

IMPACT OF TRAUMATIC PARENTAL EXPERIENCES WITH WARS ON OFFSPRING'S MENTAL HEALTH

ABSTRACT

Intergenerational transmission of trauma (ITT) is a process in which the trauma experienced in one generation is transmitted to the second or third generation. Understanding intergenerational transmission of trauma and its complexity promotes further understanding of how trauma affects individuals, families, and communities across generations, how to address it through effective intervention, and how offspring can be protected from ITT. The focus of this paper is to describe the effects and mechanisms of transmission between several war-related potentially traumatic events that parents experienced during their childhood and its intergenerational effects on their children. Using the PRISMA criteria, 34 psychosocial studies and 7 epigenetic studies met the scope of the inclusion criteria. Overall findings indicate that the children of war survivors often face mental health difficulties and suffer from PTSD symptoms, internalizing symptoms, externalizing problems, and attachment anxiety and avoidance. Regarding the mechanisms of intergenerational transmission of war trauma, self-report measures show different parenting and

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family-mediated transmission mechanisms of mental health risks on children while epigenetics reveals the underlying biological basis of ITT.

Future research must work towards a more precise operationalization of the transmission mechanisms, protective factors, and risk factors. This will provide a better understanding of the underlying processes and enable the planning of targeted and timely prevention programs for war-affected parents to protect the immediate and long-term mental health and well-being of children.

INTRODUCTION

Currently, our world is going through major large-scale crises – war conflicts, consequences of pandemics, and global warming. Violence in close relationships is still a fact of life for many children, women and families. In sum, trauma experiences take many forms, from interpersonal violence, sexual assault, and medical trauma to natural disasters, institutionalized oppression, war-related trauma and the sudden loss of a family member. All of these are related to traumatic stress. There are high expectations from the helping professions to provide immediate relief, stabilization and recovery to trauma survivors. As well, social workers, psychologists and other helping professions often are faced with a professional situation where they help people who have experienced trauma, even though it is not recognized as the cause of the problems that make them need psychosocial services.

The awareness that the needs of traumatized individuals, families, and communities require a specific approach in the (psycho)social field has led in the last two decades to the development of the concept of trauma-informed care (TIC) (Levenson, 2017) or a trauma-informed approach (Valgiusti, 2022). Brown, Baker, and Wilcox (2012) are very clear that TIC is different from trauma-focused therapy, as its primary goal is not to directly address past trauma but to view presenting problems in the context of a client's traumatic experiences. So, what is trauma-informed care or to be specific trauma-informed social work? It assumes recognition of the signs of trauma, acknowledges the effects of early adversity on psychosocial functioning across life, acknowledges the impact of trauma on daily functioning, identifies paths to address the effects of trauma experience, and actively prevents people from experiencing further trauma. As Levenson (2017) sums up, TIC relies on a set of basic principles: safety, trust, choice, collaboration and empowerment. These concepts should be consistently interwoven and applied throughout the intake, assessment, engagement, treatment, and termination phases of social work services for a broad scope of social work clients – from abused children, women, and elderly people, to refugees, war veterans, and their families.

As is highlighted in the UNICEF introductory handbook *Trauma informed approach* (Valgiusti, 2022: pp 3), it is important to consider that a trauma-informed approach is “an emerging transdisciplinary field that offers a more integrated view of trauma and its impact on children’s lives. New fields of knowledge, such as neurosciences, offer us new comprehension for non-retraumatizing interventions and for building more sensitive and friendly systems that put the child and their best interests at the center of intervention”.

The increased awareness of the sources and impact of traumatization has led to a greater awareness of a very specific phenomenon – intergenerational transmission of trauma, which is rarely mentioned in the fields of psychosocial work and social work.

Intergenerational transmission of trauma (ITT), also known as transgenerational transmission of trauma, is defined as a process in which the trauma experienced in the first generation is transmitted to the second generation (Kellerman, 2013), with thoughts, feelings and behaviors resulting from the survivors’ traumatic experiences passed on to their offspring and leading to negative mental health consequences (Dashorst et al., 2019). The American Psychological Association (APA, 2023) defines intergenerational trauma as a phenomenon in which the descendants of a person who has experienced a terrifying event show adverse emotional and behavioral reactions to the event that are similar to those of the person themselves. As it is described, “People experiencing intergenerational trauma may exhibit emotions, symptoms, reactions, patterns, and psychological effects of trauma experienced by previous generations even without having experienced it in their lifetime. They may also experience symptoms similar to those of post-traumatic stress disorder, including hypervigilance, anxiety, and mood dysregulation. However, because the individual did not directly experience the trauma themselves, there will be no flashbacks or intrusive memories but rather symptoms and emotions of events that did not happen to this person. In addition, as stress responses are related to physical health problems, intergenerational trauma can also manifest as somatic illnesses” (Valgiusti, 2022: p. 80).

