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The Parenting Concerns Questionnaire: A validation study with Portuguese parents with cancer

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Abstract

Objectives: To examine the psychometric properties of the Parenting Concerns Questionnaire (PCQ) in a sample of Portuguese parents with cancer.

Methods: The PCQ was completed by 209 adults with cancer, who are parents of at least one minor child. Participants reported on parenting concerns, depressive and anxiety symptoms, parental stress as well as quality of life. Confirmatory factor analysis and Item Response Theory (IRT) were used to assess the psychometric properties of the PCQ. Cronbach's alpha was used to examine its reliability. Pearson correlation coefficients provided information regarding convergent validity. Criterion validity was analysed.

Results: Confirmatory factor analysis confirmed the original three-factor structure. IRT indicated that most of the items were highly discriminant and better identified as moderate versus low or high levels of parenting concerns in the three dimensions of PCQ. The pattern of associations with depressive and anxiety symptoms, parental stress, and quality of life provided evidence for the convergent validity. The PCQ differentiated between parents with and without depressive symptoms.

Conclusion: Exploring parenting concerns provides additional relevant information about the experiences and the potential psychological distress experienced by these parents with cancer. The PCQ can be an important tool to identify parents with cancer who might benefit from psychological support regarding parenting.

KEYWORDS
cancer, item response theory, oncology, Parenting Concerns Questionnaire, parents with cancer, validation study

1 | INTRODUCTION

Cancer is a significant public health problem all around the world (Siegel, Miller, & Jemal, 2018). In recent years, its incidence has been increasing in Europe (Direção-Geral da Saúde, 2017) and the United States (Siegel et al., 2018; Weaver, Rowland, Alfano, & McNeel, 2010). Fortunately, the number of survivors has also been increasing worldwide (Direção-Geral da Saúde, 2017; Siegel et al., 2018). Thus, understanding the needs of patients and survivors is of high importance to develop healthcare services capable of satisfying their needs and improving their quality of life. Commonly, adults between the ages of 25 and 59 are parents of dependent children. In 2018, 15,550 Portuguese individuals, within this age range, received a cancer diagnosis (Global Cancer Observatory, 2018). Currently, cancer has been diagnosed earlier in time. Compared to the past years, a higher prevalence in younger adults has been identified (Global Cancer Observatory, 2018), at a period when the parental role is particular salient in the patient's life.

When parents receive a cancer diagnosis, their lives and the lives of their family members change (Lewis et al., 2015; Moore,

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Rauch, Baer, Pirl, & Muriel, 2015; Semple & McCance, 2010; Visser, Huizinga, van der Graaf, Hoekstra, & Hoekstra-Weebers, 2004). These patients start to think about the possible impact of their illness and possible death on their children (Park, Check, et al., 2017; Rauch & Muriel, 2004; Semple & McCance, 2010), especially when the children are minor (i.e. aged less than 18 years old). Studies have shown that the specific parenting concerns are related to how to communicate with children about parental cancer; how children will react to the cancer diagnosis; and how to handle children's reactions (Billhult & Segesten, 2003; Connell, Patterson, & Newman, 2006; Fisher & O'Connor, 2012; Muriel et al., 2012; Rauch & Muriel, 2004; Stinesen-Kollberg, Wilderäng, Möller, & Steineck, 2014; Tavares, Brandão, & Matos, 2018; Visser et al., 2004). Parenting concerns are also related to how to manage the parenting role during the oncological experience (Mackenzie, 2014; Rauch & Muriel, 2004; Tavares et al., 2018; Visser et al., 2004). Moreover, ill parents have worries about the parental competence of their partners, when it comes to taking care of the children during the disease and if the patient dies (Billhult & Segesten, 2003; Connell et al., 2006; Moore et al., 2015; Muriel et al., 2012).

