Quality of life in chronic pain patients: Illness- and wellness-focused coping as moderators

M. Graça Pereira [1], Cátia Carvalho,[1] Eleonora C. V. Costa,[2] Ângela Leite,[3] and Valéria Almeida[1]

[1]School of Psychology, University of Minho, Braga, Portugal, [2]Department of Psychology, Portuguese Catholic University, Braga, Portugal, [3]Cooperativa de Ensino Superior Politécnico e Universitário (CESPU), Gandra, Portugal

Abstract: Chronic pain is a health problem that significantly influences patients' lives, causing functional, social, socioeconomic, and emotional changes that impact quality of life (QoL). The aim of this study was to evaluate which variables (e.g., psychological morbidity, illness representations, pain, and coping) contribute to QoL and to analyse the moderating role of illness- and wellness-focused coping in the relationship between pain interference and Qol, in chronic pain patients. A sociodemographic and clinical questionnaire, the Brief Illness Perception Questionnaire, the Pain Catastrophizing Scale, the Hospital Anxiety and Depression Scale, the Chronic Pain Coping Inventory, the Short Form Health Survey, and the Brief Pain Inventory were completed by 103 patients with chronic pain. Greater use of wellness-focused coping and being professionally active were associated with better physical QoL. Cognitive representations and illness-focused coping contributed to physical QoL, and psychological morbidity contributed to mental QoL. Illness-focused coping and wellness-focused coping moderated the relationship between pain interference and physical QoL, but not with mental QoL. Since pain interference was positively related to psychological morbidity, and the latter was negatively related to QoL, it is extremely important to evaluate and promote patients' coping strategies that are focused on well-being to improve QoL. Results from this study underline the relevance of a multidisciplinary approach to chronic pain and the need to account for psychological morbidity and coping strategies in intervention programs to promote QoL in chronic pain patients.

Keywords: chronic pain; coping; psychological morbidity; quality of life

Chronic pain is a health problem that affects 25.9% of the world's population (Macfarlane, 2016) and 36.7% of the Portuguese population (Azevedo, Costa-Pereira, Mendonça, Dias, & Castro-Lopes, 2012, 2016). Chronic pain is a persistent or recurrent pain lasting longer than 3 months, including chronic primary pain, chronic cancer pain, chronic post-traumatic and postsurgical pain, chronic neuropathic pain, chronic headache and orofacial pain, chronic visceral pain, and chronic musculoskeletal pain (Treede et al., 2015). Chronic pain influences patients' lives, causing functional (such as changes in sleep, energy, and work), social (changes in intimate relationships and isolation), socioeconomic (lack of productivity and disability), and emotional (irritability,

anger, depression, and anxiety) changes. These changes cause untold suffering (Vélez, Palacio, Moreno, & Krikorian, 2013) and significantly reduce patients' quality of life (QoL; Soriano-Maldonado et al., 2015).

QoL is an individual's perception of one's position in life in relation to one's goals, expectations, standards, and concerns (World Health Organization, 2019). Sociodemographic variables, such as age, sex, marital status, and professional status, interact with QoL (Livneh, 2001; Morasco et al., 2014). Older male patients with chronic pain, less education, and who are not professionally active show worse QoL (Barbosa, Junior, & Bastos, 2007; Caron, Cargo, Daniel, & Liu, 2019). Having a partner is also an important

factor in pain adjustment (Burns et al., 2015), and the relationship between chronic pain and health-related QoL may be determined by spousal characteristics (Suso-Ribera, Sullivan, & Suso-Vergara, 2018; Suso-Ribera, Yakobov, & Ribera-Canudas, 2016).

This study was based on Livneh's (2001) model of psychosocial adaptation to chronic disease and disability in which QoL is the result of a process of adaptation to the disease. The model includes three distinct classes of interacting variables: the antecedents or triggering events related to the physical condition (pain severity and interference), followed by the dynamic process of adaptation that includes the reactions to the disease (psychological morbidity, pain representations, coping strategies, catastrophizing), and their impact on physical and mental QoL.

