

# Acute Stress Disorder in Surgically Treated Children and Their Parents: institutional Experience and Literature Review

Violeta Šetka-Čuljak<sup>1</sup>, Ante Kvesić<sup>1</sup>  
and Mladenka Vukojević<sup>2</sup>

## SUMMARY

Acute stress disorder is a psychiatric entity including symptoms that may appear as an individual response to exposure to a traumatic event within the first four weeks. Pediatric surgical treatment may cause a high level of acute stress disorder in children and their parents. The aim of this study was to determine the symptoms of acute stress disorder in children undergoing surgery and their parents, as well as their mutual connection. This was a prospective study over a three-month period, involving children undergoing surgery and their parents at the Division of Pediatric Surgery, Mostar University Clinical Hospital. Data were collected from standardized questionnaires. The study involved 200 children and their parents. Symptoms of acute stress disorder were recorded in 24.50% of mothers and 22.50% of fathers. There was no statistically significant difference according to gender of parents experiencing symptoms of acute stress. Certain symptoms were recorded in 28%-55% of children. A statistically significant correlation was found between overall stress levels in parents and avoidance symptoms in parents, and increased arousal in children. Acute stress disorder as a result of pediatric surgical procedures affects children and their parents equally. There was an association between overall stress levels in parents and increased arousal in children.

## KEYWORDS

*Acute stress disorder; Symptoms; Pediatric surgery; Children; Parents*

<sup>1</sup> Department of Surgery, Division of Pediatric Surgery, Mostar University Clinical Hospital, Mostar, Bosnia and Herzegovina;

<sup>2</sup> Department of Pediatrics, Mostar University Clinical Hospital, Mostar, Bosnia and Herzegovina

**CORRESPONDENCE TO** Violeta Šetka-Čuljak, Division of Pediatric Surgery, Mostar University Clinical Hospital, Bijeli brijeg bb, Mostar, Bosnia and Herzegovina  
violetasetka@yahoo.com

**RECEIVED** September 4, 2023

**ACCEPTED** April 18, 2024

**DOI** 10.20471/acc.2026.65.01.08



## Introduction

In contemporary literature, the term 'pediatric medical traumatic stress' refers to the psychological and physical responses experienced by children and their parents as a result of pain, injury, serious illness, medical procedures, and invasive treatments. This term has been created to investigate the experiences of children and their families in medical settings<sup>1,2</sup>. Acute stress disorder (ASD) was first introduced in the Diagnostic and Statistical Manual (DSM) in 1994<sup>3</sup>. This psychiatric entity includes symptoms that appear as an individual response to exposure to a traumatic event within the first four weeks. Symptoms can last from two days to four weeks or longer and can lead to post-traumatic stress disorder (PTSD). Four groups of symptoms of different proportions are required for the diagnosis of ASD, including symptoms of re-experiencing, dissociative symptoms and avoidance symptoms, as well as those of increased arousal<sup>4-6</sup>.

Surgical pediatric treatment involves high stress levels in both children and their parents<sup>7,8</sup>, who are an important part of the team, especially in terms of preparation for elective surgery in advance. However, in the case of an emergency, the time to adapt to a stressful situation is always short.

Children are heavily dependent on their parents and on their support. By observing the reactions of parents, they learn and react to certain situations in a similar way to their parents<sup>9,10</sup>. The occurrence and development of stress are also influenced by the interconnectedness between parents and children<sup>11</sup>. In the same way as a parent influences a child, a child influences a parent with his or her personality characteristics<sup>12</sup>. If parents are inadequately emotionally involved in stressful situations, their role can be compromising for the child. Previous research has shown that there also are significant differences in ways

of coping with stress on the part of mothers and fathers<sup>13-15</sup>. Parents also play an important role in a child's recovery after surgery. During the child's postoperative treatment, the medical staff exchange information with the parents. Immediately after surgery, the psychological reaction of parents to stress can be extremely acute and intense. Parental stress in the postoperative period can vary in intensity from adaptive to dysfunctional and may occur to a different extent in the parents of hospitalized children<sup>16-18</sup>. Acute stress can cause mental and physical symptoms such as anger, anxiety, irritability, mood swings, tension, sadness, sleep disturbance, headache, fatigue, muscle pain, hypertension or heart problems, etc. Despite evidence that acute stress impairs attention in adults, there has been minimal research in children.

This study aimed to identify the symptoms of ASD in surgically treated children and their parents, to determine a possible difference in the symptoms of ASD in children and their parents according to demographic characteristics and type of surgery (emergency vs. elective), and to determine the interconnectedness of both children and their parents experiencing symptoms of acute stress.