In addition to the existing knowledge about the impact of socialization on ITT, in recent years, a new branch, epigenetics, has revealed how traumas are transmitted between generations not through genes but through sophisticated chemical mechanisms that modify their expression (Valgiusti, 2022: p. 82). Regarding this knowledge, ITT literature usually does not cover psychological transmission mechanisms together with genetic and epigenetic mechanisms. Therefore, in this review, we include both groups of mechanisms with the goal of promoting an interdisciplinary and holistic approach to this topic. Specifically, we attempt to contribute to a better understanding of the effects and mechanisms of transmission between several war-related

potentially traumatic events that parents experienced during their childhood and their intergenerational effects on their offspring.

By increasing understanding of the ways in which trauma is passed down from parents to offspring, we can create effective interventions for long-lasting impacts of trauma, and promote mental health and resilience for individuals, families, and communities.

War trauma is of particular interest to us. First, in Croatia, there are several post-war communities in which the ITT problem is very current, and second, the long-term consequences of war is an important topic due to the war in Ukraine and the Gaza region. Additionally, social work professionals and researchers have had, even before these contemporary wars, significant interest in war-affected children and families (Denov and Shevell, 2019; Fenning and Denov, 2019), but the importance of intergenerational transmission of trauma is only shyly mentioned. Based on this, the main goal of this overview paper is to describe the consequences of ITT in children, the transmission mechanisms, including epigenetic mechanisms, risk and protective factors, and certain methodological aspects of ITT research regarding different war-related traumatic events experienced by parents.

Although war trauma is of particular interest to us, we also decided to include the Holocaust as a source of parental trauma because of its historical significance in the context of ITT research. It is the first and currently the most researched construct in the context of ITT related to the Holocaust trauma (e.g., Kellerman, 2001; Van IJzendoorn, Bakerman and Sagi-Schwartz, 2003; Dashorst et al. 2019).

METHOD

Our systematic review was guided by Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2020). In the psychosocial part of this review, we included studies if: (a) they included parents who experienced Holocaust and war-related trauma, (b) their children did not experience any of the mentioned traumatic events, (c) had measures of the child's mental health or behavior, and (d) articles were published in peer-reviewed journals from the year 2000 until the present. In the epigenetic part of this review, we included studies if: (a) they included intergenerational transmission of Holocaust and war-related trauma, (b), had explicitly stated the type of analyzed sample, and (c) articles were published in peer-reviewed journals from the year 2000 until the present. In both parts we excluded studies that: (a) were centered on trauma that did not take place in any of these two mentioned contexts, (b) had findings that were irrelevant to this review, and (c) were not published in English.

We identified articles through PsycINFO (91), Academic Search Premier (EBSCO) (728), and Europe PMC (157) using the Boolean search strategy to combine the following keywords for the psychosocial part: intergenerational or transgenerational trauma, Holocaust, and war child; and for the epigenetics part: transgenerational inheritance, parental trauma, and DNA methylation. This led to the initial identification of 976 articles generated across the databases. Then we excluded duplicates and conducted an article title and abstract review, followed by a full paper review, to determine eligibility for inclusion. 54 studies were relevant to our inclusion and exclusion criteria. Upon review of the full article, we found 34 psychosocial articles appropriate for this review, 16 for war trauma, 18 for Holocaust, and 7 epigenetics articles. Conflicts at the title and abstract screening level were discussed and resolved by the first three authors, and disagreements at the full-text screening were resolved in a discussion by the first, second, and final authors.

RESULTS

Holocaust Research

Most studies since the initial development of the intergenerational trauma transmission research area in the 1960s refer to ITT between Holocaust survivors and their offspring (e.g., Last and Klein, 1984; Van IJzendoorn, Bakerman and Sagi-Schwartz, 2003; Yehuda and Bierer, 2008; Scharf and Mayseless, 2011). The findings of review and meta-analysis papers in this research area indicate that generally speaking, the offspring of Holocaust survivors have no more mental health problems than controls but agree that some descendants experience severe psychopathological disorders related to their parents' Holocaust experiences, parental psychopathology and growing up in the families of Holocaust survivors (Felsen, 1998.; Kellermann, 2001; Dashorst et al., 2019).

On the one hand, the meta-analyses from Van IJzendoorn, Bakerman and Sagi-Schwartz (2003) on 4,418 families showed a significant difference in psychological well-being and adaptation between the second-generation Holocaust survivors and their control groups, but only in clinical groups. Besides having a parent with Holocaust experience, those groups had other significant psychological disorders or physical diseases that probably acted as multiple risk factors for mental health. On the other hand, a review by Leen-Feldner and colleagues (2013) about the transmission of parental PTSD suggested that when trauma impact is measured through parental PTSD symptoms, those are related to different offspring's mental health problems, including internalizing, general behavioral, and physical problems.

Therefore, researchers thoroughly examined the range and type of problems that arise in the offspring of Holocaust survivors and identified risks and mechanisms that contribute to the fact that some descendants experience psychopathological disorders and impaired mental health. This field made it possible today to translate those research results and re-examine them in the examples of contemporary wars and traumatic events that arise from them.

