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The Intergenerational Health Effects of Service in the Military

Volume 2

Literature review

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Introduction

This literature review has been conducted by The Centre for Military and Veterans' Health (CVMH) to inform the proposed research study into the "Intergenerational Health Effects of Military Service". This work has been commissioned by the Department of Veterans' Affairs (DVA). The aim of this review is to explore the effects of military service on the physical, mental and social health of Vietnam veterans' families with as specific focus on the sons and daughters. First background information will be presented, followed by sections on the methodology, the extent of current research, and the critical appraisal and synthesis of the relevant studies reviewed.

Volume 1 of the *Morbidity of Vietnam veterans: A study if the health of Australia's Vietnam community* [1] found that male veterans were three times more likely than a community sample to report their health as poor. In particular, veterans consistently reported 30% or greater levels of mental health problems (panic attacks, anxiety disorder, depression and PTSD). Forty percent of Australian male veterans reported that their service related health problems negatively impacted on the physical and mental health of their past or current partners, with stress, anxiety and depression being the most common reported problems. Greater length of service was related to higher reports of health problems in spouses. No comparison group was available for this data. However, as commented in the report summary, the levels of mental health problems reported by the veterans would be expected to place stress on the partner. The morbidity study also found that male veterans reported higher rates of congenital abnormalities and cancers in their children. The subsequent cancer validation study [2] found higher levels of adrenal gland cancer and acute myeloid leukemia in veterans' children, although statistical significance was not reached. Statistically higher levels of non-Hodgkin's lymphoma were found. Finally, a three times higher rate of youth suicide in children of male Vietnam veterans was verified [3].

These findings relating to the sons and daughters of Vietnam veterans lead to *The feasibility study into the health of the children of Vietnam veterans* [4]. The review of the medical literature conducted for the feasibility study found a modest literature relating specifically to Vietnam veterans and their children. The report included a literature review of 53 research articles from a Medline search using the terms "children", "veterans" and Vietnam". The literature review reported on methodology difficulties found in studies designed to assess the long term effect of the Vietnam War on the psychological and physical health of veterans, the physical and mental health of children of Vietnam veterans, and possible implications for children of Vietnam veterans. Overall, this literature review concluded that:

- Studies had found a slight increase in female to male sex ratio in offspring, as well as a weak association between the parental exposure of phenoxy herbicides and reproductive outcomes.
- Problems found in children of veterans with PTSD were more likely to be associated with disrupted family functioning rather than the intergenerational transmission of posttraumatic stress symptomatology. Veterans' combat exposure,

PTSD symptoms, and violent behaviour were positively correlated with children's anger and violent behaviour.
- Differences in the pre-military upbringing of veterans' have been observed in those who subsequently developed PTSD and those who did not suggesting this pre-existing disposition may be impacting on the long-term mental health of their children.

The current literature review sought to build on the previous review by taking a systematic and broader approach in searching the literature. The objectives of the systematic review were:

- To systematically search a wide range of research across multiple disciplines to identify studies investigating the impact of military service on spouses, families and children.
- To map the literature to a model of health to obtain an overview of the breadth of research undertaken in this area, the developmental ages of the children studied, and identify significant gaps in the literature.
- To undertake a critical appraisal and objective overview of the research, with particular focus on the strength of evidence currently available linking military service to child and family outcomes of interest.

A systematic review uses a systematic and explicit method to identify, select, and critically appraise relevant primary research. This type of review is generally conducted in the field of evidence-based medicine for assessing the quality of outcomes from specific health interventions. However, the majority of studies conducted in the area of intergenerational effects of military service are of an observational nature investigating associations between parental military service and family and child outcomes. In building on the work of the Feasibility Study the scope of this search has been increased two-fold. Firstly, the terms used to search the published literature were broadened to identify a wide range of health and wellbeing outcomes for both children and families of all military personnel. This is of particular importance given the increase in suicide rates found in the Australian veteran morbidity study. Secondly, a search of a wider range of scientific disciplines was undertaken to identify studies outside the medical literature.

In taking this broader biopsychosocial approach to the literature review a model of health was used as a guiding framework. It is generally acknowledged that health and wellbeing outcomes are the result of complex interactions between inherited risks and resiliencies as well as environmental factors, highlighting the multiple contexts in which children develop [4]. This literature review based the research variables investigated on the Lynch [5] Ecological Model of Health (Figure 1). This model utilizes both multiple environmental and individual contexts and a lifespan perspective. The upstream determinants highlight the importance of environmental factors such as social policy and the cultural environment, as well as the impact of neighbourhood, community services, and work on families and child development [6]. Thus it is acknowledges that military service may impact on family and children at various levels with social, economic policy and cultural environment being distal to the more proximal individual and biological characteristics. For example, military deployment results in family separations and may

result in exposure to traumatic events that impact on both the physical and mental health

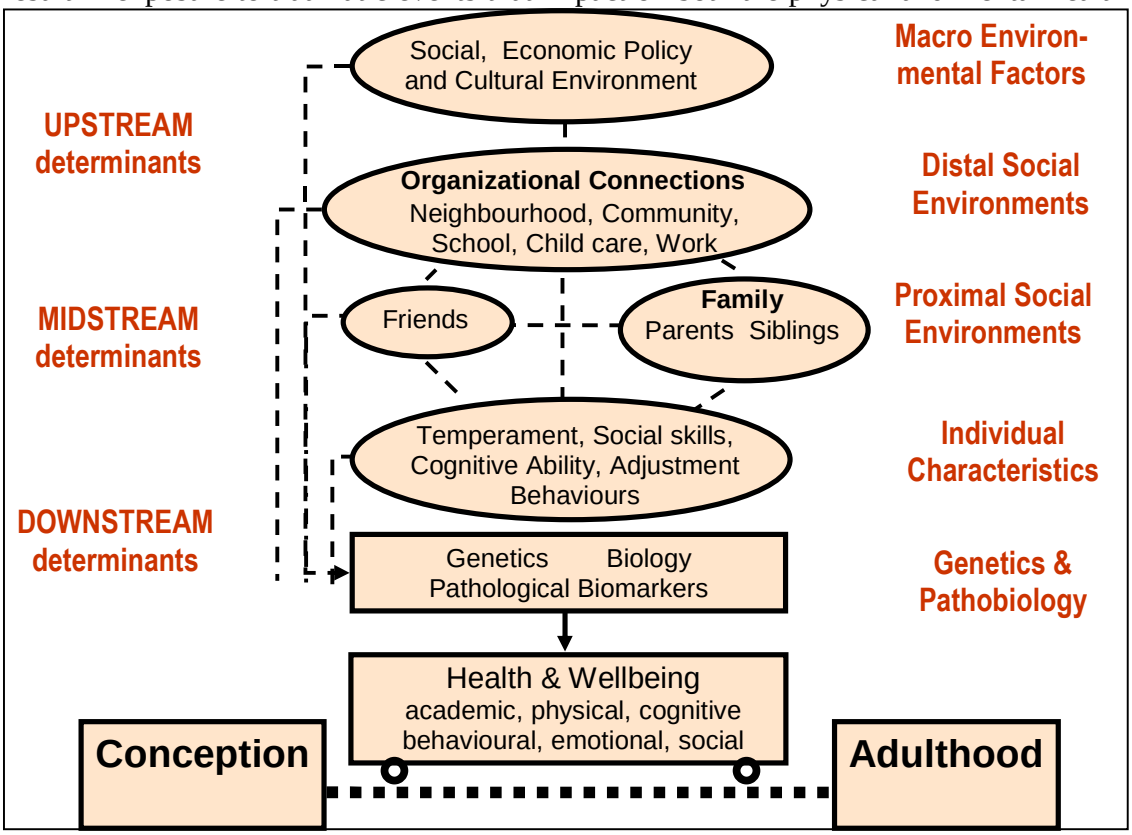

Figure 1: Ecological model of health adapted from Lynch (2000) by A/Prof Jan Nicholson

of the parent. In addition, family mobility will alter social support networks, spouse work opportunities, and result in school transfers for children, all of which may impact on both family dynamics and child outcomes. The midstream determinants of family and friends have been well studied in the area of child development, with secure child-parent relationships being of particular salience [7]. The downstream determinants of genetic and biological markers are also particularly relevant in the current study as this is the level that includes the exposure of the child's parents to various potential toxins. In addition, the factors included in each of these levels will have differing levels of impact on family and child outcomes depending on the developmental stage of the child [4].

Procedure

Search Strategy

The strategy for conducting this systematic review was adapted from 'The Cochrane Collaboration Handbook: Systematic reviews of health promotion and public health interventions' (www.vichealth.vic.gov.au/cochrane). The traditional systematic review

uses the PICO (Population, Intervention, Comparison and Outcome) method where search terms are separately developed for each component. Data bases are searched separately for each set of terms then combined to yield a set of studies that are identified in all PICO search terms. In the current study we have conceptualized research studies which assess children, family and spouse outcomes as the population (P), military service as the Comparison/Intervention (C/I) and health, development and well being as the Outcome (O). Five data bases were searched to encompass the medical (medline), psychological (PsycINFO), allied health (CINHAL), social work and policy (Sociological Abstracts), and educational (ERIC) literature. The search strategy developed is reported in Table 1.

The references identified from the five data bases were downloaded into the reference manager Endnote 9 and were searched by title and abstract to determine eligibility for the review process. Papers were included if the study population include children, spouses, or families of military personnel and investigated any health and well being outcome variables. In addition, policy and service papers effecting military families where included if an evaluation or comparison had been conducted. Papers were excluded if they did not meet the inclusion criteria, were duplicates, single case studies or clinical discussion papers, or were not primary references. Book chapter and review papers are not primary sources and were excluded, but the reference lists from these sources were assessed to ensure inclusion of all relevant primary sources. Full text articles were obtained were possible for references without abstracts before inclusion and exclusion criteria applied.

Table 1. Descriptors used for searching data bases

<table>
<tr><th>Family/child (P)</th><th>Military (I/C)</th><th colspan="2">Outcomes (O)</th></tr>
<tr><td rowspan="2">fetus
foetus
Newborn
Infant
child*
adolescent
adolescence
family
families
familial
paternal
father*
mother*
maternal
parent*
intergeneration*
transgeneration*</td><td rowspan="2">military
veterans
defense forces
soldier
armed forces
army
air force
navy
marines
submariner*
veteran
servicemen
servicewomen
service personnel</td><td>behaviour*
behavior*
emotional
social
educational
cognitive
psychosocial
reproductive</td><td>AND
outcomes
achievement
attainment
factors</td></tr>
<tr><td colspan="2">birth defects
congenital abnormalities
health
wellbeing
resilience
adaptation
violence
exposure</td></tr>
</table>

Note:* = extended words; slight modifications were required for CINHAL, ERIC, and PsycINFO

Coding of papers for study design and mapping

All papers which met the inclusion/exclusion criteria were coded and mapped using the abstracts only. Full text articles were utilized only when the abstract was unavailable or uninformative. Six mutually exclusive study design codes were used; prospective, retrospective, cross sectional, case-control, intervention and qualitative.

In relation to the breadth of the variables studied an iterative process was used to develop a series of categories from the predictor and outcome variables used in each study [8]. Military specific variables were coded within four major categories; military duty, military services, military factors and family mobility. All the categories were aligned with the appropriate level of the Ecological Model of Health [5]. This type of coding resulted in the possibility of a research paper being coded multiple times within the same level, as well as on multiple levels, depending on the number and range of variables within the particular study.

The age group of the children studied was also coded in relation to the developmental age of the child, ranging from conception to delivery (C-0), birth to two years (0to<2), the preschool (2-<5), primary (5<12) and secondary (12<18) school years, and adult children (18+). In each research paper all ages studied were coded resulting in some studies being coded in two or more age categories. When a study assessed all children regardless of age the study was coded in a separate category (All) and not placed in each individual developmental category. The study was categorized as 'Family' when the study focused on family and spouse outcomes where children may or may not have been present. Where the abstract was unclear and a full text article was unable to be retrieved the paper was coded not determined (ND).

Summary statistics are reported for either the total number of papers, or for the number of papers within each age group.

Data extraction and quality appraisal

Data extraction and quality appraisal was limited to a subset of papers that addressed factors pertinent to Vietnam veteran's families and were identified by the expert team as important for the current project and were determined from the full text article only.

Data extraction was conducted systematically using a data extraction proforma developed by the research team at CMVH (Appendix 1). Briefly, data was collected on the study design and all studies were appraised using a study-design score system. The appraisal questions and the scoring system, presented in Table 1, were conducted for each paper following data extraction. There were six questions (maximum of 2 points each) pertaining to the purpose of the study, the population, methods used, clarity of results,

interpretation, and possible alternative explanations. A maximum appraisal score was 12 points. To be considered as a study of reasonable quality, the study had to score at least 7 points on an appraisal score. Scores between 12 and 10 were considered good quality papers and between 9 and 7 adequate quality. Papers with abstracts only did not contain sufficient information and were not scored. Low quality studies (<7) and papers with abstracts only are presented in the tables in italic font.

Table 1: Appraisal scoring system

No	*Appraisal question*	*Yes*	*No*	*Can't tell or mixed answer*
1	Is the purpose of the study clear and well defined?	2	0	1
2	Is the population well defined and properly selected?	2	0	1
3	Are the methods clearly described and appropriate?	2	0	1
4	Are the results presented in a clear and understandable format?	2	0	1
5	Does the interpretation of the results seem consistent with the results presented?	2	0	1
6	Are there other explanations that could account for the results?	0	2	1
	Total score	Max of 12		

Results

Search Results

The search of the five data bases identified a total of 5450 references once obvious duplicates were removed (Table 2). Approximately 45% were identified by Medline. From the 5450 papers identified by the search strategy only 364 (6.7%) fitted the inclusion/exclusion criteria (Table 3). Of these 49 (13.5%) were not primary sources, abstracts or full text articles were not found for a further 14 references (3.8%), and a further 10 duplicates were identified, leaving a total of 291 articles from the original search included in the mapping (5.3%). The percentage types of research papers are shown in Table 4. with over eighty percent being journal articles, and the remainder being electronic sources, theses and books with original data [9-57][58-106][5, 106-154][155-204][205-254][254-303][304-308].

Table 2: Number of references identified from each of the databases searches

	Number of references identified			
Databases	**Child/family**	**Military**	**Outcomes**	**Total**
Medline	1600982	37082	1360676	2422
PsycINFO	479172	20136	510363	1540
CINAHL	230296	10332	430478	631
ERIC	47556	28618	377595	1792
Sociological Abs				
Total				6385
Total-duplicates				**5450**

Note: Limits Human and English; ERIC and Sociological Abstracts were search concurrently

Table 3: Number of research articles included in the review process

References	**Number**
Identified from databases	5450
Met inclusion/exclusion criteria	364
-Review articles, books or book chapters	49
-No abstracts or full text articles retrieved	14
-Duplicates	10
Total references included in review	**291**

Table 4: Percentage of types of articles included in the review

Reference type	*%*
Journal articles	80.4
electronic	5.8
theses	13.1
Book chapters	0.7

Study Designs

The percentages of study designs used in each age category are reported in Table 5. Approximately 50 percent of all studies utilized a cross sectional experimental design. This pattern was seen across most age groups. Approximately 20 percent of studies used a retrospective design and these were more prominent in the conception to birth age group and the 'all' age group. Many of these studies utilized record data. Ten percent of papers used a prospective design and a further 10 percent used qualitative methods.

Table 5: Percentage of articles for each study design

Age groups	**Total number**	**Study design % (n)**						
		Pros	Retro	C-S	Qual	C-C	Interv	ND
C-0	47	24.5 (11)	34.7 (17)	26.6 (12)	-	10.2 (5)	2.0 (1)	2.0 (1)
0-2	22	-	18.2 (4)	50.0 (11)	9.1 (2)	9.1 (2)	9.1 (2)	4.0 (1)
2-5	6	-	-	66.7 (4)	33.3 (2)	-	-	-
5-12	28	10.7 (3)	14.3 (4)	67.8 (19)	3.2 (1)	-	-	3.2 (1)
12-18	31	-	12.9 (4)	77.1 (24)	-	3.7 (1)	-	6.4 (2)
18+	10	-	10.0 (1)	60.0 (6)	30.0 (3)	10.0 (10)	-	-
All	35	2.9 (1)	51.2 (18)	22.8 (8)	11.4 (4)	5.7 (2)	-	5.7 (2)
ND	6	-	-	66.7 (4)	-	-	-	33.3 (2)
Family	125	12.5 (16)	10.0 (13)	50.0 (63)	15.0 (19)	-	3.3 (4)	9.2 (11)
Total %	100 (310)	10 (31)	19.7 (61)	48.7 (151)	10 (31)	6.4 (20)	2.2 (7)	6.4 (20)

Note: The total number is greater than 291 as some papers cover two age groups; Pros = prospective; Retro = retrospective; C-S = cross sectional; Qual = qualitative; Inter = intervention; C-C = case control; ND = not determined

Breadth of issues studies

The coding process identified a range of military specific factors which mapped to the distal social environment. These factors were military duty such as deployment or combat, military services such as health services, and family mobility due to military transfer. Proximal environmental factors are grouped in relation to family factors such as family resources and relationships, or parental factors such as health or psychosocial outcomes. Child factors covered the range of physical, mental, psychosocial and cognitive development. Child maltreatment was viewed as a child outcome and was categorised separately. Tables 6 summarises the number of studies in the broad categories for each age group. Overall, approximately 57 percent of all papers contained specific data on child outcomes. These were spread over the seven age categories with conception to birth having the highest individual level of research (16.2% of total number). A range of 28.6 to 66.7 percent of child studies included proximal or family factors, and between 45.7 percent and 80.0 percent included distal environmental factors. There was an overlap of studies particularly between the 5-12 and 12-18 age groups with many studies combining both primary and secondary school children. Only 10.7 percent of the studies investigated outcomes of children between 0-5 years of age. Approximately 43 percent of studies were conducted for the family category which included all papers examining effects of military duty on family functioning and spouse mental health and psychosocial functioning (without specific child outcomes).

Table 7 provides more detail of the subcategories within each environmental level. Military deployment is the major military distal environmental factor studied in the child outcome papers, with family mobility being more salient for the school age children. For the studies of spouses and general family outcomes both deployment and more specifically combat exposure are important military stressors. These studies also focus on parental mental health, particularly posttraumatic stress disorder (PTSD) in military personnel.