In addition to the impact of parental cancer on the children, there is also the impact of cancer on the patient and treatment-related decisions (Mackenzie, 2014; Rauch & Muriel, 2004; Yellen & Cella, 1995). Parenting worries and challenges that emerge after diagnosis can adversely affect parents' quality of life (Muriel et al., 2012; Park et al., 2016) and their sense of parenting competence (Fisher & O'Connor, 2012; Moore et al., 2015; Ohlén & Holm, 2006; Stiffler, Haase, Hosei, & Barada, 2008; Tavares et al., 2018). Additionally, the demands of the parenting role in individuals with cancer can increase depressive (Götze et al., 2017) and anxiety symptoms (Arès, Lebel, & Bielajew, 2014; Nilsson et al., 2009). For these reasons, parenting challenges must be examined. Therefore, it is critical to develop and test valid and reliable instruments to identify parenting concerns during the cancer trajectory. A reliable measure to assess these concerns will contribute to the improvement of healthcare services offered to these patients related to their parenting needs.

Recently, advancements were made with the development of the *Parenting Concerns Questionnaire* (PCQ; Muriel et al., 2012). This questionnaire was developed to assess specific parenting concerns among cancer patients and is composed of 15 items, distributed among three subscales. The *emotional impact* subscale assesses parental concerns about changes in emotional distress of children and their need for psychological support. The *practical impact* subscale measures parental concerns regarding how changes in parents' psychological and physical functioning affect children, as well as changes in the routines of children and the time spent between children and parents. Finally, the *co-parent* subscale assesses parental concerns about the ability of the partner to provide emotional and practical support to the children and the ill parent (Moore et al., 2015; Muriel et al., 2012). The items of the PCQ emerged through telephone focus groups with parents with cancer who had at least one dependent child (Muriel et al., 2012). The PCQ showed good reliability and moderate correlations, in the expected directions, with depression and anxiety, quality of life, and overall distress (Muriel et al., 2012). Two recent studies assessed psychometric properties among German parents with cancer (cancer stage I–IV) and American mothers with metastatic cancer. The first study supported the original three-factor structure (Inhestern et al., 2016), but in the study with patients with metastatic cancer, this structure was not entirely supported (Park, Tan, et al., 2017). The German version of the PCQ discriminated among patients who used and those who did not use psychological support (Inhestern et al., 2016).

In this study, we explored the psychometric properties of the Portuguese version of the PCQ, in a sample of parents with cancer. Specifically, we aimed to: (a) test the original three-factor structure of the PCQ, proposed by Muriel et al. (2012), using Confirmatory Factor Analysis (CFA), and to assess its reliability; (b) identify the psychometric properties of the items, using an Item Response Theory (IRT) analysis; as well as (c) obtain evidence regarding convergent (anxiety and depressive symptoms, parental stress and quality of life) and criterion validity (psychological and psychiatric support).

2 | METHODS

2.1 | Participants

Inclusion criteria were as follows: (a) being an adult (male or female) of at least 25 years of age; (b) having a cancer diagnosis; (c) being a parent of, at least, one minor child (i.e. aged less than 18 years old), and (d) being able to understand and complete a questionnaire in the Portuguese language. The criterion for exclusion was being diagnosed with cancer for more than ten years. Two hundred and nine adults (*M age* = 42.76 years, *SD* = 5.80; see Table 1), who met the inclusion criteria, answered to all items of the PCQ scale. However, only 173 participants (82.78%) completed all the scales used (i.e. 36 participants completed only the PCQ). One hundred and eight participants provided contact information for a follow-up assessment. Of these, only 49 participants (45.37%) completed the PCQ once again at six months of follow-up.

2.2 | Measures

The *PCQ* is a 15-item self-report instrument developed to assess three specific dimensions of parental concerns in cancer patients (Muriel et al., 2012). Each dimension is composed of five items rated on a Likert-type scale, ranging from 1 (*not at all concerned*) to 5 (*extremely concerned*). Higher scores indicated more parental concerns. Cronbach's alpha of the original scale was 0.83 for the total score, 0.79 for practical and emotional impact, and 0.85 for the co-parent subscale (Muriel et al., 2012).