Since ITT is a very complex human experience that scientists have so far failed to explain with a single theory of human behavior, it is more appropriate to address it in terms of several possible mechanisms associated with offspring's mental health. In a recent review paper, Dashorst and colleagues (2019) summarized the findings of studies in five key ITT areas: (1) parental mental health problems; (2) perceived parenting and attachment; (3) parental Holocaust experience; (4) additional stressful and traumatic life events; (5) cortisol metabolism, epigenetic factors and genetic predisposition. A detailed description of these mechanisms and research about them can be found in Dashorst and colleagues' paper (2019), and here we will shortly describe their conclusions. Regarding (1) parental mental health, the review showed a clear positive association with children's problems (anxiety, mood and addiction), especially between parental PTSD and a PTSD risk for children (Yehuda et al., 2008; Leen-Feldner et al., 2013; Dashorst et al., 2019). On (2) perceived parenting and attachment, long-researched topics in ITT, studies have shown that parents who experienced Holocaust trauma may have reduced capacity for physical and emotional childcare. In turn, it is reflected in insecure attachment patterns in children and associated with poorer mental health outcomes of offspring (Wiseman et al., 2002; Dashorst et al., 2019). Considering (3) parental Holocaust experience, Dashorst and colleagues (2019) examined studies that indicate more intrusive memories and other posttraumatic symptoms in the offspring group compared to the control group (Letzter-Pouw and Werner, 2013; Letzter-Pouw et al., 2014). Mental health problems are greater in the children of mothers, compared to fathers, who experienced the Holocaust (Wiseman et al., 2002; Kellermann, 2008). A less conclusive mechanism is (4) additional stressful and traumatic life events. Of the five factors proposed by Dashorst et al. (2019), this factor shows the least clear association with next-generation mental health problems. Some authors have confirmed (Baider et al., 2000), whereas others have refuted (Shrira, 2015) the proposition that the parental Holocaust experience is related to an increased vulnerability to mental health problems in children in situations of physical or psychological stress later in life. The last mechanism, biological aspects of ITT – (5) cortisol metabolism, epigenetic factors and genetic predisposition is further analyzed in this review in the context of different trauma sources and effects on offspring. In the Holocaust survivors, as Yehuda and

Bierer (2009) point out, epigenetic modulations such as DNA methylation alter the long-term functional expression of genes passed on to the next generation in response to extreme environmental influences. Consequently, epigenetic modulations may partly explain inter-individual variations in the long-term transfer of mental health risks from individuals to offspring (Bader et al. 2014; Yehuda et al., 2016; Dashorst et al., 2019). None of those five mechanisms alone sufficiently explains ITT, so this research area is open to expanding supplementary understanding and theoretical knowledge (Dashorst et al., 2019).

In the existing reviews and meta-analyses (Kellerman, 2001; Sagi-Schwartz, Van IJzendoorn and Bakermans-Kranenburg, 2008; Van IJzendoorn, Bakermans-Kranenburg and Sagi-Schwartz, 2003; Dashorst et al., 2019), there is no comprehensive analysis of specific risk and protective factors. Dashorst and colleagues offered a thorough list of trauma transfer mechanisms that can be translated as risk factors for ITT. Still, it is unclear what the roles of specific constructs are and whether they stand as units or a combination of risk, protective, or other possible factors in this interplay of psychological and biological variables in the ITT. Kellerman (2001) writes about some aggravating and mitigating factors, like social support and parenting communication styles, but without further explanation if those are treated the same or different as risk and protective factors. Likewise, individual studies mostly focused on whether Holocaust trauma transmits to the next generation, with few focusing on the protective factors (Fossion et al., 2003; Shrira et al., 2011; Giladi and Bell, 2012). Protective factors they mention are high optimism and hope (Shrira et al., 2011), social support and adequate differentiation from the parents (Giladi and Bell, 2012), and the quality of the communication of the trauma (Fossion et al., 2003).

In the samples of reviewed research of ITT of Holocaust, Holocaust survivor participants were equally represented by gender. Some research included only mothers (Baider et al., 2000, 2006, 2008; Sagi Schwartz, Van IJzendoorn and Bakermans-Kranenburg, 2003), no research included only fathers, while most research included both parents (e.g., Kellerman, 2008; Letzer-Pouw & Werner, 2013). Regarding the sample of participants' offspring, the situation is similar, and they are mostly equally represented by gender in the previously mentioned studies. Regarding the age of the participants, because of the nature of Holocaust studies and the passage of time, most study samples include middle-aged adult offspring (e.g., Baider et al., 2006; Shrira, 2015).

