8±18.9	59.0±26.5	55.0±28.3	52.8±23.3
Male (Mean±SD)	95	37.8±14.8	40.6±18.9	39.3±16.3	15.2±18.1	29.0±18.7	35.7±22.1	41.4±24.7	29.8±16.4	47.5±19.0	37.5±18.9	63.8±25.9	59.6±30.8	62.5±22.7
Profession (P)		0.009	0.067	0.002	0.010	0.002	0.000	0.004	0.002	0.095	0.181	0.030	0.001	0.010
Manual (Mean±SD)	299	35.6±15.2	39.4±17.6	36.1±15.5	14.0±18.5	27.0±17.1	29.2±19.3	37.0±22.0	25.2±16.0	42.4±17.5	34.1±18.7	58.7±26.7	53.6±27.8	53.6±23.2
Non-manual (Mean±SD)	78	40.7±14.8	43.5±18.5	42.5±18.6	20.0±17.9	34.9±20.4	41.1±22.1	47.0±27.5	31.7±18.3	46.2±18.8	37.3±19.6	66.0±24.5	66.0±31.2	61.3±23.9
Professional situation (P)		0.219	0.560	0.000	0.006	0.001	0.000	0.004	0.044	0.005	0.813	0.000	0.000	0.000
Economically active (Mean±SD)	67	38.8±16.2	41.2±13.9	43.9±17.5	20.8±19.9	35.3±19.2	41.8±19.5	46.5±26.0	30.3±17.0	48.7±16.6	34.2±19.9	71.6±25.3	68.3±31.4	64.4±24.2
Not economically active (Mean±SD)	310	36.2±15.0	40.0±18.6	36.4±15.9	14.0±18.0	27.2±17.5	29.5±20.0	37.5±22.7	25.8±16.6	41.9±17.9	34.9±18.8	57.8±26.0	53.5±27.8	53.3±22.9
Educational level (P)		0.001	0.034	0.000	0.000	0.003	0.001	0.001	0.002	0.110	0.786	0.326	0.019	0.569
Complete basic/secondary/superior education level (Mean±SD)	69	42.3±14.3	44.4±17.2	43.8±18.1	23.2±20.3	35.3±20.6	40.2±24.4	49.2±27.9	32.1±18.5	46.3±19.9	35.3±19.6	62.9±23.8	64.4±32.8	56.7±24.8
Only can read and write (Mean±SD)	308	35.4±15.2	39.3±17.9	36.0±15.7	13.4±17.6	27.1±17.1	29.8±19.0	36.9±21.9	25.3±16.0	42.5±17.3	34.6±18.8	59.7±27.0	54.3±27.7	54.9±23.2
Marital status (P)		0.297	0.416	0.609	0.568	0.689	0.633	0.572	0.294	0.229	0.501	0.660	0.851	0.926
Married (Mean±SD)	271	36.2±14.9	39.8±17.4	37.7±16.1	15.5±18.9	28.4±17.9	31.4±20.7	38.7±23.2	26.0±16.4	43.8±17.9	34.4±19.5	59.9±26.8	56.0±29.2	55.3±23.6
Not/no longer married (Mean±SD)	106	38.0±16.0	41.4±19.0	36.7±17.3	14.3±17.5	29.2±18.6	32.5±19.9	40.2±24.6	28.0±17.6	41.4±17.8	35.8±17.4	61.2±25.6	56.6±28.5	55.0±23.2
Involved knee / knee with OA (P)		0.495	0.710	0.142	0.505	0.116	0.008	0.708	0.434	0.000	0.629	0.275	0.373	0.684
Bilateral (Mean±SD)	209	36.2±14.8	39.9±18.7	36.3±16.1	14.6±19.3	27.3±18.3	30.1±19.6	38.7±23.7	27.2±17.2	40.1±17.3	35.2±18.9	58.9±25.2	55.0±28.5	54.8±22.8
Unilateral (Mean±SD)	168	37.3±15.8	40.6±16.8	38.8±16.8	15.9±17.6	30.3±17.7	33.7±21.4	39.6±23.4	25.8±16.1	46.9±17.8	34.2±19.0	61.9±27.9	57.6±29.5	55.8±24.3
Walking aids (P)		0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.055	0.027	0.000	0.000	0.002
Aids necessary (Mean±SD)	105	31.4±15.0	33.7±17.5	28.1±13.0	6.6±12.9	20.8±15.6	20.8±17.2	32.5±20.9	20.4±15.7	40.0±20.3	31.2±19.2	50.1±27.1	46.2±27.4	49.3±24.1
No aids necessary (Mean±SD)	272	38.7±14.9	42.8±17.4	41.0±16.2	18.5±19.3	31.7±18.1	35.9±20.1	41.7±24.1	28.9±16.5	44.3±16.7	36.1±18.7	64.1±25.1	60.0±28.7	57.5±22.9

