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Original article

Determinants of quality of life in Paget's disease of bone

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ABSTRACT

Objective: To evaluate the parameters associated with quality of life in patients with Paget's disease of bone.

Methods: Patients with Paget's disease of bone were evaluated with SF-36 and WHOQOL-bref questionnaires. Patients with other diseases that could cause significant impairment of their quality of life were excluded. We searched for correlations between the results and: age, time from diagnosis, type of involvement, pain related to Paget's disease of bone, limitation to daily activities, deformities, bone specific alkaline phosphatase, the extent of involvement and treatment.

Results: Fifty patients were included. Results of the SF-36 total score and its domains, physical and mental health, were significantly correlated with bone pain and deformities. Marital status was significantly correlated with the SF-36 total score and Mental Health Domain. BAP levels and disease extension were significantly correlated to SF-36 Physical Health Domain. After multivariate analysis, the only parameters that remained significantly associated with the SF-36 total score and to its Mental Health and Physical Health Domains were pain and marital status.

The WHOQOL-bref total score was significantly associated with pain, physical impairment and deformities. WHOQOL-bref Domain 1 (physical) score was significantly associated with marital status, pain and deformities, while Domain 2 (psychological) score was associated with marital status, physical impairment and kind of involvement. After multivariate analysis, the presence of pain, deformities, and marital status were significantly associated with

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results of the WHOQOL-bref total score and its Domain 1. WHOQOL-bref domain 2 results were significantly predicted by pain and marital status.
Conclusion: The main disease-related factor associated with SF-36 results in Paget's disease of bone patients was bone pain, while bone pain and deformities were associated with WHOQOL-bref.

Determinantes da qualidade de vida na doença de Paget óssea

Palavras-chave:
Doença de Paget óssea
Qualidade de vida
SF-36
WHOQOL-bref

RESUMO

Objetivo: Avaliar os parâmetros associados à qualidade de vida em pacientes com doença de Paget óssea (DPO).
Métodos: Avaliaram-se pacientes com DPO com os questionários SF-36 e WHOQOL-bref. Excluíram-se pacientes com outras doenças que pudessem causar comprometimento significativo da qualidade de vida. Buscou-se por correlações entre os resultados e idade, tempo de diagnóstico, tipo de envolvimento, dor relacionada com a DPO, limitação às atividades diárias, deformidades, fosfatase alcalina específica do osso, extensão do envolvimento e tratamento.
Resultados: Incluíram-se 50 pacientes. Os resultados da pontuação total do SF-36 e seus domínios, saúde física e saúde mental, se correlacionaram significativamente com a dor óssea e deformidades. O estado civil se correlacionou significativamente com a pontuação total do SF-36 e com seu domínio saúde mental. Os níveis de BAP e a extensão da doença se correlacionaram significativamente com o domínio saúde física do SF-36. Depois da análise multivariada, os únicos parâmetros que permaneceram significativamente associados à pontuação total do SF-36 e aos seus domínios saúde mental e saúde física foram a dor e o estado civil. A pontuação total do WHOQOL-bref esteve significativamente associada à dor, ao comprometimento físico e a deformidades. O escore do Domínio 1 (físico) do WHOQOL-bref esteve significativamente associado ao estado civil, dor e deformidades, enquanto o Domínio 2 (psicológico) esteve associado ao estado civil, comprometimento físico e tipo de envolvimento. Depois da análise multivariada, a presença de dor, deformidades e estado civil esteve significativamente associada à pontuação total do WHOQOL-bref e à pontuação do seu Domínio 1. Os resultados do WHOQOL-bref 2 foram significativamente preditos pela dor e pelo estado civil.
Conclusão: O principal fator associado aos escores do SF-36 foi a dor óssea, enquanto a dor óssea e as deformidades estiveram associadas ao WHOQOL-bref.