## Material and Methods

We conducted a prospective study over a three-month period from July 1 to October 1, 2022. The series included children hospitalized and undergoing surgery at the Division of Pediatric Surgery, Mostar University Clinical Hospital, as well as their parents. Only children whose parents were married and had provided signed written consent for the research were included in this study. Parents and children underwent the examination within seven days of surgery.

The research questionnaires were completed as follows: for children aged 2-13, the questionnaires were filled out by the parents; and children aged 14-18 filled out the questionnaires independently. For both groups of respondents, the parents provided signed written consent to participate in the research.

The research used medical archives and standardized questionnaires for parents and children as a source of data. The hospital medical archives provided an insight into the basic data, the reason for the child's hospital admission, age, gender and type of surgery. As for the type of elective surgery, the most common were inguinal and umbilical hernias, undescended testicles and phimosis. Among emergency procedures, the most common were appendicitis, acute scrotum, and bone fracture operations. Therefore, the study mainly concerned non-life-threatening surgeries.

General demographic characteristics were examined by a sociodemographic questionnaire, which contained questions related to age, gender, level of parents' education, and annual household income.

The two standardized questionnaires used in the research were:

- **Acute Stress Disorder Scale (ASDS).** This scale consists of 19 particles that represent symptoms such as re-experiencing, avoidance, arousal, and dissociation. The subjects rate symptoms on a five-point Likert scale (1 = not at all through 5 = extremely high) and items are added together in total score (range 19-95)<sup>19</sup>; and
- **Child Stress Disorders Checklist (CSDC).** This is designed to measure ASD and PTSD in children. It is adapted for ages 2 to 18 and can be filled in by observers such as nurses, teachers, and social workers. The questionnaire contains 30 questions related to the stressful event and consists of 50 items that include short statements (slightly longer than adjectives). The possible answers are 0

(incorrect), 1 (partially correct), and 2 (correct)<sup>20</sup>.

Two parameters were used to examine parental stress levels, i.e., ASD diagnosis, indicated by three dissociation symptoms and one symptom of re-experience, avoidance and arousal, confirmed at  $\geq 3$  on a five-point scale; and total result of the acute stress level obtained by summing particulate responses.

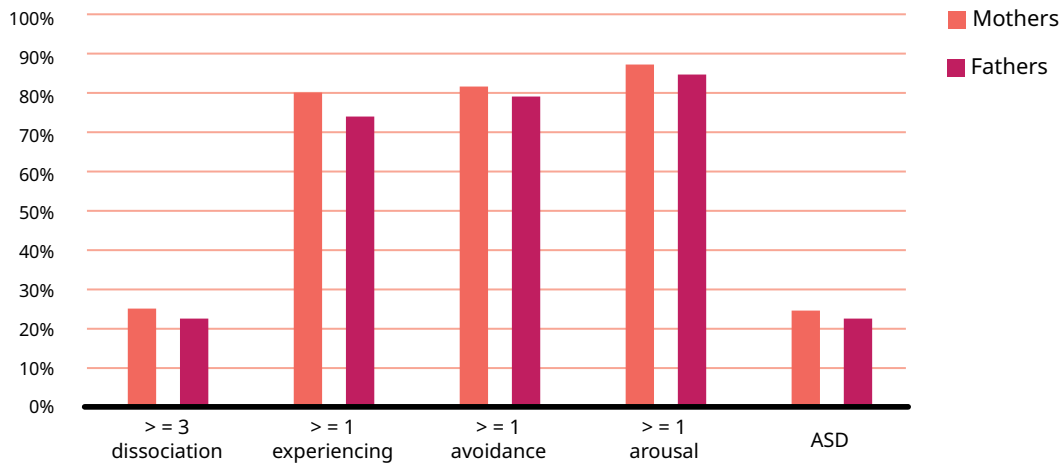
Since each particle on the ASD stress scale was interpreted as a symptom of acute stress, the overall score represented the severity of symptoms. When categorizing the prevalence of acute stress in children, only a value with a result above the 65<sup>th</sup> percentile was taken.

### Statistical analysis

Data were statistically analyzed using various parametric and nonparametric methods. Differences in the perception of ASD symptoms in children and parents concerning demographic characteristics (gender and age) and time of admission (emergency vs. elective) were statistically analyzed using the Mann-Whitney U test. The level of statistical significance was set at  $p < 0.05$ .

## Results

A total of 200 children participated in the study; the mean age of 155 males and 45 females was 8.7 years ( $M=8.7$ ) (min=0 years; max=18 years) (Table 1). The study involved 400 parents, 200 fathers and 200 mothers. Most of them were employed in private companies, had a high school education and a monthly household income of up to 500 convertible marks (KM) (Table 2). In this study, scores  $\geq 56$  on the overall acute stress level scale indicated an increased risk of PTSD.



