Posttraumatic stress disorder (PTSD) is a mental disorder caused by several distressing events that are related with psychotrauma. It is very frequent in childhood and untreated traumatic stress symptoms in children and adolescents often result in debilitating consequences on development with increased risks for a variety of physical and mental disorders. It has been found that PTSD symptoms are reduced as soon as therapeutic interventions have been applied. The aim of the present review was to summarize the available literature regarding aggravating factors associated with the development of PTSD in children after hospitalization and assessment tools for a quick and reliable screening of children who are at risk for developing PTSD. A review of published papers was conducted until April 10, 2019 to identify articles that discuss the aggravating factors and the assessment tools for PTSD in children after hospitalization published in English, German or Greek language. Search was performed on PubMed with the following combination of key-words: “PTSD” and “children” and “hospitalization”, using the filters “human” and “Publication date from 30/11/2007 to 09/04/2019” and choosing “all fields” in PubMed Advanced Search Builder. Of the 115 articles reviewed, 16 relevant articles were included, 10 of them referred to the aggravating factors and the remaining 6 were related to the assessment tools. Significant aggravating factors associated with the development of PTSD were: traumatic injuries and illness/medical-related hospital admission, previous health problems, Pediatric Intensive Care Unit (PICU) hospitalization, attendance at a hospital for child and adolescent psychiatry, female gender and psychotherapy and initial high Posttraumatic Stress Symptoms (PTSS) in parents. As for assessment tools, it was observed that the Child Trauma Screening Questionnaire (CTSQ)-Heart Rate (HR), the alternative PTSD algorithm (PTSD-AA), the Child Stress Disorders Checklist-Short Form (CSDC-SF), the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) model for PTSD symptom categories, the Posttraumatic Stress Disorder Semi-Structured Interview (PTSDSSI), the
Introduction

Hospitalization has been associated with a variety of adverse psychological events in pediatric patients, including posttraumatic stress symptoms at both diagnostic (PTSD) and subsyndromal levels (posttraumatic stress symptoms: PTSS).^{1,2} PTSD is associated with traumatic injuries or illness/medical-related hospital admission, with prevalence rates of clinically elevated levels of posttraumatic distress ranging from 6% to 45% following trauma such as falls and burns and 5 to 32% following medical-related hospital admission, such as cardiac surgery.^{1,3} Moreover, factors related to the general experience of hospitalization, such as invasive medical procedures, lack of sleep and separation from parents may also be distressing and could lead to the development of PTSD.

It has been shown that untreated traumatic stress symptom in children may persist for years, even into adulthood, often having destructively consequences on their development.^{4} For instance, PTSD has been associated with decreased total and cerebral brain volume and attenuated frontal lobe asymmetry.^{5,6} Moreover, PTSD increases the risk for a variety of physical and mental disorders, including circulatory, endocrine, musculoskeletal and digestive diseases, substance abuse, eating disorders and depression.^{7} Although there are many interventions that have been shown to significantly reduce PTSD symptoms in traumatized children, their effectiveness may be decreased as time from trauma exposure elapses.^{8-10} This finding indicates a reasonable need for assessment tools that can accurately assess traumatic stress symptoms in at-risk children, immediately after the trauma exposure.

What is more, these assessment tools should be accessible to health professionals working in settings where injured or medically ill children are treated such as emergency rooms and medical inpatient units. Particularly, measures should (a) be short enough to be easily integrated into numerous acute clinical settings, (b) based on sources readily available and (c) require minimal training to administer and interpret.^{11}

The purpose of the current review was to summarize the available literature regarding aggravating factors associated with the development of PTSD in children after hospitalization and assessment tools for screening the children who are at risk for developing PTSD.

