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Clinical, psychological and quality of life differences in fibromyalgia patients from secondary and tertiary healthcare

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Abstract

Background: The 'funnel effect' of Fibromyalgia (FM) assumes that as patients access healthcare services, they present greater severity and a more complex clinical situation than individuals with FM from the general population, but the studies comparing patients treated in different levels of healthcare are scarce. The aim of this study was to analyse the 'funnel effect' hypothesis by comparing patients from secondary and tertiary healthcare services.

Methods: A cross-sectional sample of female patients was selected in secondary (rheumatology practices - RP) and in tertiary healthcare (chronic pain clinics - CPC). Information about sociodemographic, clinical and psychological characteristics was collected and health related quality of life (HRQL) was assessed.

Results: In total, 55 patients from RP and 60 patients from CPC were included in the comparison. Patients from CPC revealed a worst clinical status (higher number of tender points, medical visits and comorbidity), more somatic symptoms (pain and daytime dysfunction levels) and worst emotional status (more anxiety) than patients from RP. Patients attending CPC also revealed a worst HRQL than RP patients although this difference was mediated by the differences in clinical and psychological variables.

Conclusions: Our study supports the 'funnel effect' hypothesis among patients of different healthcare levels, with patients from tertiary healthcare services revealing worst clinical status, more somatic and psychological symptoms, and worst HRQL than patients from secondary healthcare services.

Significance: The worst clinical and psychological status and poorer quality of life in the patients from tertiary healthcare (chronic pain clinics) in relation to the patients from secondary healthcare (rheumatology practices) must be taken into account to design studies that assess any of these aspects, to a proper analysis and interpretation of the data, and to define the scope of its generalization, as data from different clinical settings are not directly comparable.

1 | INTRODUCTION

The population of Fibromyalgia (FM) patients is a very heterogeneous group that varies in distinct clinical and psychological characteristics (Bartley et al., 2018; Wilson et al., 2009). Back in 1990, Wolfe alerted the scientific community to the existence of differences between people with FM in the general population and the patients attending healthcare services. Wolfe called 'funnel effect' of FM to indicate that as patients acceded healthcare services and with the increase of specialization, they presented greater severity or a more complex clinical situation (Wolfe, 1990).

Distinct studies have reported that FM patients in community samples or in the general population presented less severity levels, disability and psychological problems when compared to patients in healthcare services (Aaron et al., 1996, 1997; Alexander et al., 1998; Häuser et al., 2011; Kersh et al., 2001; Prescott et al., 1993; Wolfe et al., 1995a, 1995b).

Nonetheless, the studies comparing patients attending different levels of healthcare are scarce. Lledó-Boyer et al. (2009) studied the differences between patients in primary healthcare and in rheumatology practices (RP), and concluded that both were very similar in the majority of clinical characteristics, perceived health status and psychological characteristics. Häuser et al. (2011) compared patients followed in tertiary healthcare, in secondary healthcare and FM persons from the general population and they concluded that patients followed in specialized healthcare presented more pain sites and more somatic and depressive symptomatology than FM persons from the general population. However, no differences between patients attending secondary or tertiary healthcare were found. Based on the results obtained, the authors concluded for the existence of a ‘funnel effect’ between people attending healthcare and the general population, but not between people that use healthcare or in distinct levels of healthcare. The study of Galek et al. (2013) which compared patients enrolled in different medical specialties found that patients followed in psychosomatic/pain medicine settings presented a higher frequency of depressive disorders than patients in the rheumatology setting.

Therefore, until the present, there are very few studies focused on differences in clinical and psychological variables and health-related quality of life (HRQL) between FM patients attended in distinct levels of healthcare.

In the majority of the studies assessing psychological variables or HRQL performed in FM patients, the samples are fundamentally recruited in speciality consultations, mainly rheumatology and chronic pain services. For this reason, it is important to determine if there are differences in patients characteristics attended in these different healthcare levels, secondary (RP) and tertiary healthcare as chronic pain clinics (CPC), since it is important to design studies, to a proper analysis and interpretation of the data, and to define the scope of its generalization.

The aims of this study were: a) to assess the differences in sociodemographic, clinical and psychological characteristics between FM patients treated in secondary versus tertiary healthcare levels; and b) to estimate if there are differences in HRQL of patients from each healthcare level and to determine to what extent these differences can be explained by differences in sociodemographic, clinical or psychological characteristics.

2 | METHODS

2.1 | Participants

The study was comprised of female FM patients diagnosed according to the American College of Rheumatology criteria of 1990 (Wolfe et al., 1990) and the American College of Rheumatology criteria of 2010 (Wolfe et al., 2010) attending eight private RP in the north of Portugal and in CPC (Alto Minho, Braga and Alto Ave Central Hospitals). The inclusion criteria for this study were: being women, 18 years old or older, at least one-year evolution since FM diagnosis and be able to read and write in Portuguese. Excluded from the study were: patients with physical or cognitive limitations that would prevent them from filling out questionnaires and patients with other different rheumatic disorders than FM.

2.2 | Measures

2.2.1 | Sociodemographic and life style data form

Age, educational level completed, marital status, self-reported social class, local of residence, employment situation, tobacco usage (1 or more cigarette a day) and body mass index (BMI) were collected for each patient through an interview with the psychologist.

2.2.2 | Clinical data form

Clinical data sheet included the following information: time elapsed since the onset of symptoms, time elapsed since diagnosis, time elapsed between the onset of symptoms and the diagnosis, number of medical visits due to FM in the last 12 months, number of tender points, complementary treatment, psychological treatment (attended in private practices or in hospital services), and aspects related with menopause and hysterectomy (where applicable). All data were collected by the referrer specialist by consulting the administrative and clinical database.