The *Hospital Anxiety and Depression Scale*—HADS (Zigmond & Snaith, 1983; Portuguese version; Pais-Ribeiro et al., 2007) is a 14-item self-report scale, assessing levels of anxiety and depressive symptoms. This scale has two subscales (anxiety and depression)

TABLE 1 Sample socio-demographic and clinical characteristics (*n* = 209)

	***n* (%)**
Educational level	
Elementary school	40 (19.14)
High school	51 (24.40)
College	118 (56.46)
Romantic relationship	
Yes	174 (83.25)
No	35 (16.75)
Living with children	
Yes	203 (97.13)
No	5 (2.39)
Number of children	
1	89 (42.58)
2	102 (48.80)
3	16 (7.66)
4	2 (0.96)
Age of children—*M*, *SD*, range	11.14, 5.47, 0–25.33
Site of cancer	
Breast	151 (72.24)
Other	58 (27.75)
Time since diagnosis in months—*M*, *SD*, range	32.57, 25.37, 0–120
Treatments	
Chemotherapy	171 (81.81)
Radiotherapy	128 (61.24)
Immunotherapy	15 (7.18)
Hormone therapy	98 (46.89)
Surgery	157 (75.12)
Other treatments	88 (42.11)
Psychological support (present and past)	
Currently having	45 (21.53)
Had in past	52 (24.88)
Never had	118 (56.46)
Psychiatric support (present and past)	
Currently having	32 (15.31)
Had in past	38 (18.18)
Never had	150 (71.77)

with seven items each. Items are rated on a 4-point response scale. In this study, Cronbach’s alpha was .87 for anxiety and .80 for depression.

The *Parental Stress Scale*—PSS (Berry & Jones, 1995; Portuguese version Pereira, Vieira, & Matos, 2017) is an 18-item self-report measure, using a 5-point Likert-type scale (1 = *Strongly disagree*; 5 = *Strongly agree*). This scale assesses the (positive and negative) perceptions and feelings of parents regarding their parental role. The PSS has two subscales: stress (10 items) and satisfaction (8 items). In this study, only the stress subscale was used, and the value of Cronbach's alpha was 0.81.

The *European Health Interview Surveys Quality of Life 8 Item Index* (EUROHIS-QOL-8; Rocha, Power, Bushnell, & Fleck, 2012; Portuguese version Pereira, Melo, Gameiro, & Canavarro, 2014) is a self-report scale that measures the quality of life with eight items. Items are rated on a 5-point response scale. In the current study, Cronbach's alpha was 0.85.

Additionally, participants completed a brief questionnaire, providing socio-demographic (e.g. age, number of children) and clinical data (e.g. type of cancer).

2.3 | Procedure

The Ethics Committee of the Faculty of Psychology and Education Sciences of the University of Porto approved this study (reference no 2018/01-1). Participants were recruited online, between March 2018 and February 2019, through a web-based survey distributed to several Internet pages, associations (e.g. Portuguese League Against Cancer), as well as to Facebook groups related to cancer. Before starting, all participants were presented with an online informed consent form. Only participants who gave consent to participate could proceed and answer the protocol. Data were collected online using *LimeSurvey*. To protect the participant's anonymity, we used an online platform linked to LimeSurvey from the University of Porto (Inquéritos UP). This platform uses a LimeSurvey version, which does not allow the administrator to access the IP of participants. The order of presentation of the questionnaires was counterbalanced to control for possible order effects. The time required to complete the protocol was an average of 20 minutes. Participants were volunteers and did not receive any compensatory offer for their participation. To analyse test–retest reliability, six months after the first assessment, participants received an online invitation to complete the PCQ once again. Only participants who expressed their interest in participating in the retest, by providing their e-mail, received the invitation.

2.4 | Translation of the PCQ

The translation process followed the International Test Commission Guidelines (International Test Commission, 2017). Two independent researchers translated the original English version of the PCQ. Both researchers were native Portuguese speakers and fluent in English. Translations were reviewed and compared, and after discussion between the three authors of this study, a final Portuguese version was established. This version underwent backward translation into English by an independent native English speaker, who was a professional translator and fluent in Portuguese. The backward translation was reviewed and compared with the original English version. The comparison between the original version and the translation of the Portuguese version led to minor adjustments and the final Portuguese version of the PCQ.

