



Contents lists available at ScienceDirect

Journal of Pediatric Nursing

journal homepage: www.pediatricnursing.org

Measuring family communication in pediatric nursing: Psychometric properties of the Parent-Child Communication Scale – Child Report (PCCS-CR)☆

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ARTICLE INFO

Article history:

Received 10 August 2021

Revised 16 October 2021

Accepted 31 October 2021

Keywords:

Parent-child communication

Pediatric health conditions

Developmental disabilities

Psychometric properties

Physical disabilities

Parent-child relationship

ABSTRACT

Purpose: Communication quality is an essential indicator of family functioning and represents an important outcome after pediatric nursing interventions. However, few well-documented child-report questionnaires for family communication exist. We aimed to document the psychometric properties of a previously developed child-rated family communication scale for use in pediatric nursing.

Design and methods: We examined the Parent-Child Communication Scale – Child Report (PCCS-CR) in terms of factor structure, convergent validity against the Experiences in Close Relationships-Relationship Structures scale (ECR-RS), and known-groups validity between a sample of siblings of children with pediatric health conditions and controls. The sample comprised 101 siblings of children with a pediatric health condition and 44 controls (M age = 11.5 years, $SD = 2.2$).

Results: We confirmed a two-factor structure of the PCCS-CR. One factor is communication from the child to the parent, labelled child communication (e.g., “I discuss problems with my parents”) and the other is communication from the parent to the child, labelled parent communication (e.g., “My parent is a good listener”). Convergent validity of the PCCS-CR was demonstrated through correlations with ECR-RS ($r = -0.73$ to -0.22 , $p \leq .05$). Further, construct validity through differences between families with and without a child with a pediatric health condition was demonstrated ($g = 0.36-0.83$, $p \leq .052$).

Conclusion: The PCCS-CR appears to be a psychometrically sound measure of parent-child communication from the child's point of view.

Practical implications: The PCCS-CR can be administered in pediatric nursing care and can be used to target and measure the outcomes of interventions aimed at enhancing family functioning.

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Family communication is a fundamental part of the parent-child relationship. Parent-child communication starts in infancy, when children communicate to their parents through crying and their parents respond (more or less accurately) to their needs (Acebo & Thoman, 1995). This communication marks the beginning of an attachment process during which children and their parents reciprocally influence each other to create a parent-child relationship of great importance for later mental health and well-being (McCarty & McMahon, 2003). Family communication represents an important outcome of several pediatric nursing interventions. This is because children's communication about their

emotions and experiences, and parents' responses to this communication, are related to how children cope with difficulties (Schrodt et al., 2008). Specifically, parental acceptance and encouragement in parent-child communication are associated with more use of social support and problem-solving coping strategies in children, whereas lack of these quality indicators in parent-child communication is associated with more mental health difficulties (Chiariello & Orvaschel, 1995; Gentzler et al., 2005). Further, lower quality parent-child communication is related to adolescent alcohol and tobacco use, risky sexual behavior, and suicide attempts (Ackard et al., 2006; Riesch et al., 2006; Ryan, Jorm, & Lubman, 2010).

In the current study, we focus particularly on parent-child communication in families of children with pediatric health conditions, using siblings as informants. A pediatric health condition is defined herein as congenital enduring conditions impairing functioning, with no

☆ We would like to thank all the participants for taking part in this study.

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known cure for the core features (Vermaes et al., 2012). In general, family functioning, including parent-child communication, in families of children with pediatric health conditions has been found to affect the well-being and mental health of all family members, including parents and siblings of the child with a pediatric health condition (Fossen et al., 2021; Haukeland et al., 2020; Lee et al., 2020; Liu et al., 2021). Murphy et al. (2017) recently reviewed studies of communication in families of children with a pediatric health condition. They found that the communication was characterized by lower warmth and more hostility and withdrawal compared with families of children without a pediatric health condition. The factors outlined by Murphy et al. (2017) can be considered quality indicators of parent-child communication. Factors like hostility, negative affectivity, withdrawal, criticism, and inconsistency characterized poor quality parent-child communication, whereas other factors such as warmth, engagement, acceptance, structure, and openness characterized high quality parent-child communication (Murphy et al., 2017, 2018). Thus, parent-child communication is of utmost importance within families of children with pediatric health conditions.