Brief Physical Activity Assessment Tool (Marshall et al., 2005): assesses the frequency and duration of physical activities in a ‘usual’ week and the total score of the scale results from an algorithm that combines the results of 2 questions and ranges between 0 and 8. Patients are characterized as sufficiently active (score ≥ 4) and insufficiently active (score between 0 and 3). This instrument revealed proper psychometric properties both in the original version (Marshall et al., 2005) and in studies carried out in Portugal (Cruz et al., 2017).

Charlson Comorbidity Index (Charlson et al., 1987): it allows to assess physical comorbidity through 24 comorbidity possibilities which sum results in a total score. This instrument presents adequate psychometric properties (Roffman et al., 2016).

McGill Pain Questionnaire (MPQ; Melzack, 1987): it is used to monitor pain over time resulting in a total score between 0 and 78 points. The higher the pain score the greater the pain. Besides the total score, it is also possible to obtain a Pain Rating Index, a Number of Words Chosen, a Present Pain Index (was not analysed in this study) and four dimensions (sensory, affective, evaluative and misc). The original version (Kaytz & Melzack, 2011; Melzack, 1987) and the Portuguese version used in this study (Martins, 1999a, 1999b) present appropriate psychometric properties. The analysis of the data regarding the MPQ dimensions follows the method proposed by Kremer et al. (1982). In our sample, Cronbach`s α was between 0.85 for Pain Rating Index and 0.54 for Misc Dimension.

Fatigue Severity Scale (FSS; Krupp et al., 1989): it is a self-rated instrument that measures tiredness with nine sentences and a total score between 9 and 63 points (the higher the score the greater the fatigue). A total score of 36 or more suggests that the patient is suffering from fatigue (Krupp et al., 1989). The original instrument revealed suitable psychometric properties (Krupp et al., 1989), and similar results were present in the Portuguese version (Pereira & Duarte, 2010). The internal consistency in our sample was satisfactory (α= 0.94).

Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989): is an instrument with 19 self-rated questions used to measure the quality and patterns of sleep in adults and assesses seven components: sleep duration, sleep disturbances, sleep latency, daytime dysfunction, habitual sleep efficiency, subjective sleep quality and use of sleeping medications. Each component score varies between 0 and 3, and results in a total score range of 0 to 21 points, and a total score of 5 or greater is indicative of poor sleep quality (Buysse et al., 1989). Items related with roommate or bed partner opinions about patients sleep patterns were not analysed in this study. The original version of PSQI (Buysse et al., 1989) and the Portuguese language version in this study (Bertolazi et al., 2011) have proved satisfactory properties. In our sample, the internal consistency was satisfactory (α= 0.70).

Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983): it consists of 14 items divided into 2 subscales of 7 items that assess anxiety and depression symptomatology. Each subscale ranges from 0 to 21, and a score of 0–7 points is within normal values. Values between 8 and 10 indicate possible depression/anxiety, and ≥ 11 suggests clinical depression/anxiety. Both the original (Martin & Thompson, 2000; Spinhoven et al., 1997) and the Portuguese version used in this study (Pais-Ribeiro et al., 2007) demonstrated the same good psychometric properties. In our sample, the Cronbach's Alpha were 0.77 for anxiety subscale and 0.83 for depression subscale.

Brief COPE (Carver, 1997): measures the strategies used by individuals for stress management and it consists of 28 items in 14 subscales including: active coping, planning, using instrumental support, emotional social support, religion, positive reinterpretation, self-blame, acceptance, expression of feelings, denial, self-distraction, behavioural disinvestment, substance use (drugs/alcohol) and humour. According to Coolidge et al. (2000) it is possible to cluster the coping strategies in emotion-focused coping (includes acceptance, use of emotional social support, humour, positive reinterpretation and religion), problem-focused coping (consists of active coping, instrumental support and the use of planning) and dysfunctional coping (disinvestment behaviour, denial, self-distraction, self-blame, substance use and expression of feelings). The instrument has shown appropriate psychometric properties, both the original version (Carver, 1997) and the Portuguese version used in this study (Pais-Ribeiro & Rodrigues, 2004). Cronbach α in our sample was 0.76 for problem-focused coping, 0.76 for emotional-focused coping and 0.65 for dysfunctional coping. Regarding specific coping strategies, we obtained Cronbach`s α between 0.59 for planning and 0.91 for religion.

Satisfaction with Social Support Scale (SSSS; Pais-Ribeiro, 1999): it is a instrument to assess social support and it consists of 15 items divided into four dimensions: satisfaction with friends, intimacy, satisfaction with family and social activities. Each item is scored from 1 (totally agree) to 5 (totally disagree). The overall scores range from 15 to 75, and the higher the score the better is the social support perception. The SSSS was created to the Portuguese population and revealed adequate psychometric properties (Pais-Ribeiro, 1999). In our sample, the internal consistency was between 0.63 for social activities and 0.88 for satisfaction with family.

Short-Form 36 Health Survey v2 (SF-36 v2; Ware et al., 2007): evaluates generic HRQL and it consists of 36 items divided into eight dimensions: Physical Functioning (PF), Physical Role Functioning (PR), Bodily Pain (BP), General Health (GH), Vitality (VT), Mental Health (MH), Social Functioning (SF) and Emotional Role Functioning (RE). The eight dimensions can be grouped into two components: the Physical Component Summary (PCS) and the Mental Component Summary (MCS). The final scores for each dimension and component ranges from 0 to 100, with the highest scores corresponding to a better condition. The original instrument revealed adequate psychometric properties (Ware et al., 2007) as well as the Portuguese version SF-36 v2 applied in this analysis (Ferreira et al., 2012; Ferreira & Santana, 2003). The reliability in our sample was good ranging from 0.64 for SF and 0.90 for RP, RE and MH.