**FIG. 1.** Overview of the acute stress symptoms in parents. ASD = acute stress disorder

Out of the possible range of results spanning from 19 to 95, the overall results on the acute stress scale in this study ranged from 19 to 93 (19 to 93 in mothers and 19 to 85 in fathers), with 22.50% of mothers and 19% of fathers achieving a result above the clinical limit of 56.

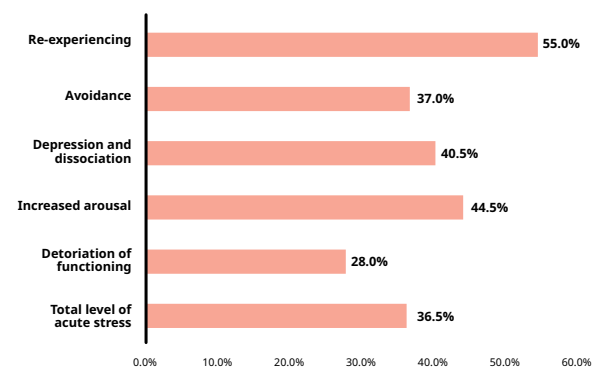
**TABLE 1.** Demographic characteristics of children

		n	%
<b>Gender</b>	Boy	155	77.50
	Girl	45	22.50
<b>Age</b>	<10 years	120	60
	≥10 years	80	40

Based on the DSM diagnostic criterion for ASD, it was determined that 24.50% of mothers and 22.50% of fathers had signs of ASD. A significant proportion, namely, 25.50% of mothers and 22.50% of fathers experienced three or more dissociation symptoms, of which 81% of mothers and 74% of fathers had re-experiencing symptoms, 82% of mothers and 79.50% of fathers had

avoidance symptoms, and 87.50% of mothers and 85% of fathers experienced the symptom of arousal. There was no statistically significant gender difference in the experience of various symptoms of acute stress ( $\chi^2=0.319$ ;  $df=3$ ;  $p=0.956$ ). The results obtained are shown in Figure 1.

Results on the prevalence of acute stress in children are shown in Figure 2. Some of the symptoms of ASD were experienced by 28% to 55% of children, with re-experiencing being the most pronounced symptom of stress (55%).



**FIG. 2.** Overview of the acute stress symptoms in children.

Differences in children's experiences of ASD symptoms, taking into account demographic characteristics (gender and age) and hospital admission type (emergency vs. elective) are shown in Table 3. The results indicated that males and those under the age of 10 showed a higher level of arousal than females and older children. Moreover, the frequency of symptoms of re-experiencing stress in children having elective hospital

admission was higher when compared to those admitted as an emergency.

A statistically significant correlation was found between the overall stress levels of children and their parents, including a correlation of individual symptoms of stress in mothers with symptoms of increased arousal in children. In addition, avoidance symptoms in mothers were significantly positively associated with symptoms

**TABLE 2.** Demographic characteristics of parents

		Parents			
		Mothers		Fathers	
		M/n	SD/%	M/n	SD/%
<b>Year of birth (M±SD)</b>		39.215	8.058	42.065	7.723
<b>Work activity</b>	State-owned enterprise	20	10	20	10
	Private company	79	39.5	79	39.5
	Private entrepreneur	60	30	62	31
	Agriculturist	32	16	31	15.5
	Unemployed	5	2.5	4	2
	Pupil/student	2	1	2	1
	Retired	2	1	2	1
<b>Education</b>	Primary school	3	1.5	8	4
	High school	98	49	123	61.5
	College	99	49.5	69	34.5
<b>Household income</b>	Up to 500 KM	81	40.5	81	40.5
	501-800 KM	31	15.5	30	15
	801-1200 KM	51	25.5	37	18.5
	1200-1600 KM	18	9	27	13.5
	Above 1600 KM	19	9.5	25	12.5

M = mean; n = number of participants; SD = standard deviation; KM = convertible mark

**TABLE 3.** Differences in ASD symptoms among children according to demographic characteristics and type of surgery

	ASD in children											
	Re-experiencing Mdn (IQ)	p	Avoidance Mdn (IQ)	p	Depression/ dissociation Mdn (IQ)	p	Arousal	p	Deterioration of functioning Mdn (IQ)	p	Level of acute stress Mdn (IQ)	p
<b>Gender</b>												
Male	1 (0-2)	0.983	0 (0-2)	0.221	1 (0-2)	0.089	1 (0-2)	0.049*	1 (0-1)	0.675	3 (1-7)	0.094
Female	1 (0-2)		0 (0-1)		0 (0-1)		0 (0-1)		0 (0-1)		2 (0-5)	
<b>Age (years)</b>												
<10	1 (0-2)	0.782	0 (0-2)	0.619	0 (0-1)	0.544	1 (0-2)	0.020*	0 (0-0)	0.150	4 (1-7)	0.226
≥10	1 (0-2)		0 (0-1)		0 (0-1)		0 (0-1)		0 (0-1)		2 (0-6)	
<b>Type of surgery</b>												
Elective	1 (0-2)	0.030*	0 (0-2)	0.527	0 (0-1)	0.216	0 (0-2)	0.928	0 (0-1)	0.171	3 (1-6)	0.189
Emergency	0 (0-2)		0 (0-1)		0 (0-1)		0 (0-2)		0 (0-0)		2 (0-7)	

