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Psychometric Evidence of the Online Version of the Coping Scale of Hospitalization, Illness and Treatment – Parents Version (COPHAT-P)

Evidências Psicométricas da Versão On-Line da Escala Coping da Hospitalização, Adoecimento e Tratamento – Versão para Pais (COPHAT-P)

Evidencias Psicométricas de la Versión en la Internet de la Escala de Afrontamiento de la Hospitalización, Enfermedad y Tratamiento – Versión para Padres (COPHAT-P)

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Abstract

Hospitalizations can be stressful for children, adolescents, and their parents, thus requires assessment and proper management. This study's objective was to provide psychometric validation of the online version of the *Escala Coping da Hospitalização, Adoecimento e Tratamento – Versão para Pais (COPHAT-P)* [Coping Scale of Hospitalization, Illness and Treatment – parents version (COPHAT-P)]. A total of 98 Brazilian parents/legal guardians of hospitalized or previously hospitalized children participated. Participants completed a sociodemographic questionnaire along with the COPHAT-P and the *Escala de Coping da Hospitalização – versão para cuidadores (COPE-H-Cuidador)* [Hospitalization Coping Scale – caregiver version (COPE-H-Caregiver)]. Confirmatory Factor Analysis did not indicate a good fit. Three factors were extracted from the Exploratory Factor Analysis, which were further supported by network analyses. Convergent validity of the online version of the COPHAT-P was supported by its associations with the COPE-H-Caregiver, except for the "maladaptive coping" dimension. The online version of the COPHAT-P had high internal consistency (α=0.94). In sum, the online version of the COPHAT-P demonstrates satisfactory validity evidence.

Keywords: hospitalization, psychometrics, psychological adaptation

Resumo

As hospitalizações podem ser estressantes para crianças, adolescentes e seus pais; portanto, exigem avaliação e gerenciamento adequado. O objetivo deste estudo foi fornecer validação psicométrica da versão on-line do Escala de *Coping* da Hospitalização, Adoecimento e Tratamento **–** versão para pais (COPHAT-P). Um total de 98 pais/responsáveis legais brasileiros de crianças hospitalizadas ou previamente hospitalizadas participaram. Os participantes responderam a um questionário sociodemográfico junto ao COPHAT-P e à Escala de *Coping* da Hospitalização **–** versão para cuidadores (COPE-H-Cuidador). A análise fatorial de confirmação não indicou uma boa adequação do modelo. Três fatores foram extraídos da Análise Fatorial Exploratória, que também foram identificados por análises de rede. A validade convergente da versão on-line do COPHAT-P foi apoiada por suas associações com o COPE-H-Cuidador, com exceção da dimensão "*maladaptive coping*". A versão on-line do COPHAT-P tinha alta consistência interna (α=0,94). Em suma, a versão on-line do COPHAT-P demonstra provas satisfatórias de validade.

Palavras-chave: hospitalização, psicometria, adaptação psicológica

Resumen

Las hospitalizaciones pueden ser estresantes para los niños, adolescentes y sus padres, por lo que requieren una evaluación y un manejo adecuado. El objetivo de este estudio fue proporcionar la

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validación psicométrica de la versión online de la *Escala Coping da Hospitalização, Adoecimento e Tratamento – versão para pais* (COPHAT-P) [Escala de Afrontamiento de la Hospitalización, Enfermedad y Tratamiento – versión para padres (COPHAT-P)]. Participaron 98 padres/tutores legales brasileños de niños hospitalizados o previamente hospitalizados. Los participantes completaron un cuestionario sociodemográfico junto con el COPHAT-P y la *Escala de Coping da Hospitalização* **–** *versão para cuidadores* [Escala de Afrontamiento de la Hospitalización – versión para cuidadores (COPE-H-Cuidador)]. El análisis factorial confirmatorio no indicó un buen ajuste del modelo. Se extrajeron tres factores del Análisis Factorial Exploratorio, que fueron confirmados por los análisis de red. La validez convergente de la versión online del COPHAT-P fue apoyada por sus asociaciones con el COPE-H- Cuidador, con la excepción de la dimensión "afrontamiento inadaptado". La versión online del COPHAT-P tuvo una alta consistencia interna (α=0,94). En resumen, la versión online del COPHAT-P demuestra una evidencia de validez satisfactoria.

