Beatriz De Mula-Fuentes[1]
María Quintana[1]
Jordi Rimbau[1,2]
Abel Martínez-Mejías[3]
María Socorro Úriz[3]
Cristina Rivera-Pérez[3]
Maite Garolera[1,4,5]

Anxiety, hospital fears and conduct and behavioral alterations during pediatric hospitalization

[1] Brain, Cognition and Behavior: Clinical Research Consorci Sanitari de Terrassa, Barcelona, España
[2] Unidad de Psicología Infantojuvenil. Consorci Sanitari de Terrassa, Barcelona, España
[3] Servicio de Pediatría. Consorci Sanitari de Terrassa. Barcelona. España
[4] Unidad de Neuropsicología. Hospital de Terrassa. Consorci Sanitari de Terrassa, Barcelona, España
[5] Grup de Recerca Consolidat en Neuropsicologia (SGR0941), Universitat de Barcelona, Barcelona, España

Introduction. A hospital admission is an experience capable of generating emotional and behavioral alterations at any age. This study pretends to analyze the response of anxiety, fears and/or behavioral alterations in pediatric patients exposed to a conventional non-surgical hospital admission and the existing relationship between these responses and certain modulating variables.

Metodology. Design of cohorts. Data collection was carried out in three stages (M1: at admission; M2: at discharge; M3: 2 weeks after discharge), on a 30 patient sample between the ages of 6 to 15 years and 30 caregivers. A comparison was made on the mean of the repeated measurements (Student *t*) of the respond variables and their correlation (Pearson's Coefficient Correlation) with modulating variables.

Results. The results of the intra-subject analysis showed significance in terms of anxiety levels state in patients in M1 *versus* M3 (t=3.93, *p<.0001, d=0.69)* and the magnitude of the total behavioral alterations registered in M1 *versus* M3 (*t=-5.02, p<.0001, d=0.60).* It was observed that a significant relationship between modulating variables of patients (anxiety risk) and of the caregiver (anxiety character state, strategy of confrontation) and the variables of response of the anxiety and behavioral alterations of the patient.

Conclusions. Exposure of a conventional non-surgical hospital admission may have negative consequences at an emotional and behavioral level in children, present far beyond the hospital admission. Certain variables, from the patient and the caregiver, are psychological vulnerability factors before a hospitalization process.

Keywords: Anxiety, Fear, Behavioral alterations, Pediatric hospitalization

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Ansiedad, miedos hospitalarios y alteraciones conductuales en la hospitalización infantil

Introducción. El ingreso hospitalario es una experiencia susceptible de generar alteraciones emocionales o conductuales a cualquier edad. Este estudio pretende analizar la respuesta de ansiedad, miedos y/o alteraciones conductuales en pacientes pediátricos expuestos a un ingreso hospitalario convencional no quirúrgico y las relaciones existentes entre dichas respuestas y determinadas variables moduladoras.

Metodología. Diseño de cohortes. La recogida de datos se realizó en tres momentos (M1: al ingreso; M2: al alta; M3: a las dos semanas del alta), sobre una muestra de 30 pacientes de 6 a 15 años y 30 cuidadores. Se realizó una comparación de medias de medidas repetidas (*t* de Student) de las variables de respuesta y su correlación (Coeficiente correlación de Pearson) con variables moduladoras.

Resultados. Los resultados del análisis intrasujeto muestran significación en cuanto a los niveles de ansiedad estado del paciente en M1 *versus* M3 (*t*=3.93, *p*<0.0001, *d*=0.69) y la magnitud de alteraciones conductuales totales registradas en M1 *versus* M3 (*t*=-5.02, *p*<0.0001, *d*=0.60). Se objetivó relación significativa positiva entre variables moduladoras del paciente (ansiedad rasgo) y del cuidador (ansiedad rasgo-estado, estrategias de afrontamiento) y las variables

Correspondence:
Dra. Maite Garolera
Unidad de Neuropsicología. Hospital de Terrassa
Carretera Torrebonica s/n
08227 Terrassa (Barcelona, Spain)
Tel.: +34937310007 ext 1557
Fax: +34937003637
E-mail: mgarolera@cst.cat

de respuesta de ansiedad y alteraciones conductuales del paciente.