Of particular importance for siblings, open and emotionally supportive communication between parents and siblings of children with a pediatric health condition has been found to be important for siblings mental health and well-being (Haukeland et al., 2020; Mitchell et al., 2021; Murphy et al., 2017). Siblings of children with pediatric health conditions are at higher risk of psychosocial difficulties like depression, anxiety, and behavioral problems than other children (Schamong et al., 2021; Shivers et al., 2019; Vermaes et al., 2012). As a consequence of their brother's or sister's pediatric health condition, siblings have to deal with many emotionally challenging experiences (Haukeland et al., 2015). Difficulties in expressing emotions and poorer parent-child communication have been found to predict mental health difficulties among siblings (Long et al., 2013). On the opposite side, emotionally supportive communication with parents has been found to be protective of sibling mental health difficulties (Haukeland et al., 2020; Inledon et al., 2015). Moreover, emotionally supportive mother-sibling communication has been found to be related to sibling strengths such as prosocial behavior (Orm et al., 2021).

Because of the enduring and often incurable nature of many pediatric health conditions, pediatric nurses often need to focus on family dynamics and processes in their interventions. In order to assess family processes and measure relevant outcomes, psychometrically sound measures of family communication are needed. In fact, a meta-analysis of effective components in parent-training programs found that components targeting parent-child interactions and parent skills in emotional communication were associated with larger intervention effects (Wyatt Kaminski et al., 2008). Further, recent studies targeting parent-sibling communication in families of children with pediatric health conditions have found improvements in both sibling and parental mental health (Fjermestad et al., 2021; Haukeland et al., 2020). This underscores the importance of including parent-child communication training in pediatric nursing interventions for families.

Family communication can be measured by observation, and some observational measures of parent-child communication have been validated (e.g., Murphy et al., 2018). However, observational measures are time- and labor consuming, making them impractical for clinical practice and intervention research. Thus, self-report measures represent an important supplement. In terms of self-report, both parents and children can rate their perception of family communication quality. Generally, in the field of pediatric nursing, parent-report dominates over child-report (Harrison, 2010). Furthermore, the overlap between parents and children in reports about psychosocial factors tend to be moderate at best (De Los Reyes & Kazdin, 2005). From a patient advocacy perspective, listening to children's own voices is important in pediatric nursing. Therefore, questionnaires that measure family communication from the child's perspective may be particularly relevant for the field.

Many different measures of family processes have been developed for use in pediatric clinical settings and research (Alderfer et al., 2008; Zapf et al., 2021). However, some limitations exist in regard to communication measures. First, many measures are measuring domain general family processes instead of specific processes such as family communication (Alderfer et al., 2008; Murphy et al., 2017). Second, insufficient attention has been paid to the psychometric properties of these measures (Alderfer et al., 2008; Zapf et al., 2021), and the use of non-validated scales is common (e.g., Paclikova et al., 2019; Su et al., 2013; Xin et al., 2021). However, a few child-report measures of family communication have been developed. Two widely used measures are the 26-item Revised Family Communication Pattern (RFCP; Ritchie & Fitzpatrick, 1990) and the 20-item Parent-Adolescent Communication Scale (PACS; Barnes & Olson, 1985). The RFCP and PACS have demonstrated adequate reliability (Houck et al., 2007; Jackson et al., 1998; Keim et al., 2017; Ritchie & Fitzpatrick, 1990; Sillars et al., 2014), and have been used with children as young as 12 and 10 years of age, respectively (Jackson et al., 1998; Keim et al., 2017; Ritchie & Fitzpatrick, 1990).