ASD = acute stress disorder; Mdn (IQ) = median (interquartile range)

**TABLE 4.** Correlation of experience of stress symptoms in parents with stress symptoms in children

		ASD in children					
ASD in parents		Reliving	Avoidance	Depression/ dissociation	Arousal	Deterioration of functioning	ASD level
Mothers	Dissociation	0.072	-0.020	0.071	0.159*	0.030	0.076
	Experiencing	0.051	0.019	0.088	0.186*	-0.015	0.087
	Avoidance	0.142*	0.073	0.110	0.254*	0.137	0.170*
	Arousal	0.044	0.047	0.096	0.175*	0.043	0.100
	Total level	0.086	0.036	0.106	0.221*	0.056	0.124
Fathers	Dissociation	0.277*	0.105	0.110	0.170*	0.136	0.194*
	Experiencing	0.296*	0.253*	0.219*	0.319*	0.234*	0.322*
	Avoidance	0.208*	0.170*	0.168*	0.328*	0.167*	0.254*
	Arousal	0.233*	0.176*	0.152*	0.324*	0.213*	0.263*
	Total level	0.292*	0.200*	0.184*	0.330*	0.217*	0.296*

\*Statistical significance at the level of  $p < 0.05$ ; ASD = acute stress disorder

of re-experiencing and overall stress levels in children. A statistically significant correlation was found between maternal avoidance symptoms and increased arousal in children ( $r=0.255$ ;  $p<0.05$ ), as well as between overall maternal stress levels and increased arousal in children ( $r=0.221$ ;  $p<0.05$ ).

A statistically significant correlation was found between all forms of acute stress in fathers, except dissociation, with some forms of stress in children. The experience of dissociation symptoms in fathers did not significantly correlate with symptoms of avoidance, depression, dissociation, and deterioration of functioning in children. All correlations were positive, meaning that fathers who scored higher on stress scales also estimated that their children had more pronounced stress symptoms (Table 4). The correlation between the fathers' results on the scale of acute stress levels and the results of increased arousal in the child was statistically significant ( $r=0.330$ ;  $p<0.05$ ). The correlation between the results on avoidance symptoms in the father and the results on increased arousal in the child was also statistically significant ( $r=0.328$ ;  $p<0.05$ ).

## Discussion

In this study, we dealt with ASD in parents and children after emergency and elective surgery in the field of pediatric surgery. In everyday clinical practice, insufficient attention is paid to the psychological component of patients and their parents. In recent years, more work has been done on ASD both in the case of parents and children, when dealing with the symptoms of ASD and PTSD in the parents of children with newly diagnosed cancer, body burns, and those injured in traffic accidents.

Regarding the time of surgery, the study sample was divided into two groups, depending on whether surgery was performed as an emergency

or was elective. The sample consisted mainly of males undergoing surgery (77.5%), and the majority of respondents were children under 10 years of age (60%). This is not surprising, given that most surgeries were performed on the male genitourinary system, which is the predominant pathology at this age. In clinical trials, the result on the prevalence of acute stress in children above the 65<sup>th</sup> percentile was considered to be the optimal level of separation of the clinical groups from the normative sample<sup>21</sup>.

Most of the parents in our series were employed by a private company, had completed high school, and had a monthly household income of up to 500 KM. The low socioeconomic status associated with increased stress<sup>22</sup>, anxiety and depression in parents of hospitalized children has also been shown as a significant stressor in previous studies<sup>23,24</sup>. Moreover, in some papers, the association between lower parental education and increased stress has been proven<sup>25-27</sup>. Nevertheless, studies of ASD in parents of children with different diagnoses show considerable data variability.

Parents of children who had undergone surgery as an emergency showed a high level of total stress, at around 28% in all ASD subgroups, which was consistent with our results<sup>14,17,27</sup>. Re-experiencing was the most common symptom among parents of hospitalized children, while avoidance was the least common<sup>28</sup>. Other studies report that parents of children hospitalized due to a car accident or other injuries had a lower percentage of ASD symptoms at around 10%<sup>29</sup>. Studies of ASD in parents of children with newly diagnosed cancer showed a high prevalence of symptoms (63%) due to the severity of the clinical signs and fear of death, while avoidance, arousal and re-experiencing were present in all parents<sup>5</sup>.