Independent samples t test (two-tailed P values). PA = Pain; OS = Other symptoms; DL = Function in daily living; SR = Function in sport and recreation; QL = Knee-related quality of life; PF = Physical functioning; RP = Role-physical; BP = Bodily pain; GH = General health; VT = Vitality; SF = Social functioning; RE = Role-emotional; MH = Mental health. KOOS and SF-36 are 0-100 points, worst to best. Gender: female vs. male; Profession: manual vs. non-manual; Professional situation: economically active vs. not economically active; Educational level: complete basic/secondary/superior education level vs. only can read and write; Marital status: married vs. not/no longer married; Involved knee: bilateral vs. unilateral; Walking aids: aids necessary vs. no aids necessary. Significant differences: P ≤0.001 in bold/underline; P ≤0.05 in bold/italic; P ≥0.20 in bold. When significant differences were found, the groups female, manual, bilateral and aids necessary consistently obtained the lowest scores, and the groups economically active and complete basic/secondary/superior education level consistently obtained the highest scores.

Table IV. Correlation coefficients between health status and patients' characteristics (N = 377)

Patients' characteristics	Health status												
	KOOS subscales					SF-36 subscales							
	PA	OS	DL	SR	QL	PF	RP	BP	GH	VT	SF	RE	MH
Age (years)	-0.12	-0.01	-0.28	-0.23	-0.20	-0.20	-0.18	-0.07	-0.07	0.01	-0.13	-0.16	-0.03
Body mass index (kg.m ⁻²)	-0.13	-0.13	-0.18	-0.19	-0.22	-0.13	-0.16	-0.18	-0.16	-0.01	-0.13	-0.09	-0.04
Duration of knee OA (years)	-0.22	-0.26	-0.25	-0.26	-0.24	-0.15	-0.14	-0.19	-0.17	-0.10	-0.13	-0.09	-0.01

Pearson's correlation coefficients.

PA = Pain; OS = Other symptoms; DL = Function in daily living; SR = Function in sport and recreation; QL = Knee-related quality of life; PF = Physical functioning; RP = Role-physical; BP = Bodily pain; GH = General health; VT = Vitality; SF = Social functioning; RE = Role-emotional; MH = Mental health. KOOS and SF-36 are 0-100 points, worst to best.

Significant correlations: P ≤ 0.001 in bold/underline; P ≤ 0.05 in bold/italic; P ≤ 0.20 in bold.

Medium correlation (|r| = 0.30 to 0.49); small correlation (|r| < 0.30)²⁸.