Palabras clave: hospitalización, psicometría, adaptación psicológica

Introduction

Pediatric hospitalizations are often a source of anxiety, depression, and stress for parents (Compas et al., 2014; Doupnik et al., 2017; Craig et al., 2019; Barreto & Boeckel, 2019; Bedford & Bench, 2019). These responses are heightened when hospitalizations occur during childhood. In addition to changing the family's routine, childhood hospitalizations may also affect child development (Gomes et al., 2016). The parents' emotional health is also associated with their children's emotional well-being, and a child's recovery may be negatively or positively influenced by the parents' stress level (Compas et al., 2012).

Crepaldi (2006) and Simões et al. (2020) state that an illness harms a child because, in addition to disrupting their lives in general, it possibly affects their development, formal education, as well as social and familial relations. Additionally, a child's psychological condition may be harmed due to anguish, fear, and pain elicited by the medical procedures performed during the hospitalization. Depending on how a child experiences a hospitalization, their emotional well-being may worsen due to being separated from their home and family members (Crepaldi, 2006; Freitas et al., 2021).

According to the Coping Motivational Theory (CMT), coping with stress is a regulatory response that involves behavior, emotions, and motivational orientation. The objective of the regulatory response is to deal with stressors, which can be seen as a threat or challenge imposed on three basic psychological needs – autonomy, competence, and relationship (Compas et al., 2012; Doupnik et al., 2017; Craig et al., 2019). The CMT explains that coping is a developmental process. Hence, a coping repertoire increases as individuals develop, whether through trial and error or by mimicking their peers and caregivers, adaptive and maladaptive coping strategies (Skinner & Zimmer-Gembeck, 2016). Thus, psychological instruments are needed to assess coping strategies according to age groups and specific stressors.

Identifying coping strategies used by parents/caregivers in a hospitalization context may significantly contribute to developing individualized assessments and interventions focusing on this population's main difficulties. As such, a better understanding of coping styles is essential to designing more effective interventions (Compas et al., 2017; Enumo et al., 2019). To this end, it has been proposed that observing the parents' emotional responses to a child's hospitalization may enable health workers to alleviate the stress caused by such an experience on the child by promoting adaptive coping strategies by the parents of hospitalized children (Craig et al., 2019; Barreto & Boeckel, 2019).

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Several instruments address coping strategies among children within a hospital setting. In Brazil, several instruments assess coping strategies, including the *Escala de Coping da Hospitalização* (COPE-H) [Hospitalization Coping Scale (COPE-H)], which can be used in children and caregivers (Garioli, 2016). More recently, an instrument called the *Coping da Hospitalização, Adoecimento e Tratamento* [Coping Hospitalization Scale (COPHAT)] was developed to assess the overall context of treatment and illness including post-discharge among children, adolescents, and their parents and caregivers (Amaral, 2019). The latest version of the scale is the COPHAT-P, which consists of 35 items and was developed using the traditional paper-and-pencil format.

The present study aimed to validate an online version of the COPHAT-P to be used outside of a hospital setting. We hypothesize that: (i) A four-factor solution, like the original COPHAT-P, will be found for the online version; (ii) The items of the online version of the COPHAT-P will present high internal consistency, (iii) the online version of the COPHAT-P total score will be positively correlated with the COPE-H; (iv) Emotional problems scores would be directly proportional to COPHAT-P scores.

Method

Participants

Participants for the current study consisted of parents of currently hospitalized children or children hospitalized in the past 12 months in addition to meeting the following inclusion criteria: (i) being the biological mother/father or legal guardian; (ii) being the child's caregiver (e.g., grandparents, aunt, uncle); and (iii) the child should be hospitalized (for any reason) at the time of data collection or some point in the past 12 months.

A total of 593 individuals completed the questionnaire, but only 98 met the inclusion criteria (N=98; M_{age}=39.4; SD=5.41). All participants answered the questionnaire online, which was available for one month. The study was disseminated on different social media platforms.

Instruments

A *sociodemographic questionnaire* consisting of eight general questions was used to characterize the sample (i.e., sex, age, marital status, education, religion, Brazilian region of residence, number of children, and occupation – employed, unemployed, or self-employed). Four questions were used to specifically address the child's hospitalization (i.e., number of hospitalizations, indication, child's age in the last hospitalization, and length of hospitalization).

