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Associations between clinical and sociodemographic data and patterns of communication in pediatric oncology

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Abstract

Pediatric communication directly contributes to treatment adherence, fewer symptoms, better clinical responses, healthier treatment adaptation and management of psychosocial issues. This study aimed to evaluate associations between the clinical and sociodemographic data of caregivers and children and the communicative patterns of pediatricians. Three oncohematology physicians and 44 child-caregiver dyads took part, with audio recording of 146 medical consultations. The physicians interacted more often with older children, offering more guidance, clarifying doubts, and asking for information. The number of questions from children and caregivers was positively correlated with the physician's communicative behaviors. However, there was no association between the age of the children and the number of doubts of the patients. The diagnosis, treatment time, family income, marital status and caregiver's level of education were associated with the amount of interaction provided by physicians to the children and caregivers. This study offers subsides relevant to psychosocial interventions that may improve communication in pediatric oncohematology settings.

Keywords: Cancer in children, Physician-patient relationship

Background

Health communication may be defined as a relational process, crucial to the success of the treatment, based on cultural and sociohistorical aspects, in which information and its comprehension are exchanged between people (Gabarra and Crepaldi 2011; Wassmer et al. 2004; Zwaanswijk et al. 2011). This complex interaction has been studied with validated tools: *Roter Interaction Analysis System* (Wissow, Larson, Anderson & Hadjiisky, 2005), *Verona Coding Definitions of Emotional Sequences* (Vatne et al. 2010a, b), *Rating Scales for Emphatic Communication in Medical Interviews - REM* (Nicolai et al. 2007), *Communication Assessment Tool - CAT* (Makoul et al. 2008), and the *Paediatric Consultation Assessment Tool* (Howells et al. 2010). However, none of these tools have been translated and validated to Brazilian Portuguese, which prevents researchers from using them in data collection and highlights the need for studying health communication in Brazil from an objective and observable way.

The literature has focused on communication in pediatric settings in the last three decades due to the fact that this process is strongly related to quality of life, treatment adherence, symptom management, satisfaction with health service, fewer outpatient returns and better coping with treatment related difficulties (Ammentorp et al. 2011; Coyne and Gallagher 2011; Croom et al. 2011; Drotar 2009; Sleath et al. 2012).

A desirable interaction during pediatric medical consultations may include: (a) provision of tailored information by physicians, using adapted language; (b) approaching psychosocial issues related to health care (such as daily care and consequently changes in the family routine, expenses related to the treatment, caregiver's anxiety related to clinical responses); (c) emphasizing the active role of physicians, parents, and patients during the interaction; and (d) provision of social support and empathy by pediatricians (Gabarra

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and Crepaldi 2011; Wassmer et al. 2004; Zwaanswijk et al. 2011).

There is, however, a lack of professional training during medical undergraduate courses that could provide the necessary skills regarding communication in pediatric settings, since it demands specific abilities related to the triad interaction (Rider et al. 2008). The literature shows that the insufficient amount of communicative training during medical undergraduate courses, along with parents' worries about protecting the child from suffering, leads to a disregard for the pediatric patients' contributions during consultations, with them participating mainly in small talk or providing only basic health information (Taylor et al. 2010; Vaknin and Zisk-Rony 2010; Washington et al. 2012). Therefore, more studies concerning the process of pediatric communication are needed, in order to understand its characteristics, which could lead to psychosocial and educational interventions focused on a more efficient interaction.

The literature presents studies concerning associations between the child's clinical condition, social/demographic data and pediatric communication patterns, which are relevant to deepen the understanding of factors that may influence interaction during medical consultations. Studies conducted in the United States of America and in the United Kingdom have highlighted that, considering the characteristics of the caregivers, pediatricians tend to share more decisions and provide more information, of better quality, to white parents (Fiks et al. 2010; Moseley et al. 2006) with higher levels of education (Brinkman et al. 2011; Washington et al. 2012; Zwaanswijk et al. 2011), and higher monthly incomes (Taylor et al. 2010).

Considering communication between physicians and children during medical consultations, the literature shows age as a major differential in pediatric settings, although children at the age of four already understand information about self care, identify symptoms and organs, have doubts and concerns about treatment, and feel emotional responses related to their condition (Gordon et al. 2010; Knighting et al. 2010; Märtenson and Fägerskiöld 2007; Märtenson et al. 2007; Vatne et al. 2010a, b). Older children receive more information from pediatricians and answer more questions directed toward them by physicians (Gabarra and Crepaldi 2011; Stivers 2011, 2012; Stivers and Majid 2007; Taylor et al. 2010; Zwaanswijk et al. 2011).