Table V. Multiple stepwise regression models of knee-specific health status (N = 377)

KOOS subscales	Step	Predictors	Adjusted R ²	F	df	P*	Beta [†]	P [‡]
PA	1	Duration of knee OA (years)	<i>0.048</i>	<i>19.9</i>	<i>1,375</i>	<i>< 0.001</i>	-0.174	0.001
	2	Walking aids	<i>0.079</i>	<i>17.1</i>	<i>2,374</i>	<i>< 0.001</i>	-0.179	< 0.001
	3	Educational level	0.094	14.0	3,373	< 0.001	0.135	0.007
OS	1	Duration of knee OA (years)	<i>0.067</i>	<i>28.1</i>	<i>1,375</i>	<i>< 0.001</i>	-0.233	< 0.001
	2	Walking aids	0.100	21.9	2,374	< 0.001	-0.190	< 0.001
DL	1	Walking aids	<i>0.122</i>	<i>53.4</i>	<i>1,375</i>	<i>< 0.001</i>	-0.271	< 0.001
	2	Duration of knee OA (years)	<i>0.158</i>	<i>36.2</i>	<i>2,374</i>	<i>< 0.001</i>	-0.135	0.006
	3	Body mass index (kg.m ⁻²)	<i>0.175</i>	<i>27.6</i>	<i>3,373</i>	<i>< 0.001</i>	-0.135	0.004
	4	Educational level	<i>0.187</i>	<i>22.7</i>	<i>4,372</i>	<i>< 0.001</i>	0.110	0.021
	5	Age (years)	0.197	19.4	5,371	< 0.001	-0.121	0.021
SR	1	Walking aids	<i>0.081</i>	<i>34.1</i>	<i>1,375</i>	<i>< 0.001</i>	-0.243	< 0.001
	2	Duration of knee OA (years)	<i>0.125</i>	<i>27.8</i>	<i>2,374</i>	<i>< 0.001</i>	-0.182	< 0.001
	3	Educational level	<i>0.147</i>	<i>22.6</i>	<i>3,373</i>	<i>< 0.001</i>	0.144	0.003
	4	Body mass index (kg.m ⁻²)	0.162	19.2	4,372	< 0.001	-0.135	0.005
QL	1	Walking aids	<i>0.070</i>	<i>29.2</i>	<i>1,375</i>	<i>< 0.001</i>	-0.219	< 0.001
	2	Body mass index (kg.m ⁻²)	<i>0.109</i>	<i>24.0</i>	<i>2,374</i>	<i>< 0.001</i>	-0.178	< 0.001
	3	Duration of knee OA (years)	<i>0.140</i>	<i>21.4</i>	<i>3,373</i>	<i>< 0.001</i>	-0.174	< 0.001
	4	Profession	0.153	18.0	4,372	< 0.001	-0.126	0.009

PA = Pain; OS = Other symptoms; DL = Function in daily living; SR = Function in sport and recreation; QL = Knee-related quality of life. KOOS subscales are 0-100 points, worst to best. Profession: 1 = manual, 0 = non-manual; Educational level: 1 = complete basic/secondary/superior education level, 0 = only can read and write; Walking aids: 1 = aids necessary, 0 = no aids necessary. *Statistical significance of the models (all steps). † Standardized coefficients of the predictors included in the final model. ‡ Statistical significance of the predictors include in the final model. Data from the final steps in bold. Data from the previous steps in italic.

for 7.6% of the variance in the SF-36 role--physical subscale score. Need for walking aids (negative), higher body mass index (negative), longer duration of knee OA (negative), manual profession (negative) and being female (negative) accounted for 11.2% of the variance in the SF-36 bodily pain subscale score.

Bilateral knee OA (negative), longer duration of knee OA (negative), being female (negative) and higher body mass index (negative) accounted for 7.6% of the variance in the SF-36 general health subscale score. Only need for walking aids (negative) was a significant predictor of the SF-36 vitality subscale

Table VI. Multiple stepwise regression models of generic health status (N = 377)