Parents whose children were admitted to intensive pediatric care unit showed a range of ASD symptoms of around 32%<sup>5,11</sup>. In parents of children with acute injuries from traffic accidents, symptoms of ASD were expressed in around 20%

of parents, while arousal and dissociation were the most common symptoms recorded in 88% of children<sup>30</sup>. In our study, 28% to 55% of children experienced some of the stress symptoms, with re-experiencing being the most pronounced symptom. In addition, the percentage of clinically significant levels of ASD in children ranged from 15% to 28% in some studies<sup>29-31</sup>, while a study by Nelson *et al.* showed that 51% of children exhibited symptoms of ASD after admission to the pediatric intensive care unit<sup>32</sup>.

Differences in the reactions to stress relating to a higher level of arousal in males compared to females can be explained by the so-called biological response to stress, i.e., the fight-or-flight response in males, and the tend-and-befriend response in females<sup>33</sup>. The attachment response related to the stress response and seeking of social support tend to decrease the activation of the sympathetic nervous system and the hypothalamic-pituitary-adrenal axis<sup>34</sup>.

Analyzing our results, we found that symptoms of arousal were more pronounced in younger than older children, which can be explained by the results of previous studies, showing that strategies focused on emotions were more pronounced in younger children (who usually are associated with high levels of arousal), while adaptive coping strategies, focusing on the problem associated with lower levels of arousal were more commonly applied in older children aged 10 to 14 years<sup>35-37</sup>.

Studies on fear and anxiety due to elective surgical procedures exist, but these mostly relate to adult patients<sup>38</sup>. The results of our study found that children who had undergone elective surgery were more likely to exhibit a relapse in terms of symptoms when compared with children who had undergone surgery as an emergency.

Children's cognitive development reduces the ability to clearly define and determine the duration of a stressful event and very often stimulates a stress response by feeling as though they

are reliving a medical experience<sup>39-41</sup>. Children typically construct mental representations and narratives about surgical procedures that are not in line with reality, given their propensity to exaggerate and distort reality. Therefore, the way information is communicated to the child is important because if they manage to incorporate it into an already existing narrative, they will be less intimidated about facing the new situation, resulting in less fear, anxiety and stress<sup>42,43</sup>. It is possible that children for whom surgery was elective did not receive clear information about the surgical procedure, thus, should a procedure be planned in advance, this may trigger an additional stress response.

In our study, overall maternal stress levels were associated with increased arousal in children, while the most pronounced symptom of ASD was avoidance in mothers and relapse symptoms in children. Regarding fathers, total ASD levels were associated with all elevated ASD symptoms in children, except dissociation, which was consistent with previous research<sup>29</sup>. Schreier *et al.* observed an association between relapse and avoidance symptoms in parents and all ASD symptoms in children, with an emphasis on increased arousal<sup>43</sup>, which was also demonstrated in our study. However, some studies have shown that total elevated stress levels in parents have less of an impact on children in the peritraumatic period but are associated with increased PTSD in children<sup>45</sup>. Therefore, during the preoperative phase of treatment, it is important to explain the surgical procedure and the expected pain to the child, as well as to inform the parents about the operative risk, various psychological symptoms of stress, and help resources<sup>46,47</sup>.

Hospitalization is always stressful, especially for children, and for this reason, it is extremely important to provide them with as much support as possible (to enable mothers to stay with their children, to extend visiting hours to include the whole day, to organize daily activities, etc.)<sup>48</sup>.

At the end of this paper, we would like to address certain study limitations stemming from the non-involvement of single parents. It is also necessary to perform additional statistical analyses to determine the transfer of stress from parent to child and from child to parent in a multi-center study.

## Conclusion

Acute stress disorder resulting from pediatric surgical procedures affects children and their parents equally. Children perceive injuries and hospitalization as extremely stressful situations. Therefore, it is important to recognize the symptoms of ASD in children and parents and prevent the occurrence of PTSD in both parties.

Re-experiencing and increased arousal are the most common psychological changes in children caused by ASD immediately after surgery.

Boys and those under the age of 10 show a higher level of arousal when compared to girls and older children. The frequency of symptoms of re-experiencing stress in children whose hospital admission was planned was higher when compared to those rushed to hospital. There was an association between overall stress levels in parents and increased arousal in children.

Early intervention needs to be developed and evaluated for children and their parents exposed to ASD after pediatric surgical treatment.