QoL is influenced by organic causes of an individual's health and by a set of biopsychosocial factors, including chronic pain (Dueñas, Ojeda, Salazar, Mico, & Failde, 2016), pain severity (Shim et al., 2018), pain interference (Gerdle et al., 2019), pain catastrophizing (Lamé, Peters, Vlaeyen, Kleef, & Patijn, 2005), and representations and beliefs about pain (Jorgensen, 2014). Pain duration also predicts worse QoL (Anyfanti et al., 2016); and catastrophizing is a negative cognitive and affective response to pain (McPeak et al., 2018) that is associated with pain and its severity (Morasco et al., 2014), with functional impairment in different everyday activities (McPeak et al., 2018), and with QoL (Geelen, Kindermans, van den Bergh, & Verbunt, 2017; Lamé et al., 2005). High levels of catastrophic thoughts about pain predict worse QoL in all dimensions (Geelen et al., 2017; Lamé et al., 2005), significantly influencing the perception of pain severity and reported anxiety (Wertli et al., 2014).

QoL is also determined by psychological morbidity (Rogers, Bakhshaie, Mayorga, Ditre, & Zvolensky, 2018) and by the type of coping strategies used to deal with pain (Gattino, Rollero, & De Piccoli, 2015; Krsmanovic et al., 2014). Depression is a strong predictor of QoL (Belayev et al., 2015), being associated with a decrease in general well-being, interfering with daily functioning (McMahon et al., 2017), and limiting social interactions (Belayev et al., 2015). The way individuals perceive pain can also influence how they react to and cope with it (Geelen et al., 2017). Coping predicts patients' adjustment to pain (Khan, Devereaux, LeManach, & Busse, 2016), as well as moderating physical and mental QoL (Jones, Cunningham, Kashikar-Zuck, & Brunner, 2016). Coping

strategies focused on disease avoidance are negatively correlated with all dimensions of QoL (Lira, Avelar, & Bueno, 2015). Active coping strategies, such as those focused on positive thinking and seeking social support, are associated with less pain, lower depression, and better QoL (Garcia-Campayo, Pascual, Alda, & Ramirez, 2007; Gattino et al., 2015); whereas coping strategies focused on negative thinking, such as self-blame, are associated with a decrease in physical and psychological well-being, greater pain, depression, disability, and worse QoL. However, despite several models of coping in chronic pain having been proposed, research is not integrative. In fact, Suso-Ribera, Camacho-Guerrero, McCracken, Maydeu-Olivares, and Gallardo-Pujol (2016) and Suso-Ribera, Yakobov, and Ribera-Canudas (2016) have proposed a mental health model that reveals potentially beneficial and harmful problem-solving components.

The goal of the present study was to evaluate which variables (such as psychological morbidity, illness representations, pain, and coping) contribute to QoL and to determine the moderating role of illness- and wellness-focused coping between paint interference and Qol, in chronic pain patients. This is essential because chronic pain is a health problem that affects patients' lives, causing functional, social, socioeconomic, and emotional changes impacting QoL. Additionally, despite bivariate associations between all assessed constructs and QoL, the independent contribution of each psychological factor remains unclear (Suso-Ribera, Martínez-Borba, Martín-Brufau, Suso-Vergara, & García-Palacios, 2019). The following hypotheses were tested:

Hypothesis 1: Pain interference and severity, psychological morbidity, catastrophizing, pain threatening representations, and illness-focused coping strategies will be associated with poor physical and mental QoL while wellness-focused coping will be associated with better physical and mental QoL.

Hypothesis 2: Cognitive illness representations, illness-focused coping strategies, will contribute to worse physical QoL; and psychological morbidity will contribute to worse mental QoL.

Finally, based on the literature that showed that the reduction in pain intensity was strongly associated with improved physical functioning (Suso-Ribera, Camacho-Guerrero, Osma, Suso-Vergara, & Gallardo-Pujol, 2019; Suso-Ribera, Jornet-Gibert, et al., 2016), the authors expected the following:

Hypothesis 3: Coping will moderate the relationship between pain interference and physical and mental QoL; that is, improvements in QoL after a reduction in pain intensity will be facilitated when individuals report more use of wellness-focused coping. Conversely, illness-focused coping will result in an inhibition of the positive effects of pain-reduction efforts on QoL.

Methods

Participants

The sample consisted of 103 patients undergoing outpatient treatment for chronic pain in a large Portuguese hospital. To participate in the study, patients needed to be treated in the chronic pain unit, on an outpatient basis, and be 18 years old or more. Exclusion criteria included a diagnosis of severe psychiatric illness or cognitive deficit registered in the patient's medical chart.

