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Abstract

Hospitalization is stressful for children and their families that can affect health outcomes, depending on how they face the situation. This study analyzed how children deal with indicators of physiological and psychological stress related to hospitalization. Participants were 20 children aged five years old, most of them hospitalized for chronic diseases, in a public hospital in Cuiabá, MT. The following were applied individually in the playroom library: a) Morning and late afternoon salivary cortisol index to measure physiological stress; b) Interview script on illness and hospitalization - child version; and c) Hospitalization Coping Scale (COPE-H). Salivary cortisol was above that indicated in four children. More than half of the sample reported having difficulties caused by the disease to perform several activities; invasive medical procedures are more aversive. They also presented psychological stress responses, with coping of involuntary and voluntary disengagement within the mean age. They reported adaptive strategies to deal with hospitalization, such as watching TV, talking, taking medication and, especially, playing, evaluated as a stress reducer by almost half of the children. However, half of the sample presented a poorly adaptive coping pattern of hospitalization below that expected for their age. There were no significant correlations between salivary cortisol index and coping. Consistent with the literature of the area on the limitations imposed by hospitalization and psychosocial consequences for the child and the caregiving family, the results indicate the importance of interventions in the coping of hospitalization for this population in this age group.

Keywords: Stress. Coping. Hospitalization. Child.

INTRODUCTION

The hospitalization process can be a difficult and painful time for a child, and is generally associated with the separation of family, friends, school, changes in daily routine, entering a not very pleasant environment, and, sometimes, without any proper reception^{1,2}. These factors can trigger stress and anxiety, generating a complex condition when they occur in an exaggerated way, presenting possible symptoms, such as tremors, fear, insom-

nia, altered appetite, insecurity, crying, irritability, aggressiveness, panic, anger, phobia, among others^{3,4}.

The impacts of this condition on the development and recovery of children and adolescents depend on many variables, including hospitalization related to an acute or chronic condition (a disease lasting more than three months)⁵. In the latter case, one should consider the duration, symptomatology, severity,

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visibility of the disease, types of necessary medical interventions, characteristics of the child and family relationships, to name a few. In this context, there is the fact that both the child and his/her family members are subject to an acute stress condition⁵.

Considering some of the characteristics of a child in this hospital context, studies on the process of coping with stressors in this environment have been highlighted^{6,7,8,9,10}. In general, positive relationships have been observed between the adjustment of the child or adolescent with secondary control coping strategies (CS) (when it is not possible to act directly on the stressor), such as having positive thinking, acceptance, and distraction. Thus, more adaptive CS, such as taking medicine, talking, watching television, praying, and playing have been observed in this context, as opposed to CS like feeling guilt, or thinking about running away and hiding⁸. On the other hand, CS of avoidance and denial have been associated with a worse adjustment^{5,6,8}. Studies analyzing the relationship between pain and stress in hospitalized children and their mothers are also highlighted, identifying stress in 33% of children and 70% of mothers¹¹ and stress in 23% in a sample of 31 children⁹. In this context of acute stress⁵, the importance in pain management stands out^{12,13}.

Through stressful events present in the hospital environment, hospitalized children and adolescents can develop or improve their CS repertoire¹⁴. This repertoire can be acquired or expanded through their cognitive abilities, influence of the family and the environment in which they live, which act as models and co-regulators and, thus, manage to adapt to new challenging situations^{9,10}.

The coping process is understood by the Motivational Theory of Coping (MTC)¹⁵ as the "[...] *regulation of action in situations in the face of stress, being an organizational construct that captures interactions between behavior,*

emotion, attention, cognition, and motivation" (p. 112). It is a system that understands the transactions that the individual establishes between himself, the physical environment, and the social configuration in which he/she is inserted. Moreover, the consequences of which are not limited to the resolution of stressful episodes, but contribute to the maintenance of health, development, and individual and collective survival¹⁶. Thus, it has a developmental perspective, differentiating the coping of children, adolescents, and adults, throughout the ages and contexts¹⁷. For MTC, an event is perceived as a stressor when it challenges or threatens the universal basic psychological needs (BPN) of: a) relationship, in order to be able to be with another in a healthy way and with preserved self-esteem; b) competence, aiming to be effective in the face of interactions with the environment; and c) autonomy, in order to coordinate their preferences and the options available in the environment¹⁵.