Material and method

A review of published papers was conducted until April 10, 2019 to identify articles that discuss the aggravating factors associated with the development of PTSD in children after hospitalization and assessment tools for screening the children who are at risk for developing PTSD. Search was performed on PubMed with the following combination of key-words: “Posttraumatic stress disorder” and “children” and “hospitalization”, using the filters “human” and “Publication date from 30/11/2007 to 09/04/2019” and choosing “all fields” in PubMed Advanced Search Builder. Studies were excluded if they:

- were case studies, editorials and letters to the editors;
- were not published in English, German and Greek language;
- did not refer to the aggravating factors and the assessment tools; or

Preschool Children’s Assessment of Stress Scale (PCASS) and the diagnostic interview for children and adolescents (DICA-P) led to the identification of children who were likely to develop or had already developed PTSD symptoms, in the study population wherein each was implemented. The greatest limitation – but also a significant finding – of this review is the scarceness of published studies on this topic. Overall, there is a variety of aggravating factors associated with the development of PTSD in children after hospitalization. Assessment tools should be able to identify immediately the children who are likely to or have already developed PTSD symptoms.

Key words: PTSD, children, aggravating factors, assessment tools, hospitalization.
• focused solely on parents and/or did not include findings on children.

All the articles were read and evaluated by two independent reviewers (CT, VM) in order to determine applicability for inclusion. Out of the 115 articles reviewed, 16 relevant articles were finally included in this review.

Results

Of the 16 studies reviewed, 10 referred to the aggravating factors 12–21 (table 1) and the remaining 6 were related to the assessment tools (table 2).

Aggravating factors

A comparison study 12 investigated and compared psychological responses in children 1 month after traumatic injuries or illness/medical-related hospital admission. This study concluded that clinically elevated PTSD symptom levels were more frequent in children admitted for traumatic injuries (18%) than illness/medical-related causes (4%) and there was a significant relationship (positive) between length of stay and the development of PTSD. Another study 13 examined the prevalence of PTSD in pediatric burn survivors who had been treated for acute stress disorder (ASD) symptoms during their initial hospitalization and compared them with patients who had been asymptomatic for ASD symptoms and found that the prevalence of PTSD was similar in children with ASD symptoms and those without ASD symptoms.

Moreover, according to Bruce et al, 14 greater endorsement of both monitoring and blunting attentional coping styles were significantly correlated with elevated PTSS in childhood brain tumor survivors (β=0.24, p=0.01 and β=0.18, p=0.02, respectively). Furthermore, a study 15 that explored the risk of PTSD development and PTSS in patients at a hospital for child and adolescent psychiatry and psychotherapy, came to the conclusion that almost one of four patients of child mental health service could be identified with clinically significant PTSS. A systematic review 16 examined the research literature on children’s psychological responses to PICU hospitalization, showed that increased parental distress, length of PICU stay, delusional memories and emergency admission were possible aggravating factor for PTSD.

What is more, according to Landolt et al, 17 children with injuries had higher rates of PTSS than children with diabetes and cancer and initially high levels of PTSS in mothers and fathers were longitudinally related to poorer remission of PTSS in the child. A cohort study 18 concluded that the past health problems and sepsis were significant independent predictors of PTSS in children aged 5–16 years old admitted to intensive care with meningoccephalitis, sepsis and other critical illnesses (p<0.04).

Another study 19 showed that younger age, admission for traumatic injury and cognitive/affective factors including confusion, peritrauma panic, and sensory memory quality were associated with acute PTSS following PICU admission. Furthermore, Stowman et al 20 examined the potential mediators of later PTSS following PICU hospitalization and showed that youth acute stress disorder symptoms (ASDS), parent ASDS, youth anxiety, negative affect and hospital fear mediated later youth PTSS. Last but not least, a meta-analysis 21 concluded that the female children and adolescents who exposed to interpersonal traumatic injury are in particular risk of developing PTSD after traumatic injury.