Conclusiones. La exposición a una hospitalización convencional no quirúrgica puede producir consecuencias negativas a nivel emocional y conductual en el niño, presentes más allá del ingreso hospitalario. Determinadas variables, del paciente y del cuidador, son factores de vulnerabilidad psicológica ante el proceso de hospitalización.

Palabras clave: Ansiedad, Miedo, Alteraciones conductuales, Hospitalización infantil

INTRODUCTION

Bowlby[1] was probably the first to warn that hospitalization could leave sequels to children permanently. Later, other authors have affirmed that hospitalization should be considered as an experience susceptible to generate emotional or behavioral disturbance at any age[2-6]. However, understanding the effects that a hospitalization can have on a child requires keeping in mind the interrelations between the patient's own characteristics and the set of factors that shape the environment with which the individual will relate during and after admission, such as the characteristics of the caregiver, the aspects related to the family context and the hospital environment itself[3-5,7].

Regarding the pediatric patient, the meaning that the illness or hospitalization will have for him will depend largely on the age of the patient, being a positive relationship the age and the ability to adapt to the hospitalization process[2,4,5,7-12]. Beyond the age factor, a relationship has been identified between trait anxiety levels in the patient and their responses to state anxiety and/or hospital fear, being therefore considered a modulating variable before the hospitalization[2,3,13].

As for the caregiver, child hospitalization is perceived as a threat, which can generate him anxiety[14-16]. Research with groups of parents of sick children has demonstrated the predictive value of caregiver anxiety levels in terms of the subsequent psychological functioning of children[17,18]. Parents, who are anxious or stressed, generate in children feelings of discomfort, restlessness, worry or stress because of emotional contagion[3,4]. On the other side, several authors affirm that the implementation of maladaptive coping strategies in parents, both improper handling focused on the problem, avoiding at a cognitive level as behavioral the stressful situations and/or fantasizing about past, present or future alternative realities, as an inappropriate management focused on emotion, based on social isolation, self-criticism and self-incrimination, tend to increase stress in children[3,6].

Following the family context, it was noted that those children who had stressful life events in the family context over the last year had higher degrees of anxiety-trait and depression before surgery[2].

The elements that make the last factor, the hospital environment, a stressful event in the life of the child, are many and very varied[3,7,10,12,19]. Variables such as the intensity of medical interventions are considered important factors in the development of psychological consequences[6].

All these factors, ultimately, impact the maintenance and recovery of the health of the subject[19] and its effects may be present even in the long term[3,4,12,20].

Most studies to date have focused in the impact that child hospitalization has on the subject when it is linked to a surgical intervention or upon admission to an intensive care unit[19,20]. But the child hospitalization, whatever the reason and the characteristics of the income, is a stressor susceptible to generate emotional and/or behavioral alterations in the individual.

The overall objective of this work is to analyze the response of anxiety, fears and behavioral disturbances in children exposed to conventional non-surgical hospital admission and the relationships between these responses and certain modulating variables, improving our understanding of the child's psychological vulnerability.

Based on our overall objective, we raise the following specific objectives: first specific objective: to measure in the sample of patients the variable anxiety levels, behavioral alterations and hospital fears, and measure the level of anxiety in the sample of primary caregivers, analyzing the evolution of these variables during the three assessments. The hypotheses that we propose from this objective are: first hypothesis: a greater negative behavioral change will be observed in the child after exposure to hospitalization; second hypothesis: levels of childhood anxiety will vary throughout the three assessments of data collection; third hypothesis: the levels of anxiety of the main caregiver will vary throughout the three assessments of data collection.

Second specific objective: analyze the existing relationships among modulating variables (regarding the patient: age, levels of trait anxiety; regarding the hospital context: number of invasive procedures performed; with respect to the main caregiver: coping strategies and state-trait anxiety levels; with respect to the family context: number of stressful events that occurred during last year) and the response variables in the patient (levels of anxiety, behavioral alterations and hospital fears). The hypothesis that we raise out

of this objective are: fourth hypothesis: an inverse relationship will be observed among the age of the patient and the presence of higher levels of state anxiety, the major negative behavioral change and/or greater number of fears post hospitalization; fifth hypothesis: participants with higher trait anxiety will present greater anxiety state, greater number of behavioral alterations and/or greater number of hospital fears during and post hospital admission; sixth hypothesis: positive correlation between the presence of certain characteristics of the main caregiver, of the family and hospital context, in relation to the response of anxiety, fears and behavioral alterations in children during and after hospitalization.