The parent's emotional problems (depression, anxiety, and stress) during the child's last hospitalization were also rated on a scale from 0 (I experienced nothing) to 5 (I experienced it very intensively). These data were used to assess the external validity (i.e., convergent validity) of the online version of the COPHAT-P. Participants were classified into three groups according to their scores on depression, anxiety, and stress: Mild (0 to 1 point); Moderate (2 to 3 points), or Severe (4 to 5 points). Significant differences were found using Analysis of Variance (ANOVA) for all the symptoms with large effect sizes: depression [($F(2;95) = 613.8$, $p<0.001$; $\eta^2 =0.93$)], anxiety [($F(2;95)=625.1$, $p<0.001$; $\eta^2 =0.93$)], and stress [($F(2;95) = 669.6$, $p<0.001$; $\eta^2 =0.93$).

Escala Coping da Hospitalização, Adoecimento e Tratamento versão para pais (COPHAT-P) [Coping Hospitalization Scale, Illness and Treatment – Parent version (COPHAT-P)]. The COPHAT-P was developed to assess the general context of therapy and disease, including post-discharge. It is a 35-item instrument rated on a Likert scale ranging from 0 (never) to 4 (always). The items are distributed into four factors: (i) Disease and treatment understanding; (ii) Hospitalization; (iii) Adherence to therapy and treatment success; and (iv) Expectations for resuming school. Thus far, only the COPHAT-P paper-and-pencil version has been used with parents whose children were hospitalized. The authors reported reliability of α=0.85 in the original paper.

Escala de Coping da Hospitalização versão para cuidadores (COPE-H-Cuidador) [Hospitalization Coping Scale – Caregiver version (COPE-H-Caregiver)] was developed by Garioli (2016) to assess the coping strategies adopted by caregivers during hospitalizations. It is a 66-item instrument rated on a Likert scale ranging from 0 (never) to 4 (always). The items measure four different categories of coping: (i) Maladaptive coping; (ii) Adaptive coping; (iii) voluntary; (iv) involuntary disengagement coping. The authors reported a satisfactory internal consistency (α=0.70) of the COPE-H in the original submission.

Procedures

This study complies with Resolutions No. 466 and 516, Brazilian National Council, the National Ethics Committee's guidelines, and the Normative Resolution PUC-Campinas No. 009/19, the guidelines for research conducted by the University's members. The Institutional Review Board approved this study (No. 3.663.091, CAAE: 23248019.1.0000.5481). The author of the COPHAT-P original version (Amaral, 2019) provided permission to conduct the present validation study.

All instruments were included in the SurveyMonkey® platform, and a pilot study was conducted to test the online version of the COPHAT-P instructions regarding its online completion and assess participants' potential concerns regarding the online version. Potential errors in the questionnaire or problems in the collection system (database) were also checked. The questionnaire was then disseminated on various social media (Instagram, WhatsApp, Facebook, Linked In) and through e-mail.

Data analysis

The continuous variables were standardized (Z-scores), and values equal to or higher than three standard deviations were excluded. Kolmogorov-Smirnov test and Levene's test were used to assess the normality and homogeneity of data, respectively. One-Way ANOVA was used to identify differences in the instrument's scores according to different sociodemographic characteristics. The effect size was calculated using Eta Squared Test (η^2). This procedure was adopted as per previous studies (Cruz et al., 2018; Cunha et al., 2018; Taurisano et al., 2020).

Factorial Structure and Internal Consistency

The data presented good adequacy (KMO=0.836; Bartlett's sphericity test $p<0.001$). The instrument's factorial structure was initially assessed using Confirmatory Factor Analysis

(CFA) with maximum likelihood estimation. The following goodness of fit criteria was used: Comparative Fit Index (CFI=0.95 or higher), Tukey-Lewis Index (TLI=0.95 or higher), Root Mean Square Error of Approximation (RMSEA=0.08 or lower) to determine adequate model fit.

The CFA did not present a good fit; thus, Exploratory Factor Analysis (EFA) was performed using the Principal Axis and Varimax rotation. The COPHAT-P internal consistency was verified using Cronbach's alpha coefficient.

Network Analysis

The clustering of items was also verified using Network Analysis (NA) based on the correlation between the items. Graphs were generated using LASSO's regularization technique (Least Absolute Shrinkage and Selection Operator), estimating a network between the items based on their partial correlations. In the graphic representation models, the items (nodes) are linked through green edges (positive correlations) or red edges (negative correlations). The edges' density indicates strong correlations: thick edges indicate strong correlations, and thin edges indicate weak correlations. We conducted the NA based on previous studies (Andrade et al., 2021; Andrade et al., 2020a, Andrade et al., 2020b, Andrade et al., 2020c; Oliveira-Pinheiro et al., 2020).