Assessment tools

In 2010, a study 22 was published which (1) examined PTSD symptom structure in two samples of children (8 to 17 years of age) assessed an average of 6 months after unintentional injury: a combined dataset of 479 children assessed with a PTSD symptom checklist and a sample of 204 children assessed via a standardized clinical interview, (2) evaluated the fit of six alternative models for the factor structure of PTSS and the association of PTSS clusters with indicators of functional impairment and (3) evaluated three models for the structure of PTSD and depression symptoms jointly to examine specificity of PTSD versus general distress or mood symptoms.

The PTSD symptom checklist used in the first sample was the Child PTSD Symptom Scale (CPSS), 23 which is a 24-item self-report instrument that yields both a PTSD symptom severity score and a determi-
Table 1. Aggravating factors associated with the development of PTSD in children after hospitalization

<table>
<thead>
<tr>
<th>Authors</th>
<th>Objective</th>
<th>Sample</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murray et al(^{12})</td>
<td>Investigation of psychological responses in children one month after traumatic injuries and illness/medical-related hospital admission</td>
<td>205 children (aged 7–16 years)</td>
<td>Clinically elevated PTSD symptom levels were more prevalent in children admitted for traumatic injuries (18%) than illness/medical reasons (4%)</td>
</tr>
<tr>
<td>Rosenberg et al(^{13})</td>
<td>Examination of the prevalence of PTSD in pediatric burn survivors</td>
<td>183 participants</td>
<td>The prevalence of PTSD was similar in children with and without ASD symptoms</td>
</tr>
<tr>
<td>Bruce et al(^{14})</td>
<td>the exploration of the relationship between objective illness parameters, parent–child interactions, coping styles and PTSS</td>
<td>62 brain tumour survivors (8 to 16 years old)</td>
<td>Greater endorsement of both monitoring and blunting attentional coping styles were significantly correlated with elevated PTSS</td>
</tr>
<tr>
<td>Münzer et al(^{15})</td>
<td>Exploration of PTSS of patients attending a hospital for child and adolescent psychiatry and psychotherapy</td>
<td>413 children and adolescents at their first attendance at the clinic</td>
<td>Clinically relevant PTSS were reported in 22.9% of the children and adolescents</td>
</tr>
<tr>
<td>Rennick and Rashotte(^{16})</td>
<td>Children’s psychological outcomes following PICU hospitalization</td>
<td>28 papers</td>
<td>Increased parental distress, length of PICU stay, delusional memories and emergency admission were possible aggravating factors for PTSD</td>
</tr>
<tr>
<td>Landolt et al(^{17})</td>
<td>Examination of the presence of PTSS and PTSD in children and the mutual influence of child and parental PTSS</td>
<td>287 children (aged 6.5–16 years), their mothers (n=239) and fathers (n=221)</td>
<td>Children with injuries had higher rates of PTSS than children with diabetes and cancer and initially high levels of PTSS in mothers and fathers were related to poorer recovery of PTSS in the child</td>
</tr>
<tr>
<td>Als et al(^{18})</td>
<td>Investigation of basal cortisol regulation in 5–16 years old children, 3–6 months following PICU admission</td>
<td>47 cases and 56 healthy controls</td>
<td>Past health problems and sepsis were significant independent predictors</td>
</tr>
<tr>
<td>Dow et al(^{19})</td>
<td>Association between premorbid, trauma, and cognitive/affective variables acute PTSS following PICU admission.</td>
<td>95 children aged 6–16 years</td>
<td>Younger age, admission for traumatic injury and cognitive/affective factors were associated with acute PTSS</td>
</tr>
<tr>
<td>Stowman et al(^{20})</td>
<td>Examination of potential mediators of later PTSS FOLLOWING PICU admission</td>
<td>50 youth aged 9–17 years</td>
<td>Youth ASDS, parent ASDS, youth anxiety, negative affect and hospital fear mediated later youth PTSS</td>
</tr>
<tr>
<td>Alisc et al(^{21})</td>
<td>Investigation of the incidence of PTSD in traumatic injury-exposed children and adolescents</td>
<td>72 peer-reviewed articles on 43 independent samples (n=3,563)</td>
<td>Female gender and interpersonal traumatic injury are significant aggravating factors</td>
</tr>
</tbody>
</table>