Fibromyalgia Impact Questionnaire (FIQ; Burckhardt et al., 1991): measures specific HRQL in FM and it includes 20 items that measure functional capacity, number of days the patient felt well and number of days the patient missed work (on the previous week), work capacity, pain, fatigue, morning tiredness, stiffness, anxiety and depression. The overall scores range from 0 to 100, one hundred being the higher negative impact. According to the FIQ total score patients can be characterized as: mild (<39), moderate (39–58) and severe impact (≥59) (Bennett et al., 2009). The original FIQ revealed proper psychometric properties (Burckhardt et al., 1991), and the Portuguese version used in this study demonstrated similar psychometric properties to the original version (Rosado et al., 2006). The Cronbach`s α in our study was 0.92.

2.3 | Procedures

Patients were selected from eight private RP and from three CPC located in the North of Portugal. All patients who were attending RP and CPC that met the inclusion criteria (according to the physician) were invited to participate in the study. The purposes and procedures of the study were exposed to the selected patients followed by the written informed consent form. Of the total 120 patients approached, 5 from RP refused to participate. The clinical data form was filled by the referrer physician. The psychologist collected information about sociodemographic and life style characteristics and applied the physical activity questionnaire. FIQ, SF-36 v2 and the remaining questionnaires were randomly applied, namely the Brief COPE, the MPQ, the SSSS, the HADS, the PSQI and the FSS. These questionnaires were given in a self-administered format (without assistance) to 37 patients (32.2%), who took on average 76 min to complete the survey, and were in interview format (with assistance) to 78 patients (67.8%), who took on average 79 min to complete the survey.

The study was approved by the Bioethics Committee of the Santiago de Compostela University, by the Ethics Committee of the Alto Minho Central Hospital, by the Executive Committee of the Braga Central Hospital and by the Ethics Committee of the Alto Ave Central Hospital. The investigation fulfilled the legal requirements regarding data confidentiality and followed the good clinical practices guidelines from the Declaration of Helsinki.

2.4 | Statistical design

For the descriptive analysis in this study, the continuous variables were expressed as mean, standard deviation and range, and the categorical variables as frequency and percentage.

Comparisons between patients recruited in RP and patients recruited in CPC regarding sociodemographic, clinical, psychological variables and HRQL were performed using χ^2 tests for categorical variables and t-student test or Mann–Whitney test for continuous variables (Kolmogorov–Smirnov test was used to assess normality).

To determine the impact of FM on HRQL in relation to the general population the SF-36 v2 scores were standardized using the Portuguese female population normative data (Ferreira et al., 2012; Ferreira & Santana, 2003). The formula applied was: standardized score = (patient score − female population mean score)/female population standard deviation. Each patient´s score was expressed as standard deviations regarding the scores of the Portuguese female population (to which was attributed a zero score). Scores above zero indicates a better HRQL than the Portuguese female population and a negative score indicates a worse HRQL than the Portuguese female population.

The relationship between the type of healthcare service and the HRQL controlling for sociodemographic, clinical and psychological variables was examined using ANCOVA (for SF-36 dimensions and components) and Binary Logistic Regression (for FIQ severity levels). The initial models were adjusted for all those sociodemographic, clinical and psychological variables that, in the bivariate analysis, showed differences with a p value $\leq .05$.

Power calculations revealed that a minimum sample size of 60 patients in each group detects differences of 13 points in SF-36, with a confidence level of 95% and a statistical power of 80%.

Due to the multiple comparisons, the level of significance was set at $p \leq 0.01$. All analyses were conducted with SPSS Version 24.0 statistical package.

3 | RESULTS

A total of 115 female patients participated in the study, out of these 60 (52.2%) were recruited in CPC and 55 (47.8%) in RP. Sociodemographic and life style characteristics of the sample are summarized in Table 1. On both samples, the majority of women were predominantly of secondary level or lower education (90.9% CPC vs. 90% RP), were

TABLE 1 Differences in sociodemographic and life style characteristics between fibromyalgia patients treated in outpatient chronic pain clinics and fibromyalgia patients treated in rheumatology practices

Variables	Practice: Chronic pain clinic ($n = 60$)	Practice: Rheumatology ($n = 55$)	χ^2/(Z)	*p*
Age (years) *M* ± *SD* (range)	48.45 ± 10.18 (19–72)	47.56 ± 9.69 (21–59)	−0.143	0.886
Educational level				
Primary	11 (20)	18 (30)	1.69	0.429
Secondary	39 (70.9)	36 (60)		
University	5 (9.1)	6 (10)		
Marital status				
Married/living with a stable partner	49 (81.7)	40 (72.7)	1.311	0.252
Single/divorced/widowed	11 (18.3)	15 (27.3)		
Social class				
Middle and upper middle class	27 (45)	24 (43.6)	0.141	0.932
Lower middle class	21 (35)	21 (38.2)		
Lower class	12 (20)	10 (18.2)		
Residence				
Rural area	33 (55)	33 (60)	0.293	0.588
Urban area	27 (45)	22 (40)		
Employment situation				
Active	17 (28.3)	24 (43.6)	2.929	0.087
Non active	43 (71.7)	31 (56.4)		
Tobacco consumption				
Yes	7 (11.7)	7 (12.7)	0.030	0.862
No	53 (88.3)	48 (87.3)		
Physical activity				
Sufficiently active	16 (26.7)	14 (25.5)	0.022	0.882
Not sufficiently active	44 (73.3)	41 (74.5)		
BMI				
Normal	24 (40)	21 (39.6)	0.069	0.966
Overweight	26 (43.3)	24 (45.3)		
Obese	10 (16.7)	8 (15.1)		

Note:: Data are shown as *n* (%), except specification

Abbreviation: BMI, body mass index.

not active with respect to employment status (71.7% CPC versus 56.4% RP), their physical activity level was low (73.3% CPC vs. 74.5% RP), and were overweight or obese (60% CPC vs. 60.4% RP). There were no statistically significant differences on none of the sociodemographic and life style variables analysed.