WAR TRAUMA

The war-related transgenerational trauma transmission stands out as another relevant field in the overall ITT research. In addition to research directly dealing with war trauma, this section will also include specific research related to ITT in refugees. As Phipps and Degges-White (2014) state for Latino immigrants – traumatic life events are experienced immediately before physical migration, and those may include political violence, domestic violence, substantial impoverishment, and death of loved ones. It is reasonable to presume that these circumstances also apply to the relocation of refugees, alongside the obvious reason that is fleeing war. As political violence often includes massive imprisonments, systematic torture of prisoners, executions, and forced exile to silence political opponents (De Viñar, 2012), these circumstances certainly overlap with traumatic events that are usually the source of war trauma. This is also in conformity with Denov and Shevell (2019) who emphasized that the impacts of war are further compounded by the complexities of displacement, flight, migration, and resettlement to new contexts. As they stated, “These processes can cause destabilizing ruptures in the social fabric, networks, and services that support and protect children and families, ultimately hindering their potential protective capacities and potentially contributing to negative long-term intergenerational effects.” (Denov and Shevell, 2019: 1).

Table 1. Overview of the war studies included in the review

Citation and year	Sample	Control group	Symptoms in children	Transmission mechanism	Protective factors	Risk factors
O'Toole, 2022	Fathers Vietnam veterans; adult children	No	PTSD symptoms	Quality of parent-child relationships, family emotional climate	Positive emotional climate – only for daughters	Father's PTSD
Aloni et al., 2020	Fathers ex-POWs with PTSD; adult children	Yes	Attachment anxiety and avoidance	Parental attachment anxiety	/	Father's PTSD, attachment anxiety
Bachem et al., 2020	Fathers combat veterans; mothers; adult children	No	PTSD symptoms	Parental overprotectiveness, negative parental benevolence and self-worth	/	Low parental self-worth
Lee et al., 2019	Adult children of “comfort women” (survivors of sexual slavery)	No	Shame, hyperarousal, irritability, problems with aggression control, negative worldview, low self-esteem	Parental modeling, inadequate psychological parenting, biological vulnerability, secondary-traumatization	/	Mother's PTSD

Citation and year	Sample	Control group	Symptoms in children	Transmission mechanism	Protective factors	Risk factors
Stein et al., 2018	Fathers ex-POWs with PTSD; adult children	Yes	PTSD symptoms, increased global psychiatric distress	Children's personality traits	Child's conscientiousness and agreeableness	Child's neuroticism
Zerach & Solomon, 2018	Fathers ex-POWs; mothers; adult children	No	PTSD symptoms	Parental lower care and higher overprotectiveness	/	/
Dalgaard & Montgomery, 2017	War refugees, mothers and fathers, at least one parent has PTSD; children's age 4-9	No	Higher internalizing, conduct, hyperactivity/inattention and peer relationship problems, lower prosocial behavior	Family functioning	Family flexibility and cohesion	Role-reversing parenting, a pile-up of stressors, parental lack of problem-solving skills and coping strategies
Nicolai et al., 2017	Fathers ex-POWs with PTSD; adult children	Yes	PTSD symptoms	Child's self-differentiation	/	Father's PTSD
Sangalang et al., 2017	Mothers refugees with trauma experience; children's age M=12	No	Depressive symptoms, antisocial and delinquent behavior	Family functioning	/	Intergenerational communication barriers, home environments characterized by family conflict, and a sense of distance and detachment from parents
Zerach, 2017	Fathers ex-POWs with PTSD; adult children	Yes	PTSD symptoms, psychiatric symptomatology	Venting of emotions	Problem-focused coping strategies of active coping and planning, disengagement-oriented coping strategies of alcohol and substance use and venting of emotions	Father's PTSD
Dalgaard et al., 2016	War refugees, mothers and fathers, at least one parent has PTSD; children age 4-9	No, the results were compared to Danish norms	Less psychologically well-adjusted, disruption in attachment representation	Disruptions in children's attachment representations	Modulated disclosure, child-focused communication strategy (regarding parental traumatic experiences)	Open style communication and silencing strategy
Zerach & Solomon, 2016	Fathers ex-POWs with PTSD; adult children	Yes	PTSD symptoms, intrusion, avoidance, hyperarousal, attachment anxiety	Parental proximity to children, parental sensitivity to children's needs	/	Father's PTSD, attachment anxiety

Citation and year	Sample	Control group	Symptoms in children	Transmission mechanism	Protective factors	Risk factors
Zerach et al., 2016	Fathers ex-POWs with PTSD; adult children	Yes	PTSD symptoms	Fathers PTSD, fathers depression symptoms	/	/
Field et al., 2013	Khmer rouge refugees, mothers; daughters age 16-18	No	Higher anxiety	Role-reversing parenting	/	Mother's PTSD
Van Ee et al., 2012	Refugees and asylum seekers, mothers with war trauma; children age 18-42 months	No	Higher levels of psychosocial problems of infants	Not clarified, the hypothesis has not been confirmed	Parental ability to regulate affect and arousal	Mother's PTSD, unstructured, hostile & insensitive parenting, less emotional availability within the parent-child interaction
Daud et al., 2005	Fathers and mothers refugees, one parent has experience of war torture; children's age 6-17	Yes	PTSD symptoms, increased depression and anxiety, attention-deficits and behavioral disorders	Impaired parenting capacities	/	/

ITT of war trauma is primarily being studied (as any ITT) for the negative impact of the trauma parents experienced on their offspring. These negative consequences (alongside transmission mechanisms, protective and risk factors) need to be identified to enable the design of adequate and timely interventions to mitigate or completely interrupt this undesirable pattern of ITT in future generations.