METHODOLOGY

Participants

The total number of participants in the sample was 30 patients and 30 principal caregivers (N=60). The criteria for inclusion in the study were: Patient: patient between the ages of 6 and 15 years old, admission to a conventional ward (Pediatric Unit of Terrassa Hospital), during the period from September 15, 2015 to March 28, 2016, with admission not linked to surgical intervention and expectation of hospitalization of 3 days or more (unit: overnight stay); Primary caregiver: adult who provides both physical and emotional support

Excluded from the sample: those who did not meet the inclusion criteria, patients or caregivers with difficulty to understand the meaning of the items of the administered tests, patients with neurodevelopmental disorders (collected in the personal medical or psychological history), caregiver absent during the hospitalization process, patients whose clinical condition don't allow the evaluation and those patients whose relatives express a refusal to participate in the study or abandon it.

The sociodemographic characteristics of patients and caregivers are described in Table 1.

Table 1 Sociodemographic characteristics of patients and caregivers

Characteristics	Patient (*n*=30)			Caregiver (*n*=30)	
	n	%	*M(DE)*	%	*M(DE)*
Age			9.36 (2.89)		38.60 (6.45)
6	4	13.3			
7	6	20			
8	5	16.7			
9	2	6.7			
10	5	16.7			
11	2	6.7			
12	1	3.3			
13	1	3.3			
14	0	0			
15	4	13.3			
Gender					
Male		43.3		20	
Female		56.7		80	
Educational level achieved					
Primary				13.3	
High school				16.7	
Vocational training				36.7	
Baccalaureate				6.6	
Higher education				26.7	
Employment situation					
Not working				10	
Home care				23.3	
Actually working				66.7	
Medical history		70			
Psychopathological background		33			
Hospital stays			1.13 (2.82)		
Admission diagnosis					
Drepanocytosis / vasoocclusive crisis	2				
Bronchitis	3				
Ataxia	1				

Process

The approval of the Clinical Research Ethics Committee (CEIC) of the Terrassa Health Consortium (July 20, 2015) was obtained and all participants gave written informed consent (primary caregiver and patients aged between 12 and 15 years of age).

The study involved the pediatric service and the Child and Adolescent Psychology Unit of the Hospital. The data collection, both the patient's and the primary caregiver's,

Table 1 Continuation

Characteristics	Patient (*n*=30) n	%	*M(DE)*	Caregiver (*n*=30) %	*M(DE)*
Admission diagnosis					
Hand cellulitis	2				
Foot cellulitis	2				
Balanitis	1				
Acute gastroenteritis	2				
Purple of Schönlein-Henoch	2				
Tonsillar abscess	2				
Decompensation Type I	1				
Abdominalgia	4				
Sepsis	3				
Pyelonephritis	1				
Parotitis	1				
Pancreatitis	1				
Pneumonia	2				

was performed by the psychologist over three assessments: M1: initial data collection from both the patient and the primary caregiver, in the room where the individual was admitted to the hospitalization floor; M2: throughout the 24 hours or prior to discharge, both from the patient and the main caregiver, again in the room where the individual was admitted; M3: approximately two weeks after discharge, in Outpatient Consultations of Pediatrics.

Evaluated variables and instruments

In consideration of the theoretical review carried out and the stated objectives set for the chosen sample, the variables and those instruments for their assessment were determined. For a better understanding, the variables are classified according to whether they are an exposure variable, a modulating variable or a response variable (see Figure 1).

The clinical and sociodemographic variables were collected through a questionnaire designed ad hoc.

The instruments used for the collection of psychological variables are detailed in Table 2.

All statistical analyzes were performed using the Statistical Package for the Social Sciences (SPSS) program, version 18.

