

# Communication concerns in mothers with cancer: Development and psychometric properties of a new measure

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## Abstract

**Objective:** This study aimed to present the development of the Communication Concerns in Parents with Cancer Scale (CCPCS) and to evaluate its psychometric properties in mothers with cancer.

**Methods:** Two hundred and twenty-nine mothers with cancer participated in this study. Participants reported on parenting concerns, depressive and anxiety symptoms and quality of life. An exploratory factor analysis (EFA) was performed to explore the factor structure of the new scale. Concurrent and convergent validity, internal consistency and test-retest reliability were evaluated/obtained. To measure invariance according to type of cancer and time passed since diagnosis, a multi-group analysis was used.

**Results:** EFA suggested that the scale comprised one factor that explained 75.63% of the total variance. The developed CCPCS had high internal consistency. Communication concerns were positively associated with other parenting concerns, as well as anxiety and depression symptoms. Test of measurement invariance showed scalar invariance for type of cancer, and residual invariance for time passed since diagnosis.

**Conclusion:** The CCPCS seems to be a promising scale to measure communication concerns in mothers with cancer for clinical and research purposes. Knowing the impact of communication concerns in the mother's process of adaptation to cancer can provide clues for the psycho-oncological care offered.

## KEYWORDS

communication concerns, invariance, mothers with cancer, parenting concerns, psychometric analysis

## 1 | INTRODUCTION

Mothers with cancer face several parenting demands and tasks during the cancer adaptation trajectory. In fact, mothers with cancer are likely to report higher levels of anxiety and more worries than cancer patients without children (Arès et al., 2014). In performing their parental role, communicating with children about maternal cancer is one of the main worries of mothers after receiving a cancer diagnosis (Semple & McCance, 2010; Tavares et al., 2018; Turner et al., 2007). Specifically, mothers may have doubts about talking with their children about cancer and when and how to communicate with them, as

well as what information they should provide (Barnes et al., 2000; Elmberger et al., 2000; Fearnley & Boland, 2017; Fisher & O'Connor, 2012; Muriel et al., 2012; Stiffler et al., 2008; Turner et al., 2007). Evidence shows parents need guidance and support to talk with their children about parental cancer (Semple et al., 2021; Sinclair et al., 2019). However, to the best of our knowledge, there is no instrument to assess the communication worries of parents with cancer.

Muriel et al. (2012) developed the first instrument that allows to assess parenting concerns within this context, calling attention for the specific needs of parents with cancer. The *Parenting Concerns*

Questionnaire (PCQ) is composed of three subscales measuring different parental concerns, namely, (1) the emotional impact of cancer on children; (2) the practical impact of cancer on children; and (3) the concerns about the co-parenting. The items of the PCQ were developed based on the five themes that emerged in a focus group (Muriel et al., 2012). Although the questionnaire initially tapped the concern about communication with children, the respective items presented an insufficient factor loading in the exploratory factor analysis (EFA) and were dropped by the authors (Muriel et al., 2012). This scale does not assess this concern directly despite the communication being one of the most common concern of parents with cancer. To fill this gap in measuring communication concerns about talking with their children about parental cancer, this study presents the development of a new measure, the Communication Concerns in Parents with Cancer Scale (CCPCS). Additionally, we assessed the psychometric properties of the scale in mothers with cancer.

## 2 | METHODS

### 2.1 | Instrument development

To develop CCPCS, we followed the three phases defined by Boateng et al. (2018) guidelines: (1) item development; (2) scale development; and (3) scale evaluation. In the first phase (i.e. item development), we defined parents communication concerns as the domain and proposed 12 items corresponding to the main concerns related to communication. These 12 items were established based on the findings of previous studies, namely, semi-structured interviews that we conducted with mothers with breast cancer (Tavares & Matos, 2016), a systematic review on impact of the mother's diagnosis of breast cancer on the parent-child relationship and on parenting (Tavares et al., 2018) and additional literature about communication concerns and needs in parents with cancer (e.g. Fearnley & Boland, 2017). Individually, two psychologists assessed the initial 12 items considering their content relevance, representativeness and technical quality (i.e. face validity). The experts considered that some items focused on the same specific communication concerns and excluded four repeated items. Thus, from an initial pool of 12 items, the final version of CCPCS contained eight items. In the scale development phase, 10 mothers with cancer answered the items, verbalising the mental process entailed in providing answers.