2.5 | Data analysis

Descriptive statistics for socio-demographic and clinical characteristics as well as for the subscales of the PCQ were examined. Thirty-six participants only answered the PCQ scale, so there were missing data on other scales. In those cases where the participant had no contact with the other parent, some items of the PCQ co-parent subscale were not answered (i.e. item 14—“My children's other parent would not be a responsible caregiver if I die.” and item 15—“My children's other parent would not be able to meet their emotional needs if I die.”). The same occurred when the participant did not have a romantic relationship (i.e. item 12—“My partner is not providing me with enough emotional support.” and item 13—“My partner is not providing me with enough practical support.”). To assess the psychometric proprieties of the Portuguese version of the PCQ, several statistical analyses were conducted using *IBM SPSS Statistics 25.0*, *AMOS 25.0* and *IRTPRO 3.0*, all for Windows. The reliability of the scale was assessed using internal consistency by calculating Cronbach's alpha coefficients for the total score of the scale and the three subscales. Test–retest reliability was assessed using the Intraclass Correlation Coefficient (ICC). The ICC is considered adequate when it is above 0.40. Factorial validity was tested with CFA, using maximum likelihood estimation. The goodness-of-fit indicators used were as follows: Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA). A CFI value equal to or greater than 0.90 is representative of a well-fitting model, and a RMSEA value equal to or lower than 0.10 indicates adequate fit (Marôco, 2014). To analyse the relationship between an unobserved trait (i.e. parenting concerns) and item responses, the IRT was performed using the Graded Response Model from Samejima (1968) separately for each dimension of the PCQ, according to the CFA results. Convergent validity was evaluated using the Pearson correlation between the Portuguese version of the PCQ and other measures (i.e. HADS, PSS, and EUROHIS-QOL-8). To examine criterion validity, a Mann–Whitney U test was used to compare parenting concerns among parents who have/had or not psychological or psychiatric support. This test was used because the sample did not follow a normative distribution. The Mann-Whitney U test analyses the differences between two independent groups and compares medians.

3 | RESULTS

3.1 | Preliminary analyses

Descriptive statistics for the PCQ total score, subscales and items are presented in Table 2. The values of skewness (<3) and kurtosis (<7) indicated no serious departures from normality (Marôco, 2014).

TABLE 2 Descriptive statistics of the PCQ total score, subscales and items (*n* = 209)

PCQ subscales and Items	Mean (*SD*)	Median	Min/max	IQR	sk	ku	Corrected item-total correlations	Cronbach's alpha
Practical impact	2.85 (1.05)	2.8	1–5	1.60	0.07	−0.94		0.87
Item 1	3.03 (1.18)	3	1–5	2	−0.02	−0.92	0.66	
Item 3	3.00 (1.28)	3	1–5	2	−0.03	−1.06	0.73	
Item 5	2.34 (1.30)	2	1–5	2	0.55	−0.94	0.63	
Item 8	2.84 (1.31)	3	1–5	2	0.19	−1.06	0.75	
Item 10	3.02 (1.40)	3	1–5	2	−0.03	−1.29	0.68	
Emotional impact	2.70 (1.11)	2.6	1–5	1.80	0.21	0.34		0.90
Item 2	2.73 (1.24)	3	1–5	2	0.18	−0.97	0.61	
Item 4	2.36(1.23)	2	1–5	2	0.48	−0.91	0.62	
Item 7	2.73 (1.35)	2	1–5	2	0.26	−1.21	0.79	
Item 9	3.14 (1.37)	3	1–5	2	−0.07	−1.23	0.71	
Item 11	2.57 (1.40)	2	1–5	3	0.41	−1.16	0.63	
Co-parent	2.41 (1.23)	2	1–5	1.80	0.66	−0.73		0.85
Item 6	3.10 (1.59)	3	1–5	4	−0.14	−1.55	0.66	
Item 12	1.92 (1.21)	1	1–5	2	1.07	−0.04	0.45	
Item 13	2.05 (1.23)	2	1–5	2	0.86	−0.43	0.46	
Item 14	2.04 (1.42)	1	1–5	2	1.08	−0.31	0.42	
Item 15	2.35 (1.48)	2	1–5	3	0.66	−1.05	0.44	
Total score								0.91

Abbreviations: IQR, interquartile range; ku, kurtosis; *SD*, standard deviation; sk, skewness.