Main themes

A range of research themes emerged from mapping the literature. The main research themes were different for each of the mapped age groups and are presented separately by age group, with the exception of studies in the 5-12 and 12-18 years aged range. For each research area the common upstream and down stream variables investigated are reported.

Table 7. Summary of the numbers of research papers on Military children and family analysed from abstracts by age group of children studied for each level of the Lynch Ecological Model of Health

Model Levels	Life Stage of Children -Years (N =291)									
	n (%)	C to 0 47 (16.2)	0 to <2 25 (8.6)	2 to <5 6 (2.1)	5 to <12 29 (9.6)	12 to <18 32 (10.7)	18+ 10 (3.4)	All ages 35 (12.1)	Unknown 6 (2.1)	Family 125 (43.1)
Macro	**23 (7.9)**	**4 (8.5)**	**2 (8.0)**	**0**	**2 (7.1)**	**4 (12.9)**	**0**	**1 (2.9)**	**0**	**12 (9.6)**
Distal	**191 (65.9)**	**32 (68.1)**	**13 (52.0)**	**5 (83.3)**	**20 (67.9)**	**20 (61.3)**	**8 (80.0)**	**16 (45.7)**	**5 (83.3)**	**90 (72.0)**
Military duty		14 (29.8)	2 (8.0)	2 (33.3)	11 (35.7)	9 (16.1)	5 (50.0)	5 (14.3)	4 (75.0)	46 (36.8)
Military services		7 (14.9)	8 (32.0)	2 (33.3)	1 (3.6)	1 (3.2)	0	6 (17.1)	0	16 (12.8)
Military factors		11 (23.4)	2 (8.0)	1 (16.7)	1 (3.6)	0	0	3 (8.6)	0	12 (9.6)
Family mobility		3 (6.4)	3 (12.0)	3 (50.0)	8 (28.6)	10 (32.2)	2 (20.0)	5 (14.3)	2 (33.3)	30 (24.0)
School characteristics		0	0	0	1 (3.6)	1 (3.2)	0	0	0	0 (0.0)
Peers relationships		0	0	0	1 (3.6)	1 (3.2)	0	0	0	1 (0.8)
Religion		0	0	0	0	0	1 (10.0)	0	0	1 (0.8)
Proximal	**179 (61.7)**	**18 (38.3)**	**16 (64.0)**	**4 (66.7)**	**10 (32.1)**	**13 (38.7)**	**7 (70.0)**	**10 (28.6)**	**5 (80.00)**	**112 (89.6)**
Family Factors		***8 (17.0)***	***4 (16.0)***	***3(50.0)***	***4 (10.7)***	***7 (19.3)***	***4 (40.0)***	***9 (25.7)***	***2 (33.3)***	***69 (55.2)***
Structure & resources		8 (17.0)	2 (8.0)	2 (33.3)	0	1 (3.2)	1 (10.0)	3 (8.6)	2 (33.3)	14 (11.2)
Continued….	**n (%)**	**C-0**	**0 to <2**	**2 to <5**	**5 to <12**	**12 to <18**	**18+**	**All ages**	**Unknown**	**Family**
Family relationships		1 (2.1)	3 (12.0)	1 (16.7)	4 (10.7)	5 (16.1)	4 (40.0)	6 (14.1)	1 (20.0)	61 (48.8)
Parent Factors		***13 (27.7)***	***15 (60.0)***	***2 (33.3)***	***9(28.6)***	***12 (34.5)***	***6 (60.0)***	***9 (25.7)***	***4 (75.0)***	***97(7.6)***
Characteristics		4 (8.5)	0	-	1 (3.6)	1 (3.2)	1 (10.0)	4 (11.4)	0	17 (13.6)
Mental health		1 (2.1)	5 (20.0)	2 (33.3)	6 (17.9)	9 (25.8)	6 (60.0)	4 (11.4)	2 (33.3)	45 (36.0)
Physical health		8 (17.0)	0	0	0	1 (3.2)	1 (10.0)	1 (2.9)	0	7
Psychosocial		-	5 (20.0)	2 (33.3)	3 (10.7)	3 (9.7)	2 (20.0)	4 (11.4)	3 (50.0)	41 (32.8)
Behaviors & Beliefs		6 (12.8)	9 (36.0)	0	3 (10.7)	3 (9.7)	1 (10.0)	1 (2.9)	2 (33.3)	9 (7.2)
Genetic	**31 (10.7)**	**23 (48.9)**	**1 (4.0)**	**0**	**3 (10.7)**	**0**	**0**	**4 (11.4)**	**0**	**0**
Exposure		23 (48.9)	1 (4.0)	0	2 (7.1)	0	0	4 (11.4)	0	0
Child gender		0	0	0	1 (3.6)	0	0	0	0	0
Child outcome	**125 (43.1)**	**40 (85.1)**	**9 (36.0)**	**3 (50.0)**	**25 (85.7)**	**27 (83.9)**	**10 (100.0)**	**27 (77.1)**	**3 (60.0)**	**0**
Physical health		40 (85.1)	7 (28.0)	2 (33.3)	3 (10.7)	0	0	9 (25.7)	0	0
Mental health		0	0	0	16 (53.6)	16 (48.4)	7 (70.0)	5 (14.3)	2 (33.3)	0
Psychosocial		0	0	0	6 (15.8)	8 (25.8)	8 (80.0)	2 (5.7)	2 (33.3)	0
Cognitive		0	0	0	11 (39.3)	11 (35.5)	0	0	1 (20.0)	0
Abuse		0	2 (8.0)	1 (16.7)	0	0	0	15 (42.9)	0	0

Note: Overlapping age groups: 0-2 and 2-5 (5), 5-12 and 12-18 (13), 12-18 and 18+ (3)

Table 8: Detailed mapping of research papers on military children and family analyzed from abstracts by age group of children studied for each level of the Lynch Ecological Model of Health

Model Levels									
		C to 0	0 to <2	2 to <5	5 to <12	12 to <18	18+	All ages	Unknown	Family
	n (%)	47 (16.2)	25 (8.6)	6 (2.1)	29 (9.6)	32 (10.7)	10 (3.4)	35 (12.1)	6 (2.1)	125 (43.1)
Macro	**23 (7.9)**	**4 (8.5)**	**2 (8.0)**	**0**	**2 (7.1)**	**4 (12.9)**	**0**	**1 (2.9)**	**0**	**12 (9.6)**
		-	1	-	-	-	-	-	-	2
		4	1	-	2	4	-	1	-	10
Distal	**191 (65.9)**	**32 (68.1)**	**13 (52.0)**	**5 (83.3)**	**20 (67.9)**	**20 (61.3)**	**8 (80.0)**	**16 (45.7)**	**5 (83.3)**	**90 (72.0)**
		13	2	2	8	3	1	3	1 (2Mm)	26
*combat		1	-	-	2	5	4	1	1	18
Continued….		**C-0**	**0 to <2**	**2 to <5**	**5 to <12**	**12 to <18**	**18+**	**All ages**	**Unknown**	**Family**
*atrocities		-	-	-	1	1	-	-	-	1
*POW/MIA		-	-	-	1	1	-	1	-	6
Military services		7 (14.9)	8 (32.0)	2 (33.3)	1 (3.6)	1 (3.2)	0	6 (17.1)	0	16 (12.8)
*health service use		3	11	1	-	-	-	1	-	7
*health service eval		3	6	1	1	1	-	3	-	8
*health surveillance		1	-	-	-	-	-	1	-	-
*support programs		-	-	-	-	-	-	1	-	4
Military factors		11 (23.4)	2 (8.0)	1 (16.7)	1 (3.6)	0	0	3 (8.6)	0	12 (9.6)
*culture		1	-	-	1	-	-	1	-	2
*rank		3	-	-	-	-	-	2	-	6
*current status		-	1	1	-	-	-	1	-	-
*Climate/stress		6	1	-	-	-	-	-	-	5
Family Mobility		3 (6.4)	3 (12.0)	3 (50.0)	8 (28.6)	10 (32.2)	2 (20.0)	5 (14.3)	2 (33.3)	30 (24.0)
* support/isolation		3	3	3	2	3	1	4	1	16
*school transfers		-	-	-	7	10	1	1	1	-
*living conditions		-	-	-	-	-	-	-	-	4
*spouse work		-	-	-	-	-	-	-	-	12
*number of moves		-	-	-	1	1	-	-	-	1
School characteristics		0	0	0	1 (3.6)	1 (3.2)	0	0	0	0 (0.0)

Continued….		**C-0**	**0 to <2**	**2 to <5**	**5 to <12**	**12 to <18**	**18+**	**All ages**	**Unknown**	**Family**
*size		-	-	-	1	1	-	-	-	-
*public system		-	-	-	1	1	-	-	-	-
*parent involve		-	-	-	1	1	-	-	-	-
Peers relationships		0	0	0	1 (3.6)	1 (3.2)	0	0	0	1 (0.8)
Religion		0	0	0	0	0	1 (10.0)	0	0	1 (0.8)
Proximal	**179 (61.7)**	**18 (38.3)**	**16 (64.0)**	**4 (66.7)**	**10 (32.1)**	**13 (38.7)**	**7 (70.0)**	**10 (28.6)**	**5 (80.00)**	**112 (89.6)**
Family Factors		***8 (17.0)***	***4 (16.0)***	***3(50.0)***	***4 (10.7)***	***7 (19.3)***	***4 (40.0)***	***9 (25.7)***	***2 (33.3)***	***69 (55.2)***
Structure & resources		8 (17.0)	2 (8.0)	2 (33.3)	0	1 (3.2)	1 (10.0)	3 (8.6)	2 (33.3)	14 (11.2)
*structure		5	-	1	-	1	1	1	-	7
*fin. resources		4	1	-	-	-	-	2	1	6
*cope/adaptation		-	1	1	-	-	-	-	-	9
*care deployment		-	-	-	-	-	-	-	2	-
Family relationships		1 (2.1)	3 (12.0)	1 (16.7)	4 (10.7)	6 (16.1)	4 (40.0)	6 (14.1)	1 (20.0)	61 (48.8)
*fam. Functioning		1	1	1	4	5	3	2	1	21
*marital relations		-	1	-	2	2	-	2	-	27
*inter. violence-dv		-	1	-	2	4	1	3	-	29
Parent Factors		***13 (27.7)***	***15 (60.0)***	***2 (33.3)***	***9 (28.6)***	***12 (34.5)***	***6 (60.0)***	***9 (25.7)***	***4 (75.0)***	***97(7.6)***
Mf [Mm] (Sp) NS*										
Characteristics		4 (8.5)	0	-	1 (3.6)	1 (3.2)	1 (10.0)	4 (11.4)	0	17 (13.6)
*ed, age, gender		[3] (1)	-	-	-	-	-	[1] 3*	-	7 (4) 1*
*prior history		-	-	-	1	1	1	-	-	9
Mental health		1 (2.1)	5 (20.0)	2 (33.3)	6 (17.9)	9 (25.8)	6 (60.0)	4 (11.4)	2 (33.3)	45 (36.0)
*PTSD		-	-	-	3	4	6	2 [1]	2	24 (9)
*Depress/anxiety		-	[4] 1*	(1) 1*	1 (2)	1 (2)	(1)	2 [1] 1*	1	9 (9) 1*
*Drug/alcohol		-	-	-	1	1	-	3 [2]	-	5 (1)
*suicidal		-	-	-	1	1	1	-	-	1
*general/distress		[1]	-	-	1 (3)	(2)	-	-	-	1 (8) 1*
Physical health		8 (17.0)	0	0	0	1 (3.2)	1 (10.0)	1 (2.9)	0	7
*general		[5] (2)	-	-	-	(1)	(1)	[1]	-	1 (5) 1*
*war injury		-	-	-	-	-	-	-	-	2
*reproductive		2	-	-	-	-	-	-	-	-
Psychosocial		-	5 (20.0)	2 (33.3)	3 (10.7)	3 (9.7)	2 (20.0)	4 (11.4)	3 (50.0)	41 (32.8)
*coping/adaptation		-	[2] 1*	(1)	1 (1)	1	1	[1]	2	3 (29)
*stress (general)		[4] (2)	-	(1) 1*	-	-	-	-	-	5 (11) 1*
*parenting stress		-	[2] 1*	-	2	2	-	3	1 (1-fa)	(1)
*caregiver burden		-	-	-	-	-	-	-	-	(2)
*self esteem		[1]	-	-	-	(1)	(1)	-	-	-
Behaviors & Beliefs		6 (12.8)	9 (36.0)	0	3 (10.7)	3 (9.7)	1 (10.0)	1 (2.9)	2 (33.3)	9 (7.2)

Continued….		**C-0**	**0 to <2**	**2 to <5**	**5 to <12**	**12 to <18**	**18+**	**All ages**	**Unknown**	**Family**
*preventive health		[6]	[2] (1) 6*	-	-	-	-	-	-	1*
*parent/skills/style		-	1*	-	-	-	-	1	1	1
*parent/satisfaction		-	-	-	-	-	-	-	-	1
*appraisal/child		-	-	-	-	-	-	-	1	-
*relationship/child		-	-	-	2	2	1	-	-	1
*education/belief		-	-	-	1	1	-	-	1 (1-fa)	-
*appraisal/military		-	-	-	-	-	-	-	-	(3)
*gender role		-	-	-	-	-	-	-	-	(3)
Child Indicators		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Genetic	**31 (10.7)**	**23 (48.9)**	**1 (4.0)**	**0**	**3 (10.7)**	**0**	**0**	**4 (11.4)**	**0**	**0**
Exposure **Mf [Mm] (Sp)**		23 (48.9)	1 (4.0)	0	2 (7.1)	0	0	4 (11.4)	0	0
*Vietnam		8 [1] (2)	-	-	2	-	-	-	-	-
*Gulf		(8)	-	-	-	-	-	-	-	-
*other		[1]	1 (1)	-	-	-	-	3 (1)	-	-
*methodology		3	-	-	-	-	-	-	-	-
Child gender		0	0	0	1 (3.6)	0	0	0	0	0
Continued….		**C-0**	**0 to <2**	**2 to <5**	**5 to <12**	**12 to <18**	**18+**	**All ages**	**Unknown**	**Family**
Child outcome	**125 (43.1)**	**40 (85.1)**	**9 (36.0)**	**3 (50.0)**	**25 (85.7)**	**27 (83.9)**	**10 (100.0)**	**27 (77.1)**	**3 (60.0)**	**0**
Physical health		40 (85.1)	7 (28.0)	2 (33.3)	3 (10.7)	0	0	9 (25.7)	0	0
*growth & dev		22	-	-	3	-	-	2	-	-
*vaccinations		-	2	2	-	-	-	-	-	-
*morbidity		-	2	-	-	-	-	5	-	-
*mortality		7	4	-	-	-	-	1	-	-
*birth defects		21	1	-	-	-	-	1	-	-
Mental health		0	0	0	16 (53.6)	16 (48.4)	7 (70.0)	5 (14.3)	2 (33.3)	0
*PTSD		-	-	-	-	2	1	-	1	-
*emotion/behave		-	-	-	15	13	3	5	2	-
*distress/stress		-	-	-	1	2	2	-	-	-
Psychosocial		0	0	0	6 (15.8)	8 (25.8)	8 (80.0)	2 (5.7)	2 (33.3)	0
*self esteem		-	-	-	2	2	4	-	1	-
*resilience/coping		-	-	-	3	1	3	2	1	-
*social comp		-	-	-	1	1	1	-	1	-
*risk behaviours		-	-	-	1	3	2	-	-	-
*emotional exp		-	-	-	-	-	-	-	1	-
*identity develop		-	-	-	-	-	2	-	-	-
*relation/parent		-	-	-	1	2	-	-	-	-

Continued….	C-0	0 to <2	2 to <5	5 to <12	12 to <18	18+	All ages	Unknown	Family
*inter. relationship	-	-	-	-	-	1	-	-	-
*inter. violence	-	-	-	1	2	1	-	-	-
*attitude/military	-	-	-	-	-	-	-	1	-
Cognitive	0	0	0	11 (39.3)	11 (35.5)	0	0	1 (20.0)	0
*school outcomes	-	-	-	10	8	-	-	1	-
*cognitive development	-	-	-	1	1	-	-	-	-
*absenteeism	-	-	-	3	3	-	-	-	-
*attitude to school	-	-	-	1	1	-	-	-	-
Abuse	0	2 (8.0)	1 (16.7)	0	0	0	15 (42.9)	0	0

Note: Overlapping age groups: 12-18 and 18+ (3), 5-12 and 12-18 (13), 0-2 and 2-5 (5)

Age group: conception to birth

Two major themes emerged in this age group which accounted for 16.2 percent of all the studies.

Parental exposure to toxins and birth deficits

- Upstream determinants
    - Deployment
- Downstream determinants
    - Parental exposure
    - Birth defects

Birth outcomes (birth weight, gestation, etc) for military mothers

- Upstream determinants
    - Ethnicity
    - Perinatal health services
    - Deployment
    - Work related stress
- Midstream determinants
    - Family structure
    - Parental health prevention behaviours

Age group: birth to 2 years

Two major research themes emerged for this age group which accounted for 8.6% of the studies mapped.

Infant mortality and morbidity in military populations

- Upstream determinants
    - Military service
- Downstream determinants
    - Infant morbidity and mortality

Postnatal outcomes for military mothers

- Upstream determinants
    - Health service use and program evaluation – breastfeeding/vaccinations
    - Deployment
    - Support
- Midstream determinants
    - Postnatal depression
    - Psychosocial – coping, parenting stress
    - Preventive health behaviours – breastfeeding

Age group: 2 to 5 years

Only 2.1% of the studies were conducted in this age range. Again two main themes were found.

Military spouses coping with young children

- Upstream determinants
    - Deployment
    - Mobility –social support
- Midstream determinants
    - Family factors
    - Parental factors - postnatal depression, coping/adaptation

Vaccination rates in military children

- Upstream determinants
    - Health service use and evaluation
- Downstream determinants
    - Vaccination rates

Age group: 5-12 years and 12-18 years

Primary and secondary school ages were combined as there was a significant number of studies which combined both age groups. In addition, the same two themes emerged.