Introduction

Paget's disease of bone (PDB) is a common osteometabolic disease characterized by increased and disorganized bone turnover. It is usually asymptomatic but may cause bone pain, fractures, deformities, secondary osteoarthritis, neurologic and cardiac complications and, in rare cases, neoplasm.[1,2] These complications can adversely affect the quality of life (QoL) of the symptomatic PDB patient. Therefore, studies evaluating QoL in PDB patients and the effects of PDB treatment in QoL have been published.[3–10]

Few of these studies have focused on determinants of QoL in this population, but this knowledge is important in the evaluation of treatment effects on QoL. If the parameters related with poor QoL are affected by currently available treatments, an increase in QoL is expected after the treatment. On the other hand, if some important parameters are not influenced by PDB's treatment, then, measures of QoL would have a limited role in the evaluation of different therapeutic options. This could help to understand the heterogeneous results of PDB treatment in QoL in different studies.[4,5,10]

The present study was undertaken to evaluate parameters associated with QoL in PDB patients.

Methods

Consecutive patients with PDB followed by rheumatologists in Florianopolis, Brazil, were included after signing an informed consent term. Patients were followed at one public hospital (Hospital Governador Celso Ramos) or at the author's private offices. Exclusion criteria were: incapacity to understand the questionnaires and presence of any other chronic disease that may adversely affect QoL, including: depression, dementia, systemic inflammatory diseases, primary osteoarthritis

of the lower limb, fibromyalgia, neurological syndromes not due to PDB, acute or chronic infections, peripheral arterial insufficiency, ischemic cardiac disease, heart failure, chronic pulmonary diseases, renal or hepatic insufficiency, neoplasm and osteoporotic fractures.

PDB and osteoarthritis were diagnosed by typical findings on radiographs. Disease activity was evaluated by 99mTc MDP bone scintigraphy; a patient was considered to have the disease if a recent bone scintigraphy shows high uptake suggestive of PDB and other possible diagnosis were excluded by x-rays or another computed tomography. Disease extension was evaluated by X-rays and bone scintigraphy, previous and recent. The method described by Meunier et al.[11] was used to calculate disease extension on bone scintigraphy. Analysis of bone scintigraphy was done without identification of the patient or date.

A patient was considered to be in current treatment if he had used oral bisphosphonates (alendronate, risedronate or ibandronate) in the past six months or zoledronic acid in the previous 12 months. Fasting blood samples were collected for determination of bone-specific alkaline phosphatase (BAP) by enzyme-linked immunosorbent assay (Mybiosource, San Diego, CA, ref. MBS724100).

Patients were allowed to take paracetamol or dipyrone for pain, if necessary, according to their regular prescriptions.

Patients were asked to answer to the Brazilian versions of SF-36[12] and WHOQOL-bref[13] questionnaires. The SF-36 scores were calculated as described by Kalantar-Zadeh et al.[14] The questionnaires were administered by a rheumatologist, once per patient. Results were further compared among subgroups defined by clinical characteristics and correlated to disease activity and extension parameters. The local ethical committee approved the study protocol (protocol number 353,461). All subjects signed an informed consent form; this study was conducted by the principles of the Declaration of Helsinki.[15]

Statistical analysis

Statistical analysis was carried out to verify if disease-related factors could influence QoL in PDB patients. Comparisons of subgroups defined according to clinical characteristics were made with Mann–Whitney *U* test. Correlations between continuous variables were analyzed by Spearman's rho correlation. Generalized linear model regression was used to assess the association between the results of QoL tests and PDB parameters. Parameters significantly associated to QoL on univariate analysis as well as parameters theoretically associated with decreased QoL were entered in the regression model. Results are presented as mean (SD) or median (25–75 percentiles).

Statistical analysis was performed with SPSS 20.0, with a level of significance of 0.05.