Convergent validity

Convergent validity was examined using Spearman's correlation between the online version of the COPHAT-P factors and total score with the COPE-H three factors and total score. Sociodemographic and emotional variables were also included in the correlation matrix.

Results

Table 1 shows the mean score obtained from the online version of the COPHAT-P compared to different sociodemographic characteristics. Most participants were married women, employed, and from southeast Brazil. Additionally, most reported a religious affiliation and higher education.

Regarding emotional problems, most participants reported moderate levels of stress and depression and high anxiety levels during their child's hospitalization. An ANOVA suggested differences between the score obtained in the online version of the COPHAT-P for only the emotional aspects related to their child's hospitalization. Participants reporting high levels of anxiety, depression, or stress scored significantly higher in the COPHAT-P than those reporting few symptoms (p<0.001).

Table 1

Sociodemographic Data of the Study's Participants (N=98)

Variables			COPHAT-P			
	N	*%*	*M*	*SD*	*p*	η^2
Sex					0.20	0.31
Male	21	21.4	51.3	22.3		
Female	77	78.6	59.0	24.7		
Marital status					0.94	0.00
Single	8	8.30	58.9	18.0		
Married	80	83.4	56.8	25.3		
Divorced	8	8.30	54.9	17.8		
Occupation					0.70	0.00
Employed	79	85.9	56.4	23.5		
Unemployed	3	3.30	63.0	37.0		
Self-employed	10	10.8	62.4	27.0		
Brazilian Region					0.95	0.00
South	17	17.3	57.1	23.1		
Southeast	37	37.8	56.8	26.7		
North	8	8.20	59.6	28.6		
Northeast	25	25.5	55.5	23.8		
Midwest	11	11.2	62.1	18.9		
Religious affiliation?					0.30	0.36
Yes	89	90.8	56.5	24.5		
No	9	9.20	65.3	21.8		
Educational level					0.30	0.04
Elementary	1	1	99.0	-		
College (incomplete)	4	4.10	71.3	19.5		
College degree	93	94.9	56.3	24.1		
Stress					***	0.16
Mild	20	20.4	39.3	26.5		
Moderate	42	42.9	58.5	23.8		
Severe	36	36.7	65.9	18.3		
Anxiety					***	0.11
Mild	10	10.2	34.5	26.6		
Moderate	39	39.8	57.3	21.9		
Severe	49	50.0	62.0	23.5		
Depression					***	0.24
Mild	27	27.5	41.4	24.5		
Moderate	42	42.9	57.0	21.5		
Severe	29	29.6	72.7	18.0		
Illness of the last hospitalization					0.38	0.05
Respiratory	25	25.5	60.7	20.7		
Digestive	17	17.3	61.3	23.9		
Motor	6	6.2	53.8	18.4		
Neurological	3	3.10	69.3	21.1		
Cancer	3	3.10	75.3	4.73		
Others	44	44.8	52.3	27.3		

Note: *N* = participants; *M* = Mean; *SD* = standard deviation; *p* = significance level; η^2 = effect size calculated with eta-squared test. *** *p* <.001.

Regarding internal consistency (Table 2), results showed the sample's good adequacy (KMO=0.836) and a high level of reliability (α=0.94). Item 2 obtained the highest mean score (2.827), while item 16 obtained the lowest mean (0.602) among all 35 items.