Family mobility and its impact on child development

- Upstream determinants
    - Family mobility due to military postings – school transfers
- Downstream determinants
    - Academic - outcomes
    - School – absenteeism, attitude
    - Psychosocial development
    - Mental health – emotional and behavioural problems

Impact of military duty on children

- Upstream determinants
    - Deployment/combat/POW
- Midstream determinants
    - Parental mental health (military father)
    - Parenting stress
    - Parent – child relationship
- Downstream determinants
    - Child mental health – emotional and behavioural –problems
    - Child resilience/coping

Age group: 18+ years

Only one main theme emerged in the study of adult offspring. These studies accounted for only 3.4% of the research mapped.

Effects of combat on child development

- Upstream determinants
    - Combat exposure
- Midstream determinants

    - Family relationships – family functioning
    - Parental mental health – PTSD, depression
- Downstream determinants
    - Child mental health – emotional and behavioural problems
    - Psychosocial development – self esteem, resilience, competence, risk taking behaviours

Age group: all ages n = 35 (12.1%)

One major and three minor areas of research were found that included child of all ages and accounted for 12.1% of all studies.

Child abuse in the military (major)

- Upstream determinants
    - Family mobility – social isolation
    - Military factors – culture, rank
    - Health services – use, evaluation
- Midstream determinants
    - Family structure and resources
    - Family relationships – functioning, violence
    - Parenting attitudes
- Downstream determinants (half only investigated at this level)
    - Child maltreatment

Parental exposure and child physical outcomes

- Downstream determinants
    - Parental exposure
    - Child physical health – cancers, lead levels

Effects of mobility on child outcomes

- Upstream determinants
    - Family mobility
    - Military services
- Downstream determinants
    - Child mental health problems
    - Child resilience

Effects of deployment on child outcomes

- Upstream determinants
    - Deployment/POW
- Midstream determinants
    - Parental health
- Downstream determinants
    - Child mental health problems

Age group: not determined

These studies were all theses (2.1%) and only one minor theme emerged.

Parental mental health and parent-child relationship (minor)

- Upstream determinants
    - Deployment
- Midstream determinants
    - Parental mental health – PTSD
    - Parental child relationship
- Downstream determinants
    - Child mental health problems

Age group: Family (nonspecific in relation to children)

Four major themes emerged in the studies of spouses and general family functioning. These studies accounted for 43.1 percent of the mapped literature.

Intimate partner violence in military families

- Upstream determinants
    - Culture - ethnicity
    - Military duty – combat, atrocities
    - Military factors - rank, climate, stress
    - Mobility - isolation/social support
- Midstream determinants
    - Individual characteristics – age, prior history
    - Mental health of military person
    - Interpersonal relationships
    - Family structure and resources

Impact of military service on family

- Upstream determinants
    - Military duty – deployment, combat, POW (enforced family separation)
- Midstream determinants
    - Mental health – both military person and spouse
    - Psychosocial functioning of spouse – coping, well being, stress
    - Interpersonal relationships – marital, family functioning

Impact of family mobility on spouse

- Upstream determinants
    - Work participation
    - Social support/isolation
- Midstream determinants
    - Psychosocial – coping, wellbeing

Evaluation/utilization of services provided to military families

- Upstream determinants
    - Military duty – deployment, combat
    - Mobility – isolation
- Midstream determinants
    - Mental health

- Stress
- Coping/adaptation

Identified gaps in the literature

A range of research areas were identified were little research had been conducted. These are summarised in relation to the level of environmental factors and study design.

- Upstream factors
    - Social climate, conscription, welfare dependency
    - Evaluation of military family support services
- Midstream or family factors
    - Parenting behaviours
    - Parent emotional availability
    - Parent-child relationships
- Downstream
    - Attachment, psychosocial development
    - Outcomes for 0-5 age group and adult offspring
    - Transitions (entering preschool, school, adolescence)
- Linking
    - Distal and proximal environmental factors to child outcomes
- Study design
    - Prospective studies

Summary of results

Overall, 57 percent of studies identified included child outcomes. Approximately 16 percent of the research investigated the impact of military service on birth outcomes. Of particular interest to this review were the studies assessing the risk of birth defects in the children of military personnel potentially exposed to toxins during deployment. There was also an emerging area of research investigating the impact of military stress on military mothers. A further 8.6 percent of studies in the birth to 2 year age category followed similar themes. Very few papers addressed issues other than vaccination rates in the 2 to 5 year age group. A further 10 percent of papers each covered the primary and secondary school years with many studies combing these developmentally distinct groups. These studies investigated the impact of mobility on child outcomes, as well as the impact of deployment on parental stress and child well-being. A small number of studies assessed the mental health and psychosocial development of adult off spring in relation to parental combat exposure, parental mental health and family functioning. Twelve percent of studies addressed the issue of child abuse in military families across all age groups. These studies investigated the impact of military specific factors such as military culture and family isolation, as well as family factors relating to family resources and interpersonal violence on child abuse rates. Differences in reporting make it difficult to directly compare child abuse rates in the military to those found in the general populations.

Forty three percent of the studies assessed family outcomes. Two main areas of research relevant to this review emerged. The most prominent theme was the impact of military deployment and combat exposure on the mental health and well being of both the military personnel and their spouse and the quality of their interpersonal relationship. The second main theme addressed the relationship between military service and interpersonal violence. These studies investigated the impact of a range of military factors such as deployment and combat exposure, military climate, and family isolation, as well as variables specific to the military person such as age, family of origin history, and mental health. Two other areas were identified but will not be included further in the review; the impact of tied migration on spouse employment participation, and the evaluation of military health service.

Overall, the vast majority of studies are of a cross sectional nature which means that causal pathways cannot be determined. Few studies investigated the impact of military service across multiple levels of the ecological model of health. Those that did assess the relationships between military service, parental and family functioning, and child well-being were generally cross sectional and retrospective self report methodologies. The few more recent longitudinal studies are of very limited time frames. Of particular note, no studies addressed the parent-child relationship during the developmentally important birth to preschool age group and only a few studies investigating this at any age. Further, no studies of child outcomes specifically assess salient age specific stages for children, such as periods of transitions to school and into adolescence. No studies were found that investigated suicide rates in children of military personnel.

Critical appraisal and synthesis

This stage of the literature review focussed the analysis to particular variables of interest identified from the mapping exercise and identified by the expert team. The review was further focussed on higher quality papers using systematic data extraction and critical appraisal. The following section is broadly divided into:

1. Outcomes affecting military spouses and family functioning
2. Outcomes specifically assessing children of military personnel.

Effects of military service on spouses and family functioning

Outcomes of interest

The mapping of the literature to the Lynch [5] model of health identified four broad areas in which research had been conducted to investigate the impact of military service on family and spouses. Three of these areas, health and wellbeing, interpersonal violence (IPV), and the effects of mobility on the spouse employment opportunities were included in the critical analysis. The fourth area, evaluation of U.S. military services and clinical programs was not included. There were 123 papers specifically relating to spouse and family outcomes. Sixteen of these related to evaluations and clinical programs [37, 39, 44, 70] [77, 79, 103, 108, 119, 184, 193, 214, 222, 234, 259, 296] and were removed from further analysis.

Of the 107 remaining paper 87 were journal articles, 13 were theses [19, 50, 64, 76, 92, 102, 115, 157, 163, 168, 201, 261, 298], eight were electronic resources [41, 49, 110, 114, 122, 123, 262, 268], and one book chapter [176]. All full text articles were sought. Thirteen papers were removed as their content were found not to be relevant to the current analysis [43, 52, 76, 102, 134, 163, 164, 176, 240, 262, 268, 290, 305]. At the time of writing this report eight documents were not available and are included in the tables (italicised) but have not received an appraisal rating [9, 19, 110, 114, 115, 210, 233, 261]. Data extraction and critical analysis was performed on the remaining 94 papers.

Populations, stressors and outcomes

For each of the three main outcome areas the papers were group according to the specific military populations studied. There are three tables relating to populations, stressors, outcomes and results, and study design and appraisal for each of three main research areas Tables 9 – 17 and are located at the end of this section on spouse and family outcome. Tables 9, 10 and 11 summarise the populations, outcomes, stressors and results, and the design quality respectively for the spouse health, wellbeing and family functioning studies. Tables 12, 13, and 14 summarise the populations, outcomes, stressors and results, and the design quality respectively for the IPV studies. Tables 15, 16, and 17 summarise the populations, outcomes, stressors and results, and the design quality respectively for the spouse employment studies. Four different military populations were identified; military service in general, deployed military personnel, veterans, and families of prisoners of war or soldiers missing in action (POW/MIA). Each summary table has been subdivided to reflect these populations.

Spouse health, wellbeing and family functioning

There were 58 papers which investigated the impact of military service on the health and wellbeing of the spouse and family functioning. The specific populations used in each study are summarised in Table 9. In each of the four military categories a range of more specific outcomes were measured (see Table 12).

a. General Military (n=13). These papers mainly assessed current active duty soldiers who may or may not have previously been deployed. The main stressors of interest are the impact of military service and family mobility. The main outcome assessed were:
    - Physical and mental health of non-military spouses (n=5)
b. Psychosocial and family functioning variables such as coping and adaptation of non-military spouse, marital and family functioning in military-civilian dyads (n=8).
c. Deployment (n=16). These papers as the name suggests investigated the impact of deployment on the non-military spouse and family unit. The main outcomes were:
    - Physical and mental health of non-military spouses (n=5)
    - Psychosocial and family functioning (n=11)
d. Veterans (n=24). The main stressors on the spouse and family in the veteran populations relate to combat exposure and atrocities exposure, as well as the veterans trauma related posttraumatic stress disorder (PTSD) symptoms. The outcomes addressed include
    - Physical and mental health of non-military spouses (n=4)
    - Psychosocial and family functioning (n=20)
e. Prisoner of war and soldiers missing in action (POW/MIA; n=5). These papers investigated the impact of uncertainty and extended separations of the military person on spouses. The outcomes they addressed were
    - Marital stability and adjustment upon reunion (n=5)

Interpersonal violence

There were 28 papers predominately investigate interpersonal violence (IPV) within the following three military populations. See Table 10 for specific details on the populations used in each study. In each of these populations a range of more specific outcomes were measured (Table 13).

a. General Military (n=14). These papers address the:
    - Rate IPV in the military service (n=8)
    - Predictors of IPV (n=6)
b. Deployment (n=3)
    - Rates of IPV post-deployment (n=3)
c. Veterans populations (n=11)
    - Rates of IPV (n=1)
    - Combat exposure and PTSD (n=8)
    - Impact on family functioning (n=2)

Effects of military service on spouse employment

There were eight papers in this group investigating the impact of tied migration for spouses of military personnel. The specific populations used in each study are summarised in Table 11. Two specific outcomes were measured. More detail of outcomes measured are found in Table 14.

a. General Military (n=8). These papers address the:
    - Rates of spouse employment (n=4)
    - Psychosocial family functioning (n=4)

Study Variables

Where studies conducted

Over eight four percent (n=93) of the studies were performed in the United States, 5.5 percent (n=6) in Israel [18, 32, 244, 270-272], 2.7 percent (n=3) in the United Kingdom [93, 105, 218], 1.8 percent (n=2) in New Zealand [98, 155], and .9 percent (n=1) in Australia [78], Bosnia-Herzegovina [251], Canada [122], Croatia [29], Holland [80], Puerto Rico [19]. Origins of each study can be found in the population tables for each research area (Tables 9-11).

Outcome measures

The specific outcome measures differed for the three main research areas. The spouse and family wellbeing papers generally relied on a range of self report questionnaire measures assessing distress, wellbeing, marital relationships and family functioning (Table 12). Several quantitative studies used record data [18, 179, 251], psychiatric interviews and medical examinations [55, 86, 156, 251], as well as more detailed semi structured interviews [155, 177, 179, 251, 270, 272].

The majority of measures used in the study of IPV in the military also relied heavily on self-report questionnaires (Table 13). Two papers used substantiate cases from Army records [170, 202]. Army records are more representative of personnel living on military bases than personnel living in non-military areas. The majority of studies only assessed violence within married couples, with only three papers more broadly assessing co-habiting couples [47, 209, 264]. Interpersonal violence is an area where confidentiality is paramount. Confidentially was not assured to military personnel in one study which seriously confounded the results [58]. Several studies have assessed bi-directional relationship violence, however the measure used in these studies does not discriminate between directed violence and self defence and should be interpreted with caution [38, 63].

Studies into spouse employment also utilized self report questionnaires (Table 14), with the exception of one paper which used a large national data base connecting migration and employment status [67].

Study Design

The majority (70%) of all studies used a cross-sectional design, 13.6 percent (n=15) prospective, 7.3 percent (n=8) retrospective, and 9.1 percent (n=10) qualitative. As shown in Table 15, fourteen of the prospective studies were in the area of spouse health, wellbeing and marital functioning [28, 33, 50, 60, 65, 97, 167, 177, 179, 183, 215, 228, 235, 251]. Eight qualitative studies were also used in this research area [19, 35, 101, 105, 114, 196, 218, 244], and four retrospective designs [156, 272, 297]. The majority of the studies of IPV used cross sectional designs with the exception of three retrospective studies [29, 170, 202] and two qualitative designs [89, 122] (Table 16). Again the majority of study designs in the spouse employment area were also cross-sectional (Table 17), with the exception of one retrospective design [67], and one prospective study [67, 139].

Size of Studies

The size of the populations studied varied greatly. In the area of spouse health and wellbeing 5.1 percent (n=3) of the studies had large populations of greater than 10,000 [42, 66, 215]. A further 8.5 percent (n=5) had samples of between 1000 and 10,000 [86, 106, 217, 239, 251]. Thirty nine percent (n=23) had sample sizes between 100 and 999, and 44.0 percent had samples of less than 100 participants (Table 15).

The samples sizes in general were larger in the study of IPV with 43 percent (n=16) being over 1000. Half of these were over 10,000 [31, 130, 170, 175, 202, 209]. Fifty percent of the IPV studies had sample sizes between 100 and 1000.

The sample size varied widely for the papers assessing tied employment. Thirty seven percent (n=3) utilizing survey data had samples over 5,000 [67, 68, 260]. A quarter (n=2) had samples between 100-1000 (Table 17).

Controls

Approximately 50 percent (n=28) of the studies investigating spouse health, wellbeing and family functioning did not use control groups, using correlations, regression and modelling statistical methods to answer the research questions posed. The remaining quantitative studies used military controls (n=17), non-military controls (n=4) and comparisons to normative samples (Table 15).

Over 53 percent (n=15) of the studies investigating IPV in the military did not utilize a control group, opting for regression and modelling techniques (Table 16). The remaining studies used military controls (n=9), non-military controls (n=3) and normative samples (n=1).

Half (n=4) the studies into the impact of tied migration utilised regression and modelling techniques. Three other studies used military control groups and one study compared the military with a civilian population (Table 17).

Critical appraisal results

Papers of good quality will be highlighted throughout the result section. Although low quality studies and papers with abstracts only have not been excluded from general tables, their results are inconclusive and are not reported in this section of the review.

Spouse health, wellbeing and family functioning

Thirty nine out of the 58 papers (67.5%) were included in this final section reviewing spouse and family outcomes. Overall 10 papers (17.2%) obtained an appraisal rating of good. Twelve papers (20.4%) were excluded due to poor quality [28, 94, 98, 101, 105, 156, 177, 196, 201, 218, 244, 293, 297], and a further seven (12.1%) full text articles were not available [9, 19, 114, 115, 201, 210, 233]. Of those reviewed 23 (59.0%) demonstrated adverse effects, 13 mixed (33.3%), two not significant (5.1%),

and two inconclusive. Further, 80% of the good quality papers and 84% of studies of veterans demonstrated adverse effects. See Tables 9, 12, and 15.

General Military

Physical and mental health

There were three studies of adequate quality in this population utilizing self report of health status and service use. Two studies assessing health service utilization of current military spouses in general found no increase in health and mental health problems or in the use of medical services compared to the general population. The large scale study (n=26,097) by Constantian [66] assessed a range of military personnel and found higher mental health rates for female Air Force personnel and spouses of Air Force members only compared to the general population (z scores 2.15 and 2.50 respectively). Overall, the military personnel and their spouses used mental health service less than the general population despite similar rates of problems. The large scale study (n=50,160) by Peterson [215] assessed the impact of the World Trade Centre terrorist attacks on the families of military personnel. This longitudinal study found increases in distress post attack, particularly for families with active duty members. However, it must be noted that the second wave of data collection altered the wording of the questionnaire to assess the period immediately after the attack. The third much smaller study was conducted in Israeli by Anson [18]. This found Army spouses (n=55) used medical services more for their children compared to spouses of non-military personnel (n=44). The Authors suggested reflected less confidence in parenting for Army spousees.

Psychosocial and family functioning

Five studies of adequate quality were reviewed. These studies assessed spouse wellbeing and adaptation in dealing with military life, particularly family mobility and the associated reduction in social supports. Three studies found independent impacts of both military and non-military variables on wellbeing, family adaptation and life satisfaction. The study of spouse wellbeing by Martin [167] was prospective in nature and assessed a representative sample of military wives (n=277). The study by McCubbin 1986 [180] investigated adaptation of 947 families relocated to West Germany, and the study of life satisfaction of 947 spouses of combat soldiers was conducted by Rosen 1989 [230]. A large scale representative study of civilian spouses of Air Force personnel (n=17,161) conducted by Bowen [42] found a positive sense of community and unit support were positively related to family adaptation. However, families with children had lower levels of adaptation. The longitudinal study by Rosen [235] of 332 wives of combat soldiers found that spousal wellbeing was positively related to mastery and satisfaction in personal life and the predictability of military partners schedule.

Deployment

Physical and mental health

Two longitudinal studies using representative samples of Army personnel addressed the impact of Gulf War deployment. The study by Benotsch [33] was of good quality and assessed the mental health of soldiers at 12 and 24 months post deployment (n=826 and n=348 respectively). This study of military personnel found a significant increase in PTSD symptoms and avoidant behaviours, and a reciprocal significant decrease in interpersonal relationships over the 24 month return period. The study by Rosen [228] assessed the wives of Army personnel during and post deployment (n=776). This study found a significant level of distress in 64% of the wives during deployment, with 24% still showing significant distress 10 months after reunion.