In the current report, we focus on an adapted version of the PACS, the Parent-Child Communication Scale – Child Report (PCCS-CR; Conduct Problems Prevention Research Group, 1994). The PCCS-CR is widely used in recent observational and interventional studies (e.g., Fjermestad et al., 2021; Fjermestad, Silverman, & Vatne, 2020; Haukeland et al., 2020; Orm et al., 2021; Reedtz et al., 2019; Schulte et al., 2017). The potential advantage of this scale is that it was developed to be used with children younger than 10 years of age. Further, the number of items was reduced from 20 to 8, making the scale easier to administer in pediatric nursing care. However, to our knowledge, only unpublished analyses of the PCCS-CR psychometric properties exist (McCarty & Doyle, 2001). McCarty and Doyle (2001) suggested, based on unpublished exploratory factor analysis, that the PCCS-CR comprises two subscales; (1) child communication, i.e., communication of feelings and problems from the child to their parent (three items), and (2) parent communication, i.e., children's perception of their parents' efforts to maintain open communication with them (five items). However, given that the factor analysis has not been published in peer-reviewed journals, information about the extraction method, criteria, and factor loadings is unknown and, to our knowledge, no later study has confirmed the validity of the PCCS-CR.

The purpose of our study was to investigate the construct and convergent validity of the PCCS-CR in a sample of siblings of children with a pediatric health condition through three steps. First, we use confirmatory factor analysis (CFA) to test the proposed two-factor solution of the PCCS-CR. Second, we investigate the overlap between PCCS-CR and a measure of the child's perception of quality of the relationship with their parent. We chose this comparator because communication quality is conceptualized as a related, but distinct, phenomena to overall relationship quality in attachment theory (e.g., Ehrlich et al., 2011; McCarty & McMahon, 2003). Third, we investigate the known-groups validity (Davidson, 2014) of the PCCS-CRs ability to differentiate between siblings of children with pediatric health conditions and controls.

Method

Participants

Two groups were included in the current study; (1) siblings of children with a pediatric health condition ($n = 101$), and (2) controls ($n = 44$) without a sibling with a pediatric health condition. The total sample thus comprised 145 children between 8 and 16 years of age ($M = 11.5$, $SD = 2.2$; 50.3% males; 49.7% females). The majority of mothers (82.3%) and fathers (66.9%) had university education. There were no significant group differences in age, gender, or mothers' educational level. However, fathers of controls (88.6%) had significantly higher educational level than fathers of siblings (60.2%) ($\chi^2(1) = 11.60$, $p = .001$).

Table 1
Fit indices from CFA of PCCS-CR report about mother and about father.

	χ^2	<i>p</i>	RMSEA	<i>p-close</i>	CFI	TLI	SRMR
Model							
Report about mother	21.025	0.335	0.027	0.703	0.995	0.993	0.067
Report about father	17.878	0.531	0.000	0.955	1.000	1.002	0.051

Among the siblings of children with a pediatric health condition, the majority were siblings of children with rare genetic disorders affecting physical and/or cognitive development (52.5%; i.e., Smith-Magenis Syndrome; DiGeorge syndrome; Prader-Willis syndrome; Fragile X syndrome; Angelman syndrome; Becker/Duchenne muscular dystrophies, Friedreich's ataxia, spinal muscular atrophy), while the remaining sample were family members of children with either autism spectrum disorder (25.3%), congenital heart disease (12.1%), Down syndrome (7.1%), or cerebral palsy (3.0%).

Procedure

Siblings of children with pediatric health conditions were recruited to participate in an intervention for siblings and parents of children with pediatric health conditions targeting parent-child communication, called the SIBS intervention (Vatne et al., 2019). The siblings were recruited through two national resource centers for rare disorders and neurodevelopmental disorders and four user associations (autism spectrum disorder; congenital heart disease; Down syndrome; cerebral palsy). Typically developing siblings between the age of 8 and 16 years were invited. The invitation contained information letters for siblings and parents, respectively. In total, 199 siblings were invited to participate, of which 107 (54%) accepted but only 101 (51%) returned baseline data. Among the families who provided a reason for declining (17%), the most common was that the sibling did not want to participate (44%) or that participation was not possible due to family logistics (31%). For siblings of children with pediatric health conditions, the baseline pre-intervention assessments of parent-child communication and parent-child relationship were analyzed in the current study. The controls were recruited through public elementary schools in the same country as siblings of children with pediatric health conditions. The study was approved by the Regional Committee for Medical and Health Research Ethics prior to data collection and written informed consent were collected from all participating families, informing them that participation was voluntary, would not affect their service access, and that they had the right to withdraw from the study at any time. No financial incentives were provided.