Table 2

Item and Reliability Analysis of the COPHAT-P

Statements	Mean	SD	Item-total correlation	Cronbach's alpha	KMO
IT1- When my child asks something about the disease, they still have doubts.	1.582	1.093	0.417	0.940	0.791
IT2- My child gets anxious when they are going to be hospitalized.	2.827	1.193	0.646	0.938	0.913
IT3- It is hard for my child to receive bad test results.	2.184	1.446	0.578	0.938	0.940
IT4- My child feels bad about the treatment.	2.071	1.133	0.704	0.937	0.938
IT5- My child thinks it will be difficult to keep up with the activities at school.	1.449	1.363	0.563	0.938	0.789
IT6- My child has doubts about how their treatment works.	1.673	1.208	0.642	0.938	0.875
IT7- My child is angry about being hospitalized.	2.184	1.350	0.636	0.938	0.887
IT8- My child gets in the way of treatment.	0.898	1.060	0.396	0.940	0.732
IT9- It is hard for my child to accept the changes in their body because of the treatment.	1.622	1.231	0.612	0.938	0.870
IT10- My child is afraid that colleagues will laugh at them.	1.163	1.314	0.415	0.940	0.766
IT11- My child doesn't know why they must take medicine.	0.918	1.137	0.296	0.941	0.646
IT12- It is unbearable for my child to be hospitalized, even though they can play at the hospital.	2.020	1.414	0.630	0.938	0.793
IT13- It is difficult for my child when the professional "takes his vein".	2.745	1.365	0.592	0.938	0.791
IT14- My son/my daughter has difficulty sleeping because of the treatment.	1.459	1.105	0.558	0.938	0.780
IT15- My child is afraid of getting hurt at school.	0.908	1.016	0.461	0.939	0.867
IT16- The staff hides from my son/ daughter the reason for his/her treatment.	0.602	0.992	0.464	0.939	0.839

Statements	Mean	SD	Item-total correlation	Cronbach's alpha	KMO
IT17- It is hard for my child to stay hospitalized.	2.388	1.367	0.699	0.937	0.892
IT18- It is hard for my child when they take blood from them.	2.786	1.379	0.581	0.938	0.790
IT19- It is hard for my child not to be able to do the things they used to do before the treatment.	1.990	1.358	0.600	0.938	0.823
IT20- My child is afraid to go back to school.	0.541	0.827	0.483	0.939	0.872
IT21- My child doesn't know the name of their disease.	0.918	1.298	0.306	0.941	0.639
IT22- Being hospitalized is bad for my son/daughter because he/she misses home and his/her things.	2.786	1.270	0.602	0.938	0.871
IT23- My son/daughter fidgets when it's time to do the exams with equipment.	1.541	1.286	0.493	0.939	0.819
IT24- My son/daughter has difficulty depending on others.	1.592	1.250	0.501	0.939	0.799
IT25- My child thinks it will be difficult to do everything the teacher asks.	1.163	1.002	0.570	0.938	0.812
IT26- My child has doubts about the reason for their treatment.	1.071	1.028	0.639	0.938	0.749
IT27- My child gets sad about being hospitalized.	2.602	1.250	0.695	0.937	0.883
IT28- My child is afraid to stay sick.	2.469	1.302	0.655	0.937	0.899
IT29- My child feels different from the others.	0.939	1.129	0.457	0.939	0.792
IT30- My child thinks their teacher will have difficulties accepting them.	0.673	0.982	0.443	0.939	0.832
IT31- It is hard for my child to think about the future.	0.878	1.105	0.393	0.940	0.844
IT32- My child thinks it is bad when other people ask about their illness/treatment.	0.867	1.071	0.499	0.939	0.811
IT33- My child gets afraid of being hospitalized.	2.082	1.360	0.688	0.937	0.878
IT34- It is hard for my child to see the family worried about them	1.929	1.237	0.495	0.939	0.832
IT35- It is hard for my child to take medicine.		1.097	0.477	0.939	0.853
Total	1.64	0.69	0.94		0.836

Note: M = Mean; SD = standard deviation; p = significance level; KMO = Keiser Mayer Olkin Test. The COPHAT-P overall Cronbach's α was 0.94.

We detected that the CFA indicated unsatisfactory goodness of fit: CFI=0.662; TLI=0.634; RMSEA=0.111 (95%CI=0.103-0.119). The EFA indicated a three-factor solution (Table 3). All items presented factor loading above 0.3 and were considered in the COPHAT-P final version. Factor 1 (Hospitalization) was composed of 16 items and explained 21.7% of the variance. Factor 2 (Expectations for returning to school) was composed of 10 items and explained 14.7% of the variance. Factor 3 (Understanding the disease and treatment) was composed of 9 items and explained 10% of the variance. Thus, the final model explained 46.4% of the variance.