Psychosocial and functioning

Six studies assessed spouse wellbeing and family functioning during deployment. The good quality cross sectional study by Everson (2005) [92] found spouses of Gulf War deployed military personnel demonstrated significantly poorer coping and lower quality of life and wellbeing compared to spouses of non-deployed personnel (total n=205). In addition, this effect was greater for spouses whose husbands had been away for longer periods. For three studies addressing similar outcomes it was unclear if deployment involved potential combat. The good quality study by Eastman (1990) [84] assessed the family functioning of a representative sample of U.S. Navy families (n=785). The study found adverse levels of stress and poorer family functioning were related to deployment cycles. However, the overall functioning of Navy families was not found to be significantly different from a U.S. normative sample. Frankel (1988) [97] conducted a small longitudinal study of spouses (n=75) of Navy Aviators being deployed to the Pacific region. The study assessed spouse health and marital relationship before and during deployment. Adverse health such as general health complaints and dysphoria, and increased stress were found during deployment, with poorer outcomes associated with lower pre-deployment marital happiness, having older children, and the longer the deployment. The prospective study by McNulty (2003) [183] of 299 U.S. families based in Japan found no significant differences in family functioning between spouses of deployed and non-deployed military personnel. However, wives of deployed personnel demonstrated a significant increase in the use of health services for their children during deployment.

Two cross sectional studies investigated factors associated with spouse adaptation to deployment to the Gulf War. Pittman (2004) [217] found that unit culture was positively associated with coping during deployment, especially for spouses of enlisted men, in a random sample of 1,064 civilian wives. In addition, positive coping during deployment was associated with better adaptation following reunion. Rosen (1994) [239] using a random sample (n=1,274) and cluster analysis found that poorer wellbeing and coping during deployment was related to spouses being younger, of racial minority, husbands in enlisted ranks, and fewer social supports.

Veterans

Physical and mental health

Four papers investigated the health of veterans' wives in different populations. In a good quality study Eisen [86] assessed a representative sample of over 1000 wives of

Gulf War veterans and wives of non-deployed Gulf War era veterans 10 years post deployment. This study utilised medical examinations, laboratory tests and self report measures and found only small but significant differences in skin rashes and chronic hepatitis. There were no significant differences in mental health outcomes. This study did not assess the veterans' health.

The impact of the death of a military partner on hypertension was investigated in a representative sample of 1,274 Bosnia-Herzegovina families who had fought the war and lost or not lost their partner [251]. This longitudinal study by Santic (2006) used medical examinations, laboratory tests and self reported risk factors and found an significant association between partner death and increased hypertension. There was also significant increases in PTSD, smoking, and alcohol consumption but not cholesterol and triglycerides.

Two small studies using clinical samples of Vietnam veterans' wives reported adverse outcomes. Alessi [17] compared the levels of psychopathology in a group of help seeking wives of Vietnam veterans to a standardized sample of similar aged women and found veterans' wives to have higher levels of distress, but scores did not reach clinical case levels (n=131). Sherman [265] interviewed 89 wives of Vietnam veterans' with PTSD about their own mental health needs and concluded they were not receiving adequate mental health care. Several studies in the following section have found a significant relationship between veterans' PTSD and spouse mental health problems.

Psychosocial functioning and marital relationships

Fifteen papers address the impact of combat and PTSD on marital relationships and family functioning and one qualitative paper explored wives responses to their husbands serving in Vietnam. Thirteen papers investigate Vietnam veterans, four Israeli veterans and one studied Dutch veteran Peace Keepers. Only four papers use representative samples of veterans and the remaining 12 papers used clinical or convenience samples.

The following four high quality studies using representative samples of different populations found adverse significant relationships between the veterans PTSD symptoms and interpersonal relationships. Using a moderately large random sample (n=2,101) of non-officer Vietnam veterans Gimbel (1994) [106] found adverse relationships between combat exposure and marital stability, and combat exposure and marital satisfaction. This significant finding remained after accounting for pre-military factors such as emotional and behavioural problems. MacDonald [155] investigated the impact of PTSD and combat exposure on interpersonal and marital functioning in a random sample of 756 New Zealand Vietnam veterans. This study found an adverse relationship between PTSD and family functioning, and PTSD and marital relationships. Both were mediated through problems in interpersonal functioning. Taft [287] using the subgroup of veterans and spouses from the National Vietnam Veterans Readjustment Study [309] found veterans' PTSD was significantly related to PTSD symptoms in the spouse and poorer marital relationships (n=466). Using a representative sample of 696 spouses of veteran Dutch Peace Keeping forces Dirkzwager [80] found a significant association between veterans' PTSD and spouses PTSD symptoms, somatic problems, sleep disturbances and marital relationships.

Six studies of Vietnam veterans utilised small clinical or convenience samples to investigate the impact of PTSD on spouses. Two longitudinal studies with small sample sizes, Browne (1195) [50] and Carroll [60], found adverse relationships between veteran PTSD and lower interpersonal relationships, poorer emotional expression and higher levels of conflict with differences not attributable to pre-military factors (n=48; n=60; respectively). In a cross sectional study Riggs [224] found a significant adverse relationship between veteran PTSD, intimacy and marital relationships with emotional numbing being the significant PTSD symptoms (n=50). Calhoun [55] found partners of Veterans with PTSD reported significantly higher levels of caregiver burden and had poorer psychological adjustment compared to spouses of non-PTSD veterans (n=71). Caregiver burden was also significantly associated with IPV and severity of veterans' PTSD symptoms. Further, Hendrix investigated the impact of both combat exposure and PTSD on interpersonal relationships [124, 125]. He found veteran PTSD was significantly associated with family functioning, family environment, and marital and parenting satisfaction but combat exposure did not account for any additional unique variance in scores (n=47; n=131 respectively).

Four small studies of Israeli veterans with PTSD found wives to have greater levels of distress compared to wives of non-PTSD veterans [32], however positive marital relationships acted as a buffer against the wife developing mental health problems [270]. Two studies of combat stress reaction (CSR) found an adverse relationship between CSR and PTSD and spouse mental health, marital satisfaction and family functioning [271], with suggestion that reduced expressiveness in CSR/PTSD group existed pre-war trauma [272]. However, this later study utilised retrospective recall for pre-war variables.

A qualitative study of U.S. wives of Vietnam veterans conducted soon after the end of the war explored their reactions to hearing the news of their husbands imminent departure, during deployment and the early reunion period [35]. The themes arising from this study highlighted not only the stress, fears and increased demands faced by the women during deployment, but also the tensions associated with reunion with emotionally withdrawn partners. In addition, these women found the negative social context of the Vietnam War had a negative impact.

Prisoner of War/Missing in Action

Psychosocial functioning and marital relationships

Four papers were included in the review. The first three use data from the longitudinal Repatriated Prisoner of War Health Study conducted by the U.S. Naval Health Research Centre. One year after repatriation McCubbin [179] found longer length of marriage before the war was a significant positive predictors of family integration, whereas wives emotional dysfunction during separation was a negative predictor (n=47). Nice [205] found that POWs had higher rates of divorce five years after repatriation compared to non-POW Vietnam veterans (n=201). In a 20 year follow up Cohen [65] found there was a significantly greater risk of divorce within 2 years of repatriation for POWs compared to non-POWs (n=198). This good quality study

found no significant differences in re-marriage and re-divorce rates indicating that interpersonal problems did not transfer to later relationship problems. Dent [78] surveyed 145 Australian WWII POWs and their spouses approximately 50 years after the war. This study reported significantly greater somatic and depressive symptoms in the WWII POWs compared to non-POWs but no significant difference between their wives. In addition, there were no significant difference between the two groups on marriage, divorce, and number of children. With these four studies a non-military control was not used and therefore it needs to be noted that these results do not reflect possible effects of military war service on spouses and marital relationships.

Interpersonal Violence

In the 28 studies investigating interpersonal violence in the military only two (7.1%) were not of sufficient quality to be included for further analysis (Table 16). One study was qualitative [89], and the other was retrospective [29]. Of the remaining 26 studies 13 (50%) were of good quality. Nine (34.6%) papers had adverse findings, seven (26.9%) had mixed results, two non-significant (7.7%) and the remaining eight were inconclusive in relation to the impact of the military.

General Military

Rates of interpersonal violence

Eight studies assessed the prevalence of IPV within the current general military population. Two studies compared military rates with the same instruments in a comparable civilian population. A good quality study by Heyman and Neidig [130] compared a very large representative sample of 36,806 married U.S. Army personnel surveyed between 1990-94 with the 1985 U.S. Civilian National Family Violence Survey (n=3,044). Both data sets were standardised to the U.S. 1990 census. This study found non-significant differences in moderate levels of IPV between Army and civilian populations (10.8% of men and 13.1% women compared to 9.9% of civilian men and 10.0% of women). But a small significant elevation in severe IPV in Army men (2.5%) and women (4.4%) compared to civilian men (2.0%) and women (0.7%). The second study conducted by Campbell [58] compared military women to women from a U.S health management organisation from the same region (n=2,178). This study found significantly lower levels of military women had experienced IPV over the past 12 months compared to civilian women. However, this study could not guarantee confidentiality within the military for the military women, which seriously confounds this study.

The other six studies did not use control groups. The first five of these studies received appraisal ratings in the ‘good’ range. Three of these studies used samples of over 15,000. McCarroll [170] and Newby [202] utilised substantiated cases in the U.S. Army Central Registry and found rates of 8-10.5 percent per year in the total sample and significantly higher rates in African-American military personnel compared to Caucasian offenders. Pan [209], using a self report survey with Caucasian married military men, found 29.9 percent 12 month prevalence rates with 5.6 percent reporting perpetrating severe IPV. Drug use, depression and marital discord were all significantly related to increased rates of severe IPV. Rosen [232]

found similar rates of severe IPV in an Alaskan Army base. Newby [204] investigate IPV rates in female married military personnel and found 24 percent of female personnel report aggression against there partners, with the highest rates for unemployed spouses. A small study (n=94) by Bohannon [38] investigated the differences in reporting rates from male and female couples. This study found higher rates of IPV in general compared to other studies however the sample is likely to be biased toward couples with problems as they volunteered to participate in a study of couple communication.

Predictive Factors

Two good quality studies investigated the influence of military factors on rates of IPV in the military. One qualitative study interviewed 126 victims and various ranked personnel in the Canadian Forces (CF) [122]. This study started with the premise that IPV rates in the Army are likely to be at least the same as in the general population and explored specific military influences on outcomes. They found that despite specific polices to the contrary a significant proportion of CF members, CF spouses, CF peers, and CF supervisors kept silent about or minimized the problem of women abuse and by doing so entrenched the isolation of the victim whose social ties had already been weakened by her membership in the CF community. In particular unit cohesion was found to be a salient factor in this minimization. In further analysis of the Alaskan Army base data Rosen (2003) [231] reported military specific predictors of IPV included lower leadership support, culture of hyper-masculinity, lower support for spouses. This study also found individual predictors of IPV included depression, ethnicity, marital adjustment, alcohol problems and a history of childhood abuse. Similar individual predictors were found in a small clinical group (n=59) by Mackie [157]. In a case control study Bell [31] using Army Central registry data found ethnic differences in predictors of IPV with alcohol problems being predictive for Caucasian and Hispanic groups while family problems were predictive for African-Americans (n=24,328). Using a representative sample of 4,781 Air Force personnel Clawson [64] found rates of 10.7 percent IPV, with higher levels associated with family of origin violence, inappropriate coping strategies, lower rank and education, and being married less than five years.

Deployment

Rates of interpersonal violence

Three good quality studies investigated whether IPV increased post deployment. A large scale study of over 26,000 deployed and non-deployed military personnel conducted between 1990-94 McCarroll [174] found adverse effects of deployment with small but significant increases in severe IPV. Importantly, longer deployments were associated with higher levels of IPV. In another study by McCarroll [175] comparing 1,000 U.S. peace keeping soldiers to non-deployed soldiers from the same unit found no significant difference 3-4 months after return. Pre-deployment IPV was predictive of post-deployment IPV regardless of deployment status. Interpersonal violence was also related to soldiers being younger, non-Caucasian, and living off base. McCarroll suggested that the early post-deployment period may represent a

"honeymoon period" with IPV emerging over the course of 12 months post-deployment. Newby [203] surveyed 368 wives of soldiers deployed to the Gulf War 10 months post-deployment. Compared with wives of non-deployed soldiers, deployment was not found to be a risk factor for IPV for the soldiers as a whole. However, younger wives in the deployed group reported significantly higher rates of IPV. Ethnicity was not specifically related to post deployment IPV.

Veterans

Rates of interpersonal violence

One good quality study by Bradley (2007) has investigated the rates of IPV in the veteran population compared to civilians [47]. This study utilised the National Survey of Families and Households (1988), excluding current military personnel (n=5,418). Contrary to expectations this study found significantly lower levels of IPV in male veterans compared to non-veterans (23% reduction in odds). However, once relationship stressors were controlled for no significant difference was found. Relationship stressors such as financial debt, substance abuse, quarrelling and child behavioural problems increased risk of IPV for the whole group.

Combat exposure, mental health and PTSD

Six studies into the relationship between combat, PTSD and IPV were reviewed. All these studies had sample sizes between 100 and 380. Three good quality studies used a subsample of the U.S. National Vietnam Veterans readjustment Study [309] who had completed the Family Interview component which contained a mixture of veterans with combat related PTSD, combat veterans without PTSD, and low risk controls. Savarese [254] found the PTSD symptom of hyperarousal was significantly related to both physical and emotional abuse in the past 12 months and frequent heavy alcohol consumption. Both hyperarousal and alcohol consumption had significant and independent effects on rates of IPV. Using the same sample Orcutt [207] reported a direct relationship between war zone stressors, PTSD symptom severity and early relationship quality with mother. Indirect effects via PTSD were also found for stressful childhood, and childhood antisocial behaviour. Taft [288] using a further subset of the NVVRS data compared IPV positive and PTSD positive veterans with IPV positive and PTSD negative veterans, as well as IPV negative and PTSD positive veterans. This study found that both IPV and PTSD were associated with atrocity exposure, major depression, drug abuse and poor marital problems compared to IPV veterans without PTSD. Violence in family of origin was not significantly different between the two groups. Two studies using a sample of help seeking veterans with PTSD were reported by Beckham [310, 311]. These studies found combat exposure and atrocity exposure were significantly related to PTSD but after controlling for combat exposure only PTSD severity and combat exposure were related to IPV. In a group of Vietnam veterans and their spouses seeking relationship counselling, Sherman [264] reported a significant relationship between both PTSD and depression with IPV suggesting mental health in general are associated with IPV.

Family Functioning

Two good quality papers using NVVRS data investigated aspects of PTSD, IPV and family functioning. Samper (2004) [250] using only veterans and spouses with biological children from the NVVRS sample (n=250) found an adverse relationship between PTSD severity and parenting satisfaction, and IPV and parenting satisfaction. PTSD symptoms of numbing and avoidance accounted for more variance in IPV than both hyperarousal and re-experiencing symptoms. Chrysos and colleagues [63] investigated the impact of male to female, female to male, and bidirectional couple violence and found male to female violence is more severe and has a greater impact on family functioning (n=298).

Spouse Employment

From the eight studies available two studies with abstracts only were excluded from further analysis [110, 261] . Of the remaining six studies two (33.3%) was rated 'good' and four 'adequate' (Table 17). Two (33.3%) papers reported adverse findings and the other four demonstrated mixed results.

General Military

Spouse employment status

Three large scale studies using U.S. national record data addressed the status of military spouses. Two good quality papers, Cooke [67] and Cooney [68], found civilian spouses of military personnel who had migrated demonstrated a significant decline in employment and annual income for wives but not husbands, an increase in difficulty finding work and dissatisfaction with work opportunities (n=8,350; n=14,874; respectively). In addition, Schwatz [260] found migration within mainland U.S. was associated with greater levels of spouse employment compared to overseas bases (n=5,484).

Psychosocial functioning and marital relationships

Three papers investigated spouse wellbeing and marital adjustment in relationship to tied migration. The results were mixed and were more complex than employment status. Bowen (1987) [40] reported a significant interaction between marital adjustment, spouse employment, rank and base location, with wives of officers on main land bases who worked full time reporting lower marital adjustment (n=675). In a population of Navy 81 wives Mederer [185] found women with traditional gender roles were related to higher life satisfaction. In addition, Ickovics [139] prospectively found that impact of spouse employment had an initial positive impact on spouse well being but over time had a negative impact (n=278).

Critical appraisal summary: Health, wellbeing and family functioning of spouses

Studies into the health, wellbeing and family functioning of spouses did not find significant effect of current military service on spouse physical or mental health, although two studies found increased health service utilization by spouses for their children. Studies on deployment to the Gulf war found increased PTSD symptoms in military personnel were related to decreases in interpersonal functioning. Increased spousal distress and poorer coping was also found during deployment with distress remaining in a significant number of spouses post deployment. Longer deployment was associated with greater adverse outcomes. No significant differences in the mental health of spouses of Gulf war veterans compared to spouses of non-deployed soldiers were found ten years after the war. Small scale studies of clinical samples of Vietnam veterans have found adverse psychopathology outcomes for spouses in relation to PTSD in their military partners. Adverse finding in relation to PTSD was a consistent theme regardless of population. Adverse associations were found between PTSD and combat exposure, and problems in interpersonal relationships, marital relationships and increases in caregiver burden. In addition, these problems in family functioning appear to be mediated via military persons PTSD related poorer interpersonal functioning. Further, PTSD symptoms of emotional numbing, avoidance and hyperarousal are implicated in relational problems.

Rates of IPV in military populations range widely with considerably lower rates in studies which used random samples. Only several studies directly compared military and civilian populations. These suggest that in current military populations there is a small but significantly higher rate in severe IPV, however no increases were found in the one study of veteran populations. Mixed results were found in relation to deployment with severe IPV appearing to be higher 12 months post deployment but not in the early post deployment phase. Several studies also reported a dose-response with longer deployment being related to higher IPV rates. Recent meta analytic studies of the impact of IPV in civilian female victims have found dose response relationships between IPV severity and mental health problems in spouses [312], and emotional problems [313, 314], and risk taking behaviours [315] in children.

There appeared to be significant effects of military related family migration on overall employment rates and income for spouses. However, the effects on spouse wellbeing were mixed with complex interactional effects between military and family factors.