In addition to age, the level of education of the caregiver and child as well as the prognosis, the race and gender of the child appear to be relevant characteristics: pediatricians communicate more and better with white and female children, with parents and children with higher educational levels and also with children with better prognosis regarding treatment (Drotar 2009; Gabarra and Crepaldi 2011; Stivers 2011, 2012; Stivers and Majid 2007; Taylor et al. 2010; Zwaanswijk et al. 2011). Conversely, studies from Fiks et al. (2010) and Wissow et al., (2005) showed no associations between communicative patterns and sociodemographic data of parents and children.

Although the studies presented in this paper show relevant results concerning communication and sociodemographic data, there are some features that were not included in their analyses, such as type of diagnosis, marital status of the caregivers, and time since diagnosis of chronic conditions, characteristics that may be relevant when considering communication during medical consultations. Furthermore, the pediatric oncohematologic milieu presents a very specific and complex condition - which includes various psychosocial demands, long-term treatment and family challenges - that demands a better understanding related to the communication between physicians, children and caregivers. It is also relevant to note that there are few studies in the Brazilian literature related to pediatric communication, and none of them analyzes the relationship between the personal characteristics of children and caregivers and the way in which physicians communicate with them.

Therefore, this study aimed to analyze associations between communicative patterns from physicians in pediatric settings and sociodemographic data of caregivers and children. Specifically, the authors hypothesized that the physicians might establish a better communication toward parents with higher income and higher levels of education, as well as toward older children with advanced schooling.

Method

Participants

Participants in this study were three physicians of a pediatric cancer hospital, aged 49, 34 and 32 years, with seven, 11 and 26 years of medical practice. They were respectively two women and one man, however there were no noticeable differences in communicative patterns among these three participants. The public hospital in which data were collected has a pediatric oncohematology team consisting of ten physicians: two of them were not working at the time of data collection, one of them was in the process of retirement, and two were moving to other services in following weeks. Of the five physicians left, only three had stable clinical practice schedules that allowed the collection of data.

In addition to these pediatricians, 47 caregiver-child dyads were invited to participate in the research, with three refusals. Therefore, 44 dyads participated,

including 41 mothers, one aunt, one grandmother and one father. Inclusion criteria were related to the age of the child (between 4 and 12 years), the age of the caregiver (over 18 years) and dyads in the first semester of treatment for childhood cancer, considering that the first 6 months is the most difficult period, including psychosocial changes for the family, lengthy hospitalizations, a large amount of information related to care and treatment and weekly or biweekly medical visits (Kohlsdorf, 2012). The exclusion criteria were children with other chronic health conditions, cancer relapse or sequelae, speaking difficulties or that were not clinically improving from the disease. Table 1 shows the characteristics of the parents and children.

Instruments

In the study, 146 consultations were audio recorded and observed in person by the main researcher. The medical visits lasted between 6m30s and 37m36s (mean 19m23s; $SD = 13.01$). During the consultations, the researcher used an observational protocol, developed ad hoc for the study and presented in Appendix A, in which relevant aspects of the communication were written down e.g., the position of the caregiver, child and physician in the room, and other behaviors that could be relevant for the data analysis, such as whether a participant left the room.

Procedure
Data collection
Over 18 months, 146 medical visits for childhood cancer were directly audio recorded. The data were classified by the main researcher into 11 categories regarding the communication of the pediatrician with the children and the caregivers, focusing especially on the exchange of information and doubts.

Inter-rater reliability rate regarding the frequencies of communicative behaviors was calculated between two observers: the main researcher and the auxiliary researcher. Thirty percent of all the recorded consultations were randomly chosen and analyzed to provide this reliability, achieving between 55 % and 76 % concordance (mean 64.20 %; $SD = 5.03$). Disagreements between the two observers related to the data were solved by a third researcher, unaware of the answers given by each observer. This observer works as a psychology professor, has experience in research related to the field of expertise and was mentoring this research. Intra-rater reliability was also calculated for all data recorded and performed solely by the main researcher, which achieved between 75.7 % and 95 % (mean 84.55 %; $SD = 4.13$). The reliability