Previous research has mainly focused on the transmission of PTSD symptoms from parents to offspring. The results of the studies show that these children often suffer from PTSD symptoms such as hyperarousal, problems with aggression control, avoidance and intrusion (Daud et al., 2005; Nicolai et al., 2017; Zerach & Solomon, 2016, 2018; Zerach, 2017; Stein et al., 2018; Lee et al., 2019; O'Toole, 2022). In addition, research shows a greater expression of internalizing symptoms and accompanying behaviors in offspring - depressive symptoms, anxiety, negative worldview, negative self-worth, and less psychologically well-adjusted than their peers (Daud et al., 2005; Field et al., 2013; Sangalang et al., 2017; Lee et al., 2019), as well as externalizing - attention deficit and behavioral disorders, antisocial and delinquent behavior (Daud et al., 2005; Nicolai et al., 2017). In the national context, the first studies showed that paternal PTSD symptoms in participants who were

children or adolescents during the Homeland War were identified as predictors of both parenting stress and negative parenting behaviors. These, in turn, forecasted internalizing symptoms in adolescents, linking the impaired mental health of parents and adolescents. Furthermore, the internalizing problems of these mothers were found to be predictive of internalizing problems in their daughters and sons, while the fathers' internalizing problems specifically predicted their daughters' internalizing problems. This also indicates a connection between the impaired mental health of parents and their children (Kožljan, Ajduković and Rajhvajn Bulat, 2023).

Negative consequences also occur in terms of attachment, where intergenerational war trauma transmission is associated with disruptions in children's attachment representation, specifically increased levels of attachment anxiety and avoidance (Dalgaard et al., 2016; Zerach and Solomon, 2016; Aloni et al., 2020). In infants, negative consequences were also found regarding more pronounced psychosocial problems (Van Ee, Kleber and Mooren, 2012). However, interpretation of these results should be taken with caution because some studies did not include a control group and were done on relatively small samples. Therefore, it is not justified to claim that children of parents who experienced war trauma are more prone to mental health problems than their peers solely on these results.

Several mechanisms of transmission have been identified in the ITT of war trauma. In addition to biological mechanisms and secondary traumatization, most studies favor parenting-mediated transmission. In this context, the following are highlighted as transmission mechanisms: the decreased level of positive parenting, overprotectiveness, lower responsiveness and sensitivity to children's needs, lower care, negative parental benevolence, parental attachment anxiety, lower quality of parent-child relationship and interactions, and also a specific phenomenon of parentification – the role reversal between parent and child (Daud, Skoglund and Rydelius, 2005; Van Ee, Kleber and Mooren, 2012; Field, Muong and Sochanvimean, 2013; Zerach and Solomon, 2016; 2018; Dalgaard and Montgomery, 2017; Lee et al., 2019; Aloni et al., 2020; Bachem et al., 2020; O'Toole, 2022). Constructs at the family level are recognized as a mechanism of ITT as well – a negative family emotional climate and disrupted family functioning (Dalgaard and Montgomery, 2017; Sangalang, Jager and Harachi, 2017; O'Toole, 2022). Although parental PTSD is observed as a predictor in these studies, it is also seen as a transmission mechanism alongside parental depressive symptoms in a significant number of studies (Zerach et al., 2016; Zerach, 2017; Stein et al., 2018; Lee et al., 2019; O'Toole, 2022).

Parental PTSD is also mentioned in most studies as the main risk factor for psychological maladjustment of children in ITT (Van Ee, Kleber and Mooren, 2012; Field et al., 2013; Zerach and Solomon, 2016; Nicolai, Zerach, 2017; Zerach and Solomon, 2017; Lee et al., 2019; Aloni et al., 2020; O'Toole, 2022). Difficulties in parent-child

communication such as intergenerational communication barriers (Sangalang, Jager and Hitachi, 2017), open style and silencing strategies regarding trauma reporting are also stated as risk factors (Dalgaard et al., 2016). In addition, certain characteristics of parents and children are mentioned as risk factors, as well as certain characteristics of their relationship: low parental self-worth (Bachem et al., 2020), parental lack of problem-solving skills and coping strategies (Dalgaard and Montgomery, 2017), child neuroticism (Stein et al., 2018) and anxiety attachment (Dalgaard et al., 2016; Zerach and Solomon, 2016; Aloni et al., 2020), family conflicts and sense of distance and detachment from parents (Sangalang, Jager and Hitachi, 2017), unstructured, hostile and insensitive parenting, less emotional availability within the parent-child interaction (Van Ee, Kleber and Mooren, 2012) and stressor buildup due to different stressful life events (Dalgaard and Montgomery, 2017).