3.2 | Factor validity

To analyse the factor validity of the PCQ, a CFA was performed to test the original three-factor structure of the scale. The standardised factor loadings for the three factors were moderate to high (practical impact: 0.66–0.85; emotional impact: 0.67–0.90, and co-parent: 0.45–0.89; see Figure 1). The model presented a good fit to the data: $\chi^2(84) = 226.187$, $\chi^2/df = 2.69$, $p < .001$; CFI = 0.93; RMSEA = 0.09, 90% CI (0.076–0.104, $p < .001$). Fit indices indicated an adequate fit, with an exception related to chi-square test that was significant. The chi-square test is sensitive to sample size, especially when the study has more than 200 participants (Hoe, 2008). Therefore, it is recommended that the ratio of χ^2/df be analysed, to reduce the effect of sample size on the model. As this ratio was less than three, the model fit is reasonably good (Hoe, 2008). Thus, the three-factor structure was confirmed for the Portuguese population. As suggested by modification indices, we correlated three errors (item1–item3, item12–item13, and item14–item15). The semantic similarity of the items justified this. Due to the high correlation between practical impact and emotional impact ($r = .90$), we tested a two-factor structure (combining practical impact and emotional impact into one factor). However, fit indices of the two-factor structure were worse than the original model ($\chi^2(86) = 258.477$, $p < .001$; $\chi^2/df = 3.01$; CFI = 0.92; RMSEA = 0.10).