Procedure

This study used a cross-sectional design and was approved by the Ethics Committee of the Braga Hospital, where data collection took place. All procedures followed the ethical principles outlined in the Declaration of Helsinki. Physicians at the pain clinic consecutively invited patients who met the inclusion criteria to participate in the study for a period of 6 months. From those patients invited, 5% refused to participate and the interested patients were contacted by the researcher and signed an informed consent. Participation was voluntary and patients completed the questionnaires the same day of their routine clinic appointment.

Measures

The sociodemographic and clinical questionnaire included seven items assessing, sex, age, education, marital status, occupational status, financial status, and location; and five items assessing clinical issues: duration of pain, medication for pain, surgical/invasive intervention to control pain, other treatments to control pain, and other health problems besides pain.

The Brief Illness Perception Questionnaire (Broadbent, Petrie, Main, & Weinman, 2006; Portuguese version by Figueiras et al., 2010) assesses the cognitive and emotional representations of the illness with eight items ranked on a scale from (*0*) to (*10*) and a ninth item that addresses the cause of the illness and is open-ended. Five items assess the cognitive representation of the disease (consequences, timeline, personal control, treatment control, and identity), two items assess emotional representations (concern and emotions), and one item evaluates illness comprehensibility. A high score indicates more threatening illness representations. In this study, only the cognitive and emotional representations were used, with Cronbach's αs of .69 for cognitive representations and .74.for emotional representations.

The Chronic Pain Coping Inventory – 42 (Jensen, Turner, Romano, & Strom, 1995; Romano, Jensen, & Turner, 2003; Portuguese version by Costa & Gouveia, 2008) evaluates coping (cognitive and behavioral dimensions) to deal with pain through 42 items assessed with a scale ranging between (*1*) and (*7*). The strategies are divided into eight subscales: Guarding, Resting, Asking for Assistance, Relaxation, Pacing, Exercise/Stretching, Seeking Social Support, and Coping Self-statements, and two general dimensions: Illness-focused coping (first three subscales) and Wellness-focused coping (the remaining subscales). Only the two dimensions of illness-focused coping and wellness-focused coping were used in this study. The Cronbach's αs for these dimensions in the Portuguese version ranged between .61 and .88; in the present study they were .82 for illness-focused coping and .75 for wellness-focused coping.

The Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983; Portuguese version by Pais-Ribeiro et al., 2007) consists of two subscales (Anxiety and Depression) of seven items each. Scores up to 7 indicate absence of symptoms, scores of 8–10 are considered borderline cases, and those above 11 suggest anxiety and clinical depression. The original authors consider that the combined scores (total scale) can suggest psychological distress. In the Portuguese version, Cronbach's α for the total scale was .94; in this study it was .86. In the present study, only the total scale was used.

The Short Form Health Survey (Ware, Kosinski, & Keller, 1996; Portuguese version by Cunha-Miranda et al., 2010) comprises 12 items assessing two dimensions of QoL: physical and mental. It comprises eight dimensions (physical functioning, physical performance, physical pain, general health [physical], mental health, emotional performance, social function, and vitality [mental]) that can be grouped into two components (physical and mental QoL) that were used in this study. High scores in the physical and mental components indicate higher physical and mental

QoL, respectively. In the Portuguese version, the Cronbach's α was .81 for the physical dimension and .73 for the mental dimension; in this study, the Cronbach's α was .74 for the physical dimension and .71 for the mental dimension.

The Brief Pain Inventory (Cleeland, 1991; Portuguese Version by Azevedo et al., 2007) measures the severity of pain and degree of pain interference, which encompasses seven dimensions of functioning (general activity, mood, walk ability, normal work, relations with other people, sleep, and enjoyment of life). This questionnaire includes 15 items organized into: the Severity subscale (four items) and the Interference subscale (seven items), evaluated on a Likert-type scale ranging from zero to 10; a dichotomous item to determine the presence of pain; one item regarding pain location; and two items on medication intake and pain-relief effect. Higher scores indicate greater severity and functional interference. The Portuguese version showed a Cronbach's α of .99 for the Severity subscale and .84 for the Interference subscale; in the present study, the Cronbach's α was .77 for the Severity subscale and .80 for the Interference subscale.