Table 3

Exploratory Factor Analysis and Loadings of SPAI COPHAT-P

	COPHAT-P		
Items	Hospitalization	Expectations for returning to school	Understanding of the disease and treatment
IT1			0.457
IT2	0.626		
IT3	0.541		
IT4	0.664		
IT5		0.445	
IT6			0.583
IT7	0.629		
IT8			0.388
IT9	0.383		
IT10		0.673	
IT11			0.470
IT12	0.657		
IT13	0.600		
IT14	0.471		
IT15		0.486	
IT16			0.304
IT17	0.887		
IT18	0.640		
IT19	0.450		
IT20		0.645	
IT21			0.598
IT22	0.757		
IT23			0.581
IT24		0.351	
IT25		0.635	
IT26			0.585
IT27	0.862		
IT28	0.705		
IT29		0.775	
IT30		0.798	
IT31		0.713	
IT32		0.621	
IT33	0.740		

	COPHAT-P		
Items	Hospitalization	Expectations for returning to school	Understanding of the disease and treatment
IT34	0.496		
IT35			0.399
Eigenvalue	7.61	5.15	3.51
Variance (%)	21.7	14.7	10.0
Cumulative (%)	21.7	36.5	46.5

Note: The extract method was performed using exploratory factor analysis (extraction method- Principal Axis; Rotation: Varimax). A cutoff of .30 was used to include items. The eigenvalue was 3.51 and explained 46.5% of the COPHAT-P total variance.

Table 4 presents Spearman's correlations with the COPE-H and the emotional and socio-demographic variables regarding convergent validity. Only the COPE-H dimension 2 (Adaptive Coping) was not correlated with the online version of the COPHAT-P total score. Regarding emotional aspects, the online version of the COPHAT-P was significantly correlated with all variables, especially with the perception of depression (rho coefficient ρ=0.520). Length of hospitalization (in days) and the number of hospitalizations were the only two sociodemographic variables that significantly correlated with the online version of the COPHAT-P total score.

Table 4

Spearman Correlation Coefficients Between the COPHAT-P Total Score and the Three Factors, COPE-H, Emotional Problems and Sociodemographic Data

	COPHAT total	p	COPHAT_ F1	p	COPHAT_ F2	p	COPHAT_ F3	p
COPE-H								
Factor 1 – Maladaptive Coping	0.375	***	0.363	***	0.208	*	0.370	***
Factor 2 – Adaptive Coping	0.058	0.57	0.168	*	0.091	0.37	-0.206	*
Factor 3 – Maladaptive Coping	0.644	***	0.655	***	0.369	***	0.518	***
COPE-H total score	0.472	***	0.539	***	0.304	***	0.230	*
Emotional								
Depression	0.520	***	0.503	***	0.309	**	0.411	***
Anxiety	0.277	**	0.325	**	0.114	0.26	0.180	0.07
Stress	0.382	***	0.391	***	0.242	*	0.273	**
Sociodemographic								
Parents' age	-0.107	0.29	-0.149	0.14	0.037	0.71	-0.256	*
Income	-0.051	0.62	-0.064	0.53	-0.055	0.59	-0.135	0.19
Number of children	0.068	0.50	0.090	0.37	-0.030	0.77	0.052	0.61

	COPHAT total	p	COPHAT_ F1	p	COPHAT_ F2	p	COPHAT_ F3	p
Length of hospitalization (days)	0.249	*	0.272	**	0.088	0.39	0.217	*
Number of hospitalizations	0.205	*	0.213	*	0.263	**	0.060	0.55
Age in the last hospitalization	-0.085	0.40	-0.131	0.19	0.145	0.15	-0.239	*