The instruction and item response alternatives followed those used in the PCQ to allow, in the future, using both scales to measure specific parenting concerns in parents with cancer. The following sentence was presented before items 'In the past month, I have been concerned ...'. In the instructions, it was reinforced for participants to think about their concerns and not if the situation has occurred. Items are rated on a Likert-type scale ranging from 1 (*no concerns*) to 5 (*extremely concerned*). The unidimensional factor investigated communication concerns of mothers with cancer that are related to the relevance and the best moment to talk with children about maternal

cancer, information to provide, children's ability to understand the news, as well as children's reactions and questions.

### 2.2 | Participants

Participants were 229 Portuguese mothers with cancer (183 had breast cancer, and 46 had other types of cancer;  $M_{\text{age}} = 42.69$ ,  $SD = 5.54$ , range 26–59 years). All participants have at least one dependent child (i.e. children until 18 years old). Most had a romantic relationship (84.7%), lived with their children (87.7%) and had an academic degree (54.6%). On average, time since diagnosis was 29.59 months ( $SD = 25.92$ , range 0–120 months). In terms of oncological treatments, 79% made chemotherapy, 61.6% made radiotherapy, 48.5% made hormone therapy, and 7.4% made immunotherapy. Most participants made at least one invasive surgical procedure (77.3%; e.g. mastectomy). One hundred and twenty-five participants provided contact information for a follow-up measurement. Of these, 66 participants (52.80%) completed the CCPCS again 6 months later. Table 1 presents the participants' sociodemographic and clinical information.

### 2.3 | Procedure

The study was approved by the Ethics Committee of the Faculty of Psychology and Education Sciences of the University of Porto (reference no 2017/12-2). Participants were recruited between March 2018 and March 2020, through a web-based survey and through contacts made available by a public hospital. For all participants, the survey was filled out online using the LimeSurvey platform. All participants provided an informed consent prior to inclusion. To control for possible order effects, the presentation of the instruments was counterbalanced. Six months after the first assessment, participants received by email an invitation to complete the CCPCS once again to analyse test-retest reliability. Only participants who expressed their interest in participating in the retest received this invitation.

### 2.4 | Instruments

First, participants completed a brief questionnaire providing sociodemographic (e.g. age and number of children) and clinical data (e.g. type of cancer, date of diagnosis and oncological treatments). All questions were in the Portuguese language, including the items of CCPCS.

Parenting concerns were measured using the Portuguese version of the PCQ (Tavares et al., 2020), composed of 15 items rated on a five-point Likert scale (1 = *no concerns*, 2 = *a little bit concerned*, 3 = *somewhat concerned*, 4 = *very concerned* and 5 = *extremely concerned*). In this study, Cronbach  $\alpha$  was 0.92 for the total score, 0.87 for practical impact, 0.90 for emotional impact and 0.84 for co-parent.

**TABLE 1** Participants' sociodemographic and clinical data

|   | N (%)      | M (SD)        |
|---|------------|---------------|
| Age   |            | 46.69 (5.54)  |
| Marital status  |            |               |
| Single  | 13 (5.7)   |               |
| Married or living with partner                            | 185 (80.7) |               |
| Divorced  | 29 (12.7)  |               |
| Widowed   | 2 (0.9)    |               |
| Education level   |            |               |
| Middle school   | 47 (20.5)  |               |
| High school   | 57 (24.9)  |               |
| Graduation  | 125 (54.6) |               |
| Professional occupation                                   |            |               |
| Employed  | 118 (51.5) |               |
| Unemployed  | 29 (12.7)  |               |
| Medical discharge   | 76 (33.2)  |               |
| Retired   | 6 (2.6)    |               |
| Number of children  |            |               |
| One child   | 103 (45)   |               |
| Two children  | 109 (47.6) |               |
| Three children  | 15 (6.6)   |               |
| Four children   | 2 (0.9)    |               |
| Living with children                                      |            |               |
| Yes   | 201 (87.7) |               |
| No  | 28 (12.2)  |               |
| Age of minor children in months at the mother's diagnosis |            | 11.12 (5.21)  |
| Time since diagnosis in months                            |            | 29.59 (25.92) |
| Type of cancer  |            |               |
| Breast  |            | 183 (79.9)    |
| Haematological  |            | 12 (5.2)      |
| Digestive   |            | 10 (4.4)      |
| Gynaecological  |            | 6 (2.6)       |
| Thyroid   |            | 6 (2.6)       |
| Head and neck   |            | 4 (1.7)       |
| Lung  |            | 4 (1.7)       |
| Bone  |            | 1 (0.4)       |
| Endocrine   |            | 1 (0.4)       |
| Eye   |            | 1 (0.4)       |
| Mediastinal   |            | 1 (0.4)       |
| Oncology treatments                                       |            |               |
| Surgery   |            | 177 (77.3)    |
| Chemotherapy  |            | 181 (79)      |
| Radiotherapy  |            | 141 (61.6)    |
| Hormonal therapy  |            | 111 (48.5)    |
| Immunotherapy   |            | 17 (7.4)      |