The Pain Catastrophizing Scale (Sullivan, Bishop, & Pivik, 1995; Portuguese version by Azevedo et al., 2007) provides a total score and includes three distinct subscales: Rumination (four items), Magnification (three items), and Helplessness (six items) about thoughts, perceptions, or catastrophic feelings associated with pain assessed in a scale ranging between (0) and (4) regarding their frequency. A cutoff score greater than 30 is associated with a relevant clinical catastrophizing level. In the Portuguese version, the Cronbach's α was .80 for the Rumination subscale, .79 for the Magnification subscale, and .90 for the Helplessness subscale. In this study, only the total scale was used, with a Cronbach's α of .93.

Data analysis

Pearson's correlation test and the point-biserial correlation coefficient were used to analyze the relationships among sociodemographic, clinical, and psychological variables. The variables that correlated with QoL were selected for the regression analysis. A multivariate hierarchical linear regression t identified the variables that contributed to physical QoL; a multiple regression analysis was performed to find the variables that contributed to mental QoL. In both analysis, the assumptions underlying the use of regression analysis t (variance inflation factor value, and residue tolerance and

normality; Field, 2009) were confirmed. Due to constraints of sample size, the criterion for variables to be included in the model was the highest correlation with the outcome variable for each type of variable considered in the theoretical model: antecedent, emotional responses, and contextual variables taking into consideration the maximum number of predictors allowed (Soper, 2018). The moderation analysis was tested using the macro Process command for SPSS (Hayes, 2017), Version 3.1. The data were processed using the IBM SPSS software, Version 25.0.

Results

Sample description

The sample included 103 patients diagnosed with chronic pain, 78.6% women, with a mean age of 53.86 years ($SD = 11.32$ years) and a mean of 7 years of education. In total, 76.7% were married/in a common-law union, and 73.8% had an inactive employment status. The majority of the sample (Table 1) reported chronic pain for more than 3 years; however, only one-third had undergone surgical/invasive interventions for pain control. Table 1 also shows the descriptive results in all variables assessed.

Relationships among sociodemographic, clinical, and psychological variables

Negative associations were found between: pain severity and physical QoL; pain interference and physical and mental QoL; psychological morbidity and physical and mental QoL; catastrophizing and mental QoL; illness-focused coping and physical and mental QoL; cognitive representations and physical and mental QoL; and emotional representations and physical and mental QoL. More catastrophic perceptions about pain were also associated with worse mental QoL. There was also a significant positive association between wellness-focused coping (e.g., exercise, relaxation, seeking social support) and physical QoL and between employment status and physical QoL (Table 2).

Greater pain severity, greater interference of pain in the individual's functioning, greater psychological morbidity, a greater use of illness-focused coping strategies, more threatening cognitive representations, and more threatening emotional representations were associated with worse physical and mental QoL. Greater use of wellness-focused coping and being professionally active were associated with better physical QoL. The remaining sociodemographic and

Table 1

Sample Sociodemographic, Clinical, and Psychological Variables (N = 103)

Sociodemographic variables

Age (years)	M ± SD [range]	53.86 ± 11.38 [21–82]
Sex	Female	81 (78.6%)
	Male	22 (21.4%)
Marital status	Not married	24 (23.3%)
	Married	79 (76.7%)
Employment status	Active	27 (26.2%)
	Inactive	76 (73.8%)
Years of education	M ± SD [range]	7.01 ± 3.53 [0–15]
Income	<500 euros/month	56 (54.4%)
	>500 euros/month	47 (45.6%)
Area of residence	Urban	45 (43.7%)
	Rural	58 (53.6%)

Clinical variables

Duration of pain	<3 years	36 (35%)
	>3 years	67 (65%)
Pain medication	No	15 (14.6%)
	Yes	88 (85.4%)
Surgical/invasive interventions for pain control	No	71 (68.9%)
	Yes	32 (31.1%)
Other treatments for pain control	No	44 (42.7%)
	Yes	59 (57.3%)
Other health problems besides pain	No	43 (41.7%)
	Yes	60 (58.3%)

Psychological variables

	M	SD	Min.	Max.	α
Brief Pain Inventory					
Pain severity	5.68	1.67	0	9	.73
Pain interference	6.16	2.16	1	10	.80
Brief Illness Perception Questionnaire					
Cognitive representations	31.79	7.91	9	45	.61
Emotional representations	14.85	5.01	0	29	.73
Hospital Anxiety and Depression Scale					
Psychological distress	20.12	8.55	4	39	.85
Pain Catastrophizing Scale					
Total pain catastrophizing	29.7	13.47	1	51	.93
Chronic Pain Coping Inventory – 42					
Illness-focused coping	8.63	3.93	2	18	.82
Wellness-focused coping	12.22	4.52	3	25	.77
Short Form Health Survey					
Physical QoL	28.15	8.09	11	53	.84
Mental QoL	41.27	12.32	13	70	.85