Table 1 Characteristics of the Caregiver and Child

Characteristics of the caregiver and child	Frequency
Child's age	
4 to 6 years	21
7 to 10 years	15
11 to 12 years	08
Mean (SD)	7.3 years (2.6)
Child's schooling	
Primary or none	20
First year to sixth year	24
Child's gender	
Male	22
Female	22
Diagnosis	
Leukemia or lymphoma	25
Solid tumors	19
Time since diagnosis	
1 month	14
2 to 4 months	25
4 to 6 months	06
Mean (SD)	2.03 months (1.52)
Caregiver's age	
22 to 35 years	22
36 to 56 years	22
Mean (SD)	35 years (7,9)
Caregiver's education level	
Elementary school	09
Middle school	11
High school	13
College	11
Caregiver's marital status	
Married/cohabiting	24
Single/divorced/widowed	20
Household income	
Low income	26
Medium income	14
High income	04

index was conducted according to Danna and Matos (2006).

Data analysis
This cross-sectional and descriptive research focused on statistical associations between nine characteristics from the dyad child-caregiver and eleven communicative categories observed during pediatric consultations. Based on studies available in the literature, nine variables from the dyad child-parent were chosen,

corresponding to the sociodemographic data presented in Table 1, regarding the age, schooling and gender of the child, time since diagnosis, cancer diagnosis, household income, and age, education level, and marital status of the caregiver.

A total of eleven communicative categories were developed by the researchers ad hoc for this study, corresponding to the other variables in this research. Following the proposal of Bardin (1977), the main researcher and the auxiliary researcher listened twice to all the recorded consultations and made an individual list of categories. Each researcher worked independently to develop this first list of communicative behaviors, excluding repetitive issues and/or broadening these categories to include similar themes. Then, these initial lists were compared in order to achieve a second list with the same categories, including their operational definition. Finally, both researchers listened one last time to all the consultations to check for new categories or any necessary adjustments.

Each communicative category was analyzed based on its frequency during the consultations in order to provide statistical data analysis. The six categories focused on physician-child communication and the five categories focused on physician-caregiver communication are described in Appendix B.

The Statistical Package for Social Sciences (SPSS) was used (version 13). Considering the frequencies obtained for each quantitative variable, Shapiro-Wilk normality tests were performed and all data showed $p \leq 0.002$, therefore non-parametric tests were applied in the data analysis, including Spearman's correlations, the Mann Whitney U test, and the Kruskal-Wallis test. Results in which $p \leq 0.05$ were considered statistically significant.

Ethical considerations

This study was approved by the Ethics Committee of the Foundation for Research and Education in Health Sciences under registration number 289/2009. All audio recordings and other information were sealed in a confidential, password-protected archive. The research took place in a hospital that provides cancer treatment for children and adolescents. All participants - physicians, caregivers and children, through their parents - were first approached and invited to participate in the study, by signing an Informed Consent form.

Results

Tables 2 and 3 show the results of the Spearman's correlations, regarding communication with the children and caregivers.

The age of the child was positively and moderately associated with the amount of physicians' behaviors directed toward the patient, regarding guidance to children ($r = 0.46$; $p < 0.01$), asking about doubts ($r = 0.45$; $p < 0.01$) and obtaining information from the child ($r = 0.54$; $p < 0.01$); it was also negatively and

Table 2 Correlations between Sociodemographic and Clinical Dimensions and Pediatrician's Communicative Behaviors towards the Child

	Child's age	Time since diagnosis	Guidance for child	Asks child about doubts	Child's doubts	Protesting	Child's schooling	Bonding with child
Time since diagnosis	$r = -0.29$							
	$p < 0.01$							
Guidance for child	$r = 0.46$	$r = -0.01$						
	$p < 0.01$	$p = 0.37$						
Asks child about doubts	$r = 0.45$	$r = -0.05$	$r = 0.64$					
	$p < 0.01$	$p = 0.11$	$p < 0.01$					
Child's doubts	$r = -0.01$	$r = 0.13$	$r = 0.49$	$r = 0.23$				
	$p = 0.76$	$p = 0.73$	$p < 0.01$	$p < 0.01$				
Protesting	$r = -0.32$	$r = 0.18$	$r = 0.17$	$r = -0.14$	$r = 0.15$			
	$p = 0.01$	$p = 0.03$	$p < 0.01$	$p = 0.26$	$p = 0.27$			
Child's schooling	$r = 0.81$	$r = -0.26$	$r = 0.52$	$r = 0.50$	$r = 0.24$	$r = -0.17$		
	$p < 0.01$	$p < 0.01$	$p < 0.01$	$p < 0.01$	$p = 0.02$	$p = 0.05$		
Bonding with child	$r = -0.12$	$r = 0.23$	$r = 0.44$	$r = 0.28$	$r = 0.38$	$r = 0.13$	$r = 0.13$	
	$p = 0.41$	$p = 0.02$	$p < 0.01$	$p < 0.01$	$p < 0.01$	$p = 0.62$	$p = 0.25$	
Obtaining information from the child	$r = 0.54$	$r = -0.11$	$r = 0.64$	$r = 0.57$	$r = 0.24$	$r = -0.10$	$r = 0.62$	$r = 0.30$
	$p < 0.01$	$p = 0.04$	$p < 0.01$	$p < 0.01$	$p = 0.03$	$p = 0.27$	$p < 0.00$	$p = 0.01$