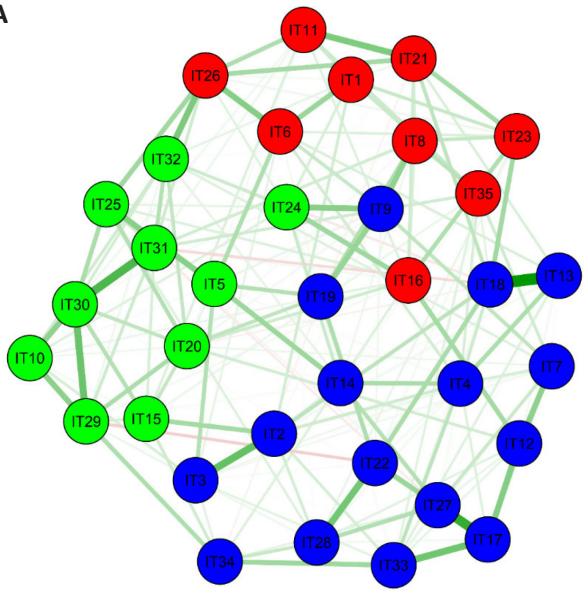
Note: COPHAT_total = total score of the instrument, COPHAT_F1 = Hospitalization; COPHAT_F2 = Expectations for returning to school; COPHAT_F3 = Understanding of disease and treatment; ρ = Spearman correlation coefficient, *p* = significance level. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Figure 1A represents the clustering of items (nodes) based on the three factors identified in the EFA. Factor 1 (Hospitalization) presented the highest frequency of strong partial correlations among the items. Items 13-18 presented the strongest correlation in the entire network (r=0.479), followed by items 17-27 (r=0.351). Strong partial correlations were identified in Factor 2 (Expectations for returning to school) between items 30-31 (r=0.337) and 29-30 (r=0.298). Factor 3 (Understanding the disease and treatment) presented the lowest strong partial correlations between the items. Regarding centrality levels (Figure 1B), items 5 and 25 had the highest values in the three measures considered (i.e., Betweenness, Closeness, and Degree).

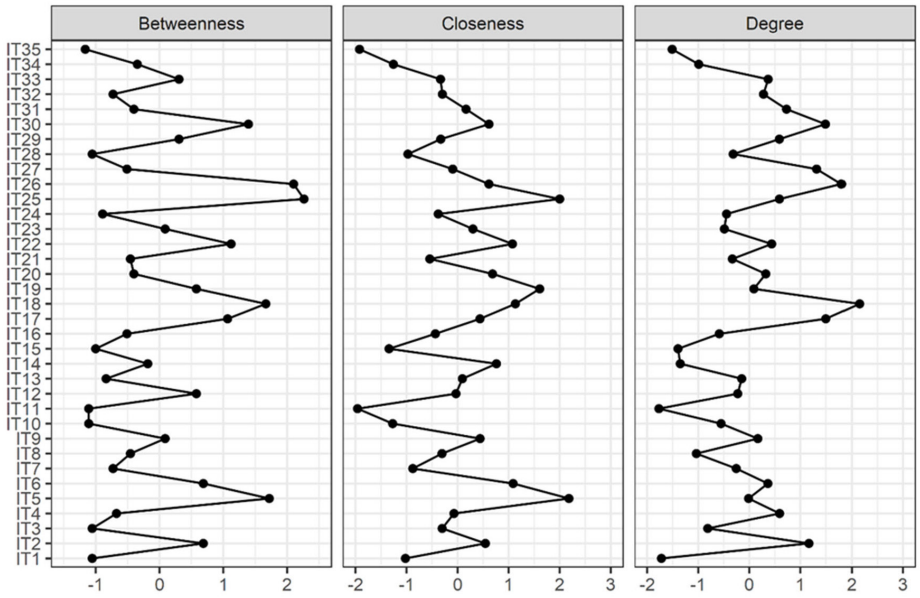
Figure 1

1A. Gaussian Graphic Model According to the COPHAT-P 35 Items. The Green Edges Represent Positive Correlations, and the Red Edges Represent Negative Correlations. Tick Edges Indicate Strong Correlations, and Thin Edges Represent Weak Correlations. 1B. Representation of the Factors of the Three Levels of Centrality Considered in this Study

1A



1B



Legend: Blue nodes represent Factor 1) Hospitalization; Green nodes represent Factor 2) Expectations for returning to school; and red nodes represent Factor 3) Understanding of the disease and treatment.

Discussion

The present study aimed to assess the reliability and validity of an online version of the Coping Scale of Hospitalization, Illness and Treatment – parents version (COPHAT-P). The main results indicated that COPHAT-P is an instrument with reliable psychometric properties that can be completed in an online format. The EFA indicated a three-factor solution: (i) Hospitalization; (ii) Expectations for returning to school; (iii) understanding of the disease and treatment. All the items presented factor loading above 0.3 and were kept in this version.