As far as clinical characteristics are concerned, there were no statistically significant differences between patients from CPC and patients from RP regarding time elapsed since onset of symptoms, time elapsed since diagnosis of FM, and time elapsed between onset of symptoms and diagnosis of FM. There were also no statistically significant differences between samples concerning receiving complementary or psychological treatments, menopause condition and hysterectomy. Nevertheless, patients from CPC presented a higher number of medical visits due to FM in the last 12 months (3.75 ± 2.01 versus 2.29 ± 1.80, $p < 0.001$) and displayed a higher number of tender points (15.58 ± 2.38 versus 13.80 ± 2.45, $p < 0.001$). In this global sample, the levels of comorbidity were low, ranging between 0 and 4, but it

TABLE 2 Differences in clinical characteristics between fibromyalgia patients treated in outpatient chronic pain clinics and fibromyalgia patients treated in rheumatology practices

	Practice			
Variables	**Chronic pain clinic ($n = 60$)**	**Rheumatology ($n = 55$)**	**χ^2/(F)/(Z)**	***p***
Time elapsed since onset of symptoms (years) *M* ± *SD* (range)	14.25 ± 8.04 (4–38)	13.22 ± 9.97 (2–45)	−1.396	0.163
Time elapsed since diagnosis of FM (years) *M* ± *SD* (range)	6.63 ± 5.05 (1–25)	5.13 ± 4.60 (1–22)	−2.044	0.041
Time elapsed between onset of symptoms and diagnosis of FM (years) *M* ± *SD* (range)	7.65 ± 7.05 (0–35)	8.06 ± 9.00 (0–32)	−0.458	0.647
Number of medical visits due to FM in the last 12 months (*M* ± *SD*; range)	3.75 ± 2.01 (1–10)	2.29 ± 1.80 (1–10)	1.841	<0.001
Number of tender points (*M* ± *SD*; range)	15.58 ± 2.38 (10–18)	13.80 ± 2.45 (8–18)	0.492	<0.001
Charlson Comorbidity Index				
0 comorbidities	29 (48.3)	48 (87.3)	19.666	<0.001
≥1 comorbidities	31 (51.7)	7 (12.7)		
Complementary treatment				
Yes	30 (50)	35 (63.6)	2.171	0.141
No	30 (50)	20 (36.4)		
Psychological treatment				
Yes	22 (36.7)	12 (21.8)	3.038	0.081
No	38 (63.3)	43 (78.2)		
Menopause				
Yes	25 (41.7)	20 (36.4)	0.339	0.561
No	35 (58.3)	35 (63.6)		
Hysterectomy				
Yes	17 (28.3)	14 (25.5)	0.121	0.728
No	43 (71.7)	41 (74.5)		

Note:: Data are shown as *n* (%), except specification.

can be observed a significantly higher percentage of patients with associated comorbidity from CPC when compared to patients from RP (51.7% vs. 12.7%, $p < 0.001$) (see Table 2 and Table S1).

Data regarding pain, fatigue and sleep are presented in Table 3. Patients from CPC revealed the worst indicators reported by the MPQ, namely the Pain Rating Index (50.87 ± 11.52 vs. 43.21 ± 14.93, $p = 0.006$), the Number of words chosen (18.25 ± 3.05 vs. 16.05 ± 4.72, $p = 0.004$), the Sensory dimension (0.66 ± 0.45 vs. 0.60 ± 0.19, $p = 0.01$), and the Evaluative dimension (0.70 ± 0.34 vs. 0.52 ± 0.38, $p = 0.006$).

As to fatigue, patients from CPC revealed higher total scores in the FSS and presented higher percentage of subjects with score ≥36 (98.3% vs. 92.7%, $\chi^2 = 2.169$, $p = 0.141$), but both differences were no statistically significant.

In the case of sleep, assessed through the PSQI, patients from CPC showed greatest impairments in Daytime Dysfunction (2.17 ± 0.74 versus 1.71 ± 0.92, $p = 0.004$) than patients from RP. When establishing the cut-off point of PSQI total score above 5, that provides a sensitive measure of poor sleep quality, despite the higher percentage of CPC patients revealing a poor sleep quality, there were no statistically significant differences in patients according to the recruitment place (PSQI > 5; CPC 98.3% vs. RP 92.7%, $\chi^2 = 2.169$, $p = 0.141$).

Concerning psychological variables, patients followed in CPC had higher total scores in anxiety and in depression but the differences were not statistically significant. When patients were categorized as patients without anxiety (HADS-A < 8) or as doubtful cases and clinical problems of anxiety (HADS-A ≥ 8), the sample from CPC had higher percentage of patients suffering from anxiety than patients attended in RP (HADS-A ≥ 8; 96.7% vs. 81.8%, $\chi^2 = 6.770$, $p = 0.009$). It was also observed a higher percentage of patients from CPC with depressive symptoms despite the fact that no statistical differences between groups were found (HADS-D ≥ 8; CPC 88.3% vs. RP 76.4%, $\chi^2 = 2.862$, $p =$

TABLE 3 Differences in pain, fatigue and sleep between fibromyalgia patients treated in outpatient chronic pain clinics and fibromyalgia patients treated in rheumatology practices