Table 3 Correlations between Sociodemographic and Clinical Dimensions and Pediatrician's Communicative Behaviors towards the Caregiver

	Child's age	Time since diagnosis	Guidance to caregiver	Asks caregiver about doubts	Caregiver's doubts	Caregiver's age	Bonding with caregiver
Time since diagnosis	$r = -0.29$						
	$p < 0.01$						
Guidance to caregiver	$r = 0.12$	$r = -0.21$					
	$p = 0.02$	$p = 0.02$					
Asks caregiver about doubts	$r = 0.09$	$r = -0.11$	$r = 0.50$				
	$p = 0.07$	$p = 0.06$	$p < 0.01$				
Caregiver's doubts	$r = -0.07$	$r = 0.01$	$r = 0.68$	$r = 0.32$			
	$p = 0.38$	$p = 0.79$	$p < 0.01$	$p < 0.01$			
Caregiver's age	$r = 0.29$	$r = 0.03$	$r = 0.08$	$r = -0.03$	$r = 0.17$		
	$p < 0.01$	$p = 0.96$	$p = 0.33$	$p = 0.54$	$p = 0.03$		
Bonding with caregiver	$r = -0.08$	$r = 0.08$	$r = 0.31$	$r = 0.43$	$r = 0.12$	$r = -0.01$	
	$p = 0.43$	$p = 0.51$	$p < 0.01$	$p = 0.01$	$p = 0.09$	$p = 0.21$	
Obtaining information from caregiver	$r = 0.05$	$r = -0.25$	$r = 0.55$	$r = 0.18$	$r = 0.20$	$r = 0.03$	$r = 0.13$
	$p = 0.57$	$p < 0.01$	$p < 0.01$	$p = 0.03$	$p = 0.01$	$p = 0.69$	$p = 0.30$

moderately associated with protesting. Time since diagnosis was weakly and negatively associated with protesting ($r = -0.32$; $p = 0.01$).

Physician's guidance directed toward the child was moderately associated with the following behaviors: asking about doubts ($r = 0.64$; $p < 0.01$) and bonding with the child ($r = 0.44$; $p < 0.01$), expression of doubts ($r = 0.49$; $p < 0.01$), protesting ($r = 0.17$; $p < 0.01$), obtaining information from the child ($r = 0.64$; $p < 0.01$) and the child's schooling ($r = 0.52$; $p < 0.01$). Pediatrician's behavior related to asking about the child's doubts was positively and weakly associated with the child's questions ($r = 0.23$; $p < 0.01$). Doubts verbalized by children were positively associated with the child's schooling ($r = 0.24$; $p = 0.02$), bonding ($r = 0.38$; $p < 0.01$), and obtaining information from the child ($r = 0.24$; $p = 0.03$), however it is relevant to point out that this behavior had no association with the child's age ($r = 0.01$; $p = 0.76$).

Table 3 shows that the time since diagnosis was weakly and negatively associated with guidance directed toward the caregivers ($r = -0.21$; $p = 0.02$) and obtaining information from them ($r = -0.25$; $p < 0.01$). Guidance for the caregivers also showed relevant associations with clarifying the caregivers' doubts (r = 0.50; $p < 0.01$), questions raised by the caregivers ($r = 0.68$; $p < 0.01$), bonding ($r = 0.31$; $p < 0.01$) and asking information from the caregivers ($r = 0.55$; $p < 0.01$). Despite the obtained results, it is relevant to point out that pediatrician's behavior related to asking about caregiver's doubts was positively and moderately associated with

questions expressed by the caregiver (r = 0.32; $p < 0.01$), and also positively and weakly associated with obtaining information from the caregiver (r = 0.18; $p = 0.03$). Table 4 shows an analysis of communicative behaviors and marital status, diagnosis, and the child's gender.