Table 2. Assessment tools for a quick and reliable screening of children who are at risk for developing PTSD.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Objective</th>
<th>Sample</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kassam-Adams et al22</td>
<td>Examination of the factor structure of PTSS in children and adolescents who had experienced an acute single-incidence trauma</td>
<td>Two samples of children (479 and 204 respectively, 8 to 17 years of age) assessed an average of 6 months after unintentional injury</td>
<td>The DSM-IV model for PTSS categories was a reasonable fit for these child data, but several alternative models fit equally well or better</td>
</tr>
<tr>
<td>Olsson et al27</td>
<td>Investigation of the utility of the CTSQ plus HR to identify children likely to develop PTSS at 1 and 6 months post-injury</td>
<td>97 children (aged 7–16 years)</td>
<td>CTSQ-HR was better than the CTSQ or HR alone at identifying children likely to develop PTSS</td>
</tr>
<tr>
<td>Enlow et al30</td>
<td>The development of a user-friendly scale that measures traumatic stress responses in injured children.</td>
<td>147 children and adolescents (ages 6–18) hospitalized with burns or acute injuries</td>
<td>The CSDC-SF demonstrated test-retest reliability and predictive validity comparable to that of the full scale</td>
</tr>
<tr>
<td>Dow et al32</td>
<td>Exploration of PTSD in children and adolescents following PICU admission</td>
<td>59 children aged 6–16, admitted to PICU for at least 8 hours</td>
<td>The PTSD-AA was found to provide the most valid measure of PTSD at 6 months</td>
</tr>
<tr>
<td>Ari et al35</td>
<td>Assessment of the frequency and characteristics of symptoms of persistent psychological distress in children following surgery utilizing the PTSDSSI and the PCASS</td>
<td>Parents of 79 children (aged 1–6)</td>
<td>A significant portion of children suffer from psychological distress 3–5 months after hospitalization</td>
</tr>
<tr>
<td>Stoddard et al38</td>
<td>Evaluation of PTSD diagnosis and symptoms utilizing DICA-P module and the PTSDSSI</td>
<td>42 families</td>
<td>A high percentage of young children with burns manifested some PTSS one month after discharge</td>
</tr>
</tbody>
</table>


The first 17 CPSS items correspond to the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) symptom criteria, rated on a four-point Likert scale (“not at all” to “five or more times a week”). The remaining seven assess functional impairment from these symptoms, rated as absent or present. The CPSS has shown excellent internal consistency, test-retest reliability, and convergent validity with structured clinical interview measures of PTSD. On the other hand, the Clinician-Administered PTSD Scale for Children and Adolescents (CAPS-CA) was used in the second sample, which is a semi-structured interview that assesses DSM-IV diagnostic criteria for PTSD. Interviewers evaluate the frequency and intensity of each PTSD symptom as well as the impact of these symptoms on developmental, social, and scholastic functioning. Psychometric data indicate good internal consistency for each CAPS-CA subscale, and concurrent validity with other measures of PTSD. Regarding the DSM-IV Diagnostic criteria for PTSD, they include a history of exposure to a traumatic event and symptoms from each of three symptom clusters: intrusive recollections, avoidant/numbing symptoms, and hyper-arousal symptoms, a fifth criterion concerned duration of symptoms and a sixth criterion stipulated that PTSD symptoms must cause significant distress or functional impairment.

This study concluded that the (DSM-IV) 3-factor model, that contains the factors: DSM-IV re-expe-
riencing symptoms, DSM-IV avoidance symptoms and DSM-IV arousal symptoms, fit reasonably well for these child data, but several alternative models [two four-factor models: the Numbing model which contains the factors: DSM-IV re-experiencing symptoms, effortful avoidance symptoms, emotional numbing symptoms and DSM-IV arousal symptoms, and separates effortful avoidance from emotional numbing, and the Dysphoria model which contains the factors: DSM-IV re-experiencing symptoms, effortful avoidance symptoms, emotional numbing symptoms and DSM-IV arousal symptoms from general emotional distress] fit equally well or better suggesting improvements to the current diagnostic criteria for PTSD in children.