Table 9: Summary table study populations for spouse health, wellbeing and family functioning papers

Study ID	Population
General Military	
Physical and Mental Health	
Anson 1993	Israel: Wives of Army personnel attending primary care health clinic.
Constantian 1998	U.S. Stratified random sample of all of all DoD beneficiaries as of 1994. 15.7% response rate.
Fernadez-Pol 1988	U.S. Wives residing overseas with military husband (peace time). All military wives attending a routine physical examination as part of a women's 98% uptake.
Peterson 2004	U.S. Random sample TRICARE beneficiaries. 15.7% response rate.
Wallis 1968	U.K. Military personnel and their wives based in Malta attending a psychiatric facility.
Psychosocial Functioning and Family Functioning	
Bowen 2003	U.S. Civilian spouses of Air Force members. Random and representative sample.
Martin 1987	U.S. Representative sample of military wives. (75% retention).
McCubbin 1986	U.S. Military families relocated to W. Germany. Representative sample.
Paulus 1996	U.S. Army families living in mobile homes and apartments near Army base
Rosen 1988	U.S. Wives of combat soldiers. 40% return rate from 12 battalions.
Rosen 1989	U.S. Wives of combat soldiers. 40% return rate from 12 battalions.
Rosen 1991	U.S. Wives of combat soldiers. Representative sample.
Rozenzweig 1981	Israel: Wives of officer husbands not serving not more than one day's travel away from home. Regular attendees at a Mother and Child centre participating in group therapy.
Military Deployment	
Physical and Mental Health	
Abbe 1986	U.S. Wives of deployed military personnel
Beckman 1979	U.S. Wives of nuclear submarine personnel.
Benotsch 2000	U.S. Active duty Gulf War era soldiers. Soldiers attending normal drill session.
MacIntosh 1968	U.S. Clinical sample of wives of deployed military personnel
Rosen 1995	U.S. Wives of Army personnel deployed in Gulf War (Desert Storm). Sample representative of deployed units. 67% response at follow up.
Psychosocial Functioning	
Apellaniz 1990	Puerto Rico: Spouses of National Guard soldiers who were deployed to the Gulf War (1989)
Eastman 1990	U.S. Married Navy couples representative sample 69% response rate.

Table 9 continued…..

Everson 2005	U.S. Spouses of military personnel deployed to Gulf War (deployed greater an 6 months; deployed less than 6 months. Random sample 25% response rate.
Gilies 2005	U.K. Spouses of deployed military personnel attending group sessions for depression and social isolation. convenience sample.
Gross 1982	U.S. Merchant Marine families
Guha 2005	U.S. Wives of full time National Guard
McNulty 2003	U.S. Military families relocated to Japan (70% retention rate).
Quinault 1992	U.K. Wives of RAF servicemen deployed - Gulf War. Convenience sample.
Rosen 1994	U.S. Wives of Army personnel deployed on operations Desert Shield and Desert Storm. Random sample 35-75% response rates.
Frankel 1988	U.S. Wives of Navy Patrol Aviation Squadrons being deployed in Pacific.
Pittman 2004	U.S. Random sample civilian wives of deployed soldiers at least 1 months - Desert Storm.
Veterans	
Physical and Mental Health	
Alessi 2001	U.S. Veterans wives seeking psychological services.
Eisen 2006	U.S. National sample of spouses of deployed Gulf War veterans 10 years post deployment.
Santic 2006	Bosnia-Herzegovina: Family members of soldiers killed in 1992-95 war. Representative sample.
Sherman 2005	U.S. Co-habiting female partners of Vietnam veterans currently receiving treatment for PTSD; mean age 52 (SD 5.8), 51% white 42% African-American, 7% Hispanic.
Psychosocial Functioning	
Ben Arzi 2000	Israel: Convenience sample wives of veterans with PTSD and post concussion.
Bey 1974	U.S. wives of non-career servicemen who served in Vietnam.
Browne 1995	U.S. Convenience sample Vietnam veterans and their spouses.
Calhoun 2002	U.S. Spouses of help seeking combat Vietnam era veterans with and without PTSD
Carroll 1985	U.S. Convenience sample help seeking combat Vietnam era veterans with and without PTSD.
Dirkzwager 2005	Holland: Partners of former Dutch Peace Keepers; ~50% response rate for veterans population, 70% family response rate (parents and spouses).
Frederikson 1996	NZ: Wives of Vietnam veterans with PTSD. Convenience sample.
Gallagher 1998	U.S. Vietnam veterans and spouses. Clinical sample of Veterans.
Gimbel 1994	U.S. Vietnam veterans who had been married at least once. Participant from a random sample of non-officers who agreed to a medical examination.
Hendrix 1993	U.S. Army Vietnam veterans (97% male) 20 years post Vietnam. Convenience sample (via Veterans association).
Hendrix 1995	U.S. Army male Vietnam veterans. Convenience sample.
Table 9 continued…..	
MacDonald 1999	NZ: Vietnam veterans. Random sample, 55.4% return rate.

Murphy 1990	U.S. Veterans from the National Association of Atomic Veterans (and some family members) exposed to atomic radiation.
Nelson 1999	U.S. Clinical groups: veteran couples, childhood sexual abuse survivor couples.
Riggs 1998	U.S. Male Vietnam veterans with PTSD and spouses. Convenience sample from DVA medical centres.
Solomon 1991	Israel: Combat veterans diagnosis with combat related stress disorder during the Lebanon war and spouses. Clinical sample.
Solomon 1992a	Israel: Combat veterans diagnosis with combat related stress disorder during the Lebanon war and spouses. Clinical sample.
Solomon 1992b	Israel: Wives of veterans with combat stress reaction (CSR). Clinical sample.
Taft 1999	U.S. Vietnam veterans and spouses. NVVRS study sample reflective of larger population of Viet vets. Families selected into this component if they had a high probability of PTSD (31% families); high combat no PTSD (21%); or non-specific distress (16%), and low risk control (32%). Male Veterans; White 47%; African-American 24%; 29% Hispanic; Female veterans, majority white.
Verbosky 1988	U.S. Female partners of Vietnam veterans with PTSD attending a therapy group.
Prisoner of War/Missing Action	
Marital Relationships and Family Functioning	
Cohen 2005	U.S. Vietnam Navy aviators POWs who were married before their capture (71%) and a subset (57%) of their wives.
Dent 1998	Australian: WW II POWs and their partners. Random sample of veterans living in Sydney.
McCubbin 1975	U.S. Navy Vietnam veteran POWs and wives. Sample is 63% of all vets with families repatriated.
McCubbin 1976	U.S. Wives of Vietnam military personnel MIA. Representative sample.
Nice 1981	U.S. Vietnam veterans Naval aviator officers POWs.

Table 10 : Summary table study populations for IPV studies

Study ID	Population
General Military	
Rates of Interpersonal Violence	
Bonannon 1995	U.S. military personal and married spouse from one military base. Convenience sample - volunteered for study into couple communication.

Campbell 2003	U.S. Active duty military women (Washington area; 76% Caucasian, 16% African American). Random sample collected 1998-2000, 13% response rate (Not assured confidentiality).
Heyman 1999	U.S. Stratified representative sample of married Army personnel (1990-4) modified to match 1990 census (weighted for age and ethnicity).
McCarroll 1999	U.S. Substantiated cases of IPV of married coupes Army Central Registry 1989-1997. 66% of offenders were active duty Army members, 34% civilians spouses.
Newby 2000	U.S. Substantiated cases of IPV of married enlisted military personnel in the Army Central Registry 1989-1997.
Newby 2003	U.S. Active service married females; 70.9% husbands employed. Subset of data set used by Heyman 1999. Representative sample.
Pan 1994	U.S. Active duty Caucasian male married/cohabiting military personnel. Random sample from main land bases. 81.3% response rate.
Rosen 2002	U.S. Married non-deployed male soldiers stationed at an Alaskan base (58% of all non-deployed soldiers, 97% participation; 60% Caucasian, 21% African American).
Predictors	
Bell 2006	U.S. Total Army Injury and Health Database (data linkage)
Clawson 1999	U.S. Stratified representative sample of Air Force personnel and civilian spouses (response rate military personnel 55%, 17% civilian spouses).
Erez 2003	U.S. Immigrant brides of military servicemen
Harrison 2006	Canada: Canadian Forces purposeful sample of English and French speaking female victims (spouses) of IPV, and military personnel of various ranks from a range of locations.
Rosen 2003	U.S. Married non-deployed male soldiers stationed at an Alaskan base (58% of all non-deployed soldiers, 97% participation; 60% Caucasian, 21% African American). Same population as Rosen 2002.
Mackie 2004	U.S. Clinical intervention group of active duty Army personnel who wished to remain married (45% Caucasian, 41% African American, 10% Hispanic).

Table 10 continued…..

Deployment	
Rates of Interpersonal Violence	
McCarroll 2000	U.S. Random sample of married active duty service personnel from 47 Army bases (95% male; 62% Caucasian; 57% deployed (between 1990-4) in past 12 months.
McCarroll 2003	U.S. Married soldiers recently returned (3-4 months) from 6 month deployed in Bosnia (Peace Keeping) and non-deployed from same unit. Representative sample (98% participation rate; 50% Caucasian, 25% African American, 15% Hispanic).

Newby 2005	U.S. Wives of recently deployed soldiers (Gulf war) from one large Army base (30% response rate; 70% Caucasian, 11% African American, 10% Hispanic).
Veterans	
Rates of Interpersonal Violence	
Bradley 2007	U.S. Military veterans and cohabiting spouses in the National Survey of Families and Households (stratified sample 1988). Does not include current military personnel.
Combat exposure, mental health and PTSD	
Beckham 1997	U.S. Consecutive help seeking combat veterans with PTSD (62% Caucasian, lower middle class).
Beckham 1998	U.S. Consecutive help seeking combat veterans with PTSD (52% Caucasian, lower middle class).
Begic 2001	Croatia: Combat veterans with and without PTSD. Clinical sample.
Orcutt 2003	U.S. Vietnam veterans and spouses in NVVRS who had completed the Family Interview component (47% Caucasian, 24% African American, 29% Latino).
Rothschild 1997	U.S. Court ordered veterans entering a treatment program for IPV (57% Vietnam veterans; 43% Caucasian, 34% African American).
Savarese 2001	U.S. Vietnam veterans and spouses in NVVRS who had completed the Family Interview component (47% Caucasian, 24% African American, 29% Latino).
Sherman 2006	U.S. Military veterans and spouses seeking relationship counselling (predominately Caucasian).
Taft 2005	U.S. Partner violent Vietnam veterans. Sub sample of NVVRS who both completed the Family Interview component (64% Caucasian).
Impact of interpersonal violence on family functioning	
Chrysos 2005	U.S. Vietnam veterans and partners. Sub sample of NVVRS who both completed the Family Interview component (64% Caucasian).
Samper 2004	U.S. Vietnam veterans and spouses in NVVRS who had completed the Family Interview component and had biological children (46% Caucasian/other, 22% African American)

Table 11: Summary table of populations for spouse employment status

Study ID	Population
Current military - tied migration summary table: population	
Spouse Employment Status	

Cooke 2005	U.S. Civilians whose spouses has been in the military for at least 5-yearts and who were both living in the same Labour Market area (LMA) in 1985
Cooney 2003	U.S. Spouses currently married to active duty military personnel; mean age 30.4 years. Secondary analysis of 1992 DoD Survey of Officers and Enlisted Personnel and their Spouses
Grant 2003	U.S. Compared of wives of military men to wives of non-military men
Schwartz 1991	U.S. Army spouses: Random sample selected within stratified army. Stratified within each service, enlisted personnel stratified by length of service and gender, officers stratified by gender spouses mean 31 years old.
Psychosocial and Family Functioning	
Bowen 1987	U.S. Air Force personnel and their wives. Random sample from US military married couples in 24 bases world wide; 70% agreed to participate; stratified to couples proportionally represent each geographical area
Ickovics 1987	U.S. Non-probability sample purposefully selected to represent various types of units. Represented 75% of enlisted soldiers' wives in each unit. Second wave participation was 70%.
Mederer 1992	U.S. Navy officer wives; aged mean 32; most college educated; 54% not employed; 27% employed full time; married mean 8years, 63% had children; husbands in navy for mean 11 years; 64% return rate
Sebenick 1999	U.S. Military officers wives

Table 12: Summary table study of stressors, outcomes and results for spouse health, wellbeing and family functioning papers

Study ID	Stressor	Outcomes	Results
General Military			
Physical and Mental Health			
Anson 1993	Military service	physical and mental health, and service utilization	Army wives- Greater mobility; reduced social support and work force participation. Wives of soldiers as healthy (physically and mentally) as non-army wives. Wives of army men were more likely to bring their children to clinic for treatment of illness.

Constantian 1998	Military service	mental health; mental health service utilisation	Current active military members and their families had mental health rates similar the general population with the exception of female active air force members and female family members of air force personnel which had sig. higher problems BUT also used mental health service less than the general population. Raises issues of culture of no acknowledging or seeking treatment for mental health problems.
Fernadez-Pol 1988	Overseas posting	physical and mental health	Sig. wives of enlisted men had more symptoms than wives of officers. NS difference for age. NS different to American average.
Peterson 2004	Sep-11	physical and mental health	2.4% increase in unfavourable health outcomes post Sept 11 in total sample. Significant increase in all beneficiaries under 45 years and both genders (i.e. active duty families felt more impact – stress related to likelihood of being deployed). Significant increases found with women affiliated with marines and males affiliated with army but not other combinations.
Wallis 1968	Mobility	psychiatric disorder	Higher rates of psychiatric problems in spouses compared to soldier
Psychosocial Functioning			
Martin 1987	Military service	military stress, marital stress and general well-being	Both military and marital specific factors significantly and independently impact on general well-being.
McCubbin 1986	Overseas posting	family adaptation	Predictors of family adaptation by life cycle stages: Before children: 5 variables accounted for 31% of the variation in family adaptation: rank, type of unit (both 15%), pre-travel hassles (-), military members coping skills (+), community support (+). Young/school children: 6 factors accounted for 35% of variance, rank, military unit (both 1%); pile up of family life events prior to deployment (-); pre-travel hassles 4% (-); spouses SE 2% (+); quality of religious program 2% (+); community services 1%(+); military members sense of coherence (22%) Family with adolescents: 6 variables 34% of variance: rank (8%); pile up of post arrival hassles (2%); military members SE (3%); community support (2%); military members sense of coherence (9%). Empty nest: 5 factors accounting for 37% of variance: military members unit (14%) pile up of family events before relocation (7%); pre-travel hassles (2%); military members coping skills (4%); family cohesion (10%). i.e: different life stages require different services.
Paulus 1996	military service	housing, morale, marital harmony, health, and well-being	Higher quality housing was associated with positive housing ratings but not with more favourable morale, marital harmony, health, or well-being. The experience of housing problems was related to negative housing evaluation, while the experience of Army lifestyle problems was related to lowered morale, harmony, health, and well-being. Results were generally similar for enlisted men and their spouses.
Rosen 1988	Military service	social support, family separation and wellbeing.	Stress had an adverse effect on well-being only among those who did not perceive themselves as having social support.
Rosen 1989	Military service	Quality of life	Major proportion of life satisfaction was related to non-military factors but military specific factors contributed significantly to the variance in life satisfaction.

Rosen 1991	Military service	well-being	Strongest predictor of general well being is prior well being; mastery; marital and financial satisfaction; predictability of husbands schedule; and number of days husband been away in last 6 months.
Rozenzweig 1981	military service and intermittent travel	well-being	Women subject to short and long term stressors related to husbands service in military; Stress cumulative; deal with it in adaptive and non-adaptive ways Fear of loss of husband important stressor Women became less defensive over the course of the groups.
Marital Relationships and Family Functioning			
Bowen 2003	Military service	family adaptation and support	Positive sense of community had the largest overall effect on family adaptation; unit support had the second this was mediated through Sense of Community. Small positive relationships between informal support and family adaptation. Pay grades not sign different. OS bases and living on base had largest Sense of Community. Being in the community for more than a year was negatively associated with sense of community. Negative link between sense of community and children in the home (moderate effect size). Families with children had lower family adaptation. Model as a whole explains 12% of family adaptation.
Eastman 1990	Military service	family functioning and life stress	Navy families family environment ns different from US normal families and sig. different from US distressed families on cohesion, expressiveness, conflict, organisation. Suggesting close knit families and does not support the 'military family syndrome' (Lagrone 1978). Family environment was independent of deployment cycle and command assignment and were related to demographic variables such as age, race, number of children, total time in service and total years married. Life stress was independent of these but was sig. related to deployment cycle and command assignment indicating that deployment impacts on life stress Higher life stress was sig. related to FES (lower Cohesion, Expressiveness, Organisation and higher Conflict).

Table 12 continued….

Military Deployment			
Physical and Mental Health			
Abbe 1986	deployment	distress during and after deployment	Wives made more stress related visits both during and after husbands' absence but not children.
Beckman 1979	deployment	mental health	Sig. higher depressive symptoms during husbands' absences.