	Practice			
Variables	**Chronic pain clinic (*n* = 60)** ***M* ± *SD* (range)**	**Rheumatology (*n* = 55)** ***M* ± *SD* (range)**	**(F)/(Z)**	***p***
MPQ				
Pain Rating Index	50.87 ± 11.52 (21–72)	43.21 ± 14.93 (8–69)	−2.737	0.006
Number of words chosen	18.25 ± 3.05 (8–20)	16.05 ± 4.72 (3–20)	15.839	0.004
Sensory dimension	0.66 ± 0.15 (0.24–0.93)	0.60 ± 0.19 (0.15–0.85)	−2.575	0.010
Affective dimension	0.68 ± 0.24 (0.07–1)	0.58 ± 0.29 (0–1)	−1.594	0.111
Evaluative dimension	0.70 ± 0.34 (0–1)	0.52 ± 0.38 (0–1)	3.562	0.006
Misc dimension	0.60 ± 0.19 (0.11–0.94)	0.51 ± 0.22 (0.06–0.94)	−2.241	0.025
FSS				
Total score	58.83 ± 6.68 (26–63)	54.64 ± 10.36 (20–63)	11.582	0.012
PSQI				
Total score	13.42 ± 4.01 (5–21)	12.04 ± 4.06 (3–19)	−1.696	0.090
Sleep duration	1.08 ± 1.18 (0–3)	0.84 ± 1.10 (0–3)	−1.209	0.227
Sleep disturbance	2.27 ± 0.52 (1–3)	2.25 ± 0.58 (1–3)	−0.013	0.989
Sleep latency	1.92 ± 0.93 (0–3)	1.93 ± 1.05 (0–3)	−0.223	0.824
Daytime dysfunction	2.17 ± 0.74 (0–3)	1.71 ± 0.92 (0–3)	4.908	0.004
Habitual sleep efficiency	1.50 ± 1.28 (0–3)	1.35 ± 1.16 (0–3)	−0.684	0.494
Subjective sleep quality	1.97 ± 0.71(1–3)	1.95 ± 0.62 (0–3)	−0.044	0.965
Use of sleeping medications	2.52 ± 1.02 (0–3)	2.02 ± 1.31 (0–3)	13.296	0.026

Abbreviations: MPQ, McGill pain questionnaire; PSQI, Pittsburgh sleep quality index; FSS, fatigue severity scale.

TABLE 4 Differences in psychological characteristics between fibromyalgia patients treated in outpatient chronic pain clinics and fibromyalgia patients treated in rheumatology practices

	Practice			
Variables	**Chronic pain clinic (*n* = 60)** ***M* ± *SD* (range)**	**Rheumatology (*n* = 55)** ***M* ± *SD* (range)**	**(F)/(Z)**	***p***
HADS-A Total score	14.52 ± 3.53 (5-21)	12.78 ± 4.35 (3–21)	−2.038	0.042
HADS-D Total score	12.38 ± 3.99 (4–20)	10.42 ± 5.05 (0–21)	−1.981	0.048
BRIEF COPE				
Problem-focused coping	3.77 ± 1.22 (1.67–6.00)	3.36 ± 1.16 (0.67–6.00)	−1.434	0.152
Emotion-focused coping	3.07 ± 1.15 (0.80–5.80)	2.87 ± 1.00 (0.60–4.60)	−0.822	0.411
Dysfunctional coping	2.66 ± 0.92 (0.67–5.17)	2.25 ± 0.74 (0.83–3.83)	−2.307	0.021
SSSS				
Total score	43.52 ± 12.86 (21–73)	45.98 ± 13.68 (19–74)	−1.115	0.265
Satisfaction with friends	14.83 ± 5.43 (1–5)	15.75 ± 6.32 (1–5)	−0.870	0.384
Intimacy	10.80 ± 4.29 (1–5)	11.47 ± 4.39 (1–5)	−0.795	0.427
Satisfaction with family	10.33 ± 3.71 (1–5)	10.84 ± 3.85 (1–5)	−0.911	0.362
Social activities	7.55 ± 2.94 (1–5)	7.93 ± 3.22 (1–5)	−0.770	0.441

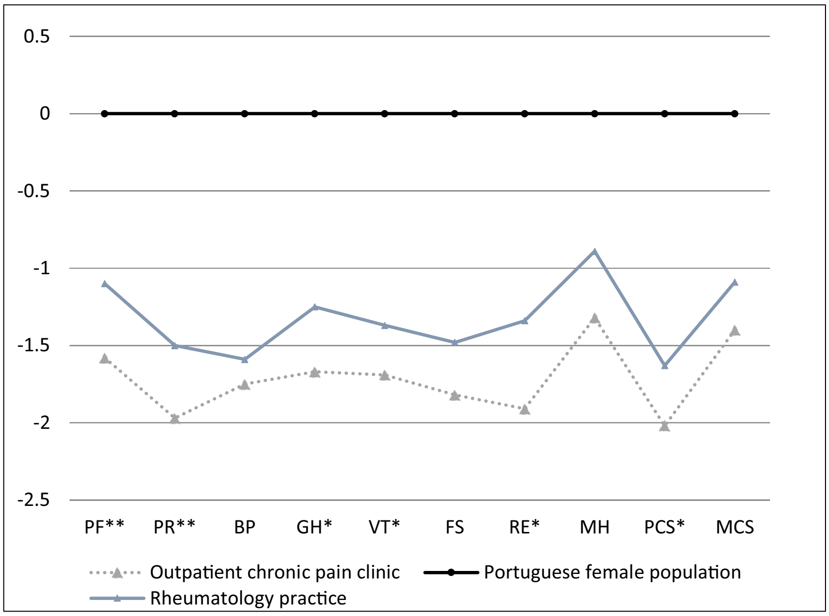
Abbreviations: HADS-A, anxiety subscale of Hospital Anxiety and Depression Scale; HADS-D, depression subscale of Hospital Anxiety and Depression Scale; SSSS, Satisfaction with Social Support Scale.