Results

Seventy-seven PDB patients were screened, and 50 patients were included. Reasons for exclusions are listed in Table 1. Subjects were mainly women (60.8%), Caucasian (96.8%) and married (80.6%). They had a mean age of 66.32 ± 8.65 years and had 7.69 ± 6.15 years from diagnosis. Most subjects had a polyostotic disease (74.2%) and 29% had a positive familial history. 41.9% were considered to be in active treatment, and 38.7% were regarded as having active disease on bone scintigraphy. No patient has taken calcitonin, intravenous ibandronate or pamidronate in the past 12 months. Bone pain related do PDB at any moment was reported by 56.9% of subjects, but only 32.3% had current bone pain, 19.4% had deformities secondary to PDB, 12.9% any physical impairments due to PDB and 32.3% had osteoarthritis considered to be secondary to PDB (Table 2).

Table 1 – Reasons for exclusion of 27 of 77 patients with Paget's disease of bone from the present study. Some patients have more than one reason for exclusion.

	Number	Frequency (%)
Alzheimer's disease	2	2.4
Chronic renal disease	1	1.2
Primary osteoarthritis of the knee	1	1.2
Psoriasic arthritis	1	1.2
Ankylosing spondylitis	1	1.2
Degenerative lumbar stenosis	1	1.2
Fibromyalgia	9	10.3
Ischemic heart disease	3	3.8
Unable to answer	1	1.2
Peripheral artery disease	1	1.2
Hepatic cirrhosis	1	1.2
Prostate câncer	1	1.2
Peripheral polyneuropathy	1	1.2
Parkinson's disease	2	2.4
Depression	1	1.2
Refuse to answer	1	1.2

SF-36

The median total score in the SF-36 questionnaire was 60.91 (38.81–78.54), the median score of Physical health component was 62.60 (38.20–75.80), and of the mental health component was 59.70 (41.30–79.90). Results of the SF-36 total score and its Physical health and Mental Health components were not significantly different when subjects were divided according to sex, kind of involvement (monostotic or polyostotic), current disease activity, current treatment of PDB, the presence of physical impairments due to PDB, the presence of secondary osteoarthritis. Results of the SF-36 total score and both its physical and mental health Domains were significantly different when patients were categorized according to current bone pain (p: 0.027, 0.008 and 0.15, respectively) and deformities secondary to PDB (p: 0.011, 0.012 and 0.017, respectively). Marital status was significantly correlated with the SF-36 total score and Mental Health Domain (p:0.046 and 0.016, respectively), but not with Physical Health Domain (Table 3). BAP levels and disease extension were significantly correlated to SF-36 Physical Health Domain (p:0.038 and 0.03, respectively), but not to SF-36 total score or Mental Health Domain. Time from diagnosis was neither associated with SF-36 total score nor to any of its domains (Table 4).

In regression analysis, we included parameters with significant association to variations in SF-36 results (current bone pain, deformities, marital status and disease extension) and some factors theoretically associated with worse results: age

Table 2 – Clinical characteristics of 50 patients with Paget's disease of bone. Results are expressed in percentage or in mean (DP).

Age (years)	66.32 (8.65)
Gender	
Female	60.8%
Male	39.2%
Race	
Caucasian	96.8%
Afrobrazilian	3.2%
Marital status	
Married	80.6%
Single or widowed	19.4%
Form of PDB	
Monostotic	25.8%
Polyostotic	74.2%
Time from diagnosis (years)	7.69 (6.15)
Positive familial history of PDB	29%
Current activity on scintigraphy[a]	38.7%
Current treatment of PDB[b]	41.9%
Disease extension[c]	2.21 (2.70)
BAP levels (U/L)	33.78 (42.83)
Bone pain (current)	32.3%
Deformities[d]	19.4%
Impairment due to PDB[e]	12.9%
Deafness[f]	3.2%
Intracranial hypertension[f]	3.2%
Osteoarthritis secondary to PDB[g]	32.3%
Fracture secondary to PDB[h]	3.2%
Osteosarcoma	0

PDB, Paget's disease of bone; BAP, bone-specific alkaline phosphatase.
[a] Defined by areas of high uptake on bone scintigraphy.
[b] Use of oral bisphosphonates in the past 6 months or zoledronic acid in the past 12 months.
[c] Defined by area of high uptake on bone scintigraphy.
[d] On clinical examination and on radiographs.
[e] Defined by limited articular range of motion due to PDB.
[f] Due to cranial involvement by PDB.
[g] Osteoarthritis in joints with bone involvement by PDB.
[h] In bone involved by PDB.

and the presence of impairments. BAP levels were excluded because they were correlated with disease extension (Pearson correlation *r*: 0.673, $p < 0.001$). After regression, the only parameters that remained significantly associated with the SF-36 total score and to its Mental Health and Physical Health Domains were pain and marital status (value of *p* for, respectively, pain: 0.001, 0.002 and 0.003; marital status: 0.005, 0.003 and 0.015) (Table 5).