According to Table 4, marital status was related to physician's guidance to caregivers (t[143] = 1.78; $p = 0.05$), asking the child about doubts (t[143] = 2.38; $p < 0.01$), and questions from caregivers (t[143] = 2.38; $p < 0.01$), with married parents presenting higher means. The diagnosis also seemed to be associated with physician's guidance directed towards the caregiver (t[144] = 3.41; $p < 0.001$), questions from children (t[144] = 2.61; $p < 0.001$) and caregivers (t[144] = 3.59; $p = 0.001$). The child's gender was not associated with any communicative behavior. Table 5 shows an analysis of associations between communicative behaviors, caregiver's level of education and monthly income.

Table 5 highlights relevant associations between the caregiver's level of education, monthly income and communicative behaviors. The caregiver's level of education was associated with physician's guidance towards the child (F[3,144] = 5.39; $p = 0.002$) and caregiver (F[3,144] = 11.07; $p < 0.001$), asking about the child's (F[3,144] = 2.57; $p = 0.05$) and caregiver's doubts (F[3,144] = 5.42; $p = 0.001$), the child's questions (F[3,144] = 2.60; $p = 0.05$), the caregiver's doubts (F[3,144] = 7.27; $p < 0.001$), pediatrician's bonding with the child (F[3,143] = 8.25; $p < 0.001$) and caregiver (F[3,143] = 8.36; $p < 0.001$) and also obtaining

Table 4 Associations Between Physician's Communicative Behaviors, Caregiver's Marital Status, Diagnosis, and Child's Gender

	Marital Status		Diagnosis		Child's gender	
	Single or divorced	Married	Leukemia or Lymphoma	Solid tumors	Female	Male
Physician's guidance to child - M(SD)	6.78 (9.51)	8.51 (8.20)	9.49 (9.54)	5.68 (7.51)	7.36 (9.1)	8.24 (8.71)
	t[143] = 1.17; p = 0.24		t[144] = 2.63; p = 0.15		t[144] = 0.59; p = 0.38	
Physician's guidance to caregiver - M(SD)	32.1 (23.25)	39.49 (26.48)	41.93 (30.9)	29 (12.37)	35.5 (23.4)	36.75 (27.21)
	t[143] = 1.78; p = 0.05		t[144] = 3.41; p < 0.001		t[144] = 0.29; p = 0.52	
Asks child about doubts - M(SD)	0.54 (1.27)	1.12 (1.58)	0.96 (1.57)	0.79 (1.47)	0.96 (1.57)	0.79 (1.47)
	t[143] = 2.38; p < 0.01		t[144] = 0.69; p = 0.81		t[144] = 0.66; p = 0.52	
Asks caregiver about doubts - M(SD)	1.21 (1.75)	1.53 (1.89)	1.73 (1.89)	0.98 (1.67)	1.50 (1.91)	1.26 (1.73)
	t[143] = 1.07; p = 0.45		t[144] = 2.47; p = 0.16		t[144] = 0.77; p = 0.35	
Child's doubts - M(SD)	1.12 (2.00)	1.12 (2.15)	1.53 (2.54)	0.68 (1.23)	1.19 (2.15)	1.09 (2.03)
	t[143] = 0.002; p = 0.75		t[144] = 2.61; p < 0.001		t[144] = 0.29; p = 0.71	
Caregiver's doubts - M(SD)	6.32 (4.96)	10.16 (8.66)	10.16 (8.61)	6.12 (4.73)	7.76 (5.97)	9.00 (8.71)
	t[143] = 3.31; p < 0.01		t[144] = 3.59; p = 0.001		t[144] = 1.02; p = 0.50	
Protesting - M(SD)	2.18 (4.91)	2.60 (4.78)	2.73 (5.57)	1.97 (5.15)	2.01 (5.09)	2.81 (5.11)
	t[143] = 0.46; p = 0.80		t[144] = 1.78; p = 0.28		t[144] = 0.99; p = 0.08	
Physician's bonding with the child - M(SD)	9.75 (5.44)	9.38 (5.49)	11.41 (5.30)	7.32 (4.74)	10.18 (6.16)	8.81 (4.38)
	t[142] = 0.70; p = 0.40		t[143] = 4.84; p = 0.46		t[143] = 1.56; p = 0.10	
Physician's bonding with the caregiver - M(SD)	2.70 (3.62)	2.47 (2.78)	2.91 (2.63)	2.21 (3.73)	2.32 (2.37)	2.91 (3.92)
	t[142] = 0.43; p = 0.83		t[143] = 1.31; p = 0.67		t[143] = 1.07; p = 0.20	
Obtaining information from child - M(SD)	3.63 (4.48)	3.99 (3.57)	4.20 (4.31)	3.42 (3.60)	3.92 (4.4)	3.76 (3.54)
	t[142] = 0.53; p = 0.91		t[143] = 1.16; p = 0.53		t[143] = 0.24; p = 0.28	
Obtaining information from caregiver - M(SD)	9.78 (5.82)	9.91 (5.20)	9.28 (5.23)	10.61 (5.71)	10.22 (6.21)	9.49 (4.49)
	t[142] = 0.14; p = 0.56		t[143] = 1.45; p = 0.78		t[143] = 0.81; p = 0.02	