Another study investigated the utility of combining the Child Trauma Screening Questionnaire (CTSQ) and children’s heart rate (HR) (HR was measured in emergency department and 24-h post-admission) to identify children likely to develop PTSS at 1 and 6 months post-injury. The CTSQ is a 10-item measure of child traumatic stress assessing five symptoms of re-experiencing and five symptoms of hyper-arousal. The CTSQ has been shown to have good convergent validity with the Children’s Impact of Event Scale and to be predictive of PTSD at 1 and 6 months posttrauma. The internal consistency was satisfactory. Children are required to respond yes (scored 1) if they have experienced the symptom since the event or no (scored 0) if they have not. Scores ≥5 indicate a positive screen for trauma symptoms. Regarding HR, there might be an association between elevated HR and the development of PTSD due to the fact that during trauma, stress hormones are released which increase blood pressure and heart rate (HR) to prepare the individual’s ‘fight or flight’ response in reaction to aversive stimuli. In this study, it was found that a combination of the CTSQ plus HR (CTSQ-HR) was better than the CTSQ alone or HR alone at identifying children likely to develop PTSS.

Moreover, Elnow et al. carried out a study to develop a user-friendly scale that measures traumatic stress responses in injured children based on the Child Stress Disorders Checklist (CSDC), a 36-item observer-report measure of traumatic stress symptoms. In this scale, the measure consists of one traumatic event item, five immediate response items and 30 symptom items. Each of the symptom items is rated on a three-point scale (0=“not true,” 1=“somewhat true,” 2=“very true”). A prior examination of the CSDC, which included the burn participants, demonstrated reliability and validity of the symptomatology total score. The researchers managed to create a four-item scale (CSDC-Short Form, CSDC-SF). The CSDC-SF contains the following items: “child reports more physical complaints when reminded of the trauma (headache, stomachache, nausea, difficulty breathing, etc.)”, “child avoids doing things that remind him or her of the trauma, child startles easily (for example, he or she jumps when hears sudden or loud noises)” and “child gets very upset if reminded of the trauma”. Moreover, it is very short and does not require specialized training for administration or interpretation and demonstrated test–retest reliability and predictive validity comparable to that of the full scale.

Furthermore, a cohort study explored (1) the diagnosis of PTSD in children and adolescents following PICU admission (6 months post discharge) and (2) the validity of the DSM-IV PTSD algorithm and alternative PTSD algorithm (PTSD-AA) in school-aged children and adolescents. With regard to PTSD-AA, it was developed by modifying DSM-IV PTSD symptom wordings, to make them more objective, behaviorally anchored, and developmentally sensitive to young children. This approach used DSM-IV criteria as a starting point, but modified the criteria and studied the effects of those modifications in a series of studies on young children. The major changes are a modification to lower the requirement for the C criterion (numbing and avoidance items) from three out of seven items to just one out of seven items and the omission of A2 (The person’s response involved intense fear, helplessness, or horror). It was more reliable and more valid for diagnosing PTSD in infancy than DSM-IV criteria.

The results of this study showed that the alternative PTSD algorithm (PTSD-AA) excluding Criterion C3 (inability to recall aspects of a trauma) provided the most valid measure of PTSD at 6 months. As for
the ability of each algorithm to identify children with functional impairment it was revealed that PTSD-AA was more sensitive than DSM-IV PTSD in identifying children with functional impairment and it was more diagnostically valid in school-aged children and adolescents, since the frequency of PTSD-AA diagnosis (n=17; 29%) was slightly higher than the frequency of DSM-IV PTSD diagnosis (n=15; 25%).