WHOQOL-bref

Median score of the WHOQOL-bref questionnaire was 14,61 (13.03–15.69). Results of its domains were: domain 1 (physical function): 14.28 (12.00–16.14), domain 2 (psychological): 14.66 (13.81–17.33), domain 3 (social relationship): 15.33 (13.33–16.00), domain 4 (environment): 14.5 (12.89–16.00). The whoqol-bref total score was significantly associated with pain, physical impairment and presence of deformities (*p*: 0.019, 0.016, 0.006, respectively). It was not associated with sex, marital status, disease activity, current treatment, the presence of secondary osteoarthritis or kind of involvement (monostotic or polyostotic) (Table 3). There was no correlation between WHOQOL-bref score and: BAP, age, time from diagnosis and disease extension (Table 4).

Concerning to WHOQOL-bref domains, only the results of physical (domain 1) and the psychological (domain 2) components were further analyzed. Domain 1 score was significantly associated with marital status, pain and deformities, (*p*: 0.042, 0.011, 0.010, respectively) but not with sex, physical impairment, kind of involvement or osteoarthritis, disease activity or current treatment. Median results of domain 2 scores were associated with marital status, physical impairment, and kind of involvement (*p*: 0.029, 0.021, 0.031, respectively), but not with sex pain, current treatment, disease activity, deformities and osteoarthritis (Table 3). WHOQOL-bref domains 1 and 2 were not associated to BAP, age, time from diagnosis and disease extension (Table 4).

Regression was performed with the same parameters chosen for SF-36 analysis. The presence of pain, deformities and marital status were significantly associated with results of the

Table 3 – Results of the questionnaires SF-36 and WHOQOL-bref in 50 PDB patients divided according to clinical characteristics. Results are expressed in median (25% and 75% percentiles). A level of significance of 5% was employed in Mann–Whitney *U* test.