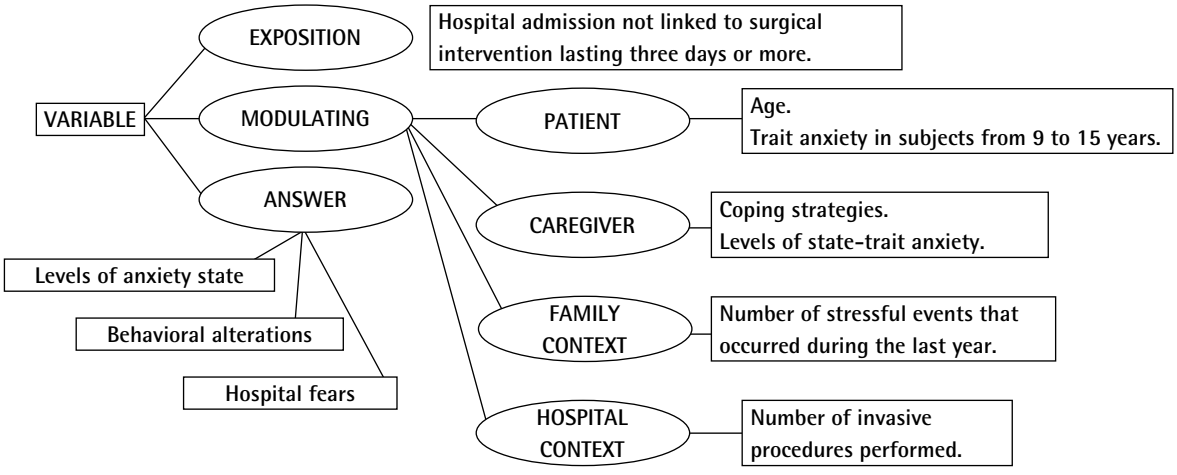

Figure 1 *Variable of exposure, modulating variables of the patient, caregiver, family and hospital context and patient response variables*

Regarding levels of anxiety state in the patient (n=30), a variable called "state anxiety" was calculated that represents the union of the results obtained in percentiles measured by the self-assessment questionnaire anxiety state / trait in children STAIC (subjects between 9 and 15 years old, n=15) and the Childhood Anxiety Questionnaire CAS (subjects between 6 and 8 years old, n=15).

The following is a description the statistical procedures used:

- Descriptive analysis: calculation of percentages, average scores and standard deviations: Data relative to the sample of patients and caregivers, exposure variable, modulating variables, response variables.

Table 2 Measuring instruments for psychological variables

Identification	Characteristics	Dimensions
Anxiety Questionnaire State / Trait STAI (eighth revised edition): Spanish adaptation of G. Buela-Casals, A. Guillén-Riquelme, N. Seisdedos Cubero (Dept. of R & D of TEA editions). Original title: "State-Trait Anxiety Inventory." Author: Charles D. Spielberger et al.	40 items. Percentile scores. Adolescent and adult population.	It comprises separate scales that measure two independent concepts of anxiety, as a state and as a trait.
Self-assessment Questionnaire Anxiety State / Trait in children STAIC (fourth revised edition): Spanish adaptation of N. Seisdedos Cubero (Dept. of R & D of TEA editions). Original title: "STAIC, State-Trait Anxiety Inventory for Children". Author: Charles D. Spielberger et al.	40 items. Percentile scores. Population from 9 to 15 years old. Reliability between 0.85 and 0.9.	It comprises separate scales that measure two independent concepts of anxiety, as a state and as a trait.
Childhood Anxiety Questionnaire CAS (5th revised edition): Spanish adaptation of E. Gómez Fernández (Department of Clinical Psychology and Psychobiology, University of Santiago) and M.T. Pulido Picouto (S.O.E.V of the Department of Education, Xunta de Galicia, Santiago). Original title "Child Anxiety Scale". Author: John S. Gillis.	20 elements. Percentile scores. Population of 6 to 8 years. The internal consistency, determined by the formula of Kuder Richardson, is 0.65.	Anxiety.
Questionnaire of Pre or Post-hospital Behavior CCPH: Spanish adaptation of M. Palomo (1995). Original title: "Posthospital Behavior Questionnaire (PBH)". Author: Vernon, Schulman and Foley.	26 elements. Total direct score and by factors. Adult population The internal consistency of the total scores is equal to 0.82. The test-retest reliability coefficients range between 0.47 and 0.65.	Internal structure of 6 anxiety factors: general anxiety and regression, separation anxiety, sleep disorder, feeding problems, aggression towards authority and apathy-withdrawal. Objective: that parents evaluate their child's maladaptive behaviors.
Inventory of Coping Strategies CSI: Spanish adaptation of F. J. Cano García, L. Rodríguez Franco and J. García Martínez. Original title: "Coping Strategies Inventory". Author: Tobin et al.	40 items. Percentile score. Adult population Internal consistency between 0.63 and 0.89.	8 types of coping strategies: Problem solving; Cognitive restructuring; Social support; Emotional expression; Avoidance of problems; Desiderative thinking; Withdrawal; Self-criticism
Family Inventory of Vital Events and Changes (FILE): Original title: "Family Inventory of Life Events and Changes". Author: McCubbin et al.	71 items. Direct score Adult population The general Cronbach's alpha is 0.79, the test-retest reliability is between 0.72 and 0.77.	It assesses the accumulation of vital or stressful events experienced by a family in the last 12 months.
Inventory of Fears to the Hospital or Scale of Appreciation of Fear to the Hospital (EAMH): Spanish adaptation of M. P. Palomo. Original title: "Hospital Fears Rating Scale". Author: Melamed and Siegel.	25 items. Children population.	Measures fear in different hospital stressors.