Our results suggest that clinicians should be aware of the possible occurrence of ASD in parents and children undergoing surgery. In collaboration with pediatric psychologists, they should be obliged to prepare children for surgical treatment and develop prosocial support programs for their parents and immediate family. The literature also shows that the demeanor and interactions of all clinicians with the child and family, including nurses, doctors and surgeons, can contribute to post-traumatic responses in children and families. ■

## References

1. Kazak AE, Kassam-Adams N, Schneider S, Zelikovsky N, Alderfer MA, Rourke M. An integrative model of pediatric medical traumatic stress. *J Pediatr Psychol.* 2006;31:343-55. doi: 10.1093/jpepsy/jsv054.
2. Price J, Kassam-Adams N, Alderfer MA, Christoferson J, Kazak AE. Systematic review: a reevaluation and update of the integrative (trajectory) model of pediatric medical traumatic stress. *J Pediatr Psychol.* 2016;41(1):86-97. doi: 10.1093/jpepsy/jsv074.
3. Cardeña E, Carlson E. Acute stress disorder revisited. *Annu Rev Clin Psychol.* 2011;7:245-67. doi: 10.1146/annurev-clinpsy-032210-104502.
4. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders DSM-IV-TR.* 4<sup>th</sup> ed. Washington, DC: 2000.
5. McCarthy MC, Ashley DM, Lee KJ, Anderson VA. Predictors of acute and posttraumatic stress symptoms in parents following their child's cancer diagnosis. *J Traumatic Stress.* 2012;25:558-66. doi: 10.1002/jts.21745.
6. Schuss E, Hawes K, Roberts S, Clayton JM, Li C, Littlejohn A, Bartelli D, Williams R; BRAIN Center at the University of Memphis. Examining the incidence of acute stress in pediatric trauma patients. *Trauma Surg Acute Care Open.* 2022;7(1):e000946. doi: 10.1136/tsaco-2022-000946.
7. Hug M, Tonz M, Kaiser G. Parental stress in pediatric day-case surgery. *Pediatric Surg Int.* 2005;2:94-9. doi: 10.1007/s00383-004-1333-1.
8. Dewan T, Birnie K, Drury J, Jordan I, Miller M, Neville A, Noel M, Randhawa A, Zadunayski

- A, Zwicker J. Experiences of medical traumatic stress in parents of children with medical complexity. *Child Care Health Dev.* 2023;49(2):292-303. doi: 10.1111/cch.13042.
9. Piira T, Sugiura T, Champion GD, Donnelly N, Cole ASJ. The role of parental presence in the context of children's medical procedures: a systematic review. *Child Care Health Dev.* 2003;31:233-43. doi: 10.1111/j.1365-2214.2004.00466.x.
  10. Fenikowski D, Tomaszek L. Factors related to anxiety in paediatric patients and their parents before and after a Modified Ravitch Procedure – a single-centre cohort study. *Int J Environ Res Public Health.* 2022;19(24):16701. doi: 10.3390/ijerph192416701.
  11. Joseph RA, Mackley AB, Davis CG, Spear ML, Locke RG. Stress in fathers of surgical neonatal intensive care unit babies. *Adv Neonatal Care.* 2007;7:321-5. doi: 10.1097/01.ANC.0000304973.77202.1b.
  12. Čudina-Obradović M, Obradović J. Psihologija braka i obitelji. Zagreb: Golden marketing – Tehnička knjiga, 2006. (in Croatian)
  13. Vukojević M, Grbavac D, Petrov B, Kordić M. Psihološka prilagodba na kronični stress roditelja djece s intelektualnim teškoćama. *Lijec Vjesn.* 2012;134:310-5. (in Croatian)
  14. Scrimin S, Haynes M, Altoè G, Bornstein MH, Axia G. Anxiety and stress in mothers and fathers in the 24 h after their child's surgery. *Child Care Health Dev.* 2009;35:227-33. doi: 10.1111/j.1365-2214.2008.00920.x.
  15. Zakirova-Engstrand R, Hirvikoski T, Westling Allodi M, Roll-Pettersson L. Culturally diverse families of young children with ASD in Sweden: parental explanatory models. *PLoS One.* 2020;15(7):e0236329. doi: 10.1371/journal.pone.0236329.
  16. Kazak AE, Alderfer AM, Rourker MT, Simms S, Streisand R, Grossman JR. Posttraumatic stress disorder (PTSD) and posttraumatic stress symptoms (PTSS) in families of adolescent childhood cancer survivors. *J Pediatric Psy.* 2004;29:211-9. doi: 10.1093/jpepsy/jsh022.
  17. Franich-Ray C, Bright MA, Anderson V, *et al.* Trauma reactions in mothers and fathers after their infant's cardiac surgery. *J Pediatric Psychol.* 2013;38:494-505. doi: 10.1093/jpepsy/jst015.
  18. Masalha B, Ben-David S, Benarroch F, Ben-Ari A. Intercultural differences in the development of pediatric medical traumatic stress (PMTS) in children following surgical hospitalization. *Children (Basel).* 2022;9(4):526. doi: 10.3390/children9040526.
  19. Bryant R, Moulds M, Guthrie R. Acute stress disorder scale: a self-report measure of acute stress disorder. *Psychol Assessment.* 2000;12:61-8. doi:10.1037/1040-3590.12.1.61.
  20. Saxe G, Chawla N, Stoddard F, Kassam-Adams N, Courtney D, Cunningham K, Lopez C, Sheridan R, King D, Kind L. Child stress disorders checklist: a measure of ASD and PTSD in children. *J Am Acad Child Adolesc Psychiatry.* 2003;42:972-8. doi: 10.1097/01.CHI.0000046887.27264.F3.
  21. Harwood TM, Beutler LE, Groth-Marnat G. *Integrative Assessment of Adult Personality.* Guilford Press: New York; 2003.
  22. Ahmadipour M, Sattari H, Nejad MA. Incidence and risk factors related to anxiety of children and adolescents before elective surgery. *Eur J Transl Myol.* 2022;32(2):10449. doi: 10.4081/ejtm.2022.10449.
  23. Muscara F, Burke K, McCarthy M, Anderson VA, Hearps SJC, Hearps SJ, *et al.* Parent distress reactions following a serious illness or injury in their child: a protocol paper for the take a Breath Cohort Study. *BMC Psychiatry.* 2015;15:153. doi: 10.1186/s12888-015-0519-5.
  24. Canga M, Malagnino I, Malagnino G, Malagnino VA. Evaluating different stressors among parents with hospitalized children. *J Educ Health Promot.* 2020;9:9. doi: 10.4103/jehp.jehp\_529\_19.
  25. Rodríguez-Rey R, Alonso-Tapia J, Colville G. Prediction of parental posttraumatic stress, anxiety and depression after a child's critical hospitalization. *J Crit Care.* 2018;45:149-55. doi: 10.1016/j.jcrc.2018.02.006.
  26. Franck LS, Wray J, Gay C, Dearmun AK, Lee K, Cooper BA. Predictors of parent post-traumatic stress symptoms after child hospitalization on general pediatric wards: a prospective cohort study. *Int J Nurs Stud.* 2015;52:10-21. doi: 10.1016/j.ijnurstu.2014.06.011.
  27. Mangelsdorf SN, Mehl MR, Qiu J, Alisic E. How do mothers and fathers interact with their children after an injury? Exploring the role of parental acute stress, optimism, and self-efficacy. *J Pediatric Psychol.* 2019;44:311-22. doi: 10.1093/jpepsy/jsy107.