information from the caregiver by the physician ($F[3,143] = 2.09$; $p = 0.01$). All behaviors with higher means were among the caregivers with a high school or college degree level of education.

Monthly income was associated with physician's guidance to caregiver ($F[2,144] = 9.96$; $p < 0.001$), questions from parents ($F[2,144] = 14.09$; $p < 0.001$), pediatrician's bonding with the child ($F[2,143] = 7.63$; $p = 0.001$), and also obtaining information from the caregiver by the physician ($F[2,143] = 2.22$; $p = 0.01$). The means in all of these behaviors were elevated for caregivers with higher income.

Discussion

The results showed that older children with advanced schooling received more interaction, since these variables were associated with more guidance from the physician directed toward the child and more frequently asking about doubts and obtaining information, data also found in the literature (Gabarra and Crepaldi 2011; Gordon et al. 2010; Knighting et al. 2010; Märtenson and Fägerskiöld 2007; Märtenson

et al. 2007; Stivers 2011, 2012; Stivers and Majid 2007; Taylor et al. 2010; Vatne et al. 2010a, b; Zwaanswijk et al. 2011).

Pediatrician's behavior related to asking about doubts of the child (e.g., *"Do you wanna ask anything, honey?"* or *"Any questions? Think carefully, ok?"*) was positively and weakly associated with questions from the child, which may suggest that this specific and simple behavior from the physician could be crucial to promote verbalization of the patients. It is also relevant to state that this physician's behavior was moderately and positively related to child's schooling and age, indicating sociodemographic characteristics that influence communicative behaviors by the physician towards the child. It should be highlighted that there was more interaction between the older children and the pediatricians, which may also have contributed to a better communicative process. The literature, however, highlights that 4-year-old patients can already understand elementary health care behaviors, identify symptoms and, therefore, should contribute within an active role in health related processes, endorsing the

Table 5 Associations between Communicative Behaviors and the Caregiver's level of education and Monthly Income