- Kolmogorov - Smirnov test: the normality of the relevant data was assessed.
- Pearson Correlation Coefficient: the linear association has been studied mainly between modulating and response variables.
- Student t test for repeated measures: used to compare the serial measurements of the same variable in the same person at different times (longitudinal paradigm).
- Cohen's d test: quantifies the effect obtained, establishing whether the statistically significant results found are relevant. It was considered (following the guidelines of Cohen, 1988) that values lower than 0.2 indicate an effect of small size, 0.5 of medium magnitude and 0.8 indicates a high magnitude effect.

All statistical tests were performed using a significance level of 0.05 to accept or reject the hypotheses of work proposed.

Design

Cohort study, framed in the paradigm of non-manipulative designs. It guarantees greater internal validity, since it ensures the temporality condition between the exposure variable (hospitalization) and the response variable (level of anxiety, fears or alterations of behavior).

Results

The data collection was carried out during a period of 7 months, from September 2015 to March 2016. The mean number of days of hospitalization of the 30 patients was 5.16 (SD=2.26) and the average number of days of follow-up from M1 to M3 was 18.5 (SD=4.0).

We contacted 38 patients and their 38 main caregivers, who could be part of the study. Figure 2 illustrates the flow of patients during the three stages of data collection.

The results obtained in the variables anxiety level, fears and behavioral alterations in the patient are illustrated in table 3.

Regarding the variables analyzed in the caregiver, an average of the percentile scores of the state anxiety variable in M1 the value of 69.16 was obtained (SD = 22.37), in M2 - 64.06 (SD=26.38) and in M3 - 49.6 (SD=28.13). The average of the percentile scores of the trait anxiety variable in the caregiver in M1 was 46.06 (SD=27.20). Regarding the Coping Strategies, according to the percentile score obtained, the most frequently used strategies were "Problem Solving" (M=61.36, SD=22.63) and "Social Retreat" (M=60, SD=22.89) and the least used were "Social Support"