TABLE 5 Differences in health-related quality of life scores between fibromyalgia patients treated in outpatient chronic pain clinics and fibromyalgia patients treated in rheumatology practices

	Practice			
Variables	**Chronic pain clinic ($n = 60$)** ***M* ± *SD* (range)**	**Rheumatology ($n = 55$)** ***M* ± *SD* (range)**	**(F)/(Z)**	***p***
SF-36 v2				
Physical functioning	26.17 ± 15.90 (0–60)	39.45 ± 22.76 (0–90)	−3.094	0.002
Physical role functioning	18.54 ± 20.23 (0–100)	30.57 ± 25.25 (0–93.75)	3.924	0.006
Bodily pain	12.98 ± 9.87 (0–41)	16.84 ± 15.96 (0–100)	4.227	0.119
General health	19.35 ± 12.13 (0–47)	27.49 ± 16.54 (0–62)	−2.732	0.006
Vitality	13.65 ± 13.34 (0–50)	20.68 ± 14.07 (0–62.50)	0.032	0.007
Social functioning	28.33 ± 21.82 (0–100)	36.36 ± 23.23 (0–100)	0.058	0.059
Emotional role functioning	23.06 ± 24.95 (0–75)	37.42 ± 32.07 (0–100)	3.949	0.009
Mental health	29.25 ± 21.70 (0–80)	39.18 ± 25.74 (0–95)	−2.012	0.044
Physical component summary	26.65 ± 6.21 (15.55–42.32)	30.77 ± 7.78 (12.56–53.26)	−2.928	0.003
Mental component summary	33.49 ± 10.25 (17.05–63.12)	36.84 ± 10.76 (20.53–67.88)	−1.498	0.139
FIQ Total score	76.65 ± 12.51 (42.96–95.11)	69.13 ± 16.40 (27.42–94.17)	−2.256	0.024

Note:: Abbreviations: SF-36 v2, 36-item Short-Form Health Survey v2 FIQ, Fibromyalgia Impact Questionnaire

FIGURE 1 Standardized scores of the SF-36 v2 dimensions and components of fibromyalgia patients treated in chronic pain clinics and fibromyalgia patients treated in rheumatology practices. Abbreviations: BP, bodily pain; GH, general health; MCS, mental component summary; MH, mental health; PCS, physical compnent summary; PF, physical functioning; PR, physical role functioning; RE, emotional role functioning; SF, social functioning; VT, vitality.
$^{*}p \leq 0.01$; $^{**}p \leq 0.001$



0.091). Respecting coping strategies and social support, there were no statistically significant differences in any of the assessed parameters (see Table 4).

In the HRQL measures assessed, patients from RP revealed better scores than patients from CPC on both physical and mental dimensions of the SF-36 v2 and this difference reached statistical significance in PF, PR, GH, VT, RE and in the PCS. FIQ total score revealed no statistically differences between groups (see Table 5). When considering the severity level according to the FIQ, it is observed a higher percentage of patients with severe impact of FM in CPC than in RP (FIQ ≥ 59; CPC 91.7% vs. RP 72.7%, $\chi^2 = 7.165$, $p = 0.007$).

When standardization, according to gender, of SF-36 v2 dimensions and components is carried out, it was observed a worst quality of life both in patients from CPC and from RP when compared to Portuguese normative data in all its domains (see Figure 1) with values between 1 to 2 standard deviations bellow the mean observed in the general Portuguese female population. The affectation profile was similar on both patients' groups, and in both cases PR and RE were the most affected and PF and MH were the less affected dimensions.

TABLE 6 ANCOVA models to estimate differences in dimensions and components of SF-36 v2 between FM patients from rheumatology practices and chronic pain clinics adjusting for clinical variables (time elapsed since diagnosis of FM, number of medical visits due to FM, number of tender points, comorbidity), MPQ dimensions (Pain Rating Index, Number of words chosen, Sensory dimension, Evaluative dimension and Misc dimension), Fatigue, PSQI dimensions (Daytime dysfunction and Use of sleeping medication), and psychological variables (anxiety, depression and dysfunctional coping)

	Physical functioning			**Physical role functioning**			**General health**			**Vitality**
Effects	**F**	**p**	**Partial eta squared**	**F**	**p**	**Partial eta squared**	**F**	**p**	**Partial eta squared**	**F**
Recruitment place	0.159	0.854	0.003	0.087	0.917	0.002	0.277	0.759	0.006	0.755
Covariates										
TIME ELAPSED SINCE DIAGNOSIS OF FM	1.049	0.308	0.009	0.176	0.675	0.002	0.485	0.487	0.004	0.064
NUMBER OF MEDICAL VISITS DUE TO FM	0.022	0.882	0.000	0.898	0.345	0.008	0.527	0.469	0.005	0.913
NUMBER OF TENDER POINTS	0.004	0.950	0.000	0.660	0.418	0.006	0.540	0.464	0.005	0.275
COMORBIDITY	0.223	0.638	0.002	1.928	0.168	0.017	0.036	0.850	0.000	0.033
MPQ										
Pain rating index	0.123	0.726	0.001	2.161	0.144	0.019	0.482	0.489	0.004	1.744
Number of words chosen	1.581	0.211	0.014	2.043	0.156	0.018	0.089	0.765	0.001	2.358
Sensory dimension	1.368	0.245	0.012	2.429	0.122	0.021	0.118	0.731	0.001	0.804
Evaluative dimension	0.004	0.951	0.000	1.027	0.313	0.009	2.035	0.157	0.018	1.156
Misc dimension	0.104	0.748	0.001	1.434	0.234	0.013	1.818	0.180	0.016	2.698
FATIGUE	0.586	0.446	0.005	1.685	0.197	0.015	3.221	0.075	0.028	0.364
PSQI										
Daytime dysfunction	4.573	0.035	0.040	2.807	0.097	0.025	4.926	0.028	0.042	1.690
Use of sleeping medications	0.000	0.996	0.000	1.367	0.245	0.012	1.850	0.177	0.016	0.138
HADS-A	3.208	0.076	0.028	**12.426**	**0.001**	**0.101**	1.672	0.199	0.015	0.026
HADS-D	4.966	0.028	0.043	**16.418**	**<0.001**	**0.129**	0.818	0.368	0.007	0.046
BRIEF COPE Dysfunctional coping	0.230	0.632	0.002	4.533	0.035	0.039	2.096	0.151	0.019	2.799

Note: Bold values correspond to F, partial eta squared and $p \leq 0.01$.