In this study, the scale's items were grouped into three factors: Factor 1, "Hospitalization," was comprised of 16 items addressing the period of hospitalization and coping strategies, for instance, item 2: *"My child gets anxious when s/he is about to be hospitalized."* Factor 2, "Expectations for returning to school," comprised ten items addressing expectations about the child going back to school, for instance, item 20: *"My child is afraid of going back to school."* Factor 3, "Understanding the disease and treatment," comprised nine items addressing the individuals' level of understanding concerning the disease and treatment, for instance, item 6: *"My child has doubts about how the treatment works."*

According to the COPHAT-P items, having a child hospitalized is a highly stressful experience for parents, regardless of the severity or length of hospitalization, even after hospital discharge (Bedford & Bench, 2019). Therefore, future interventions to identify families at high risk of experiencing mental health difficulties can guide health services more appropriately (Silva, 2018). Additionally, the emotional aspects of hospitalized children are related to having their daily routine interrupted, including not being able to attend school, feeling bad for being hospitalized, having doubts about the disease and therapy (Compas et al., 2014; Crepaldi, 2006; Freitas et al., 2021; Simões et al., 2020).

The network analysis showed a similar distribution, with three clusters. Note that items 5 – "*My child thinks it will be difficult to catch up with the school's workload*," and 25 – "*My child thinks it will be difficult to do everything the teacher will ask*" presented the highest

centrality measures. This suggests that parents become very concerned with their children's academic studies during hospitalizations. Children and adolescents are entitled to receive psycho-pedagogical support when in hospital, and the activities should be adapted to their developmental stage (Smerdel & Murgo, 2018). However, attending school also provides social-related factors beyond formal education, which may be associated with the parents' uncertainties concerning their children's education.

Additionally, the strong connection found between item 9 – "*It is hard for my child to accept the changes taking place in his/her body because of the treatment.*" with items 8 – "*My child hinders the treatment*" and 24 – "*My child has difficulty depending on others*" is noteworthy because these items belong to different factors. The same results are also found with item 16 – "*The staff hides from my child the reason for his/her treatment*," which was positioned close to "Hospitalization." However, this item belongs to the "Understanding of the disease and treatment" factor. These results indicate that knowledge concerning the disease and therapy may support treatment adherence and help children accept the necessary medical procedures for their illness. A psychologist may support this process by providing health education and psychoeducation (Joo et al., 2017; Stein et al., 2019) regarding disease illness and therapy.

Assisting the parents/caregivers is also vital and can help them relate with the hospitalized child or adolescent. A systematic literature review reports that psychological interventions conducted among parents can improve psychological control, which benefits their children's hospitalization (Law et al., 2019).

Note that basic psychological needs are involved in this process. The items highlighted in the network analysis show that there was a relevant impact on autonomy and competence. When these aspects are not adequately addressed, individuals may perceive stressors as threats and adopt maladaptive coping strategies (Skinner & Zimmer-Gembeck, 2016). Therefore, assessing this process is crucial to intervene in the context of hospitalizations appropriately.

Regarding the convergent validity of the online version of the COPHAT-P, based on the COPE-H-Caregiver, the results showed the COPE-H-Caregiver Factor 2 (Maladaptive Coping) was not correlated to the online version of the COPHAT-P. This finding was expected because these scale items were designed to identify the intensity of maladaptive coping. The parents' perceptions regarding depression, length of hospitalization, and the number of times their children were hospitalized were positively correlated with the online version of the COPHAT-P. These results are in line with other studies reporting that a child's hospitalization can be a source of anxiety, depression, and stress for parents (Compas et al., 2014; Doupnik et al., 2017; Craig et al., 2019; Barreto & Boeckel, 2019; Bedford & Bench, 2019).

Studies addressing coping strategies report relevant information for psychological assessment and intervention. In methodological terms, this study advances toward what Skinner and Zimmer- Gembeck (2016) proposed to conduct studies addressing coping from a developmental perspective. In this sense, the online version of the COPHAT-P can support understanding regarding the coping process and the development of interventions to decrease maladaptive coping strategies and improve parents' quality of life facing a child's hospitalization.

This study's limitations include the fact that a convenience sample composed of a small number of participants was used, restricting the instrument's external validity. Additionally,

due to a lack of valid instruments in Brazil, the online version of the COPHAT-P convergent validity was verified based on a single instrument (COPE-H). Lastly, a test-retest was not conducted to identify the temporal stability of data distribution.

Conclusion

In summary, this study's results showed that the online version of COPHAT-P demonstrated good validity indexes and is a useful tool that can be used in the future to assess the coping strategies adopted by parents facing the hospitalization of a child. It is quick and easy to use and can be used by health workers to design therapeutic interventions or preventive measures directed to this population.

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