	Caregiver's level of education				Monthly income		
	None, primary grade	Junior high school	High school	College	Low income	Medium income	High income
Physician's guidance to child-*M(SD)*	3.92 (5.11)	5.46 (7.27)	10.7 (11.1)	10.04 (7.8)	7.4 (9.7)	8.52 (7.8)	6.75 (7.1)
	F[3,144] = 5.39; *p* = 0.002				F[2,144] = 0.33; *p* = 0.72		
Physician's guidance to caregiver-*M(SD)*	25.69 (14.1)	24.57 (10.8)	46.82 (25.9)	47.04 (25.5)	32.3 (19.7)	34.1 (23.5)	60.94 (39.4)
	F[3,144] = 11.07; *p* < 0.001				F[2,144] = 9.96; *p* < 0.001		
Asks child about doubts - *M(SD)*	0.46 (1.42)	0.54 (1.17)	1.16 (1.77)	1.21 (1.28)	0.88 (1.57)	0.96 (1.5)	0.38 (0.62)
	F[3,144] = 2.57; *p* = 0.05				F[2,144] = 0.97; *p* = 0.38		
Asks caregiver about doubts- *M(SD)*	1.15 (1.89)	0.63 (1.22)	1.87 (2.05)	2.04 (1.84)	1.36 (1.93)	1.48 (1.7)	1.19 (1.6)
	F[3,144] = 5.42; *p* = 0.001				F[2,144] = 0.16; *p* = 0.85		
Child's doubts- *M(SD)*	1.12 (2.01)	0.52 (0.91)	1.27 (2.27)	1.86 (2.87)	1.01 (1.86)	1.39 (2.5)	0.88 (1.71)
	F[3,144] = 2.60; *p* = 0.05				F[2,144] = 0.61; *p* = 0.54		
Caregiver's doubts- *M(SD)*	6.31 (4.73)	5.74 (4.04)	9.38 (7.27)	12.93 (10.9)	6.76 (4.96)	8.37 (7.3)	16.6 (12.1)
	F[3,144] = 7.27; *p* < 0.001				F[2,144] = 14.09; *p* < 0.001		
Protesting- *M(SD)*	2.73 (6.87)	1.63 (3.08)	3.31 (5.67)	1.89 (3.15)	2.05 (4.74)	2.8 (5.26)	11.25 (6.5)
	F[3,144] = 1.06; *p* = 0.36				F[2,144] = 0.53; *p* = 0.59		
Physician's bonding with child-*M(SD)*	8.88 (5.88)	7.30 (5.55)	9.91 (3.85)	13.29 (5.18)	8.07 (5.1)	11.6 (5.1)	11.25 (6.5)
	F[3,143] = 8.25; *p* < 0.001				F[2,143] = 7.63; *p* = 0.001		
Physician's bonding with caregiver-*M(SD)*	1.81 (1.79)	1.20 (1.99)	3.30 (4.16)	4.43 (2.95)	2.28 (3.5)	2.65 (2.5)	3.88 (3.13)
	F[3,143] = 8.36; *p* < 0.001				F[2,143] = 1.70; *p* = 0.19		
Obtaining information from child-*M(SD)*	3.15 (2.55)	3.52 (3.96)	4.59 (5.24)	3.71 (2.79)	3.85 (4.18)	3.8 (4.21)	3.69 (2.39)
	F[3,143] = 0.87; *p* = 0.46				F[2,143] = 0.01; *p* = 0.98		
Obtaining information from caregiver-*M(SD)*	9.69 (5.03)	8.89 (6.24)	11.50 (4.94)	8.96 (5.01)	10.17 (5.8)	8.63 (4.8)	11.69 (5.1)
	F[3,143] = 2.09; *p* = 0.01				F[2,143] = 2.22; *p* = 0.01		

need for including these patients during medical consultations (Gordon et al. 2010; Knighting et al. 2010; Märtenson and Fägerskiöld 2007; Märtenson et al. 2007; Vatne et al. 2010a, b).

Considering communication between pediatricians and children, this study also presented relevant associations between several of the physician's behaviors directed towards the patients, including guidance, asking about doubts, bonding, and obtaining information. The results seem to indicate a group of communicative behaviors that usually occur together during the interaction, or, in other words, that pediatricians could have a personal communicative pattern and/or that this interaction is strongly influenced by the child's behavior, stimulating other subsequent interactions.

When considering the interaction between physicians and children, the present study showed no associations between the amount of doubts verbalized by the patients and their age, however, this behavior was associated with the child's schooling, bonding, and the physician obtaining information and asking about doubts. This data highlights the relevance of pediatrician's behavior that may promote child's inclusion in the communication, however, it is important to point out that pediatric cancer treatment may generate clinical conditions - such as pain, nausea, and sleepiness - which directly influence the interaction with the child (Kohlsdorf, 2012).

Considering communication between the physicians and caregivers, monthly income and caregiver's level of education were associated with better communication by the pediatrician, with parents with higher income and higher levels of education receiving more guidance, bonding, and being more frequently asked for information. These results are similar to those found in the literature (Brinkman et al. 2011; Fiks et al. 2010; Moseley et al. 2006; Taylor et al. 2010;

Washington et al. 2012; Zwaanswijk et al. 2011). In addition to these results, the present study showed associations between marital status and better communication with physicians, considering guidance from pediatricians, and the amount of questions raised by the parents.

Clinical conditions also seem to play a relevant role in communicative patterns. In the present study, the type of diagnosis was related to physician's guidance to the children, asking about the caregiver's doubts, bonding and the amount of questions asked by the children and parents. It should be noted that children with solid tumors may have a specific clinical condition with more intense symptoms - such as pain, physical impairment or injuries and surgery - which may influence the condition of the child during consultations and, as a consequence, the interaction between the patients and pediatricians (Kohlsdorf, 2012). In addition, time since diagnosis was negatively associated with guidance and asking for information, suggesting that caregivers receive more information during the early stages of the treatment. The positive and weak associations between caregiver's doubts and asking caregivers for information might suggest a relevant pattern from physicians when including parents in communication. All these results are consistent with the literature, however, the gender of the child was not associated with pediatrician's communicative patterns in the present study, which is not consistent with the existing literature (Drotar 2009; Gabarra and Crepaldi 2011; Stivers 2011, 2012; Stivers and Majid 2007; Taylor et al. 2010; Zwaanswijk et al. 2011).

