

RESEARCH ARTICLE

Mental Health Among Children Living with Veterans: A Literature Mapping

Signe Boe Rayce¹, Søren Bo Andersen², Anne-Marie Klint Jørgensen¹ and Anni Brit Sternhagen Nielsen²

¹ VIVE – the Danish Centre for Social Science Research, Herluf Trolles Gade 11, 1052 Copenhagen K, DK

² Research and Knowledge Centre, The Danish Veteran Centre, Garnisonen 1, 4100 Ringsted, DK

Corresponding author: Anni Brit Sternhagen Nielsen (vetc-vic004@mil.dk)

Introduction: Many deployed soldiers have children who may be affected by the parent's absence. Extensive studies on child mental health during deployment exist. Few focus on the reintegration period which can be challenging if the veteran suffers from physical or mental post-deployment effects. To gain knowledge on child consequences of living with a veteran parent and identify strategies/interventions that may relieve strain the first step is to characterize existing publications/research.

Aim: To identify, report main findings, and characterize contemporary scientific publications on mental health among children living with a veteran parent.

Method: Literature search (MEDLINE, PsycINFO, and SocINDEX) and systematic mapping of mental health among children living with veterans after deployment (published 1990–2015). Inclusion criteria: Iraq, Balkan, Afghanistan, Syria, Lebanon, or Libya deployments; child mental health outcome; peer-reviewed primary research from NATO/NATO-associated countries. Languages: English, German, or Scandinavian. Literature was coded after veteran post-deployment effects, deployment country, study nationality, publication type/methods, observational vs. experimental study, study design, and outcome categories. Mental health was divided into internalizing, externalizing, ADHD symptoms, secondary traumatization, and other mental health outcomes.

Results: Publications included ($n = 16$) were mainly American reporting on children living with veteran parents deployed to Iraq/Afghanistan. A minority reported on post-deployment effects and focused solely on psychological injuries. Child internalization and externalization were the most frequent mental health outcomes addressed. Publications predominantly reported on quantitative longitudinal or cross-sectional study designs.

Conclusion: This mapping suggests a need for high-quality publications based on European and Scandinavian samples, reports of post-deployment effects, and experimental studies.

Keywords: Children; mental health; military family; post-deployment effects; systematic mapping; veterans

Introduction

During the last three decades, soldiers and military personnel have deployed to international conflict/war zones such as Iraq and Afghanistan. Many of the deployed soldiers have children; e.g. in the USA up to 42% of active duty and reservists have dependent children (United States Department of Defense, 2014), and in Denmark 14% have at least one child when deployed (Lyk-Jensen et al., 2011). The deployment and absence of a parent can in itself cause serious psychological strain which may cause the child to experience emotional and behavioral problems due to missing and worrying about the parent and to changes in family relations, roles, and rules (Lester et al., 2010; Pfefferbaum, Houston, & Allen, 2012). However, sometimes family relations will be affected even after the soldier returns, creating a family environment that may pose a risk concerning the child's mental health (De Pedro et al., 2011).

Military deployment increases the risk of exposure to potentially traumatic events and subsequent post-traumatic stress disorder (PTSD) (Iversen et al., 2008; Xue et al., 2015), which has been reported to affect between 5 and 24% of veterans depending on warfare (de Burgh, White, Fear, & Iversen, 2011; Fear et al., 2010; Magruder & Yeager, 2009). Furthermore, deployment is associated with an increased risk of suffering

from depression and other mental illnesses following deployment (Bonde et al., 2016; Gates et al., 2012). Aside from affecting the veteran, deployment may also have consequences for family life and for spousal/child mental health (De Pedro et al., 2011). In a review, de Burgh et al., (2011) found that spouses of veterans have an increased risk of mental health problems such as major depression, anxiety, and sleeping disorders compared to e.g. spouses of those not deployed (de Burgh et al., 2011; Mansfield et al., 2010). Especially longer deployments, extensions, and poor mental health of the returned veteran increase the risk of mental health disorders among spouses (de Burgh et al., 2011). In general, research shows higher rates of psychiatric symptoms and psychosocial problems among children of a mentally ill parent (Beardslee, Bemporad, Keller, & Klerman, 1983; Beardslee, Versage, & Gladstone, 1998; Huntsman, 2008). Research indicates that this is also the case for children living with a veteran parent suffering from psychological problems following deployment (Creech, Hardley, & Borsari, 2014; De Pedro et al., 2011; Dekel & Goldblatt, 2008). Mental health issues such as elevated levels of psychological stress and lower capacity for intimacy may even continue into adulthood among children living with veterans suffering from PTSD (Dinshtein, Dekel, & Polliack, 2011). A recent Australian study found, almost 40 years after the Vietnam War, that adult children of Vietnam War veterans had more mental health diagnoses, self-harm, and suicidal ideation than controls (Forrest, Edwards, & Daraganova, 2018), indicating that parental deployment in itself may have an intergenerational adverse effect on children in adult life.

While stress experienced in the post-deployment reintegration phase is most pronounced among families where the veteran suffers from PTSD, the period of reintegration itself can be stressful irrespective of the veteran's post-deployment effects (De Pedro et al., 2011; Karstoft et al., 2015; Sayer et al., 2010). The importance of a secure family environment, parent-child attachment and relationship during childhood and adolescence has been stressed extensively in the literature (Brumariu & Kerns, 2011; Moretti & Peled, 2004; Russell, 2011). Psychological post-deployment effects and/or reintegration stress may result in an unstable family environment compromising the secure surroundings and psychological needs children and adolescents have in order to thrive and develop. This may harm a healthy psychological development.

There is an extensive literature on veteran mental health both before, during, and after deployment (e.g. Andersen, Karstoft, Bertelsen, & Madsen, 2014; Creamer, Wade, Fletcher, & Forbes, 2011; de Burgh et al., 2011; Rona et al., 2006). Likewise, a considerable body of research on spousal/partner and child mental health during deployment exists and has been presented in reviews (Creech, Hardley, & Borsari, 2014; De Pedro et al., 2011; White, de Burgh, Fear, & Iversen, 2011). While two of these reviews also include research on child mental health post-deployment (Creech, Hardley, & Borsari, 2014; De Pedro et al., 2011), none of them separated research on child mental health post-deployment from research focusing on the deployment period. De Pedro et al., (2011) do, however, state that very few contemporary studies focus on the impact of the reintegration period on children. They stress that more knowledge in this field of research is needed. Cramm et al., (2016) focused on the impact of parental stress on child mental health and well-being in a scoping review of the literature also including discussion papers, legal reports, policy reports, and perspective pieces such as literature reviews with no methodology described and in a broader national context (Cramm et al., 2016). We have been unable to find systematic reviews focusing specifically on child mental health post-deployment irrespective of the psychological problems of the veteran parent following deployment.

To gain knowledge of the consequences of living with a veteran parent and subsequently which strategies and interventions that can relieve strain among these children the first step is to get an overview of the existing publications and research within this field and the characteristics in terms of samples, study designs, outcomes, and findings.

Therefore, the aim of this systematic literature mapping was to identify contemporary scientific publications on mental health among children living with a veteran parent formerly deployed to conflict/war zones. Furthermore, the aim was to investigate the characteristics of these publications and to report their main findings on pre-specified domains of child mental health.