Measures

The PCCS-CR was used to measure parent-child communication (Conduct Problems Prevention Research Group, 1994). The PCCS-CR comprises ten items rated on a Likert-scale from almost never (1) to

Table 2
Factor loadings on PCCS-CR about mother.

Factor	Item	Factor loading	95% Confidence Interval (CI)	
			Lower	Upper
Child communication	Do you discuss problems with your mother?	0.756	0.614	0.898
	Do you think you can tell your mother how you really feel about some things?	1.010	0.839	1.181
	Can you let your mother know what's bothering you?	0.879	0.716	1.041
Parent communication	Is your mother a good listener?	0.526	0.425	0.627
	Can your mother tell how you are feeling without asking you?	0.672	0.541	0.803
	Does your mother try to understand what you think?	0.562	0.435	0.689
	Does your mother insult you when she is angry with you?	-0.243	-0.335	-0.151
	Can you have your say even when your mother disagrees with you?	0.631	0.485	0.777

Items are obtained from The Fast Track Project (n.d.): <https://fasttrackproject.org/techrep/p/pcc/parentchldcommchld.pdf>.

almost always (5). Previous studies have suggested two factors; (1) child communication comprising three items and (2) parent-communication comprising five items. The PCCS-CR has been found to have adequate inter-item reliability ($\alpha = 0.71-0.81$) (McCarty & Doyle, 2001). Children completed the PCCS-CR separately for their mothers and fathers.

The Experiences in Close Relationships-Relationship Structures scale (ECR-RS; Fraley et al., 2011) was used to assess child-reported relationship quality with their mother and father. The ECR-RS comprises nine items rated on a Likert-scale from strongly disagree (1) to strongly agree (7). Psychometric investigations have suggested that the ECR-RS is reliable ($\alpha \geq 0.81$) and valid (Donbaek & Elklit, 2014; Fraley et al., 2011). The ECR-RS comprises two subscales measuring the attachment dimensions avoidance (six items) and anxiety (three items) in close relationships. Higher scores indicate more avoidance and anxiety, respectively. In the current study the ERC-RS showed good inter-item reliability ($\alpha = 0.74-0.81$).

Statistical analyses

We conducted CFA using JASP (JASP Team, 2020). We used the Diagonally Weighted Least Squared (DWLS) estimator (Li, 2016). We used the following indicators of good fit: non-significant chi-square test of model fit, Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) ≥ 0.95 , Root Mean Square Error Approximation (RMSEA) < 0.06 , and Standardized Root Mean Square Residual (SRMS) < 0.10 . Missing data were imputed using the fully conditional specification method (MCMC) in SPSS version 27.

We used SPSS version 27 to conduct independent samples *t*-tests (two-tailed) to analyze group differences between siblings of children with pediatric health conditions and controls and calculated Hedges *g* as the effect size measure. Hedges *g* of 0.20, 0.50, 0.80, were interpreted as respectively a small, medium, and large effect size (Cohen, 1988). We reconducted analyses using analysis of covariance (ANCOVA) to control for fathers' educational level. We used Pearson's *r* to investigate the degree of overlap between the PCCS-CR and the ECR-RS.

Results

Factor structure of the PCCS-CR

The two-factor solution of the PCCS-CR comprising a child communication subscale of three items and a parent communication subscale of five items showed good model fit for both report about mother and report about father (see Table 1; Table 2; Table 3).

Correlations between PCCS-CR and ERC-RS

There was significant overlap between the PCCS-CR and the ERC-RS ($r = -0.22-0.73, p < .05$; see Table 4), meaning that better parent-child communication is associated with less avoidance and anxiety in the

Table 3
Factor loadings on PCCS-CR about father.