In this perspective, the CS of children and adolescents are linked to their beliefs and learned skills, related to the way they manage to have self-control in stressful situations. In the hospital context, a broad review of studies on coping from the perspective of MTC⁷ highlights that there is greater vulnerability in relation to the BPN of autonomy, especially in the face of invasive medical procedures, when the use of distraction CS are less possible, and the environment may no longer be perceived as a source of support. Especially between six and ten years of age, consistent with what was observed in this period of development¹⁶, studies in the context of hospitalization identified the use of more adaptive CS, such as distraction, problem solving, and the search for social support, indicative of a perception of challenge to the BPN of autonomy, competence, and relationship, respectively. However, the presence of rumination and magic thinking CS's, related to the perception of

threat to the BPN of autonomy, in addition to helpless, related to the threat to the BPN of competence⁷, were also observed. The importance of psychological care for hospitalized children is highlighted here, identifying their stressors and the adaptive and poorly adaptive CS in this context. Therefore, evaluating the CS of children, including self-report scales beginning from five years of age, can help in

this process⁶.

Considering that hospitalization can generate stress in children, triggering behaviors that hinder their better adaptation and recovery, this study analyzed the strategies for coping with hospitalization of children between five and seven years of age, and their relationships with physiological stress, according to the Motivational Theory of Coping.

METHODS

A cross-sectional study was conducted with 20 children (10 of each sex), aged between 5 and 7 years old ($M = 5.75$; $SD = 0.85$), hospitalized for chronic diseases ($n = 17$), such as Type 1 Diabetes Mellitus, and acute diseases, such as head colds ($n = 3$), with two or more hospitalizations ($n = 12$), only two children were hospitalized for diagnosis. The children were mainly accompanied by their mother ($n = 16$), and all had siblings. In terms of sociodemographic characteristics of families, almost half ($n = 8$) were from the same home, followed by general services ($n = 3$), with family income up to a minimum wage salary ($n = 10$) or above one minimum wage salary ($n = 8$), living in their own home ($n = 15$). The inclusion criteria for participation in the study considered the following aspects: a) children aged between 5 and 12 years; b) a minimum period of 48 hours of hospitalization; and c) reason for hospitalization due to acute or chronic condition. The exclusion criterion considered that the family caregiver was under 18 years of age.

For data collection, the following measures were used:

a) Salivary cortisol index, collected in the morning and afternoon, to assess physiological stress, in a situation of no reported pain.

The analysis of the collected material (saliva) was performed using the electrochemiluminescence method, using the following reference values: a) RV between 8 am and 10 am = less than 0.69 ug/dl; b) RV between 2 pm and 4 pm = less than 0.43 ug/dl.

b) Interview script on the disease and hospitalization - child version, specially elaborated for the study, with seven closed questions about having a chronic disease (duration greater than three months) or an acute disease, the presence of pain, the number of hospitalizations, the presence of limitations and changes in routine, the expectations of cure or improvement, the presence of support in child care, and an open question about their feeling about the disease, answered by the child and his/her caregiver. The answers were categorized according to the structure of the closed questions, and for the open question, they were organized into categories considering aspects of the context of hospitalization¹⁸.

c) Interview script on the disease and hospitalization - caregiver version, elaborated for the study which addressed sociodemographic aspects, about stressors related to the disease and hospitalization. Composed of closed and open questions, which are categorized according to content analysis¹⁸.