Methods

Search Strategy

The present study was part of a larger mapping of publications on psychosocial functioning and health among relatives of veterans deployed to international operations. (This reference is blinded and will be provided later). Besides child mental health, the overall literature search therefore also covered publications on family relationship, psychosocial well-being, and social relations. We developed search strategies for the databases focusing on specificity and search words aiming for these four themes. The database searches were performed in March 2015 in MEDLINE, PsycINFO, and SocINDEX. Together they cover medicine, health, psychology, and

sociology. The main search included conjunctions of the terms shown in **Table 1**. The search was restricted to literature published from 1990 to March 2015 due to the focus on contemporary scientific publications. Furthermore, we performed an extensive search for gray literature (theses and dissertations, research reports, government (research) reports). Types of institutions searched were: research high schools, university colleges, universities, stress institutions, public health institutions, defense institutions, and veteran centers. Finally, already known publications provided by the Danish Veteran Centre were assessed for eligibility.

Screening Procedure, Eligibility Criteria, Coding, and Categorization Procedure

All publications were screened for relevance based on title and abstract. If a publication could not be safely excluded, the full text version was screened. Screening was conducted by a research assistant under close supervision of SBR. Any doubts regarding inclusion were discussed with SBR. SBA and ABSN were consulted if there continued to be doubts regarding inclusion. Publications were included if they: 1) reported on children living with a veteran parent that had been deployed to a mission in one or more of the following countries: Iraq (including both the first and second Gulf Wars), Balkan (Bosnia, Kosovo, Croatia, FYR Macedonia, Bosnia and Herzegovina, Serbia), Afghanistan, Syria, Lebanon (including United Nations Interim Force in Lebanon, UNIFIL), Libya, as well as missions against piracy, 2) reported on at least one child mental health outcome post-deployment, 3) were based on data from the North Atlantic Treaty Organization (NATO) or NATO-associated countries (Australia, Finland, Georgia, Jordan, and Sweden), English-speaking countries, or Israel, 4) represented peer-reviewed primary research, and 5) were reported in English, German, Danish, Swedish, or Norwegian.

A veteran was defined according to the definition provided by the Danish Ministry of Defence, where a veteran is a person who has been deployed to an international mission with the armed forces of their country, i.e. the person could still be employed in the military. However, the person may also have left the military for a civilian career/education (Danish Ministry of Defence, 2016). Similar definitions are used in Norway and Sweden. Children included children under the age of 25 years living at home. Mental health outcomes included mental illness (including subclinical symptoms), psychosomatic, and psychological symptoms. Research relevant to a contemporary context was included. Therefore, the time period of the research was restricted to 1990 and later, with veterans from the Lebanon War as an exception. No restrictions were made with regard to methods and study design; i.e. we did not include e.g. experimental studies or studies using qualitative methods only. Consequently, publications could be based on quantitative, qualitative, or mixed methods, just as they could be based on an observational or experimental study design.

We conducted a descriptive coding and extracted information on the following eight overall coding categories: 1) veteran post-deployment effects, i.e. mental and/or physical symptoms/problems after homecoming, 2) country of deployment, 3) study nationality, 4) publication type, 5) methods, 6) observational vs. experimental study, 7) study design, and 8) outcome categories. These eight coding categories were chosen with reference to a previous mapping of similar literature conducted by Jensen, Karmsteen, Jørgensen, and

Table 1: Search terms of the main search.

Descriptor terms applied in the search strategy	
Family descriptors	Family – Relative – Significant other – Spouse – Partner – Off-spring – Offspring – Child – Adolescent – Toddler – Infant – Teens – Teenager – Youngster
Veteran descriptors	War – Deployment – Deployed – Conflict – Peace – NATO – North Atlantic Treaty Organization United Nations
Deployment descriptors	War – Deployment – Deployed – Conflict – Peace – NATO – North Atlantic Treaty Organization United Nations
Psychosocial descriptors	Psychological health – Inter generational – Transmission trauma – At risk – Depression – Anxiety Psychological stress – Mental health – Secondary traumatization – Vulnerability – Coping – Isolation – School problem – Loneliness – Well-being – Psychosocial health – Behavior problem – Psychological adaptation – Mental or psychosocial well-being – Quality of life – Distress – Alienation – Rejection psychology – Distress – Disruption – Academic difficulty or problem – Adjustment – Emotional stress – Aggression or aggressive – Anger – Fear – Guilt – Detachment
Social connections descriptors	Leisure time – Spare time – Social involvement – Community involvement – School involvement – Social relation – Colleague – Peer – Friend – Participation – Network – Support group – Extended family

Rayce (2015). For this mapping we added a coding category: child mental health outcomes. Mental health was divided into the following categories: 1) internalizing symptoms/problems, 2) externalizing symptoms/problems, 3) ADHD symptoms, 4) secondary traumatization, and 5) other mental health outcomes (e.g. suicide thoughts or PTSD). The categorization into internalizing, externalizing, and ADHD symptoms was inspired by the mental health scales internalizing and externalizing symptoms in the MacArthur Health and Behavior Questionnaire, where ADHD is a subcategory of the externalizing symptom group (Boyce et al., 2002; Essex et al., 2002).

To characterize the specific study samples further, information on sample size, response rate, child age, and who the children are compared to was also extracted. Furthermore, the main findings on the pre-specified domains of child mental health were extracted. Finally, limitations of the papers, e.g. small sample size (<100), were coded based on a coding procedure used by White, de Burgh, Fear, and Iversen (2011) and de Burgh et al., (2011) in papers reviewing the impact of deployment on children (White, de Burgh, Fear, & Iversen, 2011), partners, and spouses of military personnel (de Burgh et al., 2011). The assessment of limitations was conducted by two experienced senior researchers, first by SBR and subsequently by ASBN. Any doubts were discussed with SBA.

Results

The systematic literature search yielded 5,810 publications after removal of duplicates. **Figure 1** presents a flow diagram of study inclusion. The final number of included publications on child mental health was 16, representing 12 studies. Fourteen of the publications were peer-reviewed papers, while two publications were dissertations (Herzog, 2008; Letamendi, 2012).

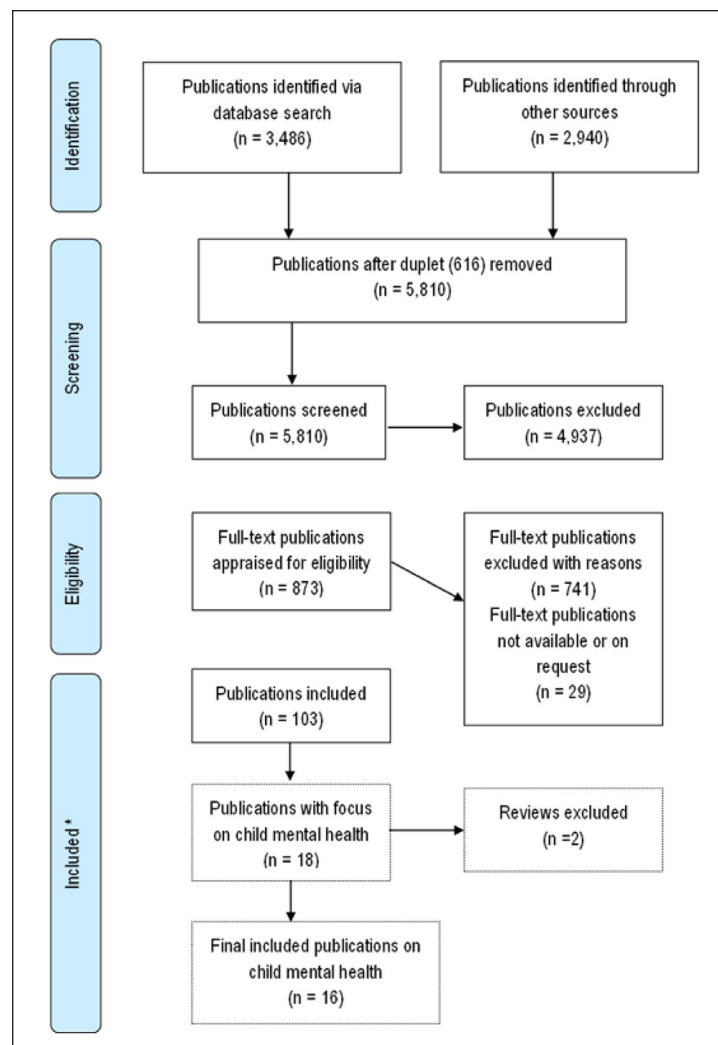


Figure 1: Flowchart for the literature search and screening of child mental health, family relationship, psychosocial well-being, and social relations.