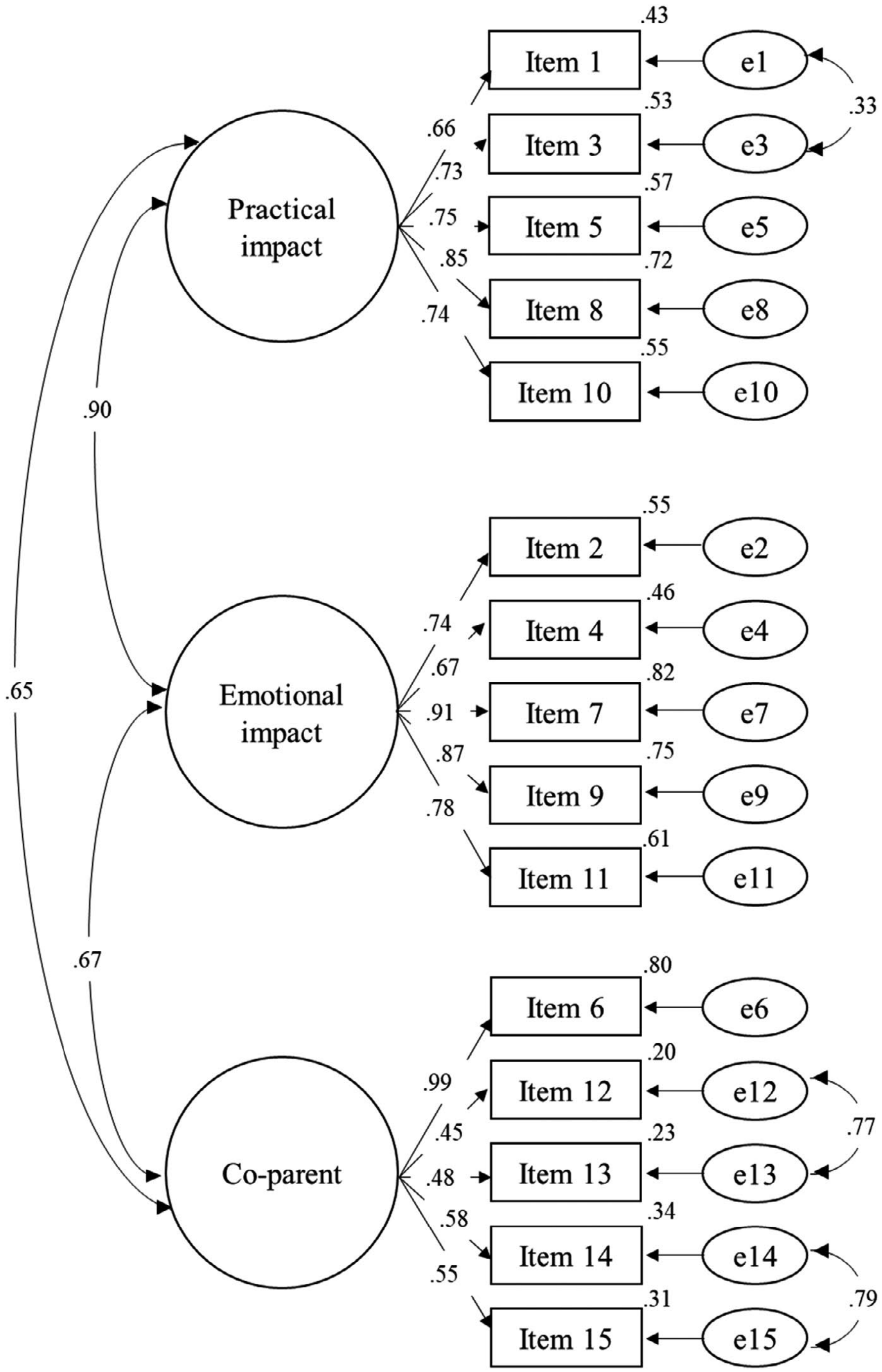

FIGURE 1 Confirmatory factor analysis of the Parenting Concerns Questionnaire

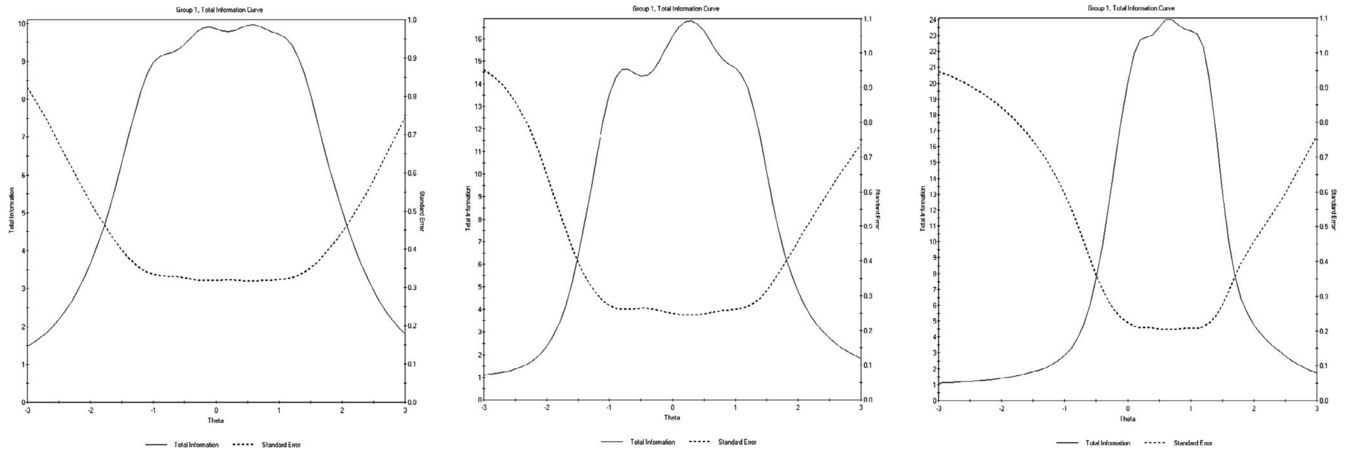

FIGURE 2 Total information curve for practical impact, emotional impact and co-parent subscales, respectively

TABLE 3 Correlations between subscales of the PCQ and anxiety, depression, parental stress and quality of life (*n* = 173)

	Practical impact	Emotional impact	Co-parent	Total
HADS				
Anxiety	0.496**	0.439**	0.398**	0.542**
Depression	0.480**	0.354**	0.430**	0.507**
PSS				
Parental stress	0.227**	0.180*	0.284**	0.283**
EUROHIS-QOL-8				
Quality of life	−0.519**	−0.445**	−0.458**	−0.577**

*Correlation is significant at the .05 level.