Protective factors also include certain parents, children, and family environment characteristics. On the parents' side, these are problem-focused coping strategies of active coping and planning, disengagement-oriented coping strategies of alcohol and substance use and emotion venting (Zerach, 2017), as well as the ability to regulate affect and arousal (Van Ee, Kleber and Mooren, 2012), and modulated style of disclosure or a child-focused strategy regarding parental traumatic experiences (Dalgaard et al., 2016). On the children's side, the child's personality traits, conscientiousness and agreeableness (Stein et al., 2018), and a positive emotional climate (O'Toole, 2022) were identified as protective factors for daughters. In addition to the above, higher family flexibility and cohesion are also protective factors in the ITT of war trauma (Dalgaard and Montgomery, 2017).

In ITT of war trauma research regarding parent samples, there is research including only fathers (Zerach et al., 2016; Zerach and Solomon, 2016; Nicolai, Zerach and Solomon, 2017; Stein et al., 2018; Aloni et al., 2020; O'Toole, 2022), only mothers (Van Ee, Kleber and Mooren, 2012; Field, Muong and Sochanvimean, 2013; Sangalang, Jager and Harachi, 2017; Lee et al., 2019) and both parents (Daud, Skoglund and Rydelius, 2005; Dalgaard et al., 2016; Dalgaard and Montgomery, 2017; Zerach and Solomon, 2018; Bachem et al., 2020) in seemingly equal proportion. However, if we look more closely, research involves fathers to a somewhat greater extent. Namely, the part of the studies that include both parents mostly refers to dyads in which fathers experienced war trauma, while mothers were included in the research as additional variables in the ITT process (e.g., as moderators in the process or victims of secondary traumatization) (Zerach and Solomon, 2018; Bachem et al., 2020). Regarding the sample of children (second and third-generation offspring), the gender distribution in the research is balanced. Still, there are some differences in the ITT concerning the age of the participants. Most studies include adult offspring - from young adults to middle aged (Zerach and Solomon, 2016; Zerach et al., 2016, 2018;

Zerach, 2017; Nicolai, Zerach and Solomon, 2017; Stein et al., 2018; Lee et al., 2019; Aloni, 2020; Bachem et al., 2020; O'Toole, 2022), while younger children are included in research to a lesser extent.

Epigenetic transmission

Previously it was considered that the only possible forces of parental influence on offspring were genetic and environmental. However, with the demonstration of inherited epigenetic modifications, a new theoretical intersection of epigenetic inheritance emerged (Lacal and Ventura, 2018). Epigenetic modifications effectively link genetics and the environment (Bhattacharya et al. 2019). Following Dashorst and colleagues' (2019) review and the rising interest in the interdisciplinary approach in this research field, we extended the review with the studies including epigenetic mechanisms in ITT. Epigenetics is defined as "the alterations in the gene expression profile of a cell that are not caused by changes in the DNA sequence" (Peschansky and Wahlestedt, 2014). That would make epigenetic inheritance the transmission of epigenetic markers from parents to offspring, of which the most studied mechanisms are DNA methylation and non-coding RNAs (Lacal and Ventura, 2018). However, the most studied one is certainly DNA methylation (Youssef et al. 2018; Bhattacharya et al., 2019). While the investigation of epigenetic mechanisms in ITT is still in its infancy (Branje et al., 2020), we included seven identified related studies. While most authors have investigated DNA methylation of NR3C1 (Perroud et al., 2014; Rodney and Mulligan, 2014; Yehuda et al., 2014; Hjort et al., 2021), other identified targets were FKBP5 (gene affecting the HPA) (Yehuda et al., 2015), BDNF (Kertes et al., 2017; Pilkay et al., 2020; Hjort et al., 2021), HTR3A (Hjort et al., 2021), SCG5 and LTA (Cao-Lei et al., 2014). Recently NGS studies have begun searching for differentially methylated DNA regions throughout the genome and for new candidate genes in ITT.

DISCUSSION

The aim of this review was to understand better the effects and mechanisms of different sources of large-scale trauma events that occurred to parents and had intergenerational effects on offspring. Of our special interest was the intergenerational transmission of war trauma, while studies about the Holocaust were described and integrated as a part of the research heritage in ITT. We explored offspring's psychological and biological outcomes and included studies in the interdisciplinary approach. In the discussion, we try to challenge the overly simplistic examination

of the mechanisms for intergenerational trauma transmission and propose some future research directions.

The findings of review and meta-analysis papers of the Holocaust research suggest the offspring of Holocaust survivors have no more mental health problems than controls but agree that some descendants experience severe psychopathological disorders related to their parents' Holocaust experiences, parental psychopathology and growing up in the families of Holocaust survivors (Felsen, 1998; Kellermann, 2001; Dashorst et al., 2019).