* *Notes:* Included publications (n = 103) cover both child mental health, family relationship, psychosocial well-being, and social relations.

Publication Characteristics

Table 2 presents the overall characteristics of the included publications according to nationality, country of deployment, veteran post-deployment effects, publication type, methods, observational vs. experimental study, study design, and outcome categories. **Table 3a** presents the individual characteristics of the 16 included publications, **Table 3b** presents the outcome measurements, and **Table 4** the main findings.

Table 2: Descriptive table of publications included in systematic literature mapping of mental health among children living with a veteran parent.

Publication characteristics	Number of publications
Veteran post-deployment effects	
Physical	–
Psychological	6
Both	–
None	–
Not reported	10
Country of deployment	
Iraq (Gulf war)	2
Iraq	11
Balkan	4
Afghanistan	7
Syria	–
Lebanon	–
Lebanon (UNIFIL)	–
Libya	–
Piracy	–
Study nationality	
Canada	–
Different nationalities	–
Croatia	2
Netherlands	1
United States	13
Publication type	
Peer-reviewed paper	14
Dissertation	2
Book chapter	–
Method	
Quantitative	14
Qualitative	–
Mixed	2
Observational vs. experimental study	
Observational study	13
Experimental study	3
Both	–

(Contd.)

Publication characteristics	Number of publications
Study design	
Cross-sectional	7
Longitudinal	6
RCT	–
NRS	3
Outcome categories	
Internalizing	16
Externalizing	11
ADHD symptoms	6
Secondary traumatization	–
Other mental health outcomes	4

Sample Characteristics

The included publications are predominantly American ($n = 13$, see **Tables 2** and **3a**). Two are Croatian (Franić et al., 2012; Maršanić et al., 2014), and one publication is Dutch (Andres & Moelker, 2011).

The countries of deployment represented in the publications are mainly Iraq and/or Afghanistan. Thirteen publications are based on samples regarding children living with veterans deployed to Iraq, of which two are based on a Gulf War sample (Kelley, 1994a, 1994b). Seven publications include children living with veterans deployed to Afghanistan (Andres & Moelker, 2011; Lester et al., 2010, 2012, 2013; Letamendi, 2012; Reed, Bell, & Edwards, 2011; Wilson et al., 2011), and four publications report on samples comprising children living with veterans from the Balkan conflict (Andres & Moelker, 2011; Franić et al., 2012; Maršanić et al., 2014; Wilson et al., 2011). Several of the publications are, however, based on samples that include children of veterans deployed to different countries: Iraq and Afghanistan: five (Lester et al., 2010, 2012, 2013; Letamendi, 2012; Reed, Bell, & Edwards, 2011), Bosnia and Afghanistan: one (Andres & Moelker, 2011), and multiple countries including Iraq, Afghanistan, and Bosnia: one (Wilson et al., 2011); see **Table 3a**.

Most of the publications ($n = 10$) do not report whether the veteran parent had any psychological after-effects or physical injuries following deployment. Only six out of 16 specifically addressed aftereffects. All of these publications focused on psychological aftereffects (Herzog, 2008; Lester et al., 2010, 2012, 2013; Letamendi, 2012; Maršanić et al., 2014).

In general, child age ranged between two and 18 years, and the mean age between 7.4 and 10.9 years. In one study child age did, however, range between zero and 28 years (up to 28 years) (Andres & Moelker, 2011), though the mean age of the children was 9.6 years (SD: 7.5).

The included publications differed with respect to the chosen comparison groups. Five publications compared children of veterans with children of non-veterans (Franić et al., 2012; Reed, Bell, & Edwards, 2011) or community norms/a nationally representative sample (Herzog, 2008; Lester et al., 2010; Wilson et al., 2011). Eight publications primarily compared children of veterans with other subgroups of children of veterans or military personnel (Kelley, 1994b, 1994a; Lester et al., 2010; Maršanić et al., 2014) or analyzed risk factors within a specific veteran sample (Herzog, 2008; Letamendi, 2012; Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013). Five publications focused on change from pre- or during deployment to post-deployment (Lester et al., 2012, 2013; Medway et al., 1995; Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013) with no non-veteran comparison group or presented a prevalence only (Andres & Moelker, 2011). Furthermore, the study samples comprised different subgroups of children of veterans. Six publications were based on children of National Guard veterans (Herzog, 2008; Medway et al., 1995; Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Houston, Sherman, & Melson, 2011; Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013; Wilson et al., 2011). Two publications were based on children of Navy veterans (Kelley, 1994b, 1994a), three on children from a mix of Army and Marine veterans (Lester et al., 2010) or Navy and Marine veterans (Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013). Four publications included children of veterans having experienced one or more deployments (Andres & Moelker, 2011; Franić et al., 2012; Letamendi, 2012; Reed, Bell, & Edwards, 2011) including a Dutch sample (Andres & Moelker, 2011) and a sample from the homeland war in Croatia (Franić et al., 2012). One publication was based on a clinical sample of Croatian children (Maršanić et al., 2014).

Table 3a: Characteristics of participants, study type, and methods of publication included in a systematic literature mapping of mental health among children living with a veteran parent.

First author	Andres	Maršanić	Frančić	Herzog	Kelley*	Lester	Letamendi	Medway	Pfefferbaum*	Reed	Wilson		
Publication year	2011	2014	2012	2009	1994a/1994b	2010	2012	1995	2011	2012	2013	2011	2011
Nationality of study population	Netherlands	Croatia	Croatia	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA
N	109 mothers reporting on 221 children	244 adolescents	695 children	54 couples (mother + father) reporting on their child	28 mothers reporting on their child	272 children, 228 parents representing 171 families	21 father-child dyads	100 mothers reporting on any of their children	18 children/10 mothers reporting on any of their children	13 children/9 mothers reporting on any of their children	11 children/9 mothers reporting on any of their children	10,606 adolescents & children	77 parents & children
Response rate	N/A	100%	N/A	5.3%	100% of sub-sample	92%	N/A	Approx. 25%	N/A	N/A	61.1%	8th grade: 77%, 10th grade: 60%, 12th grade: 50%	N/A
Range in years of children, mean age (SD)	0–28, m:9.59 (7.45)	12–18, m:15.0 (3.49)	11, m:12.2 (0.33)	2–17, m:9.38 (N/A)	5–13, m:N/A for sub-sample	6–12, m:8.53 (2.0)	3–18, m:N/A	6–17, m:9.8 (SD:N/A)	6–17, m:N/A	6–18, m:N/A	8–15, m:10.91 (2.51)	3–17, m:9.13 (4.13)	3–17, m:9.13 (4.13)
Veteran post-deployment effects	N/A	Psych	N/A	Psych	N/A	Psych	Psych	N/A	N/A	N/A	N/A	N/A	N/A

(Contd.)