Benotsch 2000	war exposure	combat exposure, PTSD symptoms, resources, family relations at 12 months (T1) and 24 months (T2) post deployment.	1) both personal and environmental resources and PTSD severity where moderately stable over time – Direction of changes - sig: hardiness decreased; avoidant coping increased; PTSD symptoms increased. 2) Those with probable PTSD at time 2 reported greater perceived war zone stress, greater BSI - avoidance coping (12% variance) and poorer family cohesion (6% variance) correctly assigned 75% with PTSD diagnosis at T1. 3) Time 1 resources sign predicted T2 PTSD symptoms even after accounting for T1 distress. 4) T1 PTSD symptoms sig. predicted T2 resources even after accounting for T1 resources.
MacIntosh 1968	deployment	mental health	Separated wives with psychiatric problems were sig. younger and had less education, most developed problems while husband away.
Rosen 1995	deployment	distress during and after 10 months after deployment	40% spouses distressed during deployment and recovered, 24% were distressed at both time points. Sig. improvement of spousal distress post deployment; Stress occurring during; deployment had both direct and indirect impact on later distress levels; Symptoms did not predict life events.
Psychosocial Functioning			
Apellaniz 1990	deployment	coping and marital relationships	Most distressing was the need to take on full responsibility for household. Those with poorer marital relationships were less distressed. Religious values, positive outlook and social support key factors in healthily coping.
Everson 2005	deployment	coping/well-being, quality of life, appraisal of stress	Family stress, well being, sense of coherence and QOL were all sig poorer for the deployed compared to non-deployed groups. The >6 months all bar QOL was poorer than <6months. Path analysis found Parenting stress, family stress, family coping, well being sense of coherence were all significantly related to QOL. Parenting and family stress were the most significant predictors of QOL for >6month deployment group. Note: personal coping removed as not reliable.
Gilies 2005	deployment	coping	Coping abilities affected by turbulence of and isolation of army life High levels of stress which impacts on their parenting confidence when children ill which is related to isolation and posting cycles.
Gross 1982	deployment	spouse well being	Three common consequences of the couples' separations. These involved changes in the couples' relationships, wives' relative personal freedom and social confinement, and the feeling that they were leading deviant lifestyles.
Guha 2005	deployment	coping	Showed that the majority of the spouses coped similarly but differences do exist between full-time and part-time military spouses. Safety, household responsibilities and maintenance, and finances, were reported to be areas of hardship for the spouses.
Table 12 continued….			
McNulty 2003	deployment	coping and adaptation	NS difference between deployed and non-deployed families on optimal family balance. NS for increased health usage during deployment but sig. for increased use for children.
Quinault 1992	deployment	stress	75% severely distressed Stress impacted on their emotional, social, and family lives.

Rosen 1994	deployment	emotional well-being; expectations of Army	9 different clusters identified ranging from young not coping spouses to older coping spouses Spouse who had most difficulty coping were younger but also older groups experiencing problems. Officers' wives coped better. Groups with high levels of distress had highest levels of dissatisfaction with services and highest expectations. Minority groups (Hispanic) and full time employed spouse also were lower well being which may be related to lower social support.
Marital Relationships and Family Functioning			
Frankel 1988	deployment	physical and mental health and marital relationships	All pre-deployment variables were predictive of early post deployment and early post deployment predicted later deployment. Marital happiness did not predict health complaints in early deployment but did on post deployment with high marital happiness related to low physical symptoms. Depression was consistent across pre and post deployment. Dysphoria symptoms increased over deployment period. Increased family stress (older children) related to poorer outcomes across deployment time. More cohesive families the less dysphoric symptoms over deployment time. Number of previous deployments increased parenting and family concerns across all times measured. Dissatisfaction with social support was predictive of reduced marital happiness between pre and post deployment.
Pittman 2004	deployment	adaptation	Family adaptation to the demands of army life is complex, with two interrelated domains: Work-family interface had implications for the quality of family relationships and management of family roles at home Family experiences related to the deployment impacted on family adaptation (external adaptation) – difficulty family had coping with the stressors of army life Satisfaction with services affected external adaptation mediated via perceived unit culture.
Veterans			
Physical and Mental Health			
Alessi 2001	partner of a veteran	psychopathology	Veterans wives sig. higher levels of distress and conflict than non-veterans wives. Vets wives did not reach pathological cut-off scores.
Bey 1974	service in Vietnam	feelings prior, during and after service	Prior: numbness/shock/disbelief when heard news. Had to vacate military housing. Some move home which was supportive for some and stressful for others. Sad and apprehensive re pending loss. During: awkward social situations; waiting wives groups helpful; social view that war was futile added to stress; increased demands single parent; anger and frustration at husbands for going; Return: increased tension as husbands returned; let down by husbands withdrawal and depressive symptoms; irritation at space they occupied; conflict with child discipline.
Table 12 continued….			
Eisen 2006	deployment	physical health	Sig. higher levels of skin rashes and chronic hepatitis in DV spouses Health problems in spouses were independent from health problems in husbands Overall; DV spouses did not have poorer medical outcomes 10 years post deployment compared to non-deployed veteran spouses.

Murphy 1990	exposure to radiation	concerns in relation to radiation exposure	Major theme – invalidation of the veterans experience/institutional denial -family concerns about genetic effects on future generations -desire to protect each other from physical consequences -a desire to leave a record of their experiences to help prevent future suffering.
Santic 2006	death of soldier	hypertension	Sig. greater hypertension in families with killed soldier at both time points than those without. Sig. decrease in hypertension over time in families with loss but not those without loss. Sig. higher PTSD, smoking and alcohol consumption in those with loss but not cholesterol and triglyceride. Sig. higher levels of hypertension in those with PTSD, smoking and drinking habits regardless of loss. Sig. higher number of people with hypertension in the group with loss who did not drink or smoke.
Verbosky 1988	PTSD	adaptation	Relationship between VV PTSD and spouse self esteem, limited coping skills, and ineffective overcompensation to deal with problems.
Marital Relationships and Family Functioning			
Ben Arzi 2000	Veterans mental health	distress and caregiver burden	PTSD and PC wives have greater psychological distress and carer burden than controls.
Browne 1995	military service in Vietnam	PTSD and interpersonal relationships	75% of vets reached PTSD criteria. Sig. high PTSD symptom severity associated with low interpersonal relationships (lower cohesion – nurturance and consistency). Sig. Partners with higher psychological distress had lower interpersonal relationships. Sig. higher aggression/anger was associated with higher PTSD severity and psychiatric symptoms were related to relationship conflict. PSTD and psychiatric scores were sig. related to communication/expressiveness scores.
Calhoun 2002	veteran PTSD and combat experience	spouse mental health and caregiver burden	Partners of PTSD veterans had significantly greater caregiver burden experience and poorer psychological adjustment compared to non-PTSD veterans partners. Care giver burden was sig. associated with partner reported IPV; veteran reported IPV, and severity of PTSD symptoms IPV and PTSD severity sig. predicted caregiver burden whereas age, race, education, and social support did not. Partner psychological adjustment was sig. related to partner burden, IPV and age (i.e. as burden and age increased partner became more distressed).
Carroll 1985	veteran PTSD and combat experience	marital adjustment	PTSD group had sig. difference compared to both other groups, greater problems with self disclosure and expressiveness with their partners, higher levels of physical aggression toward partner, poorer relationship adjustment. Not sig. different from any group, intimacy and affectionate behaviour. Differences not attributable to pre-military factors, response style, or demographic factors.
Table 12 continued….			
Dirkzwager 2005	partner a veteran Peace keeper	marital satisfaction, marital stability, pre-military factors	Sig. intercorrelations between peace keeper and partner for PTSD, somatic symptoms, sleep problems, social support and marital relationship.

Frederikson 1996	service in Vietnam and PTSD	communication and family functioning	Problems of marital and family adjustment, poor parenting skill, and violent behaviour Blamed Vietnam for the ongoing distress of their husbands. Vietnam war served as an explanation for the return soldiers not being responsible for their attitudes, behaviours, inadequacies, or faults-Vietnam had made them turn that way, and thus Vietnam has robbed the families of happiness.
Gallagher 1998	service in Vietnam	PTSD in veteran and spouse	52% of veterans and 28% of spouses met criteria for PTSD; Veterans with PTSD were sig. more likely to have a spouse with PTSD. Partners reporting of veterans PTSD moderately related to veterans with avoidance symptoms having least concordance. Partners PTSD sig. contributed to ratings of Veterans PTSD.
Gimbel 1994	combat exposure	marital satisfaction, marital stability, pre-military factors	Combat exposure (controlled for age, race, mental aptitude, age of entry) sig. moderate relationship with martial adversity. Sig. combat and ever divorced; separated for reasons other than divorce; and abuse. Pre-military factors were also significant but it did not account for all the variance in marital adversity, early behavioural problems had both direct and indirect relationships with marital adversity, emotional problems had only indirect effects through combat stress and antisocial behaviour. Overall, combat is related to stress and antisocial behaviour with only antisocial behaviour related to marital distress. Estimates that ~14% of ever-married veterans at risk of combat-related marital problems.
Hendrix 1993	combat exposure and PTSD	family functioning	Significant correlations between war zone trauma and PTSD. No significant correlations between combat exposure and family functioning. Being involved in acts of abusive violence was significantly but modestly associated with poorer couple communication but not significant for other measures of family functioning. PTSD Intrusion and Avoidance symptoms were significantly and negatively associated with poorer marital satisfaction, couple communication and family flexibility and cohesion, and parenting satisfaction.
Hendrix 1995	PTSD and combat exposure	family environment, marital and parenting satisfaction	Combat exposure was sig. positively correlated with psychological impact of trauma (intrusion and avoidance). Combat exposure was not sig. correlated with family environment. Intrusion and avoidance symptoms were sig. neg correlated with family cohesion, expressiveness, marital and parenting satisfaction.

Table 12 continued….

MacDonald 1999	PTSD and combat exposure	interpersonal and family functioning and marital adjustment	Interpersonal problems; PTSD sig. associated with family functioning and dyadic adjustment but this was mediated via interpersonal problems (via problems establishing and maintaining relationships). PTSD sig. predicted interpersonal problems, as did (but less degree) family functioning and Dyadic adjustment. Family Functioning: The higher the level of PTSD the lower the level of family functioning and dyadic adjustment (correlations) but was not a sig. contributor in regressions for either variable. PSTD and family functioning and PTSD and dyadic adjustment are indirectly related, FF, dyadic adjustment and interpersonal problems and ethnicity.
Nelson 1999	War and child abuse trauma	couple relationship, secondary trauma, relationship satisfaction	More general stress symptoms, more trauma symptoms, and more types of trauma experienced in trauma survivors, particularly veterans. Also, partners of trauma survivors reported higher levels of individual stress symptoms and secondary traumatic stress symptoms, particularly the partners of war-traumatized veterans. No sig. differences for relationship impairment.
Riggs 1998	PTSD	intimacy and marital adjustment	PTSD: Over 70% PTSD group had clinically significant dyadic distress PTSD higher rate of anxiety with intimacy. PTSD positive veterans were sig. more likely to report relationship distress than non-PTSD (same for both husband/wife reports). PTSD veteran couples were sig. poorer on global measure of relationship quality. PTSD positive couples reported greater relationship distress more, difficulty with intimacy, and more problems in the relationship. Symptom Clusters: Veterans relationship quality was sig. correlated with their self reported symptom severity. Avoidant scores predicted DAS responses (neared sig.). Emotional numbing sig. predictor of DAS and RPS.
Solomon 1991	combat exposure and PTSD	spouses mental health and marital relationships	30% of husbands met criteria for PTSD. Wife's relationship with her husband was a significant buffer for the wives mental health (anxiety, hostility and depressive symptoms) with Expressiveness being the key element of the marital relationship.
Solomon 1992a	combat exposure and PTSD	marital relations	Sig: Cooperative role division greater at beginning of marriage than after war. CSR wives reported less intimacy post war, less expressiveness across all time points, less cohesion after war and had returned to pre-war levels in last 12 months and greater levels of conflict across all times but increased after war. CSR wives were more disengaged after the war and had less marital satisfaction post war. Overall: 1. husbands who have less supportive marriages may have less resources to cope with trauma. 2. impaired marriage may be symptom of more generalized difficulty in interpersonal relationships. 3. may reflect retrospective nature of data collection
Solomon 1992b	partner of a veteran with CRS	psychopathology and marital relationships	CSR wives reported sign more PTSD symptoms in husbands than non-CSR group – following analysis for CSR and PTSD status. Both CSR and perceived PTSD were sig. associated with wives depression/OCD/anxiety problems. CSR alone associated with wives somatic problems PTSD alone associated with wives paranoia, interpersonal sensitivity and hostility as well as reduced marital satisfaction, cohesion, and consensus, family cohesion and expressiveness (FES) and increased loneliness and decreased social support. Where there was an effect of both PTSD and CSR the effect was cumulative IE wives whose husbands had CSR and perceived PTSD had greatest distress.

Table 12 continued….

Sherman 2005	partners of PTSD Vietnam	Health needs of spouse	64% thought accessing individual therapy was necessary to help cope. 78% thought important for couple therapy. But only 28% had received any mental health services in previous six months.
Taft 1999	PTSD, high combat exposure	PTSD symptoms, Marital relationships.	Moderately sig. correlations between spouse and veterans PTSD ratings Greater PTSD symptoms were sig. related to poorer quality relationships (both parties).
Prisoner of war/Missing in action			
Marital Relationships and Family Functioning			
Cohen 2005	POW experience	divorce, re-marriage and divorce	POWs greater risk of divorce in the first 2 years post repatriation compared to non-POW Vietnam veterans; more likely to divorce when younger, shorter marriage; wives reported lower marital satisfaction and more financial stress. No difference in rates of re-marriage and re-divorce (therefore interpersonal problems did not transfer to later problems).
Dent 1998	POW experience	Mental health and quality of marital relationship	No differences on groups for marriage/divorce/age/duration marriage/number of children/SES. Wives of POWs sig. higher education level. POWs sig. greater somatic depressive symptoms but not wives. No difference in marital relationships. Factor Analysis: 1. veteran's mood – increased somatic symptoms, depression/anxiety and impact of war. 2. wife's mood – higher levels of anxiety/depression, somatic symptoms, controlled and dominated by husband. 3. independence of intimate bonds from mood – more caring veteran felt wife was more caring, less he felt dominated and the more the wife felt cared for. Overall: increased mental health problems in POWs but not their wives.
McCubbin 1975	POW experience	family adjustment	Significant predictors of family reintegration's: Length of marriage (positive); wives assessment of quality of marriage (positive); wives emotional dysfunction during separation(negative);
McCubbin 1976	MIA	coping and adaptation	Six factors: Seeking Resolution and expression of feelings; Maintaining family integrity; Establishing autonomy while maintaining family ties; Reducing anxiety; Establishing independence through self development; Maintaining the past and dependence on religion; Predictors of coping patterns related to husband and wife backgrounds, history of the marriage, development stage of family, stresses of separation.
Nice 1981	POW experience	divorce and marital adjustment for families 5 years post repatriation	Significantly higher level of divorce in RPW than comparison group; families separated for longest period, few or no children, and non-catholic were more likely to divorce NS differences in family functioning between groups.

Table 13: Summary table study of stressors, outcomes and results for stressors, outcomes, results for IPV studies

Study ID	Stressor	Outcomes	Results
General Military			
Rates of Interpersonal Violence			
Bonannon 1995	military service	IPV	37 to 56% of couples reported DV depending on whether one or both spouses reported. Spouse agreement. Husband to wife violence: Husbands reported higher levels of aggression than wives (sig.). Wife to husband violence: Husbands reported higher levels than wives (sig.) Overall: significant levels of violence missed if only survey one spouse. Most agreement between item assessing specific physical behaviours such ad kick, hit, bite. Frequency: wives reported less frequent husband violence compared to husbands.
Campbell 2003	military service	IPV	Past year prevalence .5% in Military sample and HMO = 5.0% sample. Adult life time prevalence: Physical/sexual abuse 30% military; HMO = 36% (25%-39% range in most HMO settings). Combine abuse (including emotional) 38.8% in military; HMO = 44.3%. Military service prevalence: Physical/sexual 22% (18.5% abused by a civilian; 43.2% abused by current active duty person; 38.4% by veteran; off the military abusers 62.9% were enlisted and 37.1% officers (both active and veteran). Enlisted women 3x more likely to be abused than officers
Heyman 1999	military service	IPV	Army moderate IPV men 10.8% women 13.1%, civilian men 9.9% women 10.0%; Severe IPV army men 2.5%, civilian 0.7% (sig.), women 4.4% and civilian 2.0% (sig.). Significantly small but reliable elevations in Army once age and race controlled for male severe, and female moderate and severe. Caution with female data as CTS does not discriminate between self defence and female to male violence.
McCarroll 1999	military service	substantiated cases IPV	Sig. reduction in substantiated cases from 85% in 1989 to 65% in 1997; case frequency of 7000 per year; between 8-10.5% of married personnel per year; 67% female victims; 47% all victims; Black; 40.5% white; 8.5% Hispanic; 50% Black offenders; 38% white; 8.4% Hispanic; 66% offenders active duty Army; 34% civilians; 82% of victims and offenders were 18-31 years.
Newby 2000	ethnicity	substantiated cases IPV	Black to white offenders were significantly higher in every age group except for 42-46 years with the greatest differences in the youngest age groups.
Newby 2003	military service	IPV	67.8% female officers reported no IPV toward spouses, 24% of all women reported moderate aggression. Sig. 10.1% of spouses of unemployed husbands endorsed severe aggression vs 7.1% for women whose husbands were employed (8% overall);

Table 13 continued….

Pan 1994	military service	IPV	Overall prevalence of using any physical aggression against spouse in last 12 months = 29.9% At least one mild aggression accounted for 24.4% and severe aggression 5.6%; 37% of men <31 years old reported use of physical aggression (similar to other reports for this age group) *severe aggression higher in this sample*; Odds for aggression reduced for increases in age and income. Odds for mild aggression with alcohol problem increased 128% times. Odds for severe aggression increased by 121% for drug problems. Odds for severe aggression increased by 183% for every 20% increase in marital discord.
Rosen 2002	military service	IPV	31.6% reported physical aggression against their partner in past 12 months. 9.1% reported at least 1 act of moderate to severe aggression. For whites only 21% reported minor IPV and 5.8% moderate to severe. These rates similar to whole army available white norms. Sig. greater possibility of aggression if: younger, enlisted or non-commissioned officer (vs officers); black 13%, and black Hispanic 12.5%, Asian men, multiracial 11% and 37% in 'other minorities' (vs white 5.8%, and white Hispanic 4.7%). Regression: younger strongest predictor; minority status, and rank (together predicted 7.5% of variance).
Predictors			
Bell 2006	alcohol consumption and ethnicity	IPV	African-American soldiers significantly greater risk of alcohol problems compared to White soldiers. Hispanic soldiers NS different from white. Self reported alcohol problems, heavy weekly drinking, lower education, lower rank, younger age, depressive problems, low social support and low job satisfactions all significant relationship to IPV. For whites and Hispanics alcohol problems and typical consumption patterns stronger predictors of IPV than for African-Americans. Family problems significant predictors for African-Americans.
Clawson 1999	military service	IPV; social support; coping; history of abuse in family of origin	Abusers Sig: exp higher levels of family of origin abuse. Used more inappropriate coping strategies in times of stress. Higher levels of life stress; Lower education; Ethnic minority; Married less than 5 years. Enlisted rank substance abuse problems; NS: social support; Noted that these similar to civilian populations.
Erez 2003	military culture	factors relating to IPV against immigrant brides	Core aspects of military service such as unit cohesion, military readiness, honour, duty, and service are embedded in abuse of immigrant partners and in the military community's response. Immigration circumstances and status interact with the military context to compound abuse and further marginalise victim.
Harrison 2006	military culture	female victims, CF military context policy and practice	Despite specific polices to the contrary a significant proportion of CF members, CF peers, CF supervisors, CF spouses, and CF spouses peers keep silent about or minimized the problem of women abuse. By doing so they entrenched the isolation of the abused spouse, whose ties were already been weakened by her membership in the CF community.
Rosen 2003	military culture	IPV, martial adjustment, mental health, unit variables	68.4% no !PV in last 12 months, 22.5% minor and 9.1% moderate to severe. Individual predictors of IPV: were depression, race, poor marital adjustment, alcohol problems, and history of childhood abuse. Depression not associated with more severe IPV. Group predictors of IPV: lower leadership support, culture of hyper-masculinity, lower support for spouses.