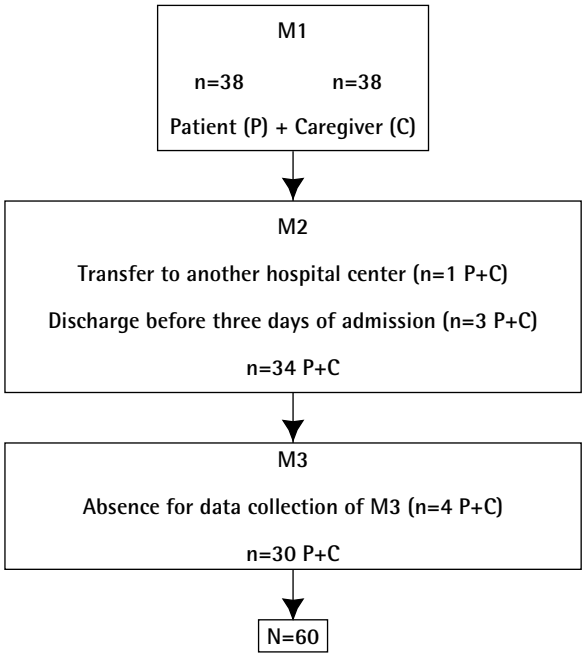

Figure 2 | *Flow diagram of the sample*

Table 3 | **Variables analyzed in the patient**

Variables	M1	M2	M3
	M(DE)	*M(DE)*	*M(DE)*
Anxiety state	60.56 (35.12)	49.23 (35.22)	38.80 (27.83)
Trait anxiety	52.93 (34.69)		
Hospital fear	25.60 (13.31)		28.13 (14.43)
Total behavioral alterations	21.53 (11.86)		28.23 (10.28)
Behavioral disorders factors			
AGR	4.90 (3.72)		6.23 (3.18)
AS	2.36 (2.44)		4.40 (3.97)
TS	5.13 (3.98)		5.93 (3.68)
PA	2.23 (2.09)		2.76 (2.44)
AA	2.30 (2.07)		2.70 (2.53)
AR	4.60 (3.89)		6.20 (3.56)

The scores of the anxiety variable are expressed in percentiles while the scores of the hospital fears variables and behavioral alterations are direct scores; AGR: General Anxiety and Regression; AS: Separation Anxiety; TS: Sleep Disorder; PA: Feeding problems; AA: Aggression Towards Authority; AR: Apathy-Withdrawal; Trait anxiety in patients from 9 to 15 years.

Table 4 Correlations between modulating variables and patient response variables

	Patient response variable									
	M1				M2	M3				
Modulating variables	ACT	AGR	TS	AA	AE	AE	ACT	TS	AA	A-R
Patient										
AR	*r*=0.60 *p*=0.017	*r*=0.52 *p*=0.046	*r*=0.64 *p*=0.01		*r*=0.68 *p*=0.005	*r*=0.64 *p*=0.01				
Caregiver										
AR				*r*=0.40 *p*=0.027						
AE M2							*r*=0.38 *p*=0.037	*r*=0.48 *p*=0.007		
EA										
AUC									*r*=0.49 *p*=0.007	
RES										*r*=0.42 *p*=0.02

AE: State Anxiety; AR: Trait Anxiety; EA: Coping Strategies; AUC: Self-Criticism; RES: Social Retreat; ACT: Total Behavioral Alterations; AGR: General Anxiety and Regression; TS: Sleep Disorder; AA: Aggression Towards Authority; A-R: Apathy-Retraction.
Significant values *p <0.05*.

(M=45.36, SD=29.12) and "Problem avoidance" (M=51.33, SD=32.04). The average of stressful events reported by the caregiver, occurring in the family context during the last twelve months, was 10.40 (SD=6.30) and the average of invasive procedures performed on the patient during hospitalization was 2.43 (SD=1.94).

An intrasubject comparison was made in terms of the results obtained in the variables anxiety state, behavioral alterations and hospital fears in the patient, in the three stages of data collection. Statistically significant levels of anxiety state of the patient in M1 versus M3, t=3.93, p<.0001, d=0.69 and the magnitude of total behavioral alterations registered in M1 versus M3, t=-5.02, p<.0001, d=0.60, at the specified level of 0.05. Disaggregating the behavioral alterations by factors, significance was obtained in the factors general anxiety and regression, t=2.75, p=.010, d=0.38, separation anxiety, t=-4.11, p<.0001, d=0.62 and apathy -retraction, t=-3.20, p=.003, d=0.43, back to the specified level of 0.05. Regarding the main caregiver, the state anxiety levels of M1 versus M3 were statistically significant, t=3.40, p=.002, d=0.53 and of M2 *versus* M3, t=2.10, p=.045, d=0.77.

The relationships between modulating variables and response variables in the patient were analyzed. The correlations obtained are illustrated in table 4.

A positive correlation was obtained between a greater number of total behavioral alterations in M1 and their presence in M3, r=.79, p=.0001. Finally, the anxiety levels of the caregiver in M1 and the adoption of Desiderative Thinking as a coping strategy correlate positively, r=.41, p=.024.