**Correlation is significant at the .01 level.

3.3 | Reliability and item discrimination

Corrected item-total correlations for all items were above 0.42, and Cronbach's alpha coefficient for the total score of the PCQ was 0.92. All subscales revealed adequate internal consistency ($\alpha = 0.87$, $\alpha = 0.90$, $\alpha = 0.85$ for practical impact, emotional impact, and co-parent, respectively). Test–retest reliability using ICC demonstrated good test–retest stability (ICC = 0.80, ICC = 0.82, ICC = 0.78 for practical impact, emotional impact and co-parent, respectively).

3.4 | IRT analyses

All item parameters of the IRT analyses are presented in Table S1. According to the guidelines by Baker (2001), all items were highly discriminant ($a \geq 1.78$), except item 6, which presented moderate discrimination ($a = 1.34$). Threshold parameters of all items ranged between −1.68 and 2.32. These values respect Toland guidelines (Toland, 2014), which define that the threshold parameters should vary between −3 and 3. To examine Local Independence (LI), we analysed the standardised Local Dependence (LD) χ^2 statistics for each item pair, which should be above or equal to 10 (Toland, 2014). LI follows the premise that the participant's item response is only influenced by the latent trait variable that is measured. This assumption was obtained for practical impact (LD χ^2 statistics ranged between 1.6 and 6.9), and emotional impact (LD χ^2 statistics ranged between −0.5 and 5.4), but not for co-parent (LD χ^2 statistics ranged between 0 and 12.1). We conducted item calibrations without items 12 and 13. We found that this violation was not problematic, because slopes and threshold parameters without one of the items were quite similar to the slopes and threshold parameters when all the items were analysed together. The Total Information Function (TIF) revealed that the PCQ provides the biggest amount of information for participants experiencing moderate levels of concerns in all dimensions (see Figure 2).

3.5 | Convergent validity

Correlations between the PCQ and anxiety and depressive symptoms, parental stress and quality of life (see Table 3) provided evidence for convergent validity. Parenting concerns were positively associated with anxiety and depressive symptoms, as well as with parental stress. Moreover, parenting concerns were negatively correlated with quality of life.

3.6 | Criterion validity

A Mann–Whitney U test was performed to compare parenting concerns among parents who have/had or not psychological or psychiatric support. Statistical differences between parents who have/had psychological support were found in co-parent and total scores ($U = 3{,}998.00$, $p = .001$ and $U = 4{,}334.50$, $p = .017$, respectively). No differences were found for practical impact and emotional impact ($p = .09$ and $p = .19$, respectively). Parents who have/had psychological support presented higher co-parent concerns (*Mean Rank* = 120.07) and global parental concerns (*Mean Rank* = 116.37) than parents who have not used this type of service (*Mean Rank* = 93.38, *Mean Rank* = 96.23, respectively). Finally, statistical differences between parents who have/had psychiatric support were found in practical impact (U = 3,592.50, p = .03), co-parent (U = 3,657.50, z = −0.196, p = .05), and for the total score (U = 3,633.50, p =.04), with an exception for emotional impact (p =.303). Regarding emotional impact, there were no statistical differences (U = 3,592.50, p = .303). Parents who have/had psychiatric support presented higher parental concerns (*Mean Rank = [111.88–119.11]*) than parents who have not used this type of support (*Mean Rank = [99.45–102.29]*), with the exception of emotional impact.

4 | DISCUSSION

The present study analysed the psychometric properties of the Portuguese version of the PCQ, in a sample of parents with cancer. The PCQ is, to the best of our knowledge, the only self-report measure available to assess parenting concerns in cancer patients. Only three studies validated this scale for two countries (USA and Germany; Inhestern et al., 2016; Muriel et al., 2012; Park, Tan, et al., 2017). Further validation is needed, and this is the first study using an IRT analysis.