First author	Andres	Maršanić	Frančić	Herzog	Kelley*	Iraq & Afg	Lester	Iraq & Afg	Iraq & Afg	Iraq	Medway	Pfefferbaum*	Reed	Wilson
Country of deployment	Bos & Afg	Croa	Croa	Iraq	Iraq (Gulf war)	Iraq & Afg	Iraq & Afg	Iraq & Afg	Iraq & Afg	Iraq	Iraq	Iraq	Iraq & Afg	Iraq, Afg, Bos, & other
Further sample information	Children of Dutch veterans having experienced a deployment	Children of veterans referred to an outpatient psychiatric clinic	Children in 6th grade with parental Home-land war involvement	Children of National Guard veteran fathers	Children of veteran fathers with Navy deployment	Children of active duty Army or Marine Corps parent	Children of Navy and Marine veterans participating in the FOCUS intervention	Children of fathers with 1+ deployment	Children of Reserve or National Guard veteran	Children of National Guard veterans	Children of National Guard veterans	Children of National Guard veterans	Children with parental deployment within the last 6 years	Children of National Guard veteran participating in the PTS intervention
Comparison	No comparison	Children with/without fathers with PTSD	Children without parents participating in the Home-land war of Croatia	Children of fathers with elevated PTSD symptoms compared to community norms ^a	Children of fathers with peace-time vs. wartime deployment	Children of recently returned veterans vs. currently deployed soldiers and community norms	Pre-posttest	Associations within sample of fathers with combat exposure	Change from deployment to post-deployment	Prepost-test and associations within sample	Pre- post-test and associations within sample	Pre- posttest and associations within sample	Children with parents with combat zone deployment within the last 6 years vs. non-veteran parents	Children of veterans vs. children in a nationally representative study
Study design	Long.	Cross.	Cross.	Cross.	Long.	Cross.	NRS	Cross.	Cross.	Long.	Long.	Cross.	Cross.	NRS
Method	Mixed	Quant.	Quant.	Quant.	Quant.	Quant.	Quant.	Quant.	Quant.	Quant.	Quant.	Mixed	Mixed	Quant.

* Same study with > 1 publication included; ^aSee Table 4 for further descriptions of comparisons. N/A = not available; SD = Standard deviation; Bos = Bosnia; Afg = Afghanistan; Croa = Homeland war in Croatia; Psych = Psychological; Cross. = Cross-sectional; Long. = Longitudinal; NRS = Non-randomized study design; PTS = Passport Toward Success, FOCUS = Families OverComing Under Stress Resilience Training.

First author	Andres	Maršanić	Franić	Herzog	Kelley*	Lester	Letamendi	Medway	Pfefferbaum*	Reed	Wilson
Other mental health outcomes			Suicide attempt (3 items) ^b			Child distress (overall SDQ) ^a	PTSD (UPID) ^b			Suicide thoughts (2 items) ^b	

* Same study with > 1 publication included; ^a Parent reported; ^b Child reported; YSR = Youth Self-Report; SDQ = Strength and Difficulties Questionnaire; CBCL = Child Behavior Checklist; CDI = Children's Depression Inventory; MASC = Multi-dimensional Anxiety Scale; UPID = The UCLA PTSD Reaction Index for DSM_IV; BASC-2 = Behavior Assessment System for Children.

Table 4: Main findings and summary of limitations in publications included in systematic literature mapping of mental health among children living with a veteran parent.

First author & publication year	Internalizing	Externalizing	ADHD	Other mental health outcomes	Limitations
Andres 2011	Separation anxiety: 40% of children were afraid their fathers would leave again (mainly children <10 years).				<ol style="list-style-type: none"> 1. No information for judging representativeness 2. Attrition/difficulty in obtaining follow-up data 3. Possible reporting bias; parent-reported separation anxiety 4. No information on veteran post-deployment effects 5. No examination of possible predictors for separation anxiety; only prevalence was presented 6. Non-validated and single item measure (separation anxiety)
Maršanić 2014	Adolescents of veterans with PTSD had sig. higher OR for overall internalizing above borderline-clinical cutoffs OR: 1.92 (CI: 1.11–3.33) compared to adolescents of veterans without PTSD.	Adolescents of veterans with PTSD had sig. higher OR for overall externalizing above borderline-clinical cutoffs. OR 2.16 (CI 1.22–3.81), compared to adolescents of veterans without PTSD. Aggressive behavior: OR 2.40 (CI 1.36–4.22). Delinquent behavior: OR 2.30 (CI 1.29–4.11).	Adolescents of veterans with PTSD had sig. higher OR for Attention problems above borderline-clinical cutoffs, OR 1.96 (CI: 1.10–3.50).		<ol style="list-style-type: none"> 1. Clinical sample. Sample may not be representative for Croatian veteran children or children referred to psychiatric clinics (symptoms may be more severe compared to other clinics) 2. No information on deployment length or number of deployment 3. Cross-sectional study design

(Contd.)

First author & publication year	Internalizing	Externalizing	ADHD	Other mental health outcomes	Limitations
Franic 2012	Sig. higher OR for <i>anxiety/depressed symptoms</i> OR: 1.71 (CI: 1.00–2.89) among adolescents of veterans with PTSD compared to adolescents of veterans without PTSD. Mean <i>depressive symptoms</i> : NS difference in mean between boys with and without a veteran parent. Borderline sig. difference among girls: 8.66 (SD 9.97) vs. 6.82 (SD 7.11), $p = 0.052$.			<i>Suicidal thoughts/attempts</i> . Boys of veterans sig. higher odds of suicide thoughts OR: 5.06 (CI: 1.72–14.89) compared to non-veteran boys. Girls: NS difference.	<ol style="list-style-type: none"> 1. Convenience sample 2. Risk of reporting bias risk; child self-reported data on parental war involvement. Child depression based on self-report (no clinical assessment) 3. No information on post deployment effects, intensity of combat, and deployment length 4. Cross-sectional study design 5. Non-validated outcome measure used to assess suicidal ideation
Herzog 2009	<i>Overall child internalizing</i> sig. correlated with soldier PTSD ($p = 0.008$) and spouse secondary traumatization ($p < 0.001$). Spouse secondary trauma symptoms mediated the association between soldier's PTSD symptoms and child internalizing symptoms. Children of fathers with elevated PTSD symptom level (PCL ≥ 48) averaged the 69 percentile in externalizing symptoms compared to norms.	<i>Overall child externalization</i> NS correlated with soldier PTSD and spouse secondary traumatization. Children of fathers with elevated PTSD symptom level (PCL ≥ 48) averaged the 69 percentile in externalizing symptoms compared to norms.			<ol style="list-style-type: none"> 1. Convenience sample 2. Small sample 3. Non-representative sample (low response rate) – only National Guard troops 4. Sample possibly biased; innovative reunion programming in the included National Guard unit 5. Reporting bias risk; parent reported data of internalizing and externalizing symptoms 6. Unadjusted analyses 7. Cross-sectional study design

(Contd.)

First author & publication year	Internalizing	Externalizing	ADHD	Other mental health outcomes	Limitations
Kelley 1994a + 1994b*	Association between deployment and <i>internalizing symptoms</i> sig. (p < 0.05) modified by deployment type. Constant symptom level pre-, during and post-deployment among children of parent with wartime deployment. Significant decrease (p < 0.001) in symptom level among children of parent with peacetime deployment.	Association between deployment and <i>externalizing symptoms</i> sig. (p < 0.05) modified by deployment type. Constant symptom level pre-, during and post-deployment among children of parent with wartime deployment. Significant decrease (p < 0.001) in symptom level among children of parent with peacetime deployment			<ol style="list-style-type: none"> 1. Convenience sample 2. Small sample 3. Non-representative sample 4. No information for judging attrition/difficulty in obtaining follow-up data 5. Reporting bias risk; parent-reported data on internalizing and externalizing symptoms 6. No information on post deployment effects 7. Possible confounding/baseline imbalance not addressed
Lester 2010	Overall child <i>internalizing symptoms</i> among children of recently returned veterans (RRV) not sig. different compared to community norms. NS difference in internalizing symptoms compared to offspring of currently deployed soldiers (CDS) after adj. for child gender and age. Child internalizing scores sig. associated with veteran depression, anxiety and symptom severity (p < 0.01). <i>Anxiety symptoms</i> sig. above community norms for both boys and girls for both RRS and CDS children. 31.9% with RRV and 24.7% of CDS parent had clinically sig. anxiety	NS difference in overall child <i>externalizing symptoms</i> among children of recently returned veterans (RRV) compared to community norms NS difference in overall child externalizing symptom score compared to offspring of currently deployed soldiers (CDS) after adj. for child gender and age when adj. for child gender and age. Externalizing behavior sig. associated with veteran PTSD, depression and symptom severity (p < 0.05).			<ol style="list-style-type: none"> 1. Convenience sample 2. Proportion of officers in the sample not representative of the country's military (Army and Marine) population 3. Reporting bias risk; patient reported data on internalizing and externalizing symptoms 4. Cross-sectional study design

(Contd.)