What is more, Ari et al. carried out a study to assess the frequency and characteristics of symptoms of persistent psychological distress in children following surgery, using two parent-report questionnaires that assess PTSS among children aged 1 to 6. The first one was The Posttraumatic Stress Disorder Semi-Structured Interview (PTSDSSI) which is concerned with the child’s response during and after the traumatic event and includes 29 items with an amount of agreement of 1 to 3 on a Likert scale. The internal consistency of PTSDSSI was good, and a strong correlation was found between PTSDSSI scores and the severity and number of symptoms found in a clinical interview several months later. The second one was the Preschool Children’s Assessment of Stress Scale (PCASS). This measure is concerned with symptoms of anxiety, fear, sleep difficulties, mood changes, and developmental regression, and includes 29 items with an amount of agreement of 1 to 5 on a Likert scale. The internal consistency of PCASS was good.

The responses to the PTSDSSI indicated that 10.39% of the children exhibit PTSS and that 28.6% of parents reported that the child’s distress causes dysfunction and adjustment difficulties. The results on the PCASS emphasized the parents’ concerns regarding the child’s behavior, function and health following hospitalization, with a significant rise between the parents’ reports of their conception of the child’s state before and after surgery.

Last but not least, another study investigated the prevalence of PTSD in young children hospitalized for burns 1 month after discharge, using both the diagnostic interview for children and adolescents (DICA-P) module and the PTSDSSI. The DICA-P addresses six symptoms clusters: meeting criteria for experiencing a traumatic event (A cluster), re-experiencing (B cluster), avoidance (C cluster), numbing/arousal (D cluster) and persistence of symptoms for over a month with clinically significant impairment (E and F, respectively). It has also been used extensively, including with samples of traumatized children and burn survivors and has demonstrated good reliability and validity.

This study found that 4 of the 42 and 1 of 39 participants who completed the DICA-P and PTSDSSI respectively, met full criteria for a diagnosis of PTSD (10% and 3%, respectively). One more finding was that 27% of the subjects met partial criteria on the DICA-P versus the 16% on the PTSDSSI, without impairment. Finally, 67% of subjects met DICA-P criteria for the re-experiencing cluster and 54% met the PTSDSSI re-experiencing criteria.

Discussion

The aim of the present review was to identify and report the existing literature with respect to the aggravating factors and the assessment tools for PTSD in children after hospitalization. After extensive literature search using PubMed, 10 articles were found related to risk factors and 6 related to assessment tools. Regarding the aggravating factors, it was found that they do not only have to do with the cause of hospital admission (traumatic injuries or illness/medical-related), but also with factors related to the general experience of hospitalization. As for the assessment tools, there are tools that provide a quick and reliable screening of children who are in danger of or have already developed PTSD or PTSS. However, future research is required to improve the reliability and validity of the existing tools and make them more user-friendly.

Aggravating Factors

The results of the studies showed that there is a variety of aggravating factors associated with the development of PTSD. Specifically, two studies found that hospital admission because of traumatic injuries (e.g. falls, burns) lead to higher risk of developing PTSD than illness/medical-related hospital admission. This may be due to the fact that accidents are more immediate events going along with pain and emergency response that are experienced as frightening and distressing more directly by the child, independent of cognitive development, in
contrast to severe disease like cancer and diabetes where children do not completely understand the implication of their disease.

Furthermore, three studies\textsuperscript{16,17,20} concluded that parental distress is a very important risk factor. A reason for this might be that the parents’ own symptoms prevent them from adequately addressing the children’s needs after the traumatic event. However, the children do not receive the protection of an optimal caretaking relationship. Another serious aggravating factor that all healthcare workers should take into account is the length of stay into the hospital and especially in PICU.\textsuperscript{12,16} As length of stay increases, children’s event related distress also increases for children admitted for traumatic injuries and illness/medical-related reasons. An additional aggravating factor worth to be analyzed is previous health problems.\textsuperscript{18} Children who suffer from chronic diseases and mainly psychiatric illnesses or have been hospitalized in the past, are extremely susceptible to develop PTSD and the necessary measures should be taken to limit this risk.