	SF-36			WHOQOL-bref		
	Physical Health Domain	Mental Health Domain	Total Score	Domain 1	Domain 2	Total score
Gender						
Female	50.60 (38.20–72.80)	59.70 (38.80–80.90)	60.27 (38.81–75.68)	14.28 (11.42–15.42)	14.66 (12.66–16.66)	14.83 (12.92–15.69)
Male	73.80 (36.60–82.80)	68.56 (41.30–79.90)	75.93 (35.43–80.18)	13.71 (10.28–15.42)	15.33 (14.00–17.33)	14.30 (13.07–16.46)
p	0.316	0.707	0.506	0.674	0.325	0.897
Marital status						
Married	61.10 (40.80–75.80)	65.25 (42.7–80.90)	63.48 (40.81–79.00)	14.28 (12.00–16.00)	15.33 (14.00–17.33)	14.61 (13.53–15.69)
Single/widowed	44.80 (30.20–59.60)	38.50 (35.46–59.70)	45.29 (31.06–60.91)	11.42 (10.29–12.57)	13.33 (12.00–14.66)	12.76 (11.84–14.92)
p	0.097	0.016	0.046	0.042	0.029	0.092
Form of PDB						
Polyostotic	69.60 (41.20–82.80)	60.80 (41.30–71.90)	75.68 (38.81–76.12)	14.85 (13.14–15.42)	16.66 (14.66–17.33)	15.46 (14.38–16.30)
Monostotic	50.40 (38.20–73.80)	56.63 (41.30–71.90)	60.07 (40.56–76.12)	14.00 (10.29–15.42)	14.66 (12.66–15.33)	14.22 (12.64–15.23)
p	0.159	0.313	0.285	0.252	0.031	0.069
Current activity on scintigraphy[a]						
Yes	46.40 (30.20–69.60)	53.45 (38.50–81.80)	47.37 (35.43–75.93)	13.71 (10.29–15.43)	14.66 (12.66–16.66)	14.53 (11.84–15.69)
No	66.80 (48.00–75.80)	63.60 (50.36–75.50)	62.10 (47.85–79.18)	14.28 (11.71–15.42)	14.99 (14.66–17.33)	14.76 (13.80–15.84)
p	0.114	0.213	0.131	0.384	0.220	0.257
Current treatment of PDB[b]						
Yes	55.10 (40.80–75.6)	60.41 (43.20–79.90)	60.59 (40.81–79.18)	13.71 (11.42–14.28)	14.66 (14.00–15.33)	14.22 (13.07–15.07)
No	63.6 (36.6–76.8)	56.70 (38.80–74.06)	61.31 (38.50–78.41)	14.85 (11.14–16.00)	15.33 (13.33–17.33)	15.03 (13.15–16.46)
p	0.894	0.594	0.581	0.147	0.322	0.324
Bone pain (current)						
Yes	42.20 (29.4–64.60)	43.20 (38.50–56.00)	47.00 (32.16–60.91)	11.43 (10.29–14.28)	14.66 (12.66–15.33)	13.38 (11.84–14.92)
No	69.60 (44.80–77.80)	68.39 (51.80–81.80)	72.71 (47–79.18)	14.86 (12.57–16.00)	15.33 (14.00–17.33)	14.92 (14.15–16.46)
p	0.027	0.008	0.015	0.011	0.123	0.019
Deformities due to PDB[c]						
Yes	40.70 (24.30–45.80)	40.38 (32.21–48.63)	40.68 (27.31–46.57)	10.00 (9.43–12.57)	13.66 (12.00–16.33)	12.45 (11.22–13.84)
No	64.60 (41.20–77.80)	61.13 (43.20–80.90)	62.10 (47.00–79.18)	14.28 (12.00–15.43)	14.99 (14.00–17.33)	14.92 (13.60–16.15)
p	0.011	0.012	0.017	0.010	0.302	0.006
Impairment due to PDB[d]						
Yes	43.50 (34.80–48.00)	53.28 (41.30–59.70)	47.42 (35.43–54.70)	11.71 (9.71–12.57)	13.00 (12.66–14.66)	12.78 (12.00–13.07)
No	64.60 (40.60–76.80)	60.80 (42.36–80.90)	62.10 (40.56–79.00)	14.28 (11.42–15.71)	15.33 (14.00–17.33)	14.87 (13.56–15.92)
p	0.113	0.268	0.151	0.053	0.021	0.016
Osteoarthritis secondary to PDB[e]						
Yes	41.40 (31.00–73.20)	46.53 (36.31–73.68)	43.78 (33.50–78.70)	11.42 (9.71–15.42)	14.66 (12.66–17.33)	14.15 (11.84–15.53)
No	63.10 (40.80–77.80)	67.56 (46.90–81.80)	65.90 (40.80–80.35)	14.28 (11.43–16.00)	14.93 (14.00–16.66)	14.61 (13.38–15.69)
p	0.281	0.195	0.195	0.204	0.935	0.544

PDB, Paget's disease of bone.
[a] Defined by areas of high uptake on bone scintigraphs.
[b] Use of oral bisphosphonates in the past 6 months or zoledronic acid in the past 12 months.
[c] On clinical examination and on radiographs.
[d] Defined by limited articular range of motion due to PDB.
[e] Osteoarthritis in joints with bone involvement by PDB.

WHOQOL-bref total score and its Domain 1 in regression (*p* results, respectively: total score: 0.040, 0.013, 0.031; domain 1: 0.022, 0.004, 0.004). WHOQOL-bref domain 2 results were significantly predicted by pain and marital status (*p*: 0.032 and 0.003, respectively) (Table 5).