First author & publication year	Internalizing	Externalizing	ADHD	Other mental health outcomes	Limitations
	<p>symptoms. NS difference in anxiety symptoms compared to offspring of CDS after adj. for child gender and age.</p> <p><i>Depression symptoms</i>: NS difference in scores compared to community norms. Sig. ($p < 0.05$) association with symptom severity of recently returned veteran</p>				
Lester 2012	<p><i>Emotional symptoms sig.</i> ($p < 0.001$) reduced from 40.9% at intervention start to 22.1% post-intervention.</p>	<p><i>Conduct problems sig.</i> ($p < 0.001$) reduced from 47.7% at intervention start to 28.4% post intervention.</p>			<ol style="list-style-type: none"> 1. No information for judging representativeness 2. Attrition problems – Completers more likely to be self-referred, less distressed on the Brief Symptom Inventory (BSI) and McMaster Family Assessment Device (FAD) 3. Reporting bias risk; parent-reported data on emotional symptoms and conduct problems (SDQ) 4. No information on deployment type or length 5. Non-randomized study design with no control group
Lester 2013	<p>Emotional symptoms reduced from pre- to post-intervention (mean dif 1.11 (SD 2.34)).</p>	<p>Conduct problems reduced from pre- to post-intervention (mean difference: 1.07 (SD 2.02))</p>	<p>Mean hyperactivity/inattention problems reduced from pre- to post-intervention, (mean difference: 0.85 (SD 2.27)).</p>	<p>Higher overall child distress than in the general child population. Family adjustment improved and predicted reduced distress among children.</p>	<ol style="list-style-type: none"> 1. No information for judging representativeness 2. Number of non-participants not available 3. No report on attrition or difficulties in obtaining follow-up data for participants 4. Reporting bias risk; parent-reported data 5. No information on deployment length or number of deployments. 6. Non-randomized study design with no control group

(Contd.)

First author & publication year	Internalizing	Externalizing	ADHD	Other mental health outcomes	Limitations
Letamendi 2012	<p><i>Overall child internalizing symptoms</i> sig. associated with fathers' combat exposure, battle aftermath, and parental PTSD (all $p = 0.003$).</p> <p>Child depression: Not associated with deployment factors.</p> <p><i>Anxiety symptoms</i> sig. associated with battle aftermath, parental combat exposure, post-deployment stressors (all $p < 0.04$).</p> <p>NS association with parental PTSD, perceived threat during deployment, post-deployment social support.</p> <p><i>Anxiety/depressive symptoms</i> Scale sig. associated with parental combat exposure, battle aftermath, and post-deployment stressors (all $p = 0.001$).</p> <p><i>Withdrawal/depression symptoms</i>: NS association with parental combat exposure, battle aftermath, or post-deployment stressors.</p> <p><i>Somatic symptoms</i>: NS association with parental combat exposure, battle aftermath or post-deployment stressors.</p>	<p><i>Overall child externalizing symptoms</i>: Sig. associated with fathers combat exposure, battle aftermath and post-deployment stressors (all $p = 0.006$). NS association with parental PTSD, perceived stress, post-deployment social support.</p>		<p>Caretaker distress predicted child distress.</p> <p><i>Child PTSD symptoms</i>: Sig. associated with fathers combat exposure post-deployment ($p = 0.003$) when measured with CBCL DSM-Oriented Scale of PTSD. Measured with UCLA PTSD Index for DSM-IV (UPIID) no association was found. NS association with parental PTSD, perceived stress, reports of battle aftermath, post-deployment social support, and post-deployment stress.</p>	<ol style="list-style-type: none"> 1. Convenience sample 2. Very small sample 3. Non-representative sample 4. Sample may be biased due to recruitment method (advertisements in community or referral from VA medical providers): Fathers enrolled in the study may have been those who were undergoing therapy or have a history of utilizing mental health services 5. Reporting bias risk; parent-reported child internalizing and externalizing behaviors 6. Unadjusted analyses 7. Possible selection bias: if more than one child in the family, the parents could choose which child to include in the study 8. Cross sectional study design

(Contd.)

First author & publication year	Internalizing	Externalizing	ADHD	Other mental health outcomes	Limitations
Medway 1995	Mean <i>anxiety problems sig.</i> reduced from 2.00 (SD 0.72) during deployment to 1.29 (SD 0.56) during reunion ($p < 0.001$).				<ol style="list-style-type: none"> 1. Convenience sample 2. Non-representative sample 3. Low response rate 4. Reporting bias risk; mothers' retrospective assessment of child anxiety during separation 5. No information on deployment length and possible veteran post deployment effects 6. Cross-sectional study design 7. Non-validated one-item measure of child anxiety
Pfefferbaum 2011*	No sig. difference in <i>internalizing problems</i> at post-deployment compared to pre- and during deployment. Child reported internalization post-deployment sig. correlated with worrying about the non-deployed parent during deployment and to worrying about the deployed parent readjusting to being home ($p < 0.05$). Parent reported internalization sig. correlated to children's reports of how safe the world was ($p < 0.05$). Mean child-reported emotional symptoms sig. lower post-deployment compared to during deployment (48.78 (SD 7.57) vs. 45.44 (SD 7.41), $p < 0.05$).	Parent-reported mean <i>externalization</i> decreased sig. from deployment to post-deployment (51.38 (SD 9.54) vs. 47.75 (SD 10.0), $p < 0.05$). Externalization sig. higher if children had experienced > 1 deployment. Post-deployment parent-reported externalizing sig. correlated to worrying about the non-deployed parent during deployment ($p < 0.05$).	No sig. difference in mean <i>inattention/hyperactivity symptoms</i> post-deployment (56.77 (SD 9.45)) compared to pre- and during deployment. Child-reported inattention/hyperactivity symptoms post-deployment sig. correlated with worrying about the deployed parents safety while deployed ($p < 0.01$)		<ol style="list-style-type: none"> 1. Convenience sample 2. Very small sample 3. Non-representative sample 4. No information on number of non-participants 5. Reporting bias risk; parent-reported child externalization and internalization 6. No information on veteran post-deployment effects or information on deployment length 7. Unadjusted analyses 8. Other biases; pre-deployment measures reported after separation. Several sibling pairs in an already small sample

(Contd.)