**Assessment tools**

As for assessment tools, the six studies had some very interesting findings. In particular, in the study of Kassam-Adams et al.\textsuperscript{22} although the DSM-IV factor structure received some support, the stronger support for the four-factor numbing model suggested the distinction between active and passive avoidance symptoms in our conceptualization of child and adolescent PTSD. The four-factor Dysphoria model provided a good fit and the Dysphoria model performed slightly better than the DSM-IV model and its fit was roughly comparable to that of the four factor Numbing model.

Moreover, one more interesting study\textsuperscript{27} concluded that the CTSQ-HR was better than the CTSQ alone or HR alone at identifying children likely to develop PTSD symptoms suggesting that the CTSQ-HR screen may increase identification of children who are at risk to develop PTSD symptoms, enabling deployment of targeted prevention programs. Furthermore, Enlow et al.\textsuperscript{10} managed to create the CSDC-SF, a very short, reliable and valid measure that assesses risk for PTSD in youth following a medical trauma that was derived from the 36-item CSDC. It should be emphasized that the CSDC-SF, due to the ease use has potential for more widespread broad application and future studies should further explore the psychometric properties of this measure so that its validity in diverse settings among different populations may be established.

One more assessment tool that approved valid was the PTSD-AA excluding Criterion C3 which was used to identify children and adolescents following PICU admission who are in great danger of developing PTSD.\textsuperscript{32} For one more time DSM-IV PTSD lagged in relation to other tools, as PTSD-AA found to be superior to DSM-IV PTSD in young children, was more diagnostically valid in older children and was more sensitive identifying children with functional impairment.

Last but not least, the results of Stoddard’s et al study\textsuperscript{38} may offer clues to current diagnoses of PTSD in young children, because PTSDSSI diagnosis is strongly linked to the diagnostic and statistical manual-5 (DSM-5) criteria for “PTSD in children 6 years and younger”.

**Limitations**

Some limitations of this review should be acknowledged. The greatest limitation - but also significant finding - of this review is the scarceness of published studies on this topic. The participation rate was low in the majority of including studies leading to reduction of generalizability of the results of those studies. Accordingly, the generalization of the findings of the present review should be interpreted with caution.

**Conclusions**

This review concluded that there is a variety of aggravating factors associated with the development of PTSD in children after hospitalization that all the healthcare workers should know in order to take the necessary precautionary measures to reduce the risk of developing PTSD. Assessment tools should provide a quick and reliable screening to identify immediately the children who are likely to or have already developed PTSD or PTSS.
Επιβαρυντικοί παράγοντες και εργαλεία αξιολόγησης της Διαταραχής Μετατραυματικού Στρες στα παιδιά μετά από νοσηλεία