CONCLUSIONS

Our results show that exposure to hospitalization causes an increase in the number of maladaptive behaviors in children, being higher as higher the level of maladaptive behavior that the patient showed before admission. These were present two weeks after discharge, beyond the hospital admission, in line with the results obtained by other authors[3], with the difference that, in this case, the admission is neither surgical nor in Intensive Care, which would confirm that a conventional infant hospitalization, regardless of the reason of admission, is a stressor capable of generating behavioral alterations in the individual.

The variables, in relation to the caregiver, related to the increase in maladaptive post-hospitalization behaviors, have been the adoption of maladaptive coping strategies and the anxiety level of the caregiver at the time of discharge. Our findings suggest that the emotional state and coping strategies of the caregiver significantly influence the behavior and emotional well-being of the child in the process of hospitalization in line with that reported by different authors[3,6,17,18,21,22].

Following the behavioral alterations, a positive relationship was obtained between the trait anxiety, both of the caregiver and the patient, and the maladaptive behavior of the children, prior to hospitalization. In the same way, Rennick & Rashotte[6] affirm that the behavioral alterations of the child, both externalizing and internalizing, manifested before the hospitalization, had a determining role in the impact of hospital admission. This leads us to consider the relevance of knowledge of the child's habitual patterns of behavior prior to admission.

Regarding the presence of anxiety, both in the patient and in the main caregiver during the hospitalization process, significantly higher levels were obtained during admission compared to the levels registered two weeks after discharge, in line with the reported by other authors[4,12,14,16], being able to affirm that a conventional infant hospitalization is a stressor capable of generating anxiety both in the patient and in the main caregiver. It was also observed that the trait anxiety levels of the patient were positively related to their anxiety levels at the end of the admission and two weeks after discharge. These results are expected since the anxiety trait would constitute a predisposition, on the part of the individual, to perceive environmental circumstances as threatening and therefore a tendency to respond, often with higher levels of anxiety[13,23].

Regarding hospital fears, we found that the levels obtained at admission remain present two weeks after discharge, even registering higher values even though the difference does not become significant. These values are similar to those recorded by Ortigosa, Quiles, Carrillo and Pedroche[24] in hospitalized patients compared to the control group (non-hospitalized). The evolution of hospital fears is similar to that found by Rennick & Rashotte[6] who, in their review, report an increase in the fear level, present at six months and even a year after discharge. On the other hand, these results do not coincide with what was found by Montoya[3], since in his study, the level of fears was greater when the surgery was scheduled, approximately one month before, decreasing one week after the intervention. A possible explanation regarding the divergence found, from the paradigm of the transactional theory of stress of Lazarus and Folkman[25], is that both conventional non-surgical admission and admission to the PICU are incidental, not foreseeable events; while, in the case of scheduled surgery, the patient has the opportunity to anticipate contact with the hospital context and develop strategies that allow him to increase the perception of control and self-efficacy, essential aspects to reduce the likelihood of generating emotional disturbances before the hospitalization management[26,27].

The data obtained in this study, does not confirm any relation between the age of the patient and the response levels of anxiety, fears or behavioral alterations found in other studies[2,4,8,10]. It is probable that both the sample size and the fact that the majority of the patients in the study are, by age, in the period of cognitive development defined by Piaget as the period of the specific operations, did not allow finding that relationship, along with the fact that in some studies, the age range explored was broader than in the present study (6-15 years versus 6 months of age until adolescence).

Regarding variables such as the number of stressful events or the number of invasive procedures, no relationship was found with the appearance of emotional or behavioral changes in the patient. Regarding invasive procedures, the number of techniques performed in a hospitalization such as the one studied does not generate negative consequences, unlike that reported in the case of admissions in intermediate care or intensive care units[6,20].

Regarding the limitations of this study, it has an impact on the reduced sample size, the time limitation and the fact that the entire sample comes from a single hospital, which requires that the results be interpreted with caution.

The data from our study complements the accumulated knowledge about what factors would be related to the psychological vulnerability of the child before hospitalization, in this case a conventional non-surgical hospitalization, helping to discern what and who could act to improve the children's health from a biopsychosocial perspective.

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