Table 2

Relationships Among Sociodemographic, Clinical, and Psychological Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Physical QoL	—												
Mental QoL	-.125	—											
Severity	-.236*	-.168	—										
Interference	-.400***	-.494***	.504***	—									
Cognitive Rep.	-.470***	-.316**	.387***	.619***	—								
Emotional Rep.	-.221*	-.497***	.273**	.617***	.486***	—							
Illness-focused coping	-.409***	-.347***	.186	.441***	.357***	.269**	—						
Wellness-focused coping	.260**	.150	.006	-.095	-.294**	-.058	-.106	—					
Catastrophizing	-.147	-.483***	.264**	.523***	.466***	.672***	.261**	-.177	—				
Psychological morbidity	-.217*	-.724***	.347***	.634***	.524***	.617***	.436***	-.211*	.625***	—			
Work status	.229*	.175	-.108	-.093	-.169	.004	-.343***	.157	-.057	-.122	—		
Having a partner	.188	-.012	-.008	-.072	-.125	-.007	-.141	.036	-.150	-.067	-.120	—	
Pain duration	-.003	-.026	.225*	.066	.123	-.123	-.123	-.100	.102	-.017	-.076	.005	—

$^* p < .05$, $^{**} p < .01$, $^{***} p < .001$.

Table 3
Predictors of Physical and Mental QoL (Final Model)

| | | | | Physical QoL | | | | |
| | | | | CI | | | | |
Predictors	R^2 (Adj. R^2)	F	B	L	H	t	p	f^2
First Block	.052 (.043)	5.557		25.253	28.858		.020	.055
Work status			.229	.670	7.711	2.361	.020	
Second Block	.320 (.270)	6.389		31.541	48.662		<.001	.47
Work Status			.067	−2.128	4.571	.724	.471	
Pain severity			−.029	−1.101	.822	−.288	.744	
Pain interference			−.145	−1.551	.466	−1.068	.288	
Cognitive representations			−.276	−.521	−.045	−2.359	.020	
Emotional representations			.080	−.224	.481	.723	.472	
Illness-focused coping			−.225	−.876	−.052	−2.235	.028	
Wellness-focused coping			.135	−.079	.563	1.496	.138	

| | | | | Mental QoL | | | | |
| | | | | IC | | | | |
Predictors	R^2 (Adj. R^2)	F	β	L	H	t	p	f^2
Model	.543 (.515)	19.016					<.001	1.19
Pain interference			−.084	53.391	68.226	−.788	.433	
Cognitive representations			.152	−1.676	.724	1.661	.100	
Emotional representations			−.076	−.046	.518	−.721	.472	
Illness-focused coping			−.046	−.697	.326	−.575	.567	
Catastrophizing			−.032	−.639	.352	−.322	.749	
Psychological morbidity			−.664	−.212	.153	−6.319	<.001	

When wellness-focused coping is −2.56 or less *SD* above mean, the simple slope is no longer significant
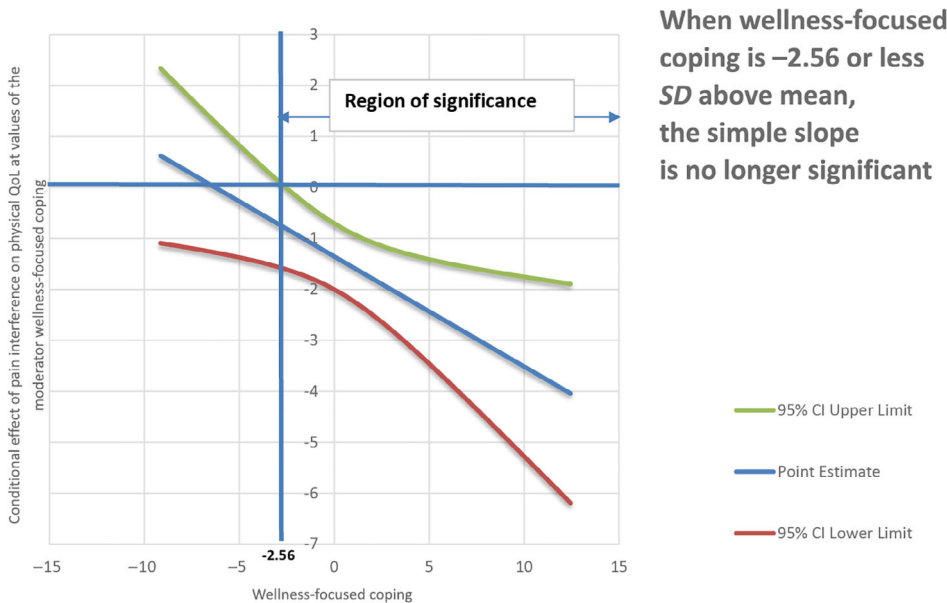
Figure 1. Wellness-focused coping as a moderator in the relationship between pain interference and physical QoL.