Overall findings of the war research indicate the offspring of war survivors, as some of the Holocaust survivors' offspring, often face mental health difficulties and suffer from PTSD symptoms (e.g., Zerach, 2017; Lee et al., 2019; O'Toole, 2022), internalizing symptoms (e.g., Field, Muong and Sochanvimean, 2013; Sangalang, Jager and Harachi, 2017; Lee et al., 2019; Kožljan, Ajduković and Rajhvajn Bulat, 2023.), externalizing problems (e.g., Daud, Skoglund and Rydelius, 2005; Nicolai, Zerach and Solomon, 2017), and attachment anxiety and avoidance (Dalgaard et al., 2016; Aloni et al., 2020). Nevertheless, the field of ITT in war trauma seems to be going through a similar research path as research in ITT of Holocaust - interpretation of the results that offspring of war survivors have more mental health problems should be taken with caution because of the methodological issues in some studies (no control group, small samples).

Regarding the mechanisms of transmission in ITT of war trauma, research shows several parenting-mediated transmission mechanisms (e.g., Zerach and Solomon, 2018; Aloni et al., 2020; Bachem et al., 2020), family-level mechanisms (Dalgaard and Montgomery, 2017; Sangalang, Jager and Harachi, 2017), parental mental health (Field et al., 2013; Zerach et al., 2016; Stein et al., 2018). The mentioned mechanisms correspond to the mechanisms identified in the Holocaust ITT - impaired parental mental health (Yehuda and Bierer, 2008; Leen-Feldner et al., 2013; Dashorst et al., 2019), adverse parental behaviors and actions (Wiseman et al., 2002; Dashorst et al., 2019). Also, the part of this review regarding epigenetic research revealed that the biological basis of ITT for both types of experienced trauma is methylation of the same genes.

In war ITT, specific risk factors are identified as different aspects of parent-child communication, characteristics of the parent-child relationship (Van Ee, Kleber and Mooren, 2012; Sangalang, Jager and Harachi, 2017), children characteristics like neuroticism (Stein et al., 2018) and anxiety attachment (Dalgaard et al., 2016; Zerach and Solomon, 2016; Aloni et al., 2020), and stressor buildup due to different stressful life events (Dalgaard and Montgomery, 2017). Protective factors include parental factors (better coping skills, emotional regulation), children's conscientiousness and agreeableness and family factors a positive emotional climate, flexibility, and cohesion (Van Ee, Kleber and Mooren, 2012; Dalgaard and Montgomery, 2017; Zerach, 2017; Stein et al., 2018; O'Toole, 2022). Although, to our knowledge, there is no compre-

hensive analysis of protective factors in Holocaust ITT, some authors mention high optimism and hope (Shrira et al., 2011), social support and adequate differentiation from the parents (Giladi and Bell, 2012), and the quality of the communication of the trauma (Fossion et al., 2003) as potential protective factors.

Methodological Issues

Most of the included studies are cross-sectional, limiting causal inference in ITT research, regardless of the field of research. As Flanagan and colleagues (2020) warn in their review of mechanisms of ITT in asylum-seeking and refugee families, all countries of those studies share high-income profiles of Western countries, which is very different from their countries of origin, which are more low-middle income countries. In general, most research is set in Western countries, while other cultures e.g. Southeast European countries are represented to an extremely small extent. This review paper also focused on research conducted in English and Western countries, which negatively impacts the broader understanding of this phenomenon in the rest of the world. In the context of ITT, the Holocaust is the most researched trauma; a significant amount of research focuses on war trauma and refugees, while other traumatic events are not involved to a significant extent, such as natural disasters. It is important to mention that several papers often originate from one large research, and in that context, all these papers have essentially the same research sample.

To better understand mechanisms of ITT in war trauma, we realized that it is not clear what the roles of specific constructs investigated from Holocaust research until today are. Researchers should work towards clear explanations and terminology, a unified way of interpreting constructs as units or a combination of risk, protective, or other possible factors in this interplay of psychological and biological variables in the ITT. Additionally, the protective factors are seldom mentioned and researched, leaving vague theory gaps in this research area.

Regarding the samples of used studies, war research involves fathers to a greater extent. In the studies that included both parents, fathers experienced war trauma, while mothers were included in the research as additional variables in the ITT process (Zerach and Solomon, 2018; Bachem et al., 2020). It would be more righteous and interesting to see how the ITT process differs for fathers and mothers who suffered war-related trauma and to see what specific risk and protective factors relate to each parent.

As mentioned earlier, due to the passage of time since the traumatic events, the offspring participants were adults in most of the research. This is also why it would be good to expand the range of researched traumatic events in ITT, to reach

younger offspring and get relevant data on whether there is a breaking point in which the consequences of ITT start to manifest in children. Also, to understand what impact certain periods such as adolescence have in the whole process, and what characteristics of children and their environment strengthen their resilience, all with the goal of creating targeted prevention programs to avoid or mitigate negative consequences of ITT in children.

Implications for future research and practical implications

Regarding the samples included in war ITT studies, war ITT research participants are mostly fathers who participated as soldiers in the war abroad. Still, there is a lack of research in which participants are civilians with war trauma. Some of them are included in research through research with refugees, but there is a substantial gap regarding civilians who, after the war, remained living in their countries of origin, in the war-affected area. It is a population that needs to be included in future research, both mothers and fathers. Furthermore, there is a lack of qualitative research aimed at deepening the understanding of individuals' perceptions and attributions of trauma and its transmission to the next generations. For more valid conclusions, control groups should be included in research whenever possible, as well as younger offspring to expand existing knowledge of ITT. Accordingly, there should be more research on war ITT in different samples, cultures and environments. Also, in the epigenetic body of research, it is important to include more longitudinal research to determine if the epigenetic changes are associated with long-term effects on the child and how the offspring have been affected by the received treatment (Yehuda and Lehrner, 2018).

Except for traumatic events that were intentionally provoked, there is an elevated risk of experiencing and transmitting potentially traumatic events as a result of natural disasters due to climate change. It would be respectable to include this type of traumatic event in future ITT research.

Future research must pay attention to the more precise operationalization of individual constructs such as transmission mechanisms, protective and risk factors. That will give us a clearer picture of different segments included in ITT, provide a better understanding of the underlying processes, and enable the planning of targeted and timely prevention programs with the goal of protecting children's mental health and well-being.

Practical implications of ITT research and this review can spread timely during and after the war and other disasters. Immediate humanitarian assistance during the wartime, like medical care, food and safe drinking water, should involve psychosocial

support and treatment for trauma for individuals and families, regarding experienced violence, human trafficking, sexual abuse and recruitment by armed groups.

Coming from the line of epigenetic research on ITT, there is strong support for planned and timely prevention and intervention strategies. Even though they are heritable changes, epigenetic changes are influenced by the environment and thus can be modified as the environment changes, indicating the strong role of resilience in individuals and families (Yehuda and Lehrner, 2018). Essential adaptive systems supporting resilience in young individuals during and after disasters are identified, and they are in conformity with the TIC basic principles and modern social work: safety, trust, choice, collaboration, and empowerment (Levenson, 2017). These systems include supportive caregiving, effective problem-solving, self-regulation, and social regulation systems that foster safety, control, optimism, and meaningful beliefs, with adults significantly influencing children's resilience in such situations (Masten and Narayan, 2012). It is equally important to provide TIC for both parents and children, integrated into all kinds of services, in addition to psychosocial support and trauma treatment by trauma treatment experts.

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UTJECAJ TRAUMATIČNIH RODITELJSKIH ISKUSTAVA S RATOVIMA NA MENTALNO ZDRAVLJE POTOMAKA

SAŽETAK

Međugeneracijski prijenos traume (intergenerational transmission of trauma - ITT) je proces u kojem se trauma doživljena u jednoj generaciji prenosi na drugu ili treću generaciju. Razumijevanje međugeneracijskog prijenosa traume i njegove složenosti promiče daljnje razumijevanje toga kako trauma utječe na pojedince, obitelji i zajednice kroz generacije, kako se nositi s njim kroz učinkovitu intervenciju, te kako se potomstvo može zaštititi od ITT-a. Cilj ovoga rada je opisati učinke i mehanizme prijenosa između nekoliko potencijalno traumatičnih događaja povezanih s ratom koje su roditelji doživjeli u djetinjstvu i njihovih međugeneracijskih učinaka na njihovu djecu. Prema PRISMA kriterijima, 34 psihosocijalne studije i 7 epigenetskih studija zadovoljavaju opseg kriterija za uključivanje. Ukupni rezultati pokazuju da se djeca roditelja koji su preživjeli ratove često suočavaju s poteškoćama mentalnog zdravlja i pate od simptoma PTSP-a, internaliziranih simptoma, eksternaliziranih problema, anksiozne privrženosti i izbjegavanja. Što se tiče mehanizama međugeneracijskog prijenosa ratne traume, mjere samoprocjene pokazuju različite roditeljske i obiteljski posredovane mehanizme prijenosa rizika mentalnog zdravlja na djecu, dok epigenetika otkriva temeljnu biološku osnovu ITT-a. Buduća istraživanja moraju raditi na preciznijoj operacionalizaciji mehanizama prijenosa, zaštitnih čimbenika i čimbenika rizika. To će omogućiti bolje razumijevanje temeljnih procesa i omogućiti planiranje ciljanih i pravovremenih preventivnih programa za ratom pogođene roditelje za zaštitu neposrednog i dugoročnog mentalnog zdravlja i dobrobiti djece.

Ključne riječi: djeca; rat; međugeneracijski prijenos traume; mentalno zdravlje; epigenetika



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