Anxiety and depression symptoms were assessed using the Portuguese version of the *Hospital Anxiety and Depression Scale* (HADS; Pais-Ribeiro et al., 2007). It is composed of 14 items that are rated on different four-point responses. In this study, Cronbach  $\alpha$  was 0.88 for anxiety and 0.81 for depression.

Quality of life was evaluated using the Portuguese version of the *European Health Interview Surveys Quality of Life 8 Item Index* (EUROHIS-QOL-8; Pereira et al., 2014). It is composed of eight items that are rated on a 5-point response scale. In this study, Cronbach's alpha was 0.85.

## 2.5 | Data analysis

IBM SPSS Statistics 25.0 and AMOS 25.0 all for windows were used for the statistical analysis. Descriptive statistics for sociodemographic and clinical characteristics were examined. In general, there were no missing data because participants had to provide an answer before they could proceed to the next question. However, participants without a romantic relationship or contact with children's parents could not answer some items of the co-parent subscale of the PCQ. Seventeen participants did not complete the EUROHIS-QOL-8. In other instruments (i.e. HADS, PCP and CCPCS), all participants answer to them. An EFA was conducted to explore the factor structure of the scale using the principal axis factoring method without rotation. Several statistical analyses were conducted to assess the psychometric proprieties of the CCPCS. The internal consistency of the scale was evaluated using Cronbach's alpha coefficients for the total score of the scale. The intraclass correlation coefficient (ICC) was used to assessed test-retest reliability. The ICC is considered adequate when it is above 0.50 (Koo & Li, 2016). Pearson's correlation coefficient was used to examine concurrent and convergent validity. A multiple-group confirmatory factor analysis was performed to analyse measurement invariance of the scale across type of cancer and time passed since the diagnosis. To compare models, the likelihood ratio test was used where the difference in  $\chi^2$  between two nested models was compared (Cheung & Lau, 2012). The invariance should be accepted when the model fit is not significantly worse than the unconstrained model (i.e.  $p > 0.05$ ). Additionally, we also followed the guidelines suggested by Chen (2007). That is, the invariance hypothesis should be accepted if  $\Delta CFI \leq 0.01$ ,  $\Delta RMSEA < 0.015$  and  $\Delta SRMR < 0.03$  for metric invariance or  $< 0.15$  for scalar and residual invariance.

## 3 | RESULTS

Following the EFA, one factor with eigenvalues greater than 1.0 emerged that explained 75.63% of the total variance. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.94, indicating it was acceptable to proceed with analysis because the strength of the relationships among variables was high. Bartlett's test of sphericity [ $\chi^2(28) = 1998.62$ ,  $p < 0.001$ ] revealed that using EFA on this sample was appropriate. All eight items showed communalities greater than

0.67 and factorial loadings higher than 0.82. Corrected item-total correlations for all items were above 0.80, and Cronbach  $\alpha$  coefficient for CCPCS was 0.96. Table 2 shows item means, standard deviations, communalities and factorial loadings. Test-retest reliability using ICC demonstrated moderate test-retest stability (ICC = 0.72).

Evidence on concurrent validity between the CCPCS and the PCQ was obtained. Pearson's correlation coefficients were 0.62 for practical impact, 0.71 for emotional impact, 0.31 for co-parent and 0.65 for total score of PCQ ( $p < 0.001$ ). Correlations between CCPCS and HADS ( $r = 0.39$ ,  $r = 0.33$ ,  $p < 0.001$  for anxiety symptoms and depression symptoms, respectively), as well as between CCPCS and EUROHIS-QOL-8 ( $r = -0.41$ ,  $p < 0.001$ ) provided also evidence for convergent validity. Communication concerns were positively associated with other parenting concerns, as well as anxiety and depression symptoms. Furthermore, communication concerns were negatively associated with quality of life.