Abbreviations: HADS-A, anxiety subscale of Hospital Anxiety and Depression Scale; HADS-D, depression subscale of Hospital Anxiety and Depression Scale; MPQ, McGill pain questionnaire; PSQI, pittsburg sleep quality index.

Comparing groups, patients attended in CPC expressed lower quality of life than RP patients in all physical and mental dimensions with statistical differences in PF, PR, GH, RE and in PCS.

ANCOVA analysis for each score of SF-36 v2 in which there were differences between patients attended in CPC or RP and binary logistic regression for FIQ severity impact levels showed that after adjustment for clinical variables (time elapsed since diagnosis of FM, number of medical visits due to FM, number of tender points, and comorbidity), MPQ dimensions (Pain Rating Index, Number of words chosen, Sensory dimension, Evaluative dimension, and Misc dimension), Fatigue, PSQI dimensions (Daytime dysfunction and Use of sleeping medication), and psychological variables (anxiety, depression, and dysfunctional coping) significant differences in HRQL did not exist between patients attended in tertiary health care (CPC) and patients attended in secondary health care (RP). The ANCOVA models showed significant effects

		Emotional role functioning			Mental health			Physical component summary		
p	Partial eta squared	F	p	Partial eta squared	F	p	Partial eta squared	F	p	Partial eta squared
0.473	0.016	0.291	0.748	0.006	0.308	0.736	0.007	0.166	0.847	0.004
0.800	0.001	0.015	0.903	0.000	0.001	0.976	0.000	1.420	0.236	0.013
0.341	0.008	3.602	0.060	0.031	0.007	0.935	0.000	0.125	0.725	0.001
0.601	0.002	0.544	0.462	0.005	0.660	0.418	0.006	0.034	0.855	0.000
0.856	0.000	0.024	0.878	0.000	0.610	0.437	0.005	0.221	0.640	0.002
0.189	0.015	0.393	0.532	0.004	7.783	0.185	0.016	0.343	0.559	0.003
0.128	0.021	2.270	0.135	0.020	2.720	0.102	0.024	0.160	0.746	0.001
0.372	0.007	1.031	0.312	0.009	1.881	0.173	0.017	0.799	0.373	0.007
0.285	0.010	0.145	0.704	0.001	0.032	0.859	0.000	0.646	0.423	0.006
0.103	0.024	0.035	0.853	0.000	1.505	0.223	0.013	1.044	0.309	0.009
0.548	0.003	1.742	0.190	0.015	4.503	0.036	0.039	0.150	0.699	0.001
0.196	0.015	0.011	0.918	0.000	0.159	0.691	0.001	**9.525**	**0.003**	**0.079**
0.711	0.001	0.006	0.941	0.000	0.101	0.752	0.001	0.891	0.347	0.008
0.872	0.000	6.698	0.011	0.057	0.758	0.386	0.007	3.310	0.072	0.029
0.830	0.000	1.459	0.230	0.013	0.300	0.585	0.003	**10.820**	**0.001**	**0.089**
0.097	0.025	**8.117**	**0.005**	**0.068**	2.453	0.120	0.022	0.689	0.408	0.006

for the dimension Daytime dysfunction from PSQI in PCS ($p = 0.003$), for the psychological variables anxiety and depression in PR ($p \leq 0.001$), for depression in PCS ($p = 0.001$), and for Dysfunctional coping in RE ($p = 0.005$) (see Table 6). In binary logistic regression analysis for FIQ severity levels the MPQ Number of words chosen dimension (OR = 1.262, 95% CI 1.072–1.681; $p = 0.005$) and depression (OR = 1.446, 95% CI 1.189–1.759; $p \leq 0.001$) were associated to a higher FM impact assessed by FIQ (FIQ $\geq$ 59).

4 | DISCUSSION

Our results showed differences in clinical, psychological and quality of life features according to the healthcare level where the patient is treated. Patients attending the tertiary healthcare level revealed a worst clinical situation (higher number of medical visits and tender points, more comorbid illness) more somatic symptoms (pain and worst sleep quality), a worst psychological status (higher levels of anxiety) and worst quality of life both in generic (PP, PR, GH, VT, RE and PCS) and specific dimensions (FIQ). These findings support that the funnel effect described by Wolfe is not only present among patients from clinical settings and persons with FM from the general population but also among patients from distinct healthcare levels, with clinical, psychological and quality of life differences between patients from RP (secondary healthcare) and from CPC (tertiary healthcare).

Our results do not match with previous studies comparing primary and secondary healthcare (Lledó-Boyer et al., 2009) and comparing secondary and tertiary healthcare (Häuser et al., 2011). The absence of differences between patients from primary and from secondary healthcare in the study of Lledó-Boyer et al. (2009) was justified by the long disease duration (mean time with pain range between 9 and 13 years) which could result in a similar adaptation to illness. However, our samples had a longer mean time with pain ranging from 13 to 14 years and even so significant differences between variables were found.

It is possible that the discrepancies observed in our results when compared with previous studies could be related with the differences in healthcare systems. In Portugal FM is commonly diagnosed and treated in primary healthcare services. Nevertheless, in about 60 to 70% of FM patients it is reported therapeutic ineffectiveness and/or drug intolerance (Direção Geral da Saúde, 2005), and in this cases patients are referenced to Rheumatology for revaluation and therapeutic guidance (Direção Geral da Saúde, 2015.

When pain assumes a central role and its management is difficult, primary care and rheumatology services reference FM patients to chronic pain, which can be Chronic Pain Consultation, Pain Therapeutic Units, Pain Multidisciplinary Units and Pain Multidisciplinary Centres. This way, the rheumatology consultations report to secondary healthcare level and chronic pain consultations report to tertiary healthcare level. In hospital rheumatology consultations, due to the excessive waiting time, that varies between 89 days in the Local Health Unite from Alto Minho and the 400 days in the Braga Hospital (Serviço Nacional de Saúde, 2019), patients often turn to private rheumatology practices, the reason why the sample of FM patients from RP was collected in private rheumatology practices. The CPC group was recruited in Pain Therapeutic Units that are multidisciplinary teams with specialists in pain control, psychiatrists, psychologists and nurses (Direção Geral da Saúde, 2008). Despite RP patients being collected in private practices and the CPC patients being collected in the public health system, no significant statistical differences in sociodemographic variables were found between both groups.