Results of SF36 total score and WHOQol-bref total score were well correlated (*r*: 0.741, $p < 0.001$).

Discussion

PDB can be completely asymptomatic at one extreme of its clinical presentation, but in the other extreme, it can cause life-threating complications, such as intracranial hypertension, severe heart failure and osteosarcoma. Between

Table 4 – Correlation of continuous variables and results of SF-36 and WHO-QOL-bref analyzed by Sperman's rho correlation and expressed as coefficient of correlation in 50 patients with Paget's disease of bone. A level of significance of 5% was employed.

	SF-36						WHOQOL-bref					
	Physical Health Domain		Mental Health Domain		Total Score		Domain 1		Domain 2		Total score	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Age (years)	−0.123	0.396	−0.092	0.523	−0.47	0.744	0.008	0.956	0.069	0.637	0.094	0.519
Time from diagnosis (years)	−0.20	0.891	−0.136	0.341	−0.54	0.708	0.001	0.995	−0.080	0.580	−0.051	0.723
Disease extension[a]	−0.308	0.030	−0.255	0.074	−0.276	0.052	−0.167	0.250	−0.089	0.542	−0.205	0.157
BAP levels (U/L)	−0.307	0.038	−0.226	0.131	−0.272	0.068	−0.226	0.131	−0.256	0.087	−0.257	0.085

BAP, bone-specific alcaline phosphatase.

[a] Defined by area of high uptake on bone scintigraphy.

Table 5 – Multivariate analysis of SF-36 and WHOQOL-bref results. Results are expressed as parameter estimates (B). A level of significance of 5% was employed.

	SF-36						WHOQOL-bref					
	Physical Health Domain		Mental Health Domain		Total Score		Domain 1		Domain 2		Total score	
	B	*p*	*B*	*p*	*B*	*p*	*B*	*p*	*B*	*p*	*B*	*p*
Marital status	21.397	0.015	23.746	0.003	22.983	0.005	3.012	0.004	2.715	0.003	1.666	0.031
Bone pain	20.051	0.003	18.767	0.002	21.344	0.001	2.002	0.022	1.625	0.032	1.325	0.040
Disease extension	0.075	0.957	0.127	0.920	0.276	0.831	0.306	0.081	0.119	0.433	0.095	0.465
Age	−0.727	0.055	−0.412	0.232	−0.523	0.137	0.064	0.143	0.049	0.197	0.580	0.710
Deformities	12.177	0.148	12.225	0.111	12.523	0.109	2.917	0.004	0.699	0.428	1.862	0.013
Impairments due to PDB	9.294	0.305	1.132	0.891	6.376	0.448	0.838	0.477	0.958	0.347	1.184	0.173

these extremes, many patients experience manifestations that could impair their QoL, such as bone pain, secondary osteoarthritis, fractures, peripheral nerve compressions and hear impairment.[1,2]

In the first study to evaluate QoL in this population, Gold et al.[9] have found that the majority of PDB patients considered that they did not have good QoL. However, that study did not employ a standardized questionnaire and, although a high number of subjects were evaluated, a significant number of them had PDB complications or comorbidities that can adversely affect QoL.

Other studies have evaluated QoL in PDB patients using the SF-36 questionnaire.[3,6,8] In general, these studies have reported reduced QoL in this population, but only one of them has searched for predictors of QoL. Langston et al.[3] have found that bone pain, age and previous bisphosphonate treatment predicted SF-36 Physical Health Domain, while the Mental Health Domain was predicted by prior bisphosphonate treatment, not being married and bone pain. Results of the present study are in line with these findings since both QoL scores were predicted by bone pain and marital status and BAP levels were not correlated with QoL. However, in our study, WHOQOL-bref results were also predicted by deformities.

Both questionnaires employed in this study have determined marital status and pain as determinants of QoL in PDB. This result was expected since these are classic determinants of QoL. However, deformities, in spite of being reasonable causes of decreased QoL, only appeared as determinants of WHOQOL-bref results. This discrepancy might be due to intrinsic characteristics is of the questionnaires, which evaluation is beyond the scope of this study. However, the fact the predictor factors were almost the same for both questionnaires reinforces the strength of the findings.