Table 13 continued….

Mackie 2004	family of origin violence	IPV, mental health, history of family of origin violence.	No sig. main effects: Family of origin (FoO) Viol and IPV (3% variance). Current depression and IPV. Current stress and IPV. Current alcohol and IPV (all 3 current = 4% variance). Sig. interactions: (19% of variance). FoO violence and alcohol abuse. FoO violence and depression.
Deployment			
Rates of Interpersonal Violence			
McCarroll 2000	deployment	IPV	Small but significantly higher rates of severe IPV in the deployed vs the non-deployed group; the longer the deployment the more likely IPV.
McCarroll 2003	deployment	IPV	NS difference between pre- and post IPV 3-4 months post return. IPV related to youth, non-white race, living off base, and previous history of IPV. Pre-deployment IPV 4-5 times greater risk of IPV regardless of deployment status.
Newby 2005	deployment	IPV	Deployment not a risk factor for later IPV for whole group; NS difference in the type or frequency of IPV between groups; NS race differences; Younger wives reported higher levels of post-deployment IPV. Pre-deployment IPV predicted post-deployment IPV. For 20year old wives there was a sig. increase with 10% not having experienced IPV experiencing IPV post-deployment.
Veterans			
Rates of Interpersonal Violence			
Bradley 2007	past military service	IPV, relationship stressors	Overall: 10% common couple violence and 3% severe violence in pat 12 months. Contrary to expectations; Sig. diff with male vets being less likely to be involved in IPV than non-vets (23% reduction in odds) however once relationship stressors were added to the regression there were no sig. differences. No sig. diff with female vets/non-vets. Relationship stressors of financial debt and substance abuse increased odds of severe IPV, as did quarrelling and child behavioural problems. If IPV already present it was exacerbated by greater number of children in the family.
Combat exposure, mental health and PTSD			
Beckham 1997	combat exposure and PTSD	IPV, relationship stressors	Interpersonal violence controlling for all covariates .NS ethnicity; Significant younger age greater combat exposure and PTSD severity; PTSD significantly correlated with combat exposure and hostility. Lower SES, greater PTSD severity and higher aggressive responding all significantly related to interpersonal violence.
Beckham 1998	combat exposure and PTSD	atrocity exposure, IPV, relationship stressors	Combat and atrocity exposure significantly related to PTSD symptom severity. Atrocity exposure (controlling for combat exposure) was significantly related to overall PTSD symptoms, 'B' symptoms, global guilt (particularly guilt cognition and Hindsight-Bias/Responsibility and Wrongdoing). Atrocity exposure was NS related to interpersonal violence.

Table 13 continued….

Begic 2001	combat exposure and PTSD	IPV	Significantly greater number of violent acts in past 12 months in PTSD group. Greater % of PTSD group had previously been mistreated (26.6% compared to 10.8% but significance was not reported).
Orcutt 2003	Combat, PTSD, pre military stressors	IPV	Direct relationships to IPV: Relationship quality with mother; war zone stressors; PTSD symptom severity. Indirect relationships to IPV via PTSD: Stressful childhood; childhood antisocial behaviour; war zone stressors. PTSD appeared to increase persons risk of perpetrating IPV.
Rothschild 1997	military service	Mental health	Three clusters: Sub-clinical Narcissism. Narcissistic personality disorder. High general psychopathology/Substance Dependence.
Savarese 2001	Vietnam service	combat , PTSD, pre military stressors, IPV, alcohol abuse, psychological distress	84% at least 1 act of psychological abuse to partner in past year; 21% physical abuse. Frequent drinking was positively correlated with physical violence. Hyperarousal was sig. positive associated with both physical and emotional abuse and both quantity and frequency of drinking Regression: Both hyperarousal symptoms and quantity of drinking had significant independent effects on physical violence (i.e. heavy drinking and greater hyperarousal symptoms = greater violence). Drinking frequency was not independently related to violence. Sig. interactions drinking frequency/quantity and hyperarousal symptoms. For psychological abuse there were few sig. effects.
Sherman 2006	relational problems	IPV, marital adjustment	Sig. greater IPV (both severity and rate) reported in PTSD (OR = 5.43) and depressed (OR 3.97) veterans. All groups had distress levels of marital satisfaction.
Taft 2005	Vietnam service	combat , PTSD, pre military stressors, IPV, mental health	PTSD+IPV related to all risk factors found in civilian samples. PTSD+IPV associated with atrocity exposure, major depression, drug abuse and poorer marital problems compared to PTSD-IPV. Violence in family of origin was not significantly different between PTSD+IPV and PTSD-IPV groups. Significantly higher relationship problems all PTSD compared to non-PTSD.
Impact of interpersonal violence on family functioning			
Chrysos 2005	past military service	IPV, family functioning	Males perpetrated more severe violence than women; severity was highest in bi-directional violence; female victims of IPV reported poorer family functioning then male victims and female non-victims.
Samper 2004	Vietnam service	PTSD, major depression, IPV, parenting satisfaction	PTSD numbing and avoidance symptoms strongest significant negative correlation with parenting satisfaction; PTSD severity also significant negative correlation with parenting satisfaction; Partner violence significantly related to all PTSD symptoms and severity variables; Partner violence was significantly and negatively correlated with parenting satisfaction; Regression: Both PTSD numbing and avoidance and severity were sig. and negatively associated with parenting satisfaction accounting for ~6-7% of the total variance each; hyperarousal and re-experiencing accounted for approximately 2% each. Remained when controlled for paternal depression, partner violence and alcohol/drug use.

Table 14: Summary table study of stressors, outcomes and results for spouse employment status studies

Study ID	Stressors	Outcomes	Results
General Military			
Rates of Employment			
Cooke 2005	tied migration	Employment status	77% of women and 62% men had migrated. Migration associated with sig. decline in employment among all civilian wives and 4hrs decline in hours worked /week; ns but similar figures for men.
Cooney 2003	tied migration	Mobility and employment history	Geographical mobility sig. associated with: Increased difficulty to find work; Increased dissatisfaction with work opportunities; Decreased employment; Decreased annual income.
Grant 2003	tied migration	Educational attainment and work participation	DK
Schwartz 1991	tied migration	Employment status	Sig: Army policy variables: spouses on main land US more likely to be employed; greater length of time in current location; presence of spouse employment service; Greater likelihood of employment: higher education, black, children between 12-17, experience. Less likely: children in preschool, spouses with higher wages.
Psychosocial and Family Functioning			
Bowen 1987	tied migration	Marital adjustment	NS wife employment did not explain sig. variance of either husband or wives report of marital adjustment. No sig. 2-way interactions. Sig. 3-way interactions: Husband& wives reports: Marital adjustment, base location, Husbands rank & wives' employment status – officers in mainland bases whose wives worked full-time reported poorer marital adjustment.
Ickovics 1987	tied migration	employment and well being	Women employed at both assessment times had significant lower GWB scores. In not employed at first assessment and employed second time increased GWB.
Mederer 1992	tied migration	Life satisfaction, role satisfaction, support of husbands Navy career	Officers' wives with traditional views of gender roles were more involved in their husbands careers and less likely to be involved in competing activities Traditional views of gender roles and greater involvement in Navy life were related to higher life satisfaction ratings.
Sebenick 1999	tied migration	worker commitment, career self-efficacy, perceived support general well-being	Results showed that employment status alone did not predict general well-being. When interactions between employment status and other career-development variables were considered, some distinctions emerged. For almost all women in this sample, career search self-efficacy was found to be a statistically significant and substantive predictor of general wellbeing

Table 15: Study quality for spouse health, wellbeing, and family functioning papers

Study ID	Study design	Size	Control group	Statistics	Outcome measurement tools	Appraisal
General Military						
Physical and Mental Health						
Anson 1993	C-S	N=98 Military =44 Non-military=54	Military vs non-military	t-tests chi-squared	Developed questionnaire for self reported health; residential mobility; social support; labour force participation; Family medical records; Scale of Psychological Distress (SPD; Ben-Sira 1982).	8
Constantian 1998	C-S	N=26,097	General population	z scores t-tests	SF-36 – Mental Composite Summary (MCS; Ware 1994); Self reported mental health service use.	7
Fernadez-Pol 1988	C-S	N=423	Normative sample	regression	Langner Scale – 22-item Checklist (Langner 1962).	5
Peterson 2004	Pros	N=50,160	no	Repeat measures	Health Status Questionnaire: HCSDB developed from the SF-8 and Consumer Assessment of Health Plans (AHRQ, 2002).	8
Wallis 1968	Retro	N=260	no	descriptive	psychiatric examination.	2
Psychosocial and Family Functioning						
Bowen 2003	C-S	N=17,161	no	SEM	Assessment Questionnaire (NAQ) created for this study?) includes: Unit support; Informal community support; Sense of Community; family adaptation; base location, housing location, community tenure, # children in home.	8
Martin 1987	Pros	N=277	no	path analysis	Marital Satisfaction Scale (Roach et al 1981) – 21/48 items General Well-Being (GWB; Dupuy 1978) Military Life Stress – 5 items.	8
McCubbin 1986	C-S	N=782	no	regression	All questionnaire measures designed by McCubbin family life stage; Community Support; Pile up of family demands; Family appraisal: Index of coherence (McCubbin & Patterson 1982); Family adaptation: McCubbin et al 1984.	9
Paulus 1996	C-S	N=169	DK	DK	DK	Abs only
Rosen 1988	C-S	N=947	no	DK	DK	Abs only

Table 15 continued….

Rosen 1989	C-S	N=947	no		QOL (Campbell et al 1976); Army Satisfaction Inventory (Datel 1978); General Well Being (GWB; Dupuy 1978); General Life Satisfaction (single item).	9
Rosen 1991	Pros	N=332	no	regression	General Well Being Scale (GWS; Fazio 1977); Marital Satisfaction (Martin 1983); Mastery Scale (Roach et al 1981); Interpersonal Dependency Inventory (Hirschfield et al 1977); plus own measure Financial Satisfaction; Role Satisfaction; Military Life Stress; Social Support .	7
Rozenzweig 1981	QUAL	N=24	no	n/a	DK	3
Military Deployment						
Physical and Mental Health						
Abbe 1986	Retro	N=38	DK	DK	case notes	Abs only
Beckman 1979	Pros	N=24	self control	t-tests, correlations	Zung Depression Scale (Zung, 1974); Multiple Affect Adjective Checklist (MAACL;	5
Benotsch 2000	Pros	N=826, follow up N=348	no	MANOVA	Dispositional Resilience Scale (DRS; Baratone et al 1989); Ways of coping checklist (WCCL; Folkman & Lazarus 1985); Social support questionnaire (SSQ; Sarason et al 1987); Family Relations Index (FRI; Holahan & Moos 1981); PTSD checklist (PCL; Weathers et al 1993); Mississippi Scale for Desert Storm War Zone Personnel (adapted from Keane et al 1988); Brief Symptoms Inventory (BSI; Derogatis & Spencer, 1982); War Zone stress severity: ODS-SE (Wolfe 1990); Personal resources:	11
MacIntosh 1968	Retro	N=174	clinical wives of non-deployed	t-tests	Diagnostic psychiatric interview - case review	2
Rosen 1995	Pros	N=776	Time 1 and 2	path analysis	Army Spouse Life Events Scale (ASLES; Brown & Harris 1989); Operation Desert Storm Events Checklist (ODSEC; Rosen et al 1993); Deployment Distress Scale (DDS; developed); Hopkins Symptom Checklist (HSCL; Winokur et al 1984) plus 2 added depression symptoms.	7
Psychosocial Functioning						
Apellaniz 1990	QUAL	DK	no	DK	mixed qualitative and quantitative	Abs only

Table 15 continued….

Eastman 1990	C-S	N=785	normative data	MANOVA	Family Environment Scale (FES; Moos & Moos 1981) Life Experience Scale (LES; Sarason 1978)	10
Everson 2005	C-S	N=205	spouses of non-deployed	ANOVA, path analysis	Family Crisis Oriented Personnel Evaluation Scales (FCOPES; McCubbin et al 1987); Occupational Stress Inventory (OSI; Osipow & Spokane); Family Inventory of Life Events and Changes (FILE=C; McCubbin & McCubbin 1989); Family Strains Index (FSI; McCubbin & McCubbin 1989); Parent Stress Scale (PSS; Berry & Jones 1995); Generalized Contentment Scale (GCS; Hudson 1982); Orientation to Life Scale (OLS: Antonovsky 1987); Coping Scales for Adult – Short Form (CSA; Frydenberg & Lewis 1994).	11
Gilies 2005	Qual	N=9	no	n/a	focus groups	4
Gross 1982	Qual	N=58	commuting	n/a	in depth interviews	Abs only
Guha 2005	C-S	DK	wives of full time military persons	t-tests	four inventories (FCI, FIC, MCAS and SRI) and information attained from open-ended questions	Abs only
Frankel 1988	Pros 4-time points	N=75 couples	no	regression	18-item health checklist; Center for Epidemiological Studies – Depression (CES-D; Randloff 1977). Dysphoria Scale (Pearlin and Schooler 1978). Marital Happiness Scale (MHS: Azrin et al 1973). Spouse (4 items) and Parenting concerns (6 items). Family Adaptability and Cohesion Evaluation –III (FACES III; Olson 1985). Family Strengths Inventory (FSI; Olson et al 1982). Family Coping Inventory (McCubbin et al 1981). Appraisal of social support and financial resources.	8
McNulty 2003	Pros	N=299	Deployed vs not deployed	paired t-tests	Family Attachment and Changeability Index (FAC 18; McCubbin (1996); Family Index of Regenerativity and Adaptation-Military; which includes the Self-reliance Index (SRI); Family Index of Coherence (FIC) Family Changes and Strains (FCS) Social Support Index; Family member well being (FMWB); Family Adaptation Checklist (FAC) (McCubbin); State Trait Anxiety Score (STAI) – adult and child versions (Speilberger et al 1970/73); Health records.	7
Pittman 2004	C-S	N=1064	no	SEM	Questionnaire constructs: External adaptation; Internal adaptation; Personal and family/functioning/coping during deployment; Satisfaction with services Perceived unit culture	9

Table 15 continued……

Quinault 1992	Qual	N=12	no	n/a	Life Stress Inventory (LSI; Holmes et al 1967)	6
Rosen 1994	C-S	N=1,274	no	regression	Hopkins Symptom Checklist (Derogatis et al 1974) Questionnaire: Spouses expectations of military; Number of stressful events related to deployment; Social supports; Coping; Service utilization.	7
Veterans						
Physical and Mental Health						
Alessi 2001	C-S	N=131 wives	standardised sample	ANCOVA	MMPI-2 (Butcher et al 1989) Demographic and marital history questionnaire	8
Eisen 2006	C-S	N=1,207	spouses of non-deployed Gulf era veterans	logistic regression	Laboratory examinations; Medical examination Self report illness symptoms SF-36 (Ware 1993)	10
Santic 2006	Pros	N=1,726	Family members who did not loose family member	Fisher exact test	Medical examination: psychiatric and medical history; behavioural risk factors (smoking/alcohol/drugs); BP; if hypertensive encouraged to undergo further blood tests, ECG etc. Hypertension defined as 140mmHg/>90mmHg	10
Sherman 2005	C-S	N=89	no	descriptive	Telephone survey developed for this study – embedded Burden Inventory; Brief Symptom Inventory-18 (BSI).	7
Psychosocial Functioning						
Ben Arzi 2000	C-S	N=60 20 per group	wives of healthy veterans	ANOVA	Caregiver Burden Inventory (CBI; Novak & Guest In Figley 1986); Distress: Symptoms Checklist-90R (Derogatis 1977); Psychological Separation Inventory (Tours 1992).	9
Bey 1974	Qual	N=40	no	n/a	in depth interview	7
Browne 1995	Pros	N=48 couples	no	correlations	California Inventory for Family Assessment (CIFA; Werner & Green 1993); Colorado Self-Report Measure of Family Functioning (CSMFF; Bloom 1988); Penn Inventory for PTSD (Hammarberg 1992); Symptom Checklist 90-Revised (Derogatis 1983).	9
Calhoun 2002	C-S	N=71 couples	veterans without PTSD	ANOVA, regressions	Structured Clinical Interview -SCID (Spitzer et al 1989) Combat Exposure Scale (CES; Keane 1989); PTSD symptom severity – Mississippi Scale for Combat Related PTSD (Keane et al 1988); Conflict Tactics Scale (CYTS; Straus 1979); Cook-Medley Hostility Scale -short form (Barefoot et al 1989); Burden Interview (BI; Zarit 1989); Symptom Checklist-90-Revised (SCL-90; Derogatis, 1983).	9

Table 15 continued….