SF-36 subscales	Step	Predictors	Adjusted R ²	F	df	P*	Beta [†]	P [‡]
PF	1	Walking aids	<i>0.106</i>	45.8	1,375	< 0.001	-0.294	< 0.001
	2	Profession	<i>0.146</i>	33.0	2,374	< 0.001	-0.177	< 0.001
	3	Professional situation	<i>0.164</i>	25.6	3,373	< 0.001	0.133	0.007
	4	Gender	0.172	20.5	4,372	< 0.001	-0.100	0.036
RP	1	Educational level	<i>0.039</i>	16.1	1,375	< 0.001	0.177	< 0.001
	2	Walking aids	<i>0.062</i>	13.5	2,374	< 0.001	-0.157	0.002
	3	Body mass index (kg.m ²)	0.076	11.3	3,373	< 0.001	-0.128	0.011
BP	1	Walking aids	<i>0.049</i>	20.6	1,375	< 0.001	-0.193	< 0.001
	2	Body mass index (kg.m ²)	<i>0.077</i>	16.7	2,374	< 0.001	-0.146	0.003
	3	Duration of knee OA (years)	<i>0.093</i>	13.8	2,373	< 0.001	-0.125	0.012
	4	Profession	<i>0.104</i>	11.9	3,372	< 0.001	-0.112	0.023
	5	Gender	0.112	10.5	4,371	< 0.001	-0.103	0.035
GH	1	Involved knee (knee with OA)	<i>0.033</i>	13.9	1,375	< 0.001	-0.147	0.004
	2	Duration of knee OA (years)	<i>0.055</i>	12.0	2,374	< 0.001	-0.144	0.004
	3	Gender	<i>0.069</i>	10.3	3,373	< 0.001	-0.122	0.015
	4	Body mass index (kg.m ²)	0.076	8.7	4,372	< 0.001	-0.101	0.049
VT	1	Walking aids	0.010	4.9	1,375	0.027	-0.114	0.027
SF	1	Walking aids	<i>0.054</i>	22.6	1,375	< 0.001	-0.208	< 0.001
	2	Professional situation	<i>0.079</i>	17.1	2,374	< 0.001	0.156	0.002
	3	Body mass index (kg.m ²)	0.087	12.9	3,373	< 0.001	-0.102	0.041
RE	1	Walking aids	<i>0.043</i>	18.0	1,375	< 0.001	-0.178	< 0.001
	2	Professional situation	<i>0.067</i>	14.5	2,374	< 0.001	0.141	0.006
	3	Profession	0.081	12.0	3,373	< 0.001	-0.129	0.011
MH	1	Professional situation	<i>0.030</i>	12.7	1,375	< 0.001	0.134	0.009
	2	Gender	<i>0.052</i>	11.2	2,374	< 0.001	-0.165	0.001
	3	Walking aids	0.068	10.2	3,373	< 0.001	-0.140	0.006

PF = Physical functioning; RP = Role-physical; BP = Bodily pain; GH = General health; VT = Vitality; SF = Social functioning; RE = Role-emotional; MH = Mental health. SF-36 subscales are 0-100 points, worst to best. Gender: 1 = female, 0 = male; Profession: 1 = manual, 0 = non-manual; Professional situation: 1 = economically active, 0 = not economically active; Educational level: 1 = complete basic/secondary/superior education level, 0 = only can read and write; Involved knee: 1 = bilateral, 0 = unilateral; Walking aids: 1 = aids necessary, 0 = no aids necessary. * Statistical significance of the models (all steps). † Standardized coefficients of the predictors included in the final model. ‡ Statistical significance of the predictors include in the final model. Data from the final steps in bold. Data from the previous steps in italic.

score and accounted for 1.0% of the variance. Need for walking aids (negative), manual profession (negative) and higher body mass index (negative) accounted for 8.7% of the variance in the SF-36 social functioning subscale score. Need for walking aids (negative), being economically active (positive) and manual profession (negative) accounted for 8.1% of the variance in the SF-36 role-emotional subscale score. Being economically active (positive), being female (negative) and need for walking aids (negative) accounted for 6.8% of the variance in the SF-36 mental health subscale score. Marital status was not a significant predictor of any of the KOOS or SF-36 subscales scores.