d) Hospitalization Coping Scale (COPE-

-H)¹⁹. This is a self-report scale to assess the CS of hospitalization in children aged 5 to 12 years, based on MTC7. It contains 17 scenes depicting behaviors that can be performed in the hospital, such as crying, playing, feeling angry, or watching TV, for example. The child should describe the scene, indicating the frequency of that behavior on a Likert scale, with the filling of a circle divided into four parts: "never" (empty circle), "a little" (a part of the circle); "sometimes" (two parts of the circle); "almost always" (three parts of the circle), "always" (four parts of the circle). If the answer is "never", they follow to the next scene. In each scene, items such as cards with speech balloons are presented for the child to indicate how much he/she uses the coping strategy described in the item (e.g., "I cry because I have to get a shot"). The answers are scored, generating a crude score for each of the three factors of COPE-H: a) Factor 1 - Poorly Adaptive Hospitalization Coping, with 27 items ($\alpha = 0.98$), which makes it difficult to adapt to the hospital context, most of them involuntary, including CS, such as Submission, Opposition, Helplessness, Escape, Isolation, Delegation, related to the perception of threat to the three BPNs of relationship, competence, and autonomy, with poorly adaptive coping in child health and development; b) Factor 2 - Adaptive Hospitalization Coping, with 27 items ($\alpha = 0.73$), with voluntary coping responses, CS with adaptive coping, such as Self-Confidence, Accommodation, and Problem Solving, related to the perception of challenges to the three BPNs; and c) Factor 3 - Coping of Involuntary and Voluntary Disengagement, with 11 items ($\alpha = 0.69$), whose motivational orientation is the removal of the stressor, with poorly adaptive coping and emotional regulation, demonstrating Escape, Helplessness, Submission, and Delegation,

related to the perception of threat to the BPNs of competence and autonomy. The crude score is transformed into a percentile according to the age norm, classifying each of the factors as "lower", "lower middle", "middle", "upper middle" and "upper".

Data were collected individually in the pediatric ward library of a public hospital in the city of Cuiaba, MT, in 2017. In the first contact with the family member/caregiver, the objective of the study was explained, and the Informed Consent Form was signed. Next, contact was made with the child explaining the objective of the study, presenting the Informed Assent Form. Considering the study variables, it was possible to control the child's clinical conditions for salivary cortisol collection as: a) not having been exposed to invasive procedures on the day before collection; b) to be conscious and participative at the time of collection; and c) pharmacological information was sent to the laboratory along with the collected material. The conditions themselves at the time of salivary cortisol collection in both periods (morning - before breakfast) and afternoon (collected around 4 pm) were performed. The study was approved by the University's Ethics Committee (Opinion no. 1.083.963).

To test the hypothesis of differences between groups for morning and evening cortisol levels, the Wilcoxon signed-rank test was used, considering that the samples were related, and the distribution of the data did not meet the normality criteria. Cohen's d-test was also used to measure the size of the effect and Spearman's Rank correlation coefficient was estimated with the objective of measuring possible correlations between the measured variables, and the significance level of 5% was adopted in all analyses.

RESULTS

Regarding the caregiver's perception of aspects of the child's health and hospitalization, it is observed that more than half ($n=12$) reported that they did not perceive pain in the child caused by the disease, as well as limitations in daily life ($n=11$). Regarding the caregiver's feelings, most report feeling helpless ($n=14$), but with expectations of cure for the disease ($n=12$), in addition to receiving support in the care of the child ($n=18$) (Table 1).

The measures of stress responses were organized in terms of physiological (cortisol measurement) and psychological stress (perception of pain, limitations in routine, lack of support, low expectation of cure or improvement, for example). The salivary cortisol measurement, as an indicator of physiological stress, showed that, in the morning, three children presented a level above expected (less than $0.69 \mu\text{g/dl}$). In the afternoon period, only one child had a cortisol level above the expected (less than $0.43 \mu\text{g/dl}$), totaling four children with indications of physiological stress.

Possible stressors of the context of hospitalization were identified in the children's reports. Feeling pain, especially during invasive medical procedures and/or associated with the disease, taking tests, staying away from the family, and the food offered not being pleasant ($n=3$) were mentioned by the children (Table 2).