clinical variables were not correlated with physical or mental QoL.

Contributors to physical and mental QoL

The linear regression model was significant and explained 29% of the variance of the physical QoL, $F(8, 94) = 6.611$, $p < .001$, $f^2 = .36$, adjusted $R^2 = .294$. The results showed that having more threatening cognitive illness representations ($\beta = −.276$, $t = −2.549$, $p = .012$), greater use of illness-focused coping strategies ($\beta = −.271$, $t = −2.669$, $p = .009$), and higher distress ($\beta = .253$, $t = 2.058$, $p = .042$) contributed to worse physical QoL (Table 3).

The regression model was significant and explained 52% of the variance of mental QoL, $F(6, 96) = 19.016$, $p < .001$,
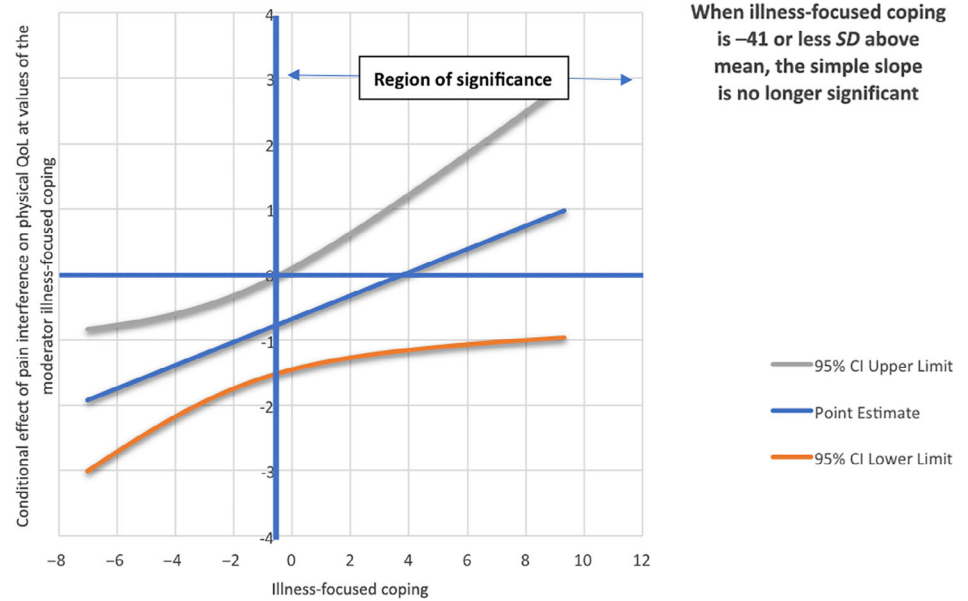
Figure 2. Illness-focused coping as a moderator in the relationship between pain interference and physical QoL.

$f^2 = .54$, adjusted $R^2 = .515$. In the final model, higher distress ($\beta = -.664$, $t = -6.319$, $p < .001$) contributed to worse mental QoL (see Table 3).

Coping as a moderator in the relationship between pain interference and physical and mental QoL

Results showed that wellness-focused coping was a moderator between pain interference and physical QoL. The interaction was significant ($\beta = -.2160$, 95% confidence interval [CI] [$-.3962$, $-.0357$], $t = -2.543$, $p = .013$), indicating that the relationship between pain interference and physical QoL was moderated by wellness-focused coping. Specifically, when wellness-focused coping was high ($\beta = -2.245$, 95% CI [-3.158, -1.332], $t = -4.877$, $p < .001$), there was a significant negative association between interference of pain and physical QoL, indicating a greater probability of patients presenting better physical QoL (see Figure 1). The Johnson–Neyman technique showed that the relationship between pain interference and physical QoL was significant when wellness-focused coping was less than -2.56 standard deviations below the mean.