The sociodemographic characteristics from both patients' samples in our study were similar to other international studies (Bernatsky et al., 2005; Lledó-Boyer et al., 2009; Walen et al., 2001) and similar to Portuguese studies except regarding educational level. Only 9.6% of the sample has higher educational level, which is lower than the observed in Portugal where about 21.6% of female population have higher education (Eurostat, 2018). Nevertheless, our results are in line with two Portuguese previous studies. In the study of, Tomás-Carús et al. (2018) aiming to analyse the effects of a breathing exercises program on pain and FM impact on daily life in Portuguese s FM patients, only 14% had higher education level. Also Ferreira and Santana (2003) in a study with a representative sample of Portuguese population, 8.5% had higher education level.

Patients in tertiary healthcare services (CPC) had a worst clinical status: a higher number of tender points and more comorbidity, and they reported a higher perception of pain and sleeping problems and higher distress (anxiety) in comparison with secondary healthcare (RP). A connexion between higher perception of physical symptoms and more psychological distress could be established, as the literature suggests a mutual relationship between anxiety and pain in FM patients (Aparicio et al., 2013; Hadlandsmyth et al., 2017; Thieme et al., 2004), although the present study does not allow us to establish causality.

The worst clinical status and the higher somatic and psychological symptom intensity in CPC patients could explain the higher healthcare resources usage found in this group of patients when compared with patients attended in RP.

In relation to HRQL, the impairment profile is similar in both groups, indicating that there are not differences in the kind of affectation in the distinct HRQL dimensions in RP and in CPC. In both groups of patients PCS was the most affected and this is consistent with the literature reporting a greater impairment in the physical component of HRQL (Costa et al., 2000; Martinez et al., 1999; Turkyilmaz et al., 2012; Walker et al., 1997). However, although HRQL affectation profile was similar, patients attended in CPC presenting a greater impact in all HRQL indicators achieving statistical significance in the generic quality of life dimensions PF, PR, GH, VT, RE, and PCS, and in the FM severity levels assessed through the FIQ.

However, when considering the differences in HRQL between patients attended in secondary level or in tertiary level, the differences in clinical and psychological variables between both groups need to be taken into account. The analysis controlling these differences indicate that the greater impact found in HRQL in FM patients from CPC can be attributed to differences in intensity of somatic (sleep daytime dysfunction and number of words chosen to describe pain) and psychological symptoms (anxiety and depression), and by the type of coping strategies used by patients (dysfunctional coping), variables which are related to worse quality of life in other studies (Aparicio et al., 2013; Campos & Vázquez, 2012; Galvez-Sánchez et al., 2020; Oncu et al., 2013; Tander et al., 2008; Tesio et al., 2018; Theadom et al., 2007).

The results obtained in this study have different clinical and research implications. First, the differences found in clinical and psychological variables and HRQL between FM patients attended in CPC or in RP must be taken into account in the design and interpretation of future studies that assess any of these aspects. Likewise, the studies must indicate the type of consultation from which the samples have been recruited, as data from different clinical setting are not directly comparable. In this same line, when they are considered to be composite samples of patients recruited in different clinical settings it would be of interest to carry out an analysis by groups of patients recruited in different clinical settings to determine potential differences in the results. Finally, the interventions in FM patients should take into account the context of healthcare in which they are to be implemented and adapt this to the characteristics of the patients in each practice type.

As strengths of this study it has to be noted that a wide sociodemographic, life style, anthropomorphic, clinical, psychological and HRQL variables were collected. Furthermore, it is important to highlight that this is a homogeneous sample as it has been established as exclusion criteria that there were no other rheumatic disease. The comorbidity of FM with other rheumatic conditions is very prevalent (El-Rabbat et al., 2017; Faro et al., 2017) and can be a confounding factor in determining the specific effect of FM in clinical, psychological and quality of life patterns (Duffield et al., 2018; Gist et al., 2018; Torrente-Segarra et al., 2016). Finally, the data was collected in multicentres, which allowed more generalizable findings.

This research work presents limitations, namely that considering the cross-sectional design of this study no causal relations can be established from this data. Despite a wide multi measure inclusion, variables such as pharmacological treatment were not taking into consideration. Data regarding how many patients of RP have visited pain departments and how many patients of pain departments have visited RP in the past was not collected, and some patients could have switched from one level of care to another. However, it should be into account that in Portugal patients need a referral to a pain physician, thus changes in healthcare levels could be related to changes in symptoms intensity in line with the 'funnel effect'. Finally, the sample was formed only by women, which limits data generalization for men, and the samples of the study were selected in Portugal, therefore caution should be taken when generalizing to other healthcare systems.

In conclusion, the results of this study show that patients from tertiary and secondary healthcare, although not having differences in sociodemographic variables, revealed differences in clinical and psychological variables and in HRQL. Our study supports the 'funnel effect' hypothesis between patients of different levels of healthcare, with patients from tertiary healthcare services revealing worst clinical, psychological and HRQL than patients from secondary healthcare services.

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CONFLICTS OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

Campos was responsible for the theoretical basis, designed and performed the research, conducted the research and the statistical analysis, interpreted and discussed the results and wrote the article. Vázquez was responsible for the theoretical basis, designed the research and conducted the statistical analysis, interpreted and discussed the results, wrote the article and was the responsible for the final revision. Vilhena conducted the statistical analysis, interpreted and discussed the results and collaborated in the final revision.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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