Treatment of PDB with potent bisphosphonates, particularly zoledronic acid, is very efficient in controlling disease activity and reduces bone pain in most patients[2,5,16]). By reducing disease activity, treatment is also expected to prevent long-term complications of PDB. Therefore, it would be expected that treatment with bisphosphonates results in improved QoL in PDB and some studies have evaluated this question, usually as a secondary end point. The Horizon study[5,10] has shown that zoledronic acid was able to improve QoL in PDB patients and this result was maintained for a long time. Interestingly, risedronate, in spite of being effective in a large proportion of patients, did not produce similar effects on QoL. By the other side, in another study, the PRISM trial, treatment of PBD was not able to induce improvements in QoL,[4] even in the long term. This might have happened because most patients used risedronate, but other factors should be considered, including the appropriateness of QoL scores as endpoints in studies of PDB treatment. Differences in study designs could also have contributed to the

differences. While the Horizon study was double-blinded and compared a single infusion of zoledronic acid with 30 mg of risedronate for 60 days, the Prism study was a randomized open study, which compared treatment with bisphosphonates with a pain-driven treatment. Populations were also different, with SF-36 tending to be higher in the Horizon study.

In the present study, as in the study of Langston et al.,[3] bone pain was the only parameter directly related to PDB that significantly predicts SF-36 results, but not every PDB patient has pain and pain is not the only indication for treatment of this disease. Moreover, other sources of pain, such as secondary osteoarthritis, are not affected by treatment of PDB. Besides control of symptoms, treatment of PDB is also indicated to prevent long-term complications,[16,17] so, a very long follow-up period should be employed to detect long-term effects on QoL due to the prevention of complications. Currently, PRISM-EZ is the study with the longest follow-up of QoL in PDB, three years, what may be not enough.[18]

One major limitation of studies of QoL in PDB, including the present one, is their cross-sectional design. Longitudinal studies would be more appropriate for chronic diseases as PDB, but its chronic and frequently indolent nature makes this kind of studies more difficult.

Another factor that could impair the utility of QoL questionnaires in the evaluation of PDB treatment is the high prevalence of comorbidities in elder people, the population most affected by PDB. We tried to avoid this problem by excluding subjects with other chronic diseases. This strategy allowed us to reduce confounding factors but also introduced a drawback, since our sample could be healthier than the typical PDB patients.

The main limitation of the present study is the relatively small sample, which results in a low number of subjects with some PDB complications that could impair QoL but that are not highly prevalent, like hearing impairment. Besides, we were not able to compare our results to those of normal Brazilian population because there are not reference values of these tests for our population. By the other hand, we were able to exclude subjects with concomitant diseases that also affect QoL, therefore eliminating a confusion factor, which was not done by other studies that have evaluated QoL in PDB.

Conclusion

In conclusion, among the factors associated with QoL in PDB, bone pain is the only one that is associated with disease activity, therefore, susceptible to treatment. The remaining factors, including deformities and marital status, cannot be changed by medications.

It should be emphasized that PDB is a very heterogeneous disease, and so are the indications for treatment. While treatment is recommended for all symptomatic patients, asymptomatic patients may also be treated, according to factors as the risk of future complications. If any treatment can ameliorate symptoms like pain, some improvement in QoL is expected to be identifiable in the short term. However, if the indication for treatment is the prevention of future complications in an asymptomatic patient, the effects in QoL could only be measured in long-term studies. Hence, the present study suggests that, because of the heterogeneity of manifestations of this disease and the long period necessary for some complications to develop, QoL questionnaires might not be an appropriate endpoint for short-term studies of PDB treatment. Future studies evaluating effects of treatment on QoL in PDB patients should either have a longer duration or assess QoL more frequently; more specific questionnaires of QoL could also be employed.

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Conflicts of interest

The authors declare no conflicts of interest.

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