Multi-group confirmatory factor analysis was performed to test structural invariance according to type of cancer and time passed since diagnosis. In the first analysis, the sample was divided into mothers with breast cancer ( $n = 183$ ) and mothers with other types of cancer ( $n = 46$ ; e.g. thyroid, lung). In the second, the sample was divided into mothers that received their diagnosis in the last 12 months ( $n = 85$ ,  $M = 6.88$ ,  $SD = 3.27$ ) and mothers who received their cancer diagnosis for more than 12 months ( $n = 144$ ,  $M = 42.99$ ,  $SD = 24.03$ ). Before testing the invariance, we correlated two errors (item1-item2 and item3-item4), as suggested by modifications indices and because of the semantic similarity of the items. Analyses provided evidence for measurement invariance (i.e. configural, metric and scalar invariance) across types of cancer and time passed since diagnosis. Regarding time passed since diagnosis, we also confirmed residual invariance (see Table 3).

## 4 | DISCUSSION

This study presented the development of a new instrument to assess the specific parents' concerns about communicating with their children about maternal cancer. Additionally, this study aimed to analyse psychometric proprieties of CCPCS in a sample of mothers with cancer. To the best of our knowledge, the CCPCS is the first instrument to evaluate this specific dimension.

Findings provided evidence that the unifactorial model of CCPCS is a promising and reliable scale to measure communication concerns in mothers with cancer. Mothers with communication concerns presented more parenting concerns in other domains, namely, emotional and practical impact of their disease in children, as well as co-parenting competences concerns. Despite the correlation between co-parenting concerns and communication concerns was weak, the correlations between CCPCS and other dimensions of the PCQ were moderate to high. These findings were expected since literature has been showing that when mothers are diagnosed with cancer, they face several parenting concerns that are specific to this new period of their life (Inhestern et al., 2016; Park et al., 2019). The most common concerns of mothers were related to communication and children's reactions (Semple & McCance, 2010; Tavares et al., 2018; Turner et al., 2007), who can explain the strong correlation found in these two dimensions. Additionally, mothers with communication concerns were more likely to report anxiety and depressive symptoms. Although the literature showed that mothers with cancer reported higher levels of anxiety than women without children (Arès et al., 2014), in this study, the correlations with anxiety and depressive symptoms and communication concerns were weak, so the findings should be analysed with caution. Additionally, mothers with communication concerns presented poor quality of life as it happens when parents with cancer have other parenting concerns (Park et al., 2016, 2018).

**TABLE 2** Descriptive statistics and factorial results of CCPCS items

| Item   | Mean | SD   | Min/max | Factor loading | Communalities |
|--|------|------|---------|----------------|---------------|
| Item 1: 'In the past month, I have been concerned if I should talk with my children about my illness'                        | 2.07 | 1.23 | 1-5     | 0.92           | 0.69          |
| Item 2: 'In the past month, I have been concerned with the best moment to talk with my children about my illness'            | 2.02 | 1.21 | 1-5     | 0.90           | 0.80          |
| Item 3: 'In the past month, I have been concerned about how to explain my illness to my children'                            | 2.17 | 1.26 | 1-5     | 0.90           | 0.85          |
| Item 4: 'In the past month, I have been concerned about how to explain to my children the side effects of treatments'        | 2.23 | 1.25 | 1-5     | 0.89           | 0.80          |
| Item 5: 'In the past month, I have been concerned if my children will understand my illness'                                 | 2.36 | 1.24 | 1-5     | 0.85           | 0.72          |
| Item 6: 'In the past month, I have been concerned with the information I should share with my children'                      | 2.38 | 1.28 | 1-5     | 0.84           | 0.82          |
| Item 7: 'In the past month, I have been concerned with the children's questions about my illness'                            | 2.14 | 1.21 | 1-5     | 0.83           | 0.67          |
| Item 8: 'In the past month, I have been concerned that my children do not feel comfortable to talk with me about my illness' | 2.44 | 1.34 | 1-5     | 0.82           | 0.70          |