First author & publication year	Internalizing	Externalizing	ADHD	Other mental health outcomes	Limitations
Pfefferbaum 2012*	Child-reported <i>internalizing problems</i> post-deployment correlated with how hard it was to help during deployment ($r = 0.51, p < 0.05$) and how often children felt they should do more to help at-home parents ($p < 0.05$). Parent-reported child internalizing problems post-deployment sig. correlated with frequency of helping parents ($p < 0.05$).	Parent-reported <i>externalizing problems</i> post-deployment sig correlation with difficulties in knowing how to help at-home parents ($p < 0.01$).	Child-reported <i>inattention/hyperactivity symptoms</i> sig. correlated with difficulty knowing how to help parents ($p < 0.05$).		<ol style="list-style-type: none"> 1. Convenience sample 2. Very small sample 3. Non-representative sample 4. No information on number of non-participants 5. Reporting bias risk; parent-reported child externalization and internalization 6. No information on veteran post-deployment effects or information on deployment length 7. Unadjusted analyses 8. Other biases; pre-deployment measures reported after separation. Several sibling pairs in an already small sample
Pfefferbaum 2013*	No sig. difference in <i>mean internalizing symptoms post-deployment</i> compared to pre- and during deployment. Mean emotional symptoms decreased sig. more post- than during deployment (45.44 (SD 7.41) vs. 48.78 (SD 7.57), $p < 0.05$). NS correlation between neither age nor gender and symptoms.		NS changes in mean <i>inattention/hyperactivity symptoms</i> compared to pre- and during deployment.		<ol style="list-style-type: none"> 1. Convenience sample 2. Very small sample 3. Non-representative sample 4. No information on deployment length and veteran post-deployment effects 5. Other biases; pre-deployment measures on child mental health reported after separation
Reed 2011	<i>Depressed mood</i> : Sig. higher OR (OR 1.50 (CI 1.02–2.20)) for depressed mood among 10 th -/12 th -grade boys with a parent deployed to combat zone during the last six years compared to boys with non-veteran parents. NS difference in			<p><i>Suicide thoughts</i>: Sig. higher OR among 8th-grade children (girls: OR 1.66 (CI 1.19–2.32); boys: OR 1.75 (CI 1.15–2.67)) and among 10th-/12th-</p>	<ol style="list-style-type: none"> 1. Reporting bias risk; retrospectively child-reported parental combat zone status. 2. No information on number of deployments, deployment length, veteran post-deployment effects. 3. Confounding risk; timing, duration, and frequency of deployment, family

(Contd.)

First author & publication year	Internalizing	Externalizing	ADHD	Other mental health outcomes	Limitations
	10 th -/12 th -grade girls and among 8 th grade children.			grade boys (OR 1.64 (CI 1.13–2.38)) with a parent deployed to combat zone during the last six years compared to adolescents with non-veteran parents. NS association among 10 th -/12 th -grade girls.	structure during deployment, survival of the parent, type of deployment, and parental mental health not examined 4. Cross-sectional study design 5. Non-validated measure (suicide thoughts). Depressed mood measured by a one-item proxy measure only.
Wilson 2011	Mean emotional symptom score during reunion (2.71 (SD 2.07)) sig. higher than children from a nationally representative sample (NHIS) (p < 0.001).	Mean <i>conduct problem</i> score during reunion (2.35 (SD 1.97)) sig. higher than children from a nationally representative sample (NHIS) (p < 0.001).	Mean <i>hyperactivity</i> score during reunion (4.69 (SD 2.89)) sig. higher than children from a nationally representative sample (NHIS) (p < 0.001).		<ol style="list-style-type: none"> 1. Small sample size (for this mapping we used the SDQ-results) 2. Sample bias risk; families who brought a child to a program aimed at helping families and children reconnect after parental deployment 3. No information for judging response rate 4. Reporting bias risk; parent reported on child symptoms (differed when reported by the previously deployed parent and the at-home parent, respectively). 5. No information on veteran post-deployment effects. 6. No adjustment for potential confounders.

OR = odds ratio; CI = 95% confidence interval; SD = standard deviation; NS = not significant; Sig. = significant/significantly; Corr. = correlated/correlation; Adj. = adjusted/adjusting; NHISCS = the National Health Interview Survey Civilian Sample. * Multiple publications based on same study.

Outcome Characteristics

The included publications focused on a variety of mental health problems among offspring within a wide age group (range, see **Table 3a** for details). Thirteen out of the 16 publications used standardized and validated questionnaires. Internalizing (e.g. anxiety, emotional and depressive symptoms) and externalizing symptoms (e.g. aggressive behavior and conduct problems) are the most widespread outcomes addressed, represented in 16 and 11 publications, respectively. Six publications reported on ADHD symptoms. Four publications reported on other mental health outcomes such as PTSD, suicide thoughts and attempts. No publications reported on secondary traumatization.

Study Design Characteristics

The majority of the publications are quantitative. Out of 16 publications two are based on mixed methods (Andres & Moelker, 2011; Wilson et al., 2011) and no publications are exclusively qualitative.

The study designs are primarily observational (13 publications) of which six publications use a longitudinal study design (Andres & Moelker, 2011; Kelley, 1994a, 1994b; Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Houston, Sherman, & Melson, 2011; Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013) and seven a cross-sectional study design (Franić et al., 2012; Herzog, 2008; Lester et al., 2010; Letamendi, 2012; Maršanić et al., 2014; Medway et al., 1995; Reed, Bell, & Edwards, 2011). The three experimental publications included in the mapping are all based on a non-randomized study design (Lester et al., 2012, 2013; Wilson et al., 2011). Sample size ranged from nine mothers reporting on 11 children (Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013) to a school survey of 10,606 adolescents (Reed, Bell, & Edwards, 2011).

Main Findings of the Publications

The main findings of the publications combined with study limitations are presented in **Table 4** categorized into internalization, externalization, ADHD, and other mental health outcomes.

Internalization Symptoms/Problems

All 16 publications examined internalization (see **Tables 3b** and **4**). Of these, nine publications, representing six studies, provided results on overall internalizing symptoms (Herzog, 2008; Kelley, 1994b, 1994a; Lester et al., 2010; Letamendi, 2012; Maršanić et al., 2014; Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Houston, Sherman, & Melson, 2011; Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013). The results differed. A large cross-sectional study among children and adolescents with a recently returned parent found no difference in internalizing score post-deployment compared to community norms. Neither did internalizing score differ significantly between offspring of recently returned veterans compared to currently deployed soldiers after adjustment for child gender and age (Lester et al., 2010). Likewise, two small studies found no change in child internalizing symptoms over the deployment circle among children of fathers experiencing a wartime deployment (Kelley, 1994a, 1994b; Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Houston, Sherman, & Melson, 2011; Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013). Among children of fathers experiencing a peacetime deployment internalizing problems decreased from pre- to post-deployment (Kelley, 1994a, 1994b). Three studies found significant associations between psychological post-deployment effects and child internalizing symptoms (Herzog, 2008; Letamendi, 2012; Maršanić et al., 2014). One large case-control study conducted in a clinical sample of adolescents found significantly higher odds of internalization problems among adolescents of veterans with PTSD compared to adolescent offspring of veterans without PTSD (Maršanić et al., 2014). This was also found in a very small pilot study, where 15 out of 21 fathers met diagnostic criteria for PTSD: veteran combat exposure, battle aftermath, parental PTSD was positively associated with child internalizing problems post-deployment (Letamendi, 2012). No significant associations were found between perceived threat during deployment, post-deployment social support, and child internalizing problems. A small cross-sectional study also found a statistically significant moderate correlation between soldiers' PTSD symptoms and child internalization mediated by spousal secondary traumatization (Herzog, 2008).

Four publications addressing symptoms of depression or being withdrawn/depressed found mixed results. In a very large cross-sectional American school survey, boys in the 10th and 12th grades with a parent who had been deployed during the last six years had significantly higher odds of depressive mood compared to boys with non-veteran parents (Reed, Bell, & Edwards, 2011). No association was found among 8th-grade boys or among girls. Two large cross-sectional studies, one Croatian and one American, did not find depression/depressive symptoms to differ significantly between children with and without a veteran

parent (Franić et al., 2012; Lester et al., 2010). Neither did it differ significantly from offspring of currently deployed soldiers after adjusting for child gender and child age. Letamendi (2012) found no associations between factors related to fathers' deployment and the presence of child depression or withdrawn/depressive symptoms.