Factor	Item	Factor loading	95% Confidence Interval (CI)	
			Lower	Upper
Child communication	Do you discuss problems with your father?	0.964	0.850	1.077
	Do you think you can tell your father how you really feel about some things?	0.981	0.865	1.097
	Can you let your father know what's bothering you?	0.785	0.683	0.886
Parent communication	Is your father a good listener?	0.511	0.430	0.591
	Can your father tell how you are feeling without asking you?	0.856	0.745	0.967
	Does your father try to understand what you think?	0.654	0.555	0.752
	Does your father insult you when she is angry with you?	-0.170	-0.230	-0.110
	Can you have your say even when your father disagrees with you?	0.593	0.496	0.690

Items are obtained from The Fast Track Project (n.d.): <https://fasttrackproject.org/techrept/p/pcc/parentchldcommchld.pdf>.

parent-child relationship. There were small to large correlations between the PCCS-CR subscales and between report about mother and report about father on the PCCS-CR ($r = 0.24-0.74, p < .05$; see Table 4), meaning that children reporting higher quality mother-child communication also reports higher quality father-child communication and vice versa.

Group differences in PCCS-CR

Siblings of children with pediatric health conditions scored their parent-child communication significantly lower than controls on all scales except of the parent-communication subscale for mothers ($p = .052$; see Table 5). Differences in child communication were large ($g = 0.75-83$) whereas differences in parent communication were small to medium ($g = 0.36-52$). When including fathers' educational level as covariate, there was significant group differences in child communication with mother ($F(1,138) = 13.285, p < .001$) and with father ($F(1,137) = 12.068, p = .001$). Fathers' educational level was a significant covariate in all four comparisons ($p \leq .020$), associated with better parent-child communication, and there was no longer a significant group effect for parent communication with mothers nor fathers. This suggests that group differences in fathers' educational level could explain the observed differences in parent communication.

Discussion

Few studies have investigated the psychometric properties of family communication scales rated from the child's perspective. We found that the PCCS-CR, a child-report scale of family communication, had a solid two-factor structure, converged with a family relations measure, and discriminated between children who were siblings of children with pediatric health conditions and controls. Thus, the PCCS-CR can be considered a convenient and valid scale for pediatric nursing care providers to examine parent-child communication from the child's point of view.

The two-factor solution for the PCCS-CR suggests that children perceive their communication of feelings and problems towards their parents as separate from parents' efforts to maintain open communication. However, the two subscales were moderately to strongly correlated,

Table 4
Correlations between PCCS-CR and ERC-RS.

	1.	2.	3.	4.	5.	6.	7.	8.
1. PCCS-CR child communication (mother)	-							
2.. PCCS-CR parent communication (mother)	0.37**	-						
3. PCCS-CR child communication (father)	0.74**	0.24**	-					
4. PCCS-CR parent communication (father)	0.64**	0.41**	0.64**	-				
5. ERC-RS avoidance mother	-0.61**	-0.48**	-0.50**	-0.48**	-			
6. ERC-RS anxiety mother	-0.22*	-0.34**	-0.19*	-0.22**	-0.25**	-		
7. ERC-RS avoidance father	-0.63**	-0.39**	-0.73**	-0.59**	0.67**	-0.29**	-	
8. ERC-RS anxiety father	-0.23*	-0.42**	-0.24**	-0.27**	-0.24**	0.78**	-0.35**	-

* $p \leq .05$, ** $p \leq .01$.

Table 5
Comparison of siblings and controls on the subscales of the PCCS-CR.

	Siblings		Controls		Group difference	
	Sum	SD	Sum	SD	p-value	Hedges g
Report about mother						
Child communication	10.79	2.96	13.09	2.20	< 0.001	0.83
Parent communication	20.26	3.21	21.36	2.80	0.052	0.36
Report about father						
Child communication	10.18	3.12	12.36	2.22	<0.001	0.75
Parent communication	18.84	3.57	20.60	2.87	0.005	0.52

suggesting that children who perceive that their parents make an effort to maintain open communication are more likely to tell their parents about their feelings and problems or vice versa. Further, there were small to large correlations between children's report about mothers and about fathers. This suggests that children perceive their communication with their mothers and fathers as similar. If a child feels comfortable communicating his/her feelings and problems to their mother, chances are high they also feel comfortable communicating about their feelings and problems with their father. This could suggest that open and supportive communication with a parent forms the child's internal working models (Pietromonaco & Barrett, 2000) and make them more comfortable communicating their feelings and problems in general.