**TABLE 3** Test of CCPCS measurement invariance across type of cancer and time passed since diagnosis

| Type of cancer              | $\chi^2(df)$ | CFI  | RMSEA (90% IC)   | SRMR | $\Delta\chi^2$ | <i>p</i> | $\Delta df$ | $\Delta CFI$ | $\Delta RMSEA$ (90% IC) | $\Delta SRMR$ | Decision |
|-----------------------------|--------------|------|------------------|------|----------------|----------|-------------|--------------|-------------------------|---------------|----------|
| Configural invariance       | 111.03* (44) | 0.97 | 0.08 (0.06–0.10) | 0.05 | –              | –        | –           | –            | –                       | –             | Accept   |
| Metric invariance           | 114.15* (51) | 0.97 | 0.07 (0.06–0.09) | 0.05 | 3.12           | 0.87     | 7           | 0.00         | 0.01                    | 0.00          | Accept   |
| Scalar invariance           | 114.55* (52) | 0.97 | 0.07 (0.06–0.09) | 0.05 | 0.40           | 0.53     | 1           | 0.00         | 0.00                    | 0.00          | Accept   |
| Residual invariance         | 149.69* (62) | 0.96 | 0.08 (0.06–0.10) | 0.07 | 35.14          | 0.00     | 10          | 0.01         | –0.01                   | –0.02         | Reject   |
| Time passed since diagnosis | $\chi^2(df)$ | CFI  | RMSEA (90% IC)   | SRMR | $\Delta\chi^2$ | <i>p</i> | $\Delta df$ | $\Delta CFI$ | $\Delta RMSEA$ (90% IC) | $\Delta SRMR$ | Decision |
| Configural invariance       | 91.33* (44)  | 0.98 | 0.07 (0.05–0.09) | 0.02 | –              | –        | –           | –            | –                       | –             | Accept   |
| Metric invariance           | 94.85* (51)  | 0.98 | 0.06 (0.04–0.08) | 0.02 | 3.53           | 0.83     | 7           | 0.00         | 0.01                    | 0.00          | Accept   |
| Scalar invariance           | 96.46* (52)  | 0.98 | 0.06 (0.04–0.08) | 0.03 | 1.61           | 0.21     | 1           | 0.00         | 0.00                    | –0.01         | Accept   |
| Residual invariance         | 112.37* (62) | 0.98 | 0.06 (0.04–0.08) | 0.05 | 15.91          | 0.10     | 10          | 0.00         | 0.00                    | –0.02         | Accept   |

Abbreviations: CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardised root mean square residual;  $\Delta$ , change from previous model.

\* $p < 0.001$ .

Results obtained in the multi-group confirmatory factor analysis demonstrated that the CCPCS is invariant regarding the type of cancer and the time passed since diagnosis. This suggests that the test's structure is similar in mothers with breast cancer and mothers with other types of cancer, as well as in mother that received recently their diagnosis and mothers who were diagnosed more than a year ago. Therefore, the findings suggest that in all groups, items function in the same way, and all groups understand equally the CCPCS items. These findings contribute to ensure that cross-group comparisons studies among different types of cancer and time since diagnosis using this scale will provide real differences on concerns and not differences based on measurement characteristics (Cheung & Lau, 2012).

The current research provided preliminary analysis to assess the psychometric properties of the CCPCS. Although this preliminary analysis has been performed with Portuguese parents, the CCPCS could be used in other languages than Portuguese. This is because items of CCPCS were developed considering Portuguese and international literature about concerns of parents with cancer in talking with their children about parental cancer (e.g. Fearnley & Boland, 2017; Tavares & Matos, 2016). However, first, researchers should perform a validation study and make the necessary cultural changes to the instrument. This research presents some limitations: (1) Only mothers participated in the study; (2) small sample in test–retest; and (3) because the questionnaire was online, maybe patients with difficulties in using technologies did not participate in the study. In the future, more studies should be conducted to analyse if this scale can be used also in fathers with cancer. It should be examined if the CCPCS and the PCQ can be applied as a unique instrument. Additionally, future studies could explore the impact of communication concerns of parents with cancer in families and parenting dimensions

(e.g. parenting self-confidence). The family communication patterns can prevent internalising and externalising problems in children of mothers with cancer (Edwards et al., 2008). Therefore, it should be helpful to understand the impact of communication concerns in the communication processes in families with parental cancer.

For clinical purposes, knowing and understanding the impact of all parenting concerns in the mother's process of adaptation to cancer (e.g. in quality of life) can provide clues for the psycho-oncological care offered. The benefits of consistent and open communication (e.g. Pariseau et al., 2020) about relationship (Badr & Acitelli, 2005) and parental cancer (e.g. Asbury et al., 2014; Ellis et al., 2017; Lewis et al., 2017) are recognised. However, this communication can cause concerns in parents and compromise parents' well-being. So, the development of a tool that allows to assess parents' communication concerns can help health professionals to identify families/parents who need psychological support.

The main strength of this study is the proposal of a new scale to filling a significant gap regarding the assessment of parenting communication concerns in mothers with cancer. This instrument is a promising tool for researchers and psychologists to performance the first assessment of communication concerns.

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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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