28. Bakker A, Van der Heijden PG, Van Son MJ, Van Loey NE. Course of traumatic stress reactions in couples after a burn event to their young child. *Health Psychol.* 2013;32:1076-83. doi: 10.1037/a0033983.
29. Kassam-Adams N, García-España JF, Miller VA, Winston F. Parent-child agreement regarding children's acute stress: the role of parent acute stress reactions. *J Am Acad Child Adolesc Psychiatry.* 2006;45:1485-93. doi: 10.1097/01.chi.0000237703.97518.12.
30. Winston FK, Kassam-Adams N, Vivarelli-O'Neill C, Ford J, Newman E, Baxt C, Stafford P, Cnaan A. Acute stress disorder symptoms in children and their parents after pediatric traffic injury. *Pediatrics.* 2002;109:e90. doi: 10.1542/peds.109.6.e90.
31. Bryant B, Mayou R, Wiggs L, Ehlers A, Stores G. Psychological consequences of road traffic accidents for children and their mothers. *Psychol Med.* 2004;34:335-46. doi: 10.1017/s0033291703001053.
32. Nelson LP, Lachman SE, Li SW, Gold JI. Effects of family functioning on the development of posttraumatic stress in children and their parents following admission to the PICU. *Pediatr Crit Care Med.* 2019;20:e208-e215. doi: 10.1097/PCC.0000000000001894.
33. Taylor SE, Klein LC, Lewis BP, Gruenewald TL, Gurung RA, Updegraff JA. Biobehavioral responses to stress in females: tend-and-befriend, not fight-or-flight. *Psychol Rev.* 2000;107:411-29. doi: 10.1037/0033-295x.107.3.411.
34. Verma R, Balhara YPS, Gupta CS. Gender differences in stress response: role of developmental and biological determinants. *Ind Psychiatry J.* 2011;20:4-10. doi: 10.4103/0972-6748.98407.
35. Donaldson D, Prinstein M, Danovsky M, Spirito A. Patterns of children's coping with life stress: implications for clinicians. *Am J Orthopsychiatry.* 2000;70:351-9. doi: 10.1037/h0087689.
36. Hampel P, Petermann F. Age and gender effects on coping in children and adolescents. *J Youth Adolesc.* 2005;34:73-83. doi: 10.1007/s10964-005-3207-9.
37. Stanislawski K. The coping circumplex model: an integrative model of the structure of coping with stress. *Front Psychol.* 2019;10:694. doi: 10.3389/fpsyg.2019.00694.
38. Karačić A, Theunissen M, Sović S, Sever M, Bakula B, Semanjski K. Validation of the Croatian version of the Surgical Fear Questionnaire (SFQ) in adult patients waiting for elective surgery. *Acta Clin Croat.* 2023;62:153-61. doi: 10.20471/acc.2023.62.01.18.
39. Erikson EH. *Childhood and Society.* 2<sup>nd</sup> ed. New York: Norton; 1963.
40. McMurtry CM, Noel M, Chambers CT, McGrath PJ. Children's fear during procedural pain: preliminary investigation of the Children's Fear Scale. *Health Psychol.* 2011;30:780-8. doi: 10.1037/a0024817.
41. Lerwick JL. Minimizing pediatric healthcare-induced anxiety and trauma. *World J Clin Pediatrics.* 2016;5:143-50. doi: 10.5409/wjcp.v5.i2.143.
42. Fernandes SC, Arriaga P, Esteves F. [Children's attitudes regarding health care and pain perception: the mediator role of medical fears]. *Ciênc Saúde Colet.* 2014;19:2073-82. doi: 10.1590/1413-81232014197.08992013. (in Portuguese)
43. Jaaniste T, Hayes B, von Baeyer C. Providing children with information about forthcoming medical procedures: a review and synthesis. *Clin Psychol Sci.* 2007;14:124-43. doi:10.1111/j.1468-2850.2007.00072.
44. Schreier H, Ladakakos C, Morabito D, Chapman L, Knudson MM. Posttraumatic stress symptoms in children after mild to moderate pediatric trauma: a longitudinal examination of symptom prevalence, correlates, and parent-child symptom reporting. *J Trauma.* 2005;58:353-63. doi: 10.1097/01.ta.0000152537.15672.b7.
45. Meiser-Stedman R, Smith P, Glucksman E, Yule W, Dalgleish T. Parent and child agreement for acute stress disorder, post-traumatic stress disorder and other psychopathology in a prospective study of children and adolescents exposed to single-event trauma. *J Abnorm Child Psychol.* 2007;35(2):191-201. doi: 10.1007/s10802-006-9068-1.
46. Ben Ari A, Margalit D, Roth Y, Udassin R, Benarroch F. Should parents share medical information with their young children? A prospective study. *Compr Psychiatry.* 2019;88:52-6. doi: 10.1016/j.comppsy.2018.11.012.
47. DeMaso DR, Snell C. Promoting coping in children facing pediatric surgery. *Semin Pediatr Surg.* 2013;22(3):134-8. doi: 10.1053/j.semped-surg.2013.04.004.
48. Crnkovic M, Divčić B, Rotim Ž, Čorić J. Emotions and experiences of hospitalized school age patients. *Acta Clin Croat.* 2009;48:125-35.