The difficulties caused by chronic diseases to perform various activities (at school, at home) were perceived by more than half of the children ($n=12$), but they reported having positive thoughts regarding their health status. Playing in the playroom ($n=8$) was highlighted as one of the positive factors, as it makes hospitalization less stressful. The food offered by the hospital was also

perceived as pleasant for six children. It is worth noting that most children ($n=13$) did not know whether perceived pain was related to the disease (Table 1).

The children reported dealing with hospitalization mainly through more adaptive CS such as playing, watching TV, talking, and taking medication. The lowest frequencies were less adaptive responses, such as coping responses of escaping and hiding (Figure 1).

Figure 2 shows that most children ($n=13$) presented an adaptive coping repertoire on average or above average according to the norms for their peers, with answers such as playing, watching TV, praying, negotiating, conversing, listening to music, taking medicine, feeling courage. However, there were five children classified below the expected for their age (COPE-H F2). Another result that stands out is the fact that half of the sample that answered COPE-H ($n=9$) presented a poorly adaptive coping of hospitalization (F1) at a lower level than their age group, with answers such as crying, hiding, feeling angry, feeling sad, discouraged, feeling fear and guilt; meanwhile, the other children were within or above average. Most children ($n=15$) also presented a coping of involuntary and voluntary disengagement from hospitalization (F3) within or above the average age, with responses of crying, feeling fear, shame, and/or desire to escape, for example.

Cortisol results differed from the measurement being made in the morning or afternoon. The Wilcoxon signed-rank test indicated that the median cortisol levels were significantly higher in the morning ($W(17) = -3.463$, $p < 0.001$); moreover, Cohen's d-test indicated a high effect ($d = 0.93$).

Significant correlations of Spearman's

rank test were found between: a) positive correlation between morning and late cortisol levels, indicating that stress response levels change directly at the beginning and end of the day; b) negative correlation between afternoon cortisol levels and age, indicating that the lower the age, the higher the cortisol levels in the afternoon, and vice versa; and c) a positive correlation between

poorly adaptive coping and voluntary and involuntary disengagement coping, indicating that CS with poorly adaptive coping for development or health, in the medium and long term, are directly correlated, whether through voluntary or involuntary CS. It should be noted that cortisol collection followed the orientation of the children's conditions in both periods (morning and early) (Table 3).

Table 1 – Aspects of health and hospitalization according to caregivers (N = 20). Cuiaba, 2017.

Variables	Answers	N (%)
Perception of stressor in the disease and hospitalization		
Limitations imposed by the disease	Present	08 (40.0)
	Absent	11 (55.0)
	Not informed	01 (5.0)
Pain due to the disease	Present	07 (35.0)
	Absent	12 (60.0)
	Not informed	01 (5.0)
Routine change caused by the disease	Yes	12 (60.0)
	No	06 (30.0)
	Not informed	02 (10.0)
Perception of the disease		
Feelings	Frailties (fear, sadness, guilt)	14 (70.0)
	Potentialities (hope, tranquility)	03 (15.0)
	Not informed	03 (15.0)
Expectations	Healing	12 (60.0)
	Improvement	07 (35.0)
	Not informed	01 (5.0)
Childcare support	Yes	18 (90.0)
	Not informed	02 (10.0)