Results showed that the PCQ presents adequate internal consistency, test–retest reliability, scale structure, and validity, supporting its adequacy to assess parenting concerns among Portuguese parents with cancer. The Portuguese version of the PCQ follows the three-factor structure proposed by Muriel and colleagues (2012), a structure also confirmed in the German validation (Inhestern et al., 2016). This structure, however, was not confirmed in a study with women with metastatic cancer (Park et al., 2017). The score sensitivity of the PCQ was good because participants used the entire response scale. Similar to the German version (Inhestern et al., 2016), all factors were highly positively interrelated. The high correlation between practical impact and emotional impact may suggest two different situations. One is that item content could be interpreted similarly by participants, even though theoretically, they are distinct. Another situation is that parents with cancer have the same level of emotional and practical concerns. The model fit indices demonstrated a good model fit. It seems that this scale distinguishes parental concerns among parents who have/had psychological and psychiatric support. These results suggest that health professionals can use the PCQ as an auxiliary assessment measure for parenting issues to identify patients that possibly may benefit from psychological support regarding these issues.

The IRT analysis indicated that all items presented a high level of discrimination, except for one item that showed moderate discrimination. In general, items were not redundant. However, two items of the co-parent subscale (items 12 and 13) violated the local independence assumption. One reason for this violation may be due to their similarity related to sentence construction (item 12: *My partner is not providing me with enough practical support*; item 13: *My partner is not providing me with enough emotional support*). In future studies, we suggest adding an example of practical support on item 12. Test information curve and TIF demonstrated that, for all the dimensions of the PCQ, the amount of information was accurate for the moderate levels of the trait. Therefore, the PCQ measures, with less precision, the lowest and the highest levels of parenting concerns.

As expected, participants with parenting concerns were more likely to report parental stress, anxiety and depressive symptoms, and poor quality of life. These findings were consistent with previous studies. Parents with cancer revealed higher levels of anxiety than patients without children (Arès et al., 2014), and parenting concerns are strongly associated with parents' poor quality of life (Park et al., 2016, 2018). Comparing correlations with the HADS (because it was the same scale used in all studies), the correlations were similar to previous studies (Inhestern et al., 2016; Muriel et al., 2012). There are some differences in the clinical characteristics of the samples. Still, the levels of psychopathology symptoms are quite similar. In our sample, the scores obtained in PCQ were similar to the study of Muriel and colleagues (2012). However, these types of comparisons should be made with caution, because there are several differences between the samples (e.g. disease stage; prognosis; time since diagnosis). The total score of the PCQ had a moderate correlation with the variables mentioned previously, demonstrating that this scale explains specific parenting suffering in parents with cancer.

4.1 | Study limitations

Despite the strengths of the current study, it presents some limitations. Most of the participants were women with breast cancer, had a romantic relationship, and had a medium to a high level of education. Future studies with more heterogeneous samples are needed, as well as studies to examine the invariance of the PCQ across several groups (e.g. single parents, stepfamilies, type of cancer). For example, in future studies, it will be essential to analyse the parenting concerns in single parents, in men with cancer, and parents with lower education level. Moreover, some clinical information of our sample was missing, such as the cancer stage, if participants were currently doing some cancer treatment or if they were in the remission/cured phase. While several studies have used IRT successfully with small samples, recommendations suggest at least 375 participants when the scale has 15 items (De Ayala, 1994). For this reason, future studies with larger samples should conduct IRT analysis. Future research should explore the moderators and mediators of the association between parenting concerns and psychological and/or health outcomes. Further studies should compare parenting concerns among different types of cancer and different disease severities, as well as among parents living in different countries. To increase the knowledge regarding parenting concerns, future studies should explore the relationship between parenting concerns and other variables, namely children's characteristics, parents' well-being, and emotion regulation. Moreover, more studies are needed to understand the influence of specific parenting concerns on the quality of life in parents with cancer.

4.2 | Clinical implications

Previous literature showed that parents with cancer have several concerns regarding their children during the disease process (Tavares et al., 2018) and that these concerns are associated with their quality of life (Park et al., 2016, 2018). Understanding the role of parenting concerns in the patient's process of adaptation to the disease is an important step to improve psychosocial care. All analyses revealed that the PCQ is a reliable instrument to use with Portuguese parents with cancer.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available upon request to the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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SUPPORTING INFORMATION

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

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