The interaction of wellness-focused coping in the relationship between pain interference and mental QoL was not significant ($\beta = .0687$, 95% CI [$-.1881$, $.3255$], $t = 0.531$, $p = .597$), indicating that the relationship between pain interference and mental QoL was not moderated by wellness-focused coping.

Results showed that illness-focused coping was a moderator between pain interference and physical QoL. The interaction was significant ($\beta = .178$, 95% CI [$-.0200$, $.3355$], $t = 2.189$, $p = .031$), indicating that the relationship between pain interference and physical QoL was moderated by illness-focused coping. Specifically, when illness-focused coping was low ($\beta = -1.480$, 95% CI [-2.3048, $-.6542$], $t = -3.557$, $p = .001$), there was a significant negative association between pain interference and physical QoL, indicating a greater probability of patients presenting a better physical QoL (see Figure 2). The Johnson–Neyman technique showed that the relationship between pain interference and physical QoL was significant when illness-focused coping was less than -0.41 standard deviations below the mean.

Illness-focused coping was not a moderator between pain interference and mental QoL. The interaction was not significant ($\beta = -.0287$, 95% CI [$-.2736$, $.2162$], $t = -0.239$, $p = .817$), indicating that the relationship between pain interference and mental QoL was not moderated by illness-focused coping.

Discussion

Concerning hypothesis 1, the results of this study showed that there was a negative association between pain severity and physical QoL. Higher levels of pain were related to higher levels of psychological morbidity (Soriano-Maldonado et al., 2015) and consequently lower levels of

physical QoL (Borge, Wahl, & Moum, 2011; Rogers et al., 2018). There was also a negative association between pain interference and physical and mental QoL. In fact, when patients report greater pain interference in daily life activities, their QoL is worse (Gormsen, Rosenberg, Bach, & Jensen, 2010). Increased pain interference in the individual's functioning has also been associated with a higher emotional impact, more suffering, and consequently worse QoL (Vélez et al., 2013), which was found in the present study, since the interference of pain was associated with higher levels of psychological morbidity. Psychological morbidity was negatively related with QoL in both dimensions. This result makes intuitive sense, since chronic pain may increase psychological morbidity, which in turn has a negative impact on QoL (Richardson et al., 2009; Rogers et al., 2018).

Catastrophizing was negatively associated with mental QoL and positively related to psychological morbidity, as expected according to the literature (Wertli et al., 2014). In fact, a negative association between higher catastrophizing, psychological morbidity, and lower QoL has been suggested by several studies with chronic pain patients (McPeak et al., 2018). In fact, depression and catastrophizing are associated with the progression of chronic pain and with worse outcomes in terms of disease adaptation (Sciascia, Waldecker, & Jacobs, 2018). Illness-focused coping correlated negatively with the two domains of QoL as hypothesized. Chronic pain patients who make greater use of illness-focused coping strategies, such as limiting body movements, locking themselves in the bedroom, or restricting the execution of their daily tasks in order to deal with pain, report higher levels of pain and depression and consequently worse QoL (Dybowski, Loewe, & Bruenahl, 2018).

More threatening cognitive and emotional representations were related to poorer physical and mental QoL, which is in line with the current literature (Clayton, Dean, & Mishel, 2018) reporting that patients with chronic pain have worse QoL, more symptoms, more serious consequences, and greater uncertainty and concern associated with the disease, as well as lower personal control regarding their disease, greater negative affectivity, and poorer understanding of chronic pain. More threatening illness representations were strongly associated with greater functional pain interference (Jorgensen, 2014), which in turn negatively correlates with QoL.

Wellness-focused coping and work status were positively associated only with physical QoL and not with mental QoL. These results agree with previous studies, since wellness-focused coping strategies are usually considered more adaptive (Israel, White, & Gervino, 2015) since patients who use these types of strategies (such as physical exercise, social support, persisting in a task, relaxing, and having positive thinking when approaching a problem) report lower levels of pain and depression and consequently better QoL (Gattino et al., 2015). Being professionally active is also associated with better physical QoL (Caron et al., 2019), probably because the focus on the task and the continuation of daily activities correlates with better QoL (Gattino et al., 2015). The first hypothesis was therefore only partially confirmed.