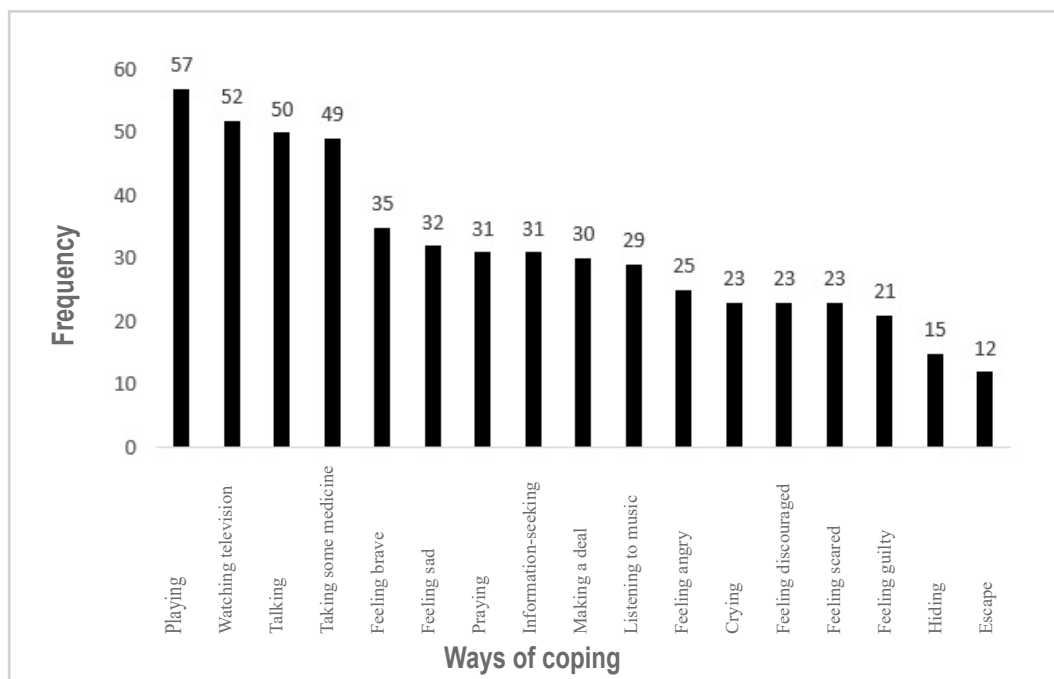


Figure 1 – Frequency of coping strategies for the hospitalization of children in the Hospitalization Coping Scale (COPE-H) (N = 18). Cuiabá, 2017.

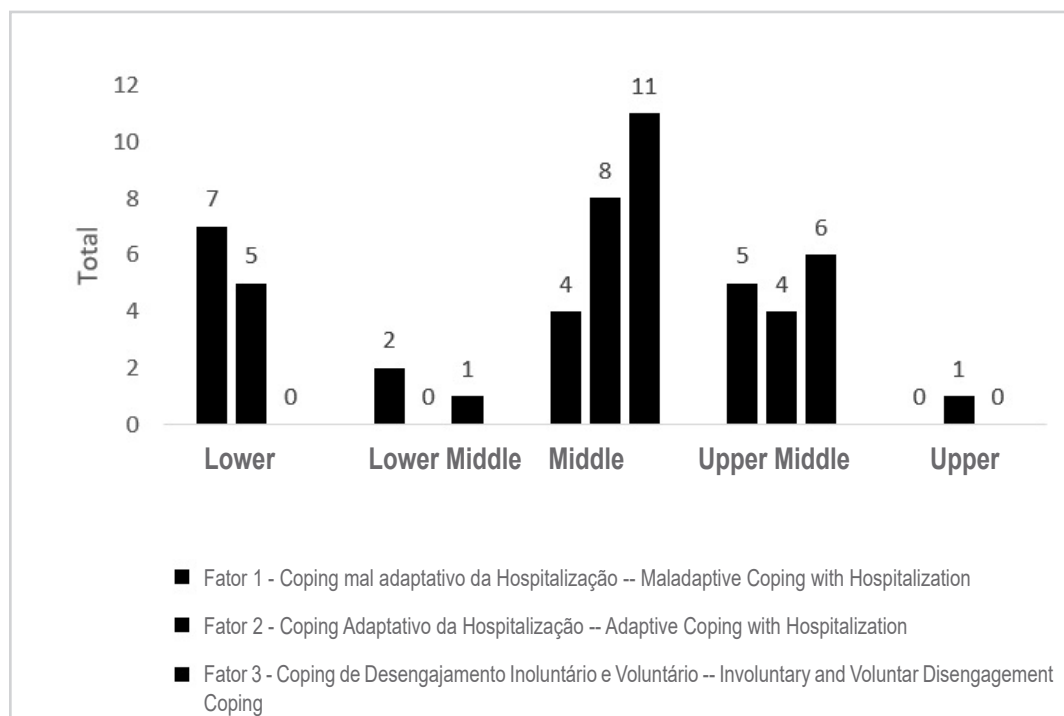


Figure 2 – Classification of children in the factors of the Coping Hospitalization Scale (COPE-H), according to the norms by age (n = 18). Cuiabá, 2017.