Carroll 1985	Pros	N=60 20 per group	non-combat veterans	MANOVA	Pre-military Adjustment Index (Foy et al 1984); Combat Exposure Scale (CES; Foy et al 1984); PTSD Checklist (Foy et al 1984); Personal Assessment of Intimacy in Relationships (PAIR; Schaeffer & Olson 1981) Active Expression of Hostility Scale (Egendorf et al 1981); Self Disclosure Questionnaire (Jourard, 1971) Dyadic Adjustment Scale (Spanier, 1976)	8
Dirkzwager 2005	C-S	N=696 partners	4 groups; depending on spouses PTSD symptoms	MANOVA	PTSD in peace keeper and partner; somatic symptoms; marital relationships; social support; life stressors (only addressed at partners not parents).	10
Frederikson 1996	Qual	N=5	no	n/a	indepth interview	6
Gallagher 1998	C-S	N=50 couples	no	correlations	PCL-M (Weathers et al 1993); PCL-Partner (developed for this study); PTSD Disclosure Checklist (PDC; developed for this study); Traumatic Stress Survey (TSS; developed for this study)	6
Gimbel 1994	C-S	N=2,101	no	regression, path analysis	Own questionnaire: Marital Adversity; Combat; Antisocial ; Pre-military factors;	11
Hendrix 1993	C-S	N=131	no	correlations	Combat Exposure Scale (CES; Lund et al 1984); Abusive Violence Scale (AVS; Hendrix & Schumm, 1990); Purduc Post-traumatic Stress Disorder Scale (PPTSDS; Figley 1989); Kansas Marital Satisfaction Scale (KMSS; Schumm et al 1986); Kansas Parental Satisfaction Scale (KPSS; James et al 1985); Family Flexibility & Cohesion Evaluation Scale III (FACES III; Olson et al 1985); Couple Communication Skill Scale (CCSS; Olson et al 1987).	9
Hendrix 1995	C-S	N=47	no	correlations	Combat exposure: Combat Exposure Scale (Lund et al; 1984); Abusive Violence Scale (Hendrix & Schumm, 1990) Psychological impact of war: Impact of Events Scale (IES; Horowitz et al 1979); Family environment: family relationships Index (Moos & Moos 1986); Marital satisfaction: Kansas Marital Satisfaction Scale (KMSS; Schumm, et al 1986); Kansas Parenting Satisfaction Scale (KPSS; James et al 1985).	8

Table 15 continued….

MacDonald 1999	C-S	N=756	no	regression	Mississippi Scale (Keane et al 1986); Inventory of Interpersonal Problems (Horowitz et al 1980); Family Functioning Scale (Bloom 1985); Dyadic Adjustment scale (DAS, Spanier 1979); Combat exposure Index (Boulanger & Kadushin 1986)	10
Murphy 1990	Qual	N=7 veterans	no	n/a	semi-structured interviews	6
Nelson 1999	C-S	N=51	couples without trauma histroy	ANOVA	DK	Abs only
Riggs 1998	C-S	N= 50 couples	Vietnam veterans with no PTSD	MANOVA	Husband and wife interviewed separately; Dyadic Adjustment Scale (DAS; Spanier 1976); Marital Status Inventory (MSI; Weiss & Cerreto, 1980); Relationship Problems Scale (RPS; Riggs, 1993); Fear of Intimacy Scale (FIS; Descutner & Thelen 1991); PTSD Checklist Military Version (PCL-M, Weathers et al 1993)	8
Solomon 1991	C-S	N=44 couples	no	regression	PTSD 13-item inventory (Solomon et al 1987); Symptom Checklist-90 Revised (SCL-90; Derogatis 1977); Semi structured interview: marital relationship and social networks	9
Solomon 1992a	Retro	N=80 49 with CRS 31 without	wives of veterans without combat related stress	MANOVA	Used verbatim transcripts from semi-structured interview to code for a range for marital variables at four different time periods from prior to war to current (6-years post war) Role division; Intimacy; Conflict; Cohesion; Integration; Consensus; Satisfaction; Boundaries from family of origin	7
Solomon 1992b	C-S	N=205 120 CRS 85 non-CRS	wives of non-CSR veterans	ANOVA	Wives perception of husbands PTSD: PTSD Inventory (Solomon et al 1987); Wives psychiatric symptoms: Symptom Checklist-90 revised (SCL-90; Derogatis 1976) Somatic complaints: Family Environment Scale (FES: Moos & Moos 1981); Dyadic Adjustment Scale (DAS; Spanier 1976); UCLA Loneliness Scale (Russell et al 1980) Social Support Questionnaire (Muellor 1978)	9
Taft 1999	C-S	N=466	no	regression	PTSD: Mississippi Scale (Keane et al 1988); Dyadic Adjustment Scale (Spanier 1976); Marital Dissatisfaction Scale (Dohrenwend 1982)	11
Verbosky 1988	retro	N=23	no	descriptive	case notes	3

Table 15 continued….

Prisoner of War/Missing in action						
Marital Relationships and Family Functioning						
Cohen 2005	pros	N=198 veterans 56 wives	non-POW Vietnam veterans	survival analysis	Questionnaire for wives in relation to their husbands absence: marital satisfaction; depressive symptoms; financial stress; legal problems; Torture Questionnaire; POWs; Social readjustment Rating Questionnaire (Rahe 1975); Survey of 20 year marital history	10
Dent 1998	C-S	N=145 couples	WW II non-POW soldiers	ANOVA	State-Trait Anxiety Inventory (Speilberger et al 1970); Zung Self-Rating Depression scale (Zung, 1965); Intimate Bond Measure (IBM, Wilhelm & Parker 1988); Somatic symptoms checklist; Rating of long term impact of war on health/QOL	8
McCubbin 1975	Pros	N=48 couples	no	regressions	Data collected from: personnel records; on-depth interviews; medical records; Captivity questionnaire; follow-up questionnaire: Background characteristics of husband and wife; Indices of family preparedness for separation and reunion; POW experiences/psychiatric status; family adjustment	9
McCubbin 1976	Pros	N=47	no	factor analysis	Official records; In-depth interview 1972 and 1975 1972; Family Assessment Form (FAF; Hunter et al 1972); Family Development Inventory (FDI; McCubbin et al 1975); Coping with Separation Inventory (McCubbin & Dahl 1975)	6
Nice 1981	C-S	N=201	matched non-POW Naval aviator officers	t-test, regression	Incidence of divorce 5 years post repatriation; Dyadic Adjustment Scale (Spanier 1976); Family Environment Scale (Moos 1974)	7

Table 16: Study quality for IPV papers

Study ID	Study design	Size	Control group?	statistics	Measurement tools	appraisal
General Miltary						

Rates of Interpersonal Violence						
Bonannon 1995	C-S	N=94 couples	no	descriptive	Conflict Tactics Scale (CTS; Straus, 1979) male and female report.	8
Campbell 2003	C-S	N=2178	1997-8 HMO civilian sample (11.5% response rate)	logistic regression	Modified Abuse Assessment Screen (Soeken et al 1998); modification separated emotional and physical abuse; Military prevalence was determined by years of IPV occurrence	8
Heyman 1999	C-S	N=36,806 military N=3,044 civilian	Civilian National Family Violence Survey (1985), married and employed only stds to 1990 census	chi-squared	Conflict tactics Scale (CTS; Straus 1979)	10
McCarroll 1999	retro	N=61,827	no	descriptive	Records of substantiated cases	12
Newby 2000	Retro	N=34,200	no	ANCOVA	Substantiated case on ARC	10
Newby 2003	C-S	N=1185	no	regression	Conflict Tactics Scale (Straus 1979); Demographics, rank, spouses employment status, marital status, number of children, place of residence, marital history	11
Pan 1994	C-S	N=15,023 prevelance N=11,870 regression	no	logistic models	Modified Conflict Tactics Scale (MCTS; Pan et al 1994). Dyadic Adjustment Scale (Spanier 1976) Work Environment Scale (Moos 1981) . Depressive symptoms (scale similar to Becks)	11
Rosen 2002	C-S	N=648	no	regression	Modified Conflict Tactic Scale (MCTS, Pan 1994)	12
Predictors of IPV						
Bell 2006	case-control	N=24,328 N=6,507 case IPV	Non-IPV cases	regression	Alcohol problems and consumption patterns: routine. Health Risk Appraisal (HRA) survey. Psychosocial factors: HRA – social support, family problems, depression. Demographic factors: army personnel files – age, ethnicity, education, rank, dependants DV perpetrator: Army Central Registry (ACR). Alcohol use at time of DV: ACR	9

Table 16 continued…..

Clawson 1999	C-S	N=4,785; N=2285 IPV	non-IPV	regressions	Air Force Needs Assessment Survey Modified CTS (for this survey – removed all bar one severe abuse questions).	11, 9
Erez 2003	Qual	N=10	no	n/a	in depth interviews	6
Harrison 2006	Qual	N=126	no	n/a	in depth interviews	11

Rosen 2003	C-S	N=713	no	regressoin	Modified Conflict Tactics Scale (Pan et al 1994) Dyadic Adjustment Scale (Spanier 1976) Center for Epidemiological Studies Depression Scale (Randolff 1977). Michigan Alcoholism Screening Test (Selzer et al 1975). Negative Masculinity Scale . Group variables aggregated across company level Peer support: Army Institute for research Horizontal Cohesion Scale (WRAIR; Griffith 1988) Group Disrespect. Support for Spouses (adopted Army Family Interface scale Rosen & Durand 2000) Leadership support WRAIR (bonding)	11
Mackie 2004	C-S	N=59	no	MANOVA	Modified CTS (Pan et al 1994) Michigan Alcohol Screening Test (MAST; Selzer 1971). Beck Depression Inventory (BDI; Beck 1979) Survey for demographic and family of origin info.	9
Deployment						
Rates of Interpersonal Violence						
McCarroll 2000	C-S	N=26,835	deployed in past 12 months verses not deployed	regression	Conflict Tactics Scale (CTS; Straus 1979)	11
McCarroll 2003	C-S	N=2469 N=1024 deployed	non-deployed soldiers	regression	Conflict Tactics Scale (CTS; Straus 1979). Presence of IPV pre and post deployment.	11
Newby 2005	C-S	N=896	wives of non-deployed soldiers	t-test, regression	Conflict Tactics Scale (CTS; Straus 1979)	11

Table 16 continued….

Veterans						
Rates of Interpersonal Violence						

Bradley 2007	C-S	N=5418 N=2004 veterans	non-veterans	logistic regression	Face-to-face interview (primary respondent) and spouse questionnaire (secondary respondent). IPV measured in both members of the dyad. 5 questions were asked which enable the construction of a 3-level ordinal variable, non-violent, common couple violence, intense couple violence. Military service 2 items. Family stressors 4 -items re family debt & employment. Drug and alcohol abuse 4 items. Demographics for controls, age, race, education, SES.	10
Combat exposure, mental health and PTSD						
Beckham 1997	C-S	N=118	no	logistic regression	Combat Exposure Scale – Mississippi scale, Keane 1989. Mississippi scale for combat related PTSD; Keane 1987. SCID; Spitzer et al 1989. CAPS-1; Blake et al 1995. Standard Family Violence Index (SFVI – subscale Strauss 1978 CTS). Medications. Child Physical Punishment Subscale of the Assessing Environments (Berger, 1981). CAGE screening questionnaire (Ewing 1984) – alcohol screener Cook-Medley hostility scale (Cook & Medley 1954) Standard Family Violence Index..	9
Beckham 1998	C-S	N=151	no	regressions	Combat exposure – Mississippi scale Atrocities Exposure – 6 item subscale from the Vietnam Era Stress Inventory (Wilson & Krauss 1983) PTSD – Davidson Trauma Scale (DTS; Davidson et al 1997). Trauma Related Guilt Inventory – (Kubany et al 1996). Interpersonal violence – Overall Violence Index (OVI; subscale of Strauss CTS 1979).	9
Begic 2001	Retro	N=116 79 with PTSD 37 without PTSD	without PTSD	t-tests	PTSD diagnosis: Mississippi Scale for Combat-Related PTSD (Keane et al, 1988) and the PTSD interview (Watson et al 1991) Psychiatric disorders meet DSM-IV criteria Aggressivity: history prior to combat experience; current aggression, direction of aggression; type of aggression; based on referring clinicians judgement.	2

Table 16 continued…..

Orcutt 2003	C-S	N=376	no	SEM	Face –to-face Interviews: Family of origin: Family dysfunction: disrupted family environment (including alcohol use); severity of punishment; IPV; trauma exposure prior to military (general); Relationship with mother/father; Antisocial behaviour; Veteran's Childhood Antisocial Behaviour: DIS (Robins et al 1991) before aged 15 years. Combat exposure. PTSD: Mississippi Scale Keane, 1988). IPV with current partner: CTS (Straus 1979).	10
Rothschild 1997	C-S	N=183	standardised sample	z-scores	MCMI-II (Millon 1987)	6
Savarese 2001	C-S	N=376	no	regressions	Face-face interviews. Mississippi Scale for Combat Related PTSD (Keane et al 1988). Diagnostic Interview Schedule (Robins et al 1981). CTS (Straus, 1979).	11
Sherman 2006	C-S	N=179	PTSD, major depression or relational problems	regression	CTS (Straus 1989). Locke-Walli8ce Marital Adjustment Test (Kimmel et al 1974). Inclusion of Other in the Self Scale (IOS; Aron et al 1992).	9
Taft 2005	C-S	N=109	3 groups 40 IPV+PTSD 41 IPV-PTSD 28 PTSD-IPV	optimal discriminati on analysis	PTSD: Mississippi Scale (Keane 1988). Physical Abuse: spouse rated CTS (Straus, 1979). Child physical abuse: veteran 1 question. Comorbid mental health: Diagnostic Interview Schedule (DIS; Robin et al 1981). Marital Adjustment: DAS (Spanier 1976) Marital Dissatisfaction Scale (Dohrenwend 1982) and questions from American Life survey (Campbell 1976) Family Adaptability and Cohesion scale: (Olson 1978) Combat exposure/Atrocity exposure/perceived threat (King et al 1995).	10
Impact of interpersonal violence on family functioning						
Chrysos 2005	C-S	N=298	4 groups related to gender and direction of violence	ANOVA	IPV: Conflict Tactics Scale (Straus, 1979). Marital Adjustment: Dyadic Adjustment Scale (Spanier 1976) Marital Dissatisfaction Scale (Dohrenwend 1982) and questions from American Life survey (Campbell 1976). Family Adaptability and Cohesion scale: (FACES II; Olson 1978).	10

Table 16 continued…..

Samper 2004	C-S	N=250	no	regression	Major Depression: Diagnostic Interview Schedule (DIS; Robins et al, 1981). Partner violence: Conflict Tactics Scale (CTS; Straus, 1979). PTSD symptoms: Mississippi Scale (Keane et al 1988). Parenting Satisfaction: (Vogt et al 2004) – 5 item self report scale.	11

Table 17: Study quality for spouse employment status papers

Study ID	Study design	Size	Control group?	statistics	Measurement tools	Appraisal
Current military						
Spouse Employment						
Cooke 2005	Retro	N=8,350	Movers vs stayers	Ordinal logistic modelling	Migration – change in place of residence (PUMS records both 1990 and 1985) Migration if moved more than 50 miles	11
Cooney 2003	C-S	N=14,874	no	logistic regression	Department of Defense (DoD) Survey	10
Grant 2003	C-S	DK	military vs civilian	DK	DK	Abs only

Schwartz 1991	C-S	N=5,484 spouses	no	regression	1985 DoD Survey spouse survey	8
Psychosocial and Family Functioning						
Bowen 1987	C-S	N=675 couples	Employed vs unemployed	ANOVA	Face – to – face interviews. Marital adjustment: Q on intimacy. Components from Communication Apprehension Scale (Powers & Hutchinson 1979). Components from Dyadic Adjustment Scale (Spanier 1976) Family Life Cycle (childless etc).	8
Ickovics 1987	Pros	N=278	no	regression	Questionnaire including the General Well Being Scale (GWB; Dupuy, 1978).	8
Mederer 1992	C-S	N=81	high vs low involvement in husbands career	chi-squared	41 item questionnaire developed; gender role, life satisfaction and well-being items from the General Social Survey (GSS: National Opinion Research Center, 1988).	8
Sebenick 1999	C-S	Military officers wives	DK	DK	Salience Inventory, (Super & Nevill, 1985), Career Search Efficacy Scale (Solberg et al., 1994), perceived support (original measures), and General Well-Being Schedule, (Dupuy, 1978, as cited in McDowell & Newell, 1987)	Abs only

Effects of military service on children

Outcomes of interests

The mapping of the literature to the Lynch [5] identified a range of research areas specific to the age group of the children being studied. Based on recommendations from the expert team, child outcome of interest were those measured in sons and daughters, related to physical health, mental health, social functioning, cognitive and educational factors in relation to military service and associated family mobility. The child studies are divided into three sections:

1. The effects of herbicides.
2. The effects of military service on child health, wellbeing and development
3. Child maltreatment in the military

Effects of herbicides

Papers relating to the physical health outcomes of children in relation to parental exposure to herbicides were not included in the data extraction and critical analysis. This research area includes a substantial number of government reports not included in this review. In addition, studies in this area are continually being reviewed by a U.S. expert committee for the Institute of Medicine (IOM) the National Academy of Sciences [316]. These outcomes are revised in relation to the outcomes and quality of evidence for parental infertility and spontaneous abortion, infant death, low birth weight, birth defects including spina bifida, and childhood cancer in offspring. The findings are rated in four categories

1. sufficient evidence of an association
2. limited or suggestive evidence of an association
3. inadequate or insufficient evidence to determine wether an association exists
4. limited or suggestive evidence of no association.

The *Veterans and agent orange: Update 2004* [316] reported there was limited or insufficient evidence of an association between Vietnam veterans' exposure to agent orange and spina bida in their offspring. There was inadequate evidence to determine an association between veterans' exposure and abnormal sperm quality and infertility, spontaneous abortion, or neonatal and infant deaths and still births in offspring. Further, there was inadequate evidence for an association between veteran exposure to agent orange and birth defects other than spina bifida, and childhood cancers in offspring.

The effects of military service on child health, wellbeing and development

Based on abstracts, there were 135 papers with child outcomes with 55 of these contained child outcomes of interest. These documents were journal articles (37), four electronically available research reports [34, 216, 226, 269, 282], twelve theses [45, 72, 152, 191, 200, 212, 249, 263, 275, 284, 289, 299] and one book chapter [242]. At the time of this report six documents are not available, four of them await document delivery, and two theses are not available. Ten papers excluded [46, 73, 119, 120, 149,

198, 226, 241, 284, 307], five because they were not studies with the original data sets, two were discussion papers [46, 198] , one was a review [149] , and two were later published in a peer-reviewed journal [73, 284].

Four studies were further excluded from the analysis because of their lack of relevance to this part of the review [120] [