**SAŽETAK****Akutni stresni poremećaj u kirurški liječene djece i njihovih roditelja: institucijsko iskustvo i pregled literature**

Violeta Šetka-Čuljak, Ante Kvesić i Mladenka Vukojević

Akutni stresni poremećaj psihijatrijski je entitet koji uključuje simptome nastale kao odgovor na izloženost traumatskom događaju u prva četiri tjedna. Operacijsko liječenje djece uključuje visoke razine akutnog stresa kako u djeteta tako i u roditelja. Cilj rada bio je utvrditi simptome akutnog stresnog poremećaja u operirane djece i njihovih roditelja, kao i njihovu međusobnu povezanost. Provedeno je prospektivno istraživanje u trajanju od tri mjeseca. Ispitanike su činila operirana djeca i njihovi roditelji hospitalizirani na Odjelu za dječju kirurgiju Sveučilišne kliničke bolnice Mostar. Podatci su prikupljeni iz standardiziranih upitnika. U istraživanju je sudjelovalo 200 djece i njihovi roditelji. Neke od simptoma akutnog stresnog poremećaja doživjelo je 28%-55% djece te 24,50% majki i 22,50% očeva. Nije utvrđena statistički značajna razlika u doživljavanju različitih simptoma akutnog stresa u odnosu na spol. Statistički značajna povezanost utvrđena je između ukupne razine stresa, kao i simptoma izbjegavanja u roditelja i povećane pobuđenosti u djece. Temeljem rezultata provedenog istraživanja zaključujemo kako akutni stresni poremećaj kao posljedicu pedijatrijskih kirurških postupaka jednako pogađa djecu i njihove roditelje. Također postoji povezanost između ukupne razine stresa u roditelja i povećane pobuđenosti u djece.

**KLJUČNE RIJEČI***Akutni stresni poremećaj; Simptomi; Dječja kirurgija; Djeca; Roditelji*