Discussion

In this study we assessed the contributions of patient characteristics to variation in joint-specific and generic health status, which were shown to be limited in the patients evaluated. Thus, in clinical practice, physical therapists should not use this routinely collected information to try to get a broader perspective on the impact of knee OA on their patients.

Of the ten patient characteristics studied, six (i.e. walking aids, duration of knee OA, body mass index, educational level, profession and age) were significant predictors of at least one dimension of the knee-

specific health status. Moreover, eight characteristics (i.e. walking aids, body mass index, gender, professional situation, profession, duration of knee OA, educational level and involved knee) were significant predictors of at least one dimension of the generic health status. The direction of the associations between health status and patient characteristics was plausible and consistent with prior research in OA²⁰⁻²³. Overall, the need for walking aids was the best significant predictor of worse health status. In fact, the aforementioned characteristic only was not a significant predictor of the SF-36 general health dimension. This is not surprising considering that the need for walking aids seems to be determined by disability, pain and age-related impairments²⁴. Marital status was the only variable that was not a significant predictor of any dimension of health status. The quality of support received from the spouse might be a better determinant²⁵.

Need for walking aids, longer duration of knee OA and higher body mass index represented better significant predictors for worse knee-specific health status and completed basic/secondary/superior education level was the best significant predictor of better knee-specific health status. Need for walking aids, higher body mass index and being female were the best significant predictors of worse generic health status and being economically active was the best significant predictor for a better generic health status. Other studies found similar results²⁰⁻²³. Helplessness, education level and body mass index were identified as determinants of pain severity in knee OA patients by Creamer et al²⁰. Golightly & Dominick²¹ found an association between longer duration of OA, presence of hip OA and lower income, and worse osteoarthritis-specific health status in Caucasian veterans. In a study of Salaffi et al²², age, lower educational level, being female and chronic co-morbidity proved to be associated with physical function in patients with symptomatic peripheral OA. Paradowski et al²³ suggested that, in patients with early knee OA, the natural history of pain and function may be related to patient characteristics such as age and body mass index.

Although nearly all studied patient characteristics were significant predictors in at least one of the multiple stepwise regression models of health status, they cumulatively explained not more than 19.7% of the variance in knee-related health status and no more than 17.2% of the variance in generic health status. Final models explained more variance

for the physical function subscales than for the other subscales, either for the KOOS (function in daily living) or for the SF-36 (physical functioning). This finding suggests that, even for physical function dimensions, a substantial amount of the variance in health status may actually be explained by other predictors that were not collected in this study. Nevertheless, it is also possible that the low amount of variance explained by the final models was influenced by the use of seven categorical independent variables dummy coded as dichotomous variables, which imply a low observed variability.

Some limitations of this study should be also mentioned. First, the sample used may not be representative for the entire population of Portuguese patients with knee OA referred for physical therapy. In fact, this study used a convenience sampling method. Second, the study sample is relatively homogeneous with respect to the studied patient characteristics. This might be one of the reasons that contributed to the low proportion of explained variation in health status. Third, only a small number of patient characteristics were evaluated. There are other patient characteristics (e.g., consumption of medication) that might help to explain a greater amount of variation in knee-specific and generic health status. Fourth, owing to practical reasons, radiographic severity of knee OA was not recorded. Although no consensus appears to exist about the association between radiographic severity of knee OA and self-reported knee pain and functional limitation^{26,27}, this could have been a confounding factor with regard to the relationship between patient characteristics and health status dimensions. Finally, neither correlation nor prediction necessarily indicate causation. Moreover, the cross-sectional nature of this study precludes any conclusions regarding causation, and also the possibility of reverse causation cannot be excluded.

Conclusion

In conclusion, the patient characteristics studied were limited predictors of joint-specific and generic health status in knee OA patients referred for physical therapy.

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