Five publications, representing three studies, addressed emotional symptoms. The intervention, Passport Towards Success (PTS), aimed at helping children and families reconnect again after deployment. At intake they found decreased emotional symptoms compared to during deployment, though still a significantly higher mean score compared to children and adolescents from a large civilian sample (Wilson et al., 2011). No post-intervention scores were presented. Pfefferbaum, Houston, Sherman, and Melson (2011) and Pfefferbaum, Jeon-Slaughter, Jacobs, and Houston (2013) likewise found in their small study significantly lower emotional symptoms post-deployment than during deployment. Evaluating the impact of the family-centered prevention program for families affected by combat- and deployment-related stress, Families OverComing Under Stress Family Resilience Training (FOCUS), Lester et al., (2012, 2013) found a clinically significant reduction in emotional symptoms post-intervention; however, no control group was included in the intervention.

Five publications addressed anxiety symptoms. At post-deployment, Lester et al., (2010) found significantly higher child anxiety levels compared to community norms. Anxiety symptoms in offspring of recently returned veterans did not differ significantly from offspring of currently deployed soldiers after adjustment for child gender and age. In a small cross-sectional study, Medway et al., (1995) found significantly lower child anxiety problems upon reunion compared to retrospectively reported level during separation. A large longitudinal study found that 40% of the children experienced separation anxiety post-deployment and were afraid that their father would leave again (Andres & Moelker, 2011). This was mainly found among children below the age of 10 years. The small cross-sectional study by Letamendi (2012) found significant associations between battle aftermath, parental combat exposure, and post-deployment stressors and both child anxiety and anxiety/depressive symptoms. No associations with parental PTSD, perceived threat during deployment, and post-deployment social support were found. The large case-control study (Maršanić et al., 2014) in a clinical sample of adolescents found significantly higher odds of anxiety/depressive symptoms among adolescents of veterans with PTSD compared to offspring of non-PTSD veterans.

One study addressed somatic symptoms (Letamendi, 2012). No relation between parental deployment factors and child somatic symptoms was found.

Externalization Symptoms/Problems

Eleven publications addressed externalization (see **Tables 3b** and **4**). Of these, eight publications addressed overall externalizing symptoms (Herzog, 2008; Kelley, 1994a, 1994b; Lester et al., 2010; Letamendi, 2012; Maršanić et al., 2014; Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Houston, Sherman, & Melson, 2011). In a clinical sample of adolescent offspring of war veterans Maršanić et al., (2014) found that adolescent offspring of war veterans with PTSD had significantly higher odds of experiencing externalizing symptoms (overall, delinquent, and aggressive behavior, respectively) compared to adolescents with a veteran parent without PTSD. The cross-sectional study by Lester et al., (2010) found no significant difference in externalizing behavior among children and adolescents with a recently returned parent compared to community norms. No significant difference in externalizing symptoms was found compared to offspring of currently deployed parents after adjustment for gender and age. Instead veteran PTSD and depression predicted child externalizing behavior. A small cross-sectional study did not find significant correlations between veteran PTSD or spousal secondary traumatization, respectively, and child externalization (Herzog, 2008). Neither did another small pilot study, where 15 out of 21 fathers met diagnostic criteria for PTSD (Letamendi, 2012). This latter study found positive significant associations between combat exposure during deployment, battle aftermath, and child externalizing problems post-deployment, but no significant associations with parental PTSD, perceived stress, and post-deployment social support, respectively. Focusing on deployment characteristics, a very small longitudinal study found deployment type to modify the association between deployment and child externalizing symptoms (Kelley, 1994a, 1994b). Externalizing symptoms decreased post-deployment among children living with veterans deployed to a peace zone, but remained elevated among children living with veterans who had experienced wartime deployment. Another very small longitudinal study (Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Houston, Sherman, & Melson, 2011) found that child externalization was significantly lower post-deployment than during deployment. Children who had experienced more than one deployment showed a higher level of externalizing behavior.

Three publications addressed conduct problems. The intervention project PTS found a significantly higher conduct problem score among children and adolescents of veterans compared to children and adolescents from a large civilian sample (Wilson et al., 2011). No post-intervention scores were presented. In the non-randomized family intervention study FOCUS, a clinically significant reduction in conduct problems was found post-intervention (Lester et al., 2012, 2013). No control group was included in the intervention study.

ADHD Symptoms

Six publications, representing four studies, examined attention deficit problems (see **Tables 3b** and **4**). At intake, the PTS intervention found significantly higher mean hyperactivity scores among children and adolescents of veterans compared to a large national health civilian sample (Wilson et al., 2011). No post-intervention score was presented. In the large case-control study conducted in a clinical sample of Croatian adolescents, Maršanić et al., (2014) found significantly higher odds of attention problems among adolescent offspring of veterans with PTSD compared to adolescent offspring of veterans without PTSD. In their very small study, Pfefferbaum et al., (Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Houston, Sherman, & Melson, 2011; Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013) found no changes in attention/hyperactivity problems over the deployment circle. The non-randomized intervention study FOCUS reported post-intervention scores and found a decrease in hyperactivity/inattention score post-intervention, but did not address significance (Lester et al., 2013). Neither was a control group included in the study.

Other Mental Health Outcomes

Four publications addressed other mental health outcomes (see **Tables 3b** and **4**) (Franić et al., 2012; Reed, Bell, & Edwards, 2011, Lester et al., 2013, Letamendi, 2012). Of these, two publications addressed suicide thoughts or attempts. A large cross-sectional study found significantly higher odds of suicide thoughts among adolescent sons but not daughters of veterans from the homeland war in Croatia compared to offspring of non-veterans (Franić et al., 2012). The very large cross-sectional American school survey conducted by Reed, Bell, and Edwards (2011) likewise found a significant association between having a veteran parent and reporting suicide thoughts; 8th-grade girls and boys and 10th-grade boys with a parent who had been deployed during the last six years had significantly higher odds of experiencing suicide thoughts compared to adolescents with non-veteran parents. In their non-randomized intervention study, FOCUS, Lester et al., (2013) reported on overall child distress. At intake, overall child distress was higher than among children from the general population. Post-intervention, the family function was significantly improved, which again decreased overall child distress (Lester et al., 2013). No control group was, however, included in the study. One very small study addressed child PTSD (Letamendi, 2012) and found a positive significant association between father's combat exposure and child PTSD symptoms post-deployment measured using the CBCL DSM-Oriented Scale of PTSD. Measured with the UCLA PTSD Index for DSM-IV (UPID), no significant association was found. No significant associations with parental PTSD, perceived stress, battle aftermath, post-deployment social support, or post-deployment stress, respectively, were found.

Discussion and Conclusion

This systematic literature mapping identified a range of contemporary scientific publications on the mental health of children living with a veteran parent formerly deployed to warfare. Sixteen publications met the inclusion criteria. The publications reported on varied considerably in sample size and covered a broad age span ranging from infants to teenagers. Most of the studies were American and comprised children living with veterans deployed to Iraq and/or Afghanistan. The publications primarily used a quantitative longitudinal or cross-sectional design. Most publications did not report on veteran post-deployment effects. The ones that did focused solely on psychological post-deployment effects. Regarding study outcomes, especially in- and externalization were covered in the included publications, while fewer publications focused on outcomes on ADHD symptoms and other mental health outcomes. Publications reporting on internalization primarily reported on overall internalization, but emotional problems and depression were also frequent outcomes. Publications on externalization mainly focused on overall externalization followed by outcomes on conduct problems.