Note: Two children did not have their data computed due to not having completed the scale.

Table 2 – Aspects of health and hospitalization according to children (N = 20). Cuiabá, 2017.

Variables	Answers	N (%)
Potential context stressors		
Pain perception	Yes	10 (50.0)
	No	10 (50.0)
Most painful procedures	Invasive procedures (venous puncture, injection, serum)	
	Shock	17 (85.0)
	Not informed	1 (5.0)
Relationship of pain with disease	Yes	2 (10.0)
	No	5 (25.0)
	Not informed	2 (10.0)
Difficulties caused by the disease	Yes	13 (65.0)
	No	12 (60.0)
	Not informed	5 (25.0)
Unfavorable aspects of hospitalization	Medicine, examination, procedures	3 (15.0)
	Stay away from family	8 (40.0)
	Food	3 (15.0)
	Staying in the room	3 (15.0)
	Mosquito	1 (5.0)
	No unfavorable aspect	1 (5.0)
	Not informed	4 (15.0)
Positive aspects of the context		
Favorable aspects of hospitalization	Playroom, Play	8 (40.0)
	Food	6 (30.0)
	Hospital routine (visit, sleep outside the home)	3 (15.0)
	Not informed	2 (10.0)
	Not like hospital	1 (5.0)
Positive thoughts about the disease	Yes	11 (55.0)
	No	4 (20.0)
	Not informed	5 (25.0)
Feeling at the time of the interview	Very cheerful	10 (50.0)
	Cheerful	4 (20.0)
	Normal	3 (15.0)
	Sad	3 (15.0)

Table 3 – Correlation matrix between study variables (N = 18)

Variables	1	2	3	4	5	6	7
1. Age	-						
2. Sex	.246	-					
3. Morning cortisol	.362	.086	-				
4. Afternoon cortisol	-.542*	.187	.590*	-			
5. F1 – Poorly adaptive Coping	.242	.097	.316	.105	-		
6. F2 – Adaptive Coping	.293	.194	.385	.244	.286	-	
7. F3 – Voluntary and involuntary disengagement Coping	.106	-.292	.158	.280	.601**	.376	-

Note: *p < 0.05; **p < 0.001 = significant by Spearman test; F1, F2 and F3 = COPE-H factors. The two children who were not able to complete COPE-H were excluded.

DISCUSSION

Understanding how children deal with hospitalization stressors can provide more prescriptive data for professional performance, with possible impacts on recovery and physical and mental health indicators^{5,6,7}. This assessment may include the child's own perception, through self-reported scales, such as the COPE-H scale^{19,6} used in the present study. Through this scale and through interviews with 20 children, around five years old on average, who were hospitalized mainly for chronic diseases, it was possible to observe some stressors such as the performance of invasive procedures (venous puncture, injection, serum), corroborating studies in the area^{20,11}. Therefore, pain was observed as a stressor in half of this sample, demonstrating the importance of pain management in children²⁰, with adequate professional preparation^{12,21}. In these situations, children tend to present CS of amplification as well as catastrophizing of pain and helplessness^{7,22,11}, indicating that children perceive themselves less competent to deal with the situation in which they have little control^{16,22}.

These feelings of helpless, discouragement, fear, desire to escape the situation, associated with the perception of threat to the BPN of competence, were identified in

almost half of the sample, as well as feeling anger and guilt, associated with the threat to BPN autonomy and relationship, respectively^{15,16,7}. These poorly adaptive responses stand out in the face of stressors for this sample, which include others, such as having to have tests, staying away from family, and not liking the hospital food. Especially for younger children, these less adaptive CS's were observed at a younger age group by COPE-H¹⁹.