Conclusions

This study has some limitations that should be mentioned. First, the number of participating physicians was very small and, therefore, the results can not be generalized to larger samples and different health conditions. It would be relevant to investigate patterns of pediatric communication with broader and multicentric samples in order to better characterize this phenomena, as well as studying samples from multiple health care settings. However, as already stated in the Method section, few professionals were available in the public health service in which this study was conducted, and all potential and recruitable participants were approached.

In addition, other variables related to the organization of the health care service were not included in this research, with these variables possibly moderating communication in pediatric settings. For example, it is possible to highlight that the amount of patients in the waiting room, the delay regarding examinations and bureaucratic procedures lead to less time for communication (Kohlsdorf, 2012). These factors may be confounding variables, which also moderate communication, beyond the sociodemographic data itself.

Furthermore, as a cross-sectional and descriptive study, it was not possible to assume causality effects among the variables, which restricts the possibilities to apply these data directly to the health communication milieu. Inter-rater reliability scores were low, which could have undermined the internal validity concerning this study. However, it should be highlighted that intra-rater reliability obtained high scores and that the field experience in health psychology and behavior observation was very different between the two observers. These two aspects may explain the low scores obtained, as already proposed by Danna and Matos (2006).

Finally, it should be stated that none validated tools to measure emphatic communication in clinical contexts have been employed in this study. Although the works of Wissow et al. (2005), Nicolai et al., (2007), Makoul et al., (2008), Vatne et al. (2010a, b) and also Howells et al. (2010) provided these tools, none of them have been adapted, translated and validated for the language and country in which this study took place, which explains the impossibility of using these scales.

Even with these limitations, this study presents contributions regarding associations between the clinical and sociodemographic data of children and caregivers, and communication patterns established by physicians. This should be taken into account when considering professional training during graduate courses, in order to provide tailored skills that may suit individual communicative patterns, since the literature highlights the lack of appropriate professional training (Rider et al. 2008). It is also relevant to point out the need of psychosocial interventions that may contribute to include children of very early ages, considering that the patients should not be excluded from pediatric interaction (Taylor et al. 2010; Vaknin and Zisk-Rony 2010; Washington et al. 2012). The data showed in the present study may be useful in planning educational interventions in health settings, focused on the staff as well as parents and children, and it may be relevant to highlight the need of more academic discussions regarding the pediatric communication process.

Future research should study other sociodemographic variables that may influence interaction during medical consultations, including the characteristics of the pediatricians and the variables related to the organization of the healthcare services, with a larger sample size and other clinical and sociodemographic variables of children and caregivers, in order to contribute towards a better quality of care in pediatric settings.

Appendix A Observational Protocol

Table 6 A Observational Protocol

Position of caregiver, child and physician in the room		
Behaviors	Details	Time ap. and/or verbal "clue" to the behavior
Participant left the room		
Participant answered the mobile		
Participant is speaking with someone else out of the consultation room		
Other relevant behaviors		

Appendix B Communicative Categories

Table 7 Communicative Categories

Physician-child communication categories and operational definitions	Examples
Guidance directed toward the child: information about exams, treatment plan, medication, diagnosis	"You will stay at the hospital for three days, ok?"
Questions concerning child's doubts: asking if the child had any doubts	"Do you want to ask anything, sweetie?"
Doubts asked about by the children: questions asked by the patient	"Can I go to the swimming pool?"
Protesting: interactions started by patient that indicated anger, such as crying, yelling and/or verbally protesting	"I don't want to stay here!"
Bonding behaviors of the physician: communication not related to the treatment but with the function of establishing small talk	"So, tell me how was your weekend?"
Obtaining information from the child: treatment-related questions, for example about symptoms, exams, hospital admission	"How are you feeling?"
Physician-caregiver communication categories and operational definitions	Examples
Guidance directed toward the caregiver: information about exams, treatment plan, medication, diagnosis	"This medication should be used to prevent sickness"
Questions related to caregiver's doubts: asking if the caregiver had any doubts	"Any questions, Mom?"
Doubts asked about by the caregiver: questions asked by the caregiver	"Can we travel home for the Holidays?"
Bonding behaviors of the physician: communication not related to the treatment but with the function of establishing small talk	"How was New Year's Eve? Was there a party?"
Obtaining information from the caregiver: treatment-related questions, for example about symptoms, exams, hospital admission	"Did he feel any pain this week?"

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