Children's report of their communication with their parents overlapped substantially with how they reported the relationship quality with their parents, suggesting that the PCCS-CR is valid and that parent-child communication is an important part of the parent-child relationship (Ackard et al., 2006; Gentzler et al., 2005). Better parent-child communication related to less avoidance and anxiety in the parent-child relationship. This finding can be interpreted in light of Murphy et al.'s (2017) framework of family communication which distinguish between positive and negative family communication. Positive family communication is characterized by warmth and structure with positive statements and cohesion. Negative communication is on the opposite side characterized by hostile-intrusive and withdrawn communication,

including negative statements, criticism, and disengagement. Negative parent-child communication such as criticism and withdrawnness can probably underpin children's avoidance and anxiety in the parent-child relationship, whereas open and warm communication attenuates anxiety and probably reinforce approach behaviors rather than avoidance.

Our study also supports the results of previous studies using observational measures who have found poorer family communication in families of children with pediatric health conditions compared with controls (Murphy et al., 2017). This emphasizes the importance of assessing and intervening on family communication in families of children with a pediatric health condition (Fjermestad, Silverman, & Vatne, 2020; Haukeland et al., 2020). Opportunities for siblings to discuss their emotional experiences and thoughts regarding their brother or sister with the condition is essential and parents are the most natural interlocutor in this matter (Inclledon et al., 2015). Strengthening parents' communication skills is important in order to consider siblings' needs, and enhanced sibling well-being can possibly have a positive influence on the child with a disability (Ferraioli et al., 2012; Fjermestad et al., 2019; Rum, Zachor, & Dromi, 2021).

It is important to note that our results suggested that paternal education could explain group differences in child-reported parent-communication, but not child-communication. This could imply that parents' communication skills are adequate, and that greater focus should be placed on siblings' communication. It could be that siblings of children with a pediatric health condition do not discuss their emotions and problems with their parents because they are afraid of placing a greater burden on their parents, who already have to take care of their brother or sister with the pediatric health condition. Thus, perhaps greater clinical focus should be placed on providing siblings with opportunities to discuss their emotions and problems, for example in sibling support groups or individually with pediatric nurses responsible for family support (Inclledon et al., 2015).

Limitations

Our sample mainly comprised siblings of children with pediatric health conditions, as well as controls. This poses some limits on the conclusions that can be drawn with respect to validity. The PCCS-CR showed good convergent validity and sensitivity to differences in parent-child communication in the current sample. However, it is uncertain if the PCCS-CR is equally valid for use with families of children with, for example, behavioral and emotional problems. It is also uncertain whether the PCCS-CR is equally valid as a measure of the communication between parents and children with a pediatric health condition (i.e., not their sibling). Thus, there is a need for further studies investigating the validity of PCCS-CR used with different populations.

Clinical implications

The PCCS-CR discriminated between parent-child communication quality rated by siblings of children with a pediatric health condition versus controls. This suggests that the PCCS-CR might be useful in pediatric nursing care with families of children with a health condition to assess communication in the family. The brevity of the PCCS-CR makes it useful in clinical practice where the PCCS-CR may be used for screening purposes with a low score indicating a need for a more comprehensive assessment, for example using observational measures. The brevity of the scale is also an advantage in interventional research, where parent-child communication is a relevant outcome variable. Given the array of screeners that are already routinely used in pediatric departments, the PCCS-CR may be considered an additional screening tool when there are concerns about poor family functioning or sibling mental health difficulties already exist. However, given that many pediatric health conditions have no cure, so that families need to learn to live with the condition over time, family communication is an important factor

that can be easily screened with the PCCS-CR. As a clinical tool, the PCCS-CR can be useful in a range of different fields, including social work with families, child welfare, child and adolescent's mental health services, and pediatric departments. The PCCS-CR comprises both child and parent communication efforts, and both positive and negative aspects of family communication, and can thus be used to tailor family interventions. For example, if a parent-child dyad is scoring particularly low on parent communication, enhancing parental communication skills can be a particular focus in intervention. In contrast, if a parent-child dyad is scoring particularly low on child communication, this could suggest that pediatric nursing care is needed for the sibling to be able to address his or her feelings and problems. Further, assessing parent-child communication from the child's point of view may make pediatric nurses and parents more aware of siblings' experiences. Such processes may enhance parents' meta-awareness of their communication patterns.

Declaration of Competing Interest

The authors declare no conflict of interest.

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