The results of this scale also showed a higher number of children classified within the expected range for their age in relation to COPE-H F3 - Involuntary and Voluntary Disengagement (F3), demonstrating the presence of behaviors that tend to move away from the stressor, seeking emotional regulation, mainly voluntarily, with CS's of escape, helplessness, submission, and delegation. In a study with COPE-H⁹, the highest means occurred in this F3 category in patients with and without stress indicators. The condition of disease and hospitalization makes it difficult to deal directly with the stressor, leading to a secondary control pattern⁵, as observed in these studies.

Despite these indicators of psychological stress and even their adaptive coping, only

four children presented altered cortisol levels, especially in the morning. This indicator of physiological stress may be related to the chronic condition present in most of the sample, thus, not being the first hospitalization. This is consistent with a lower mean of stress in patients with three or more hospitalizations, observed in another study⁹, possibly due to the process of desensitization in relation to hospitalization, in cases of chronic diseases.

Up to this point, a set of CS with poorly adaptive medium and long-term outcomes in physical and mental health was noted, but, according to MTC, it is expected that, with increasing age, there would be an increase in the frequency of adaptive CS and a decreased coping of disengagement^{16,23}. Therefore, a higher frequency of children with average classification for Adaptive Coping (F2) of COPE-H19 was observed. The higher frequencies for “playing, watching TV, talking, and taking medicine” behaviors are similar to studies that used COPE-H^{19,9}. The perception of a child in relation to playing as a factor that makes hospitalization less stressful corroborates another study in which hospitalized children emphasized the importance of playing^{14,8,21}. This behavior of playing can acquire a functionality as a distracting factor and be perceived as a challenge to the BPN of autonomy, as proposed in the MTC, so that, to the extent that the environment offers, the child can alter their preferences with what is available, making adjustments that can contribute to their adaptation to the stressful event.

The lack of significant correlation between

physiological stress measurement and COPE-H factors may be due to different variables, such as the chronic health condition of children and the greater number of hospitalizations. Thus, it can be understood that the physical and psychological reactions resulting from the stress process of children find ways to self-regulate proportionally to their efforts. This absence of correlation was verified between CS of children with and without stress in pre-surgical situations²⁴.

The presence of an inverse correlation between age and stress, indicating the propensity of younger children to experience stress, can be understood by the adoption of coping strategies of involuntary and voluntary disengagement of hospitalization as is typical of children with younger ages when they realize that their basic needs are threatened, thus, reacting with poorly adaptive behaviors. In this context, younger children tend to present a stress indicator and as strategies adopt maladaptive behaviors, thus one can understand the relationship between poorly adaptive coping and coping of voluntary and involuntary disengagement.

In general, investigating hospitalization from a child's view revealed the experience, the reactions, the ambivalence, and possible adaptations of the children from a developmental perspective. These results will allow health professionals, who care for hospitalized children, to understand the complex process between stress and coping as well as their health outcome. Thus, studies with mixed approaches to methodology and a greater number of children in this age group will allow for deeper understanding of these relationships.

CONCLUSION

The context of hospitalization presents several stressors, especially the performance of invasive procedures, perceived by children between five and seven years old as an un-

comfortable and painful experience. However, in the condition of chronic diseases, recurrent hospitalizations occur, with greater exposure to these procedures, which can

lead to an adaptation to the situation, with lower levels of physiological stress. On the other hand, psychological stressors related to family separation and changes in routine, can generate poorly adaptive responses to deal with the situation such as feelings of guilt, anger, fear. Here lies the importance of inter- and multidisciplinary action and professional training to work with this pediatric population in order to reduce these strategies of poorly adaptive coping and promote

adaptive ones.

This process can be facilitated due to the good evaluation of children in relation to the practice of playful and distracting activities in the hospital, as observed in this sample. Thus, the development of intervention proposals aimed at minimizing the effects of hospitalization for the child should consider the condition of the disease, the experience of the child and, mainly, develop and adapt playing for this environment.

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