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Η Διαταραχή Μετατραυματικού Στρες (ΔΜΤΣ) είναι μια ψυχική διαταραχή, η οποία προκαλείται από ποικίλα συμβάντα που σχετίζονται με ψυχοτραυματισμό. Είναι πολύ συχνή στην παιδική ηλικία και η μη έγκαιρη αντιμετώπιση των συμπτωμάτων της ΔΜΤΣ σε παιδιά και εφήβους συχνά οδηγεί σε δυσμενείς συνέπειες για την ανάπτυξή τους, με αυξημένο κίνδυνο για ποικίλες σωματικές και ψυχικές διαταραχές. Πολλές μελέτες έχουν καταλήξει στο συμπέρασμα ότι τα συμπτώματα της ΔΜΤΣ υποχωρούν μόλις εφαρμοστούν οι κατάλληλες θεραπευτικές παρεμβάσεις. Ο σκοπός της παρούσας ανασκόπησης ήταν να συνοψίσει τη διαθέσιμη βιβλιογραφία σχετικά με τους επιβαρυντικούς παράγοντες που σχετίζονται με την ανάπτυξη της ΔΜΤΣ σε παιδιά και των εργαλείων αξιολόγησης τα οποία συμβάλλουν στον γρήγορο και αξιόπιστο εντοπισμό των παιδιών που κινδυνεύουν να αναπτύξουν ΔΜΤΣ. Η βιβλιογραφική ανασκόπηση των δημοσιευμένων μελετών διεξήχθη μέχρι τις 10 Απριλίου του 2019 με σκοπό τον εντοπισμό δημοσιευμένων μελετών στην αγγλική, γερμανική ή ελληνική γλώσσα, οι οποίες αναφέρονται στους επιβαρυντικούς παράγοντες και στα εργαλεία αξιολόγησης της ΔΜΤΣ σε παιδιά μετά από νοσηλεία. Η αναζήτηση πραγματοποιήθηκε στη διεθνή ηλεκτρονική βάση PubMed με τον ακόλουθο συνδυασμό λέξεων-κλειδιών: «ΔΜΤΣ» και «παιδιά» και «νοσηλεία», χρησιμοποιώντας τα φίλτρα «άνθρωποι» και «Ημερομηνία δημοσίευσης των άρθρων από 30/11/2007 έως και 09/04/2019» και επιλέγοντας «όλα τα πεδία» στη μηχανή δομής της PubMed. Από τα 115 άρθρα που ανασκοπήθηκαν, 16 σχετικά άρθρα συμπεριλήφθηκαν στην παρούσα μελέτη, από τα οποία 10 αναφέρονται στους επιβαρυντικούς παράγοντες και τα υπόλοιπα 6 αφορούσαν στα εργαλεία αξιολόγησης. Σημαντικοί επιβαρυντικοί παράγοντες που σχετίζονται με την ανάπτυξη της ΔΜΤΣ ήταν: η εισαγωγή στο νοσοκομείο που σχετίζεται με τραυματισμό ή παθολογική κατάσταση, το ιστορικό προβλήματων υγείας, η νοσηλεία σε Μονάδα Εντατικής Θεραπείας Παιδιών, η νοσηλεία των παιδιών σε ψυχιατρική μονάδα παιδιών και εφήβων, το θηλυκό γένος και τα αρχικά έντονα συμπτώματα μετατραυματισμού στους γονείς. Όσον αφορά τα εργαλεία αξιολόγησης, παρατηρήθηκε ότι ο συνδυασμός του Ερωτηματολόγιου Ελέγχου Τραύματος στα Παιδιά (CTSQ) με την καρδιακή συχνότητα (CTSQ-HR), ο εναλλακτικός αλγόριθμος της ΔΜΤΣ (alternative PTSD algorithm (PTSD-AA)), η Σύντομη Έκδοση της Κλίμακας Αξιολόγησης Διαταραχών Στρες στα Παιδιά (Child Stress Disorders Checklist-Short Form (CSDC-SF)), το Διαγνωστικό και Στατιστικό Εγχειρίδιο Ψυχικών Διαταραχών, Τέταρτη Έκδοση (DSM-IV) για τις κατηγορίες συμπτωμάτων της ΔΜΤΣ, η Ημιδομημένη Συνέντευξη για τη ΔΜΤΣ (The Posttraumatic Stress Disorder Semistructured Interview (PTSDSSSI)), η Κλίμακα Αξιολόγησης του Στρες Παιδιών Προσχολικής Ηλικίας (The Preschool Children's Assessment of Stress Scale (PCASS)) και η διαγνωστική συνέντευξη για παιδιά και εφήβους (the diagnostic interview for children and adolescents (DICA-P)) οδήγησαν στον εντοπισμό περισσότερων παιδιών που ήταν πιθανά να αναπτύξουν ή έχουν ήδη αναπτύξει συμπτώματα ΔΜΤΣ στον εκάστοτε πληθυσμό που
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