Concerning the second hypothesis, cognitive representations and illness-focused coping contributed negatively to physical QoL, indicating that more threatening cognitive representations and greater use of illness-focused coping strategies were associated with worse physical QoL. The way patients deal with pain may positively or negatively affect QoL (Van Hecke, Torrance, & Smith, 2013). More threatening cognitive representations are strongly related to greater functional pain interference (Jorgensen, 2014), worse QoL (van der Have et al., 2015), and more anxiety and depression (Israel et al., 2015). Some coping strategies, such as illness-focused coping, are considered to be maladaptive and may lead to poorer QoL (Gattino et al., 2015).

High psychological morbidity predicted worse mental QoL and this result is in accordance with the literature. The contribution of depression and anxiety to QoL has been studied in chronic pain patients with similar outcomes (Barbosa, Junior, & Bastos, 2007; Bell & Burnett, 2009; Ferreira & Filho, 2011; Soriano-Maldonado et al., 2015).

Interestingly, some predictors (e.g., sociodemographic variables) ceased to be significant in the regression analysis while they were significant in the bivariate analysis. This is in line with the study of Suso-Ribera, Camacho-Guerrero and colleagues (2019), which controlled for age, sex, and pain severity, and where psychological factors (in block) significantly increased the explained variance of physical functioning, general health, and mental health; however, unique associations were only found for mental health and neuroticism. The second hypothesis was therefore confirmed.

Finally, concerning the third hypothesis, results showed that wellness-focused coping and illness-focused coping moderated the relationship between pain interference and physical QoL, meaning that when individuals used a greater number of wellness-focused coping strategies, the

negative relationship between pain interference and physical QoL was less intense, indicating a higher probability of patients presenting better physical QoL. Additionally, when individuals used a greater number of illness-focused coping strategies, the negative relationship between pain interference and physical QoL was more intense. In fact, greater pain interference is usually associated with higher functional limitations and worse physical and mental QoL (Farrar, 2018; Gormsen et al., 2010). However, wellness-focused coping is associated with less pain and psychological morbidity and better QoL (Gormsen et al., 2010). Wellness-focused coping strategies are characterized by physical activity, seeking social support, and focusing on positive thinking, (i.e., adaptive strategies; Chapin, 2017). In addition, patients with chronic pain who practice physical exercise report lower pain interference in daily activities (Kratz, Ehde, Bombardier, Kalpakjian, & Hanks, 2017) and consequently better physical QoL. In the same study, there was also a positive association between physical activity and physical QoL in chronic pain patients (Kratz et al., 2017), which may further explain these results. Illness-focused coping strategies (i.e., guarding, resting, and asking for assistance) were positively correlated with disability and depression, and negatively with QoL (Farrar, 2018). In fact, coping oriented towards symptom reduction and activity restriction is related to worse QoL, which may further explain these results, since illness-focused coping is intended to reduce or extinguish pain by being vigilant, resting as much as possible, asking for help, and reducing or avoiding activities (Almeida, Saragiotto, Richards, & Maher, 2018). The third hypothesis was therefore partially confirmed.

This study has some limitations that should be acknowledged, such as the small sample size and the fact that, due to a gender imbalance, the results might not be generalizable to men with chronic pain. Given that data were collected only in one major hospital in the north of Portugal, results need to be interpreted with caution regarding their generalizability. Future studies should include larger samples and address the moderating effect of a caregiver on patients' QoL, as well as whether coping strategies change over time.

Conclusions

Threatening cognitive representations and greater use of illness-focused coping strategies contributed negatively to physical QoL, while greater psychological morbidity negatively predicted mental QoL. Illness-focused coping and wellness-focused coping were also moderators of the interaction between pain and physical QoL. The present results underline the relevance of a multidisciplinary approach to chronic pain. Psychological interventions should focus on promoting wellness-focused coping strategies and on reducing the psychological morbidity associated with chronic pain. Since pain interference was positively related to psychological morbidity, and the latter negatively related to QoL, it is vital to evaluate patients' coping strategies and teach them wellness-focused coping strategies.

Disclosure of conflict of interest

The authors declare no conflict of interest.

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