Regarding publications on mental health among children of formerly deployed soldiers, this mapping shows a shortage of larger, longitudinal, European studies and studies focusing on the type of mental

health problems of the parents. Furthermore, publications reporting on attention deficit problems, suicide thoughts/attempts, and secondary traumatization are limited. Studies with a mixed-method or qualitative approach are scarce. Likewise, very few publications reporting on intervention studies with an experimental design and child mental health outcomes were identified.

The publications in the mapping represented a diversity of comparison groups and children included. Many publications compared either children of veterans with other subgroups of children of veterans (or military personnel), e.g. children of soldiers deployed in wartime vs. peacetime (Kelley, 1994a, 1994b), children of recently returned vs. deployed soldiers (Lester et al., 2010), or children of fathers with/without PTSD (Maršanić et al., 2014). Relatively few studies included a non-veteran comparison group, e.g. a nationally representative sample/community norms (Franić et al., 2012; Herzog, 2008; Lester et al., 2010; Reed, Bell, & Edwards, 2011; Wilson et al., 2011). Moreover, the children differed in country of origin, and whether their veteran parent represented a clinical or non-clinical sample. This diversity in choice of comparison group may have impacted conclusions about the effects of deployment on mental health of children of veterans; studies comparing children of veterans with non-veteran comparison groups may actually underestimate the possibly negative effect of deployment on the children. Military families have in some studies been estimated to be more robust than civilian families, with a few differences, due to the healthy soldier effect (Cozza, Chun, & Polo, 2005; Ryan-Wenger, 2001). Since soldiers in general are highly selected and represent mentally and physically healthier individuals compared to the background population (Larson & Highfill-McRoy, 2008; McLaughlin, Nielsen, & Waller, 2008), appropriate comparison groups are in general difficult to find within the field of military research. Comparison with civilians may therefore overlook the possibility of a healthier warrior effect. Despite this risk, a recent and large longitudinal study of Australian adult children of Vietnam War veterans still found significantly higher odds ratios for mental health diagnoses as compared to the background population (Forrest, Edwards, & Daraganova, 2018), indicating that the background population may constitute an appropriate comparison group in a longer follow-up.

This paper has some strengths and limitations. One strength is the systematic design of the mapping with a priori defined inclusion criteria ensuring that only publications meeting these criteria were included. Although all publications included in this mapping reported on child mental health, the studies are characterized by being rather heterogeneous in terms of wars, outcomes, study designs, and groups of children compared. This may be considered a limitation if focus is to gain more knowledge on specific research questions and associations. It was, however, not a primary aim of this mapping to draw conclusions on a specific prevalence or associations within the field. The primary aim was to identify publications and investigate the specific characteristics of publications within the field of veteran child mental health in a broad sense. In this light, we consider this relatively broad scope a strength.

A secondary aim of the mapping was to report the main findings on child mental health reported in the included publications. The findings of the specific publications must, however, be interpreted with reference to the limitations of the studies. First, a major limitation of the publications in this field is the small sample sizes. Half of the included publications (Herzog, 2008; Kelley, 1994b, 1994a; Letamendi, 2012; Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Houston, Sherman, & Melson, 2011; Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013; Wilson et al., 2011) comprised less than 100 respondents (n ranging from 11 to 77), limiting the statistical power of the analyses. Thus, it cannot be ruled out that some statistically non-significant findings may be the result of very small sample sizes.

Second, the majority ($n = 10$) of the publications were based on a convenience sample (Franić et al., 2012; Herzog, 2008; Kelley, 1994b, 1994a; Lester et al., 2010; Letamendi, 2012; Medway et al., 1995; Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Houston, Sherman, & Melson, 2011; Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013), and most ($n = 13$) of the publications were either characterized as non-representative samples or did not report on representativeness (Andres & Moelker, 2011; Herzog, 2008; Kelley, 1994b, 1994a; Lester et al., 2010, 2012, 2013; Maršanić et al., 2014; Medway et al., 1995; Pfefferbaum, Houston, & Allen, 2012; Pfefferbaum, Houston, Sherman, & Melson, 2011; Pfefferbaum, Jeon-Slaughter, Jacobs, & Houston, 2013; Wilson et al., 2011). E.g. one publication was based on a clinical sample of adolescents (Maršanić et al., 2014), three publications on samples of children and families participating in a post-deployment intervention study (Lester et al., 2012, 2013; Wilson et al., 2011), and one publication was based on a sample comprising a higher proportion of officers compared to the Army and Marine populations (Lester et al., 2010). Lack of representativeness may have limited the external generalizability of the findings of several of the included publications.

Third, several of the publications present unadjusted analyses or results from non-randomized studies with no control group, increasing the risk of bias. Additionally, most of the included studies ($n = 12$) did not provide or include information on one or more of the following factors which may be important modifiers of the association between having a veteran parent and child mental health outcomes: deployment length (Chandra, Martin, Hawkins, & Richardson, 2010; Mansfield, Kaufman, Engel, & Gaynes, 2011; Richardson et al., 2011) and type (Cunha, Shen, & Burke, 2018), family environment (Gewirtz & Zamir, 2014; Lester & Flake, 2014), and veteran and spouse mental health (Chandra et al., 2010; Lester & Flake, 2014; Mansfield, Kaufman, Engel, & Gaynes, 2011). Finally, most of the publications ($n = 12$) presented results based on parent-reported child mental health outcomes. While parent-reported child mental health outcomes are appropriate in some cases (e.g. when studying young children who cannot complete a questionnaire themselves or when a clinical assessment of all children is too costly), it is possible that the veteran or spouse's responses may have been affected by their own mental health or experience of the deployment circle and family life. This may constitute a risk of reporting bias leading to either over- or underestimation of e.g. child internalizing symptoms. Altogether, the considerable scope of limitations combined with the diversity in comparison groups chosen warrants cautious interpretation of the results of the publications included in this mapping.

This mapping does not only provide an overview of existing publications on mental health among children living with a veteran parent. It also draws attention to potential gaps in this research field when it comes to e.g. nationality of study population, veteran post-deployment effects, methods, and study design. Such information can prove useful when designing future studies on the mental health of children of veterans. In particular, the relatively few publications based on samples of children from another NATO or NATO-associated country than the USA, especially Europe and Scandinavia, call for more studies on child mental health post-deployment in these samples. European/Scandinavian deployments are characterized by shorter length, mainly up to half a year with the possibility of vacation during deployment, which may differ from e.g. American deployments which in general are of longer length (Mansfield, Kaufman, Engel, & Gaynes, 2011). Longer periods of separation may affect child mental health to a higher degree. This was found in a study on deployment and mental health diagnoses among children of US Army personnel (Mansfield, Kaufman, Engel, & Gaynes, 2011). E.g. missing and lack of support from the deployed parent may make the reintegration harder on both spouse and children (Lester et al., 2010). Similarly, shorter dwell time at home with the family between deployments also increases the post-deployment risk of PTSD and other mental health disorders (MacGregor, Han, Dougherty, & Galarneau, 2012), which may potentially affect children's mental health as well. Methodologically, this mapping calls for more high-quality studies of representative and large samples with appropriate adjustment for potential confounders or baseline imbalance. Furthermore, publications on studies investigating possible mediators and effect moderators are important in order to increase knowledge on the specific factors that would benefit from being targeted in mental health interventions for children of veterans. Finally, publications documenting randomized control studies of interventions aimed at families/children of veterans and their effects on child mental health are important in order to gain new knowledge on how to support children living with veterans and families post-deployment.

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Competing Interests

The authors have no competing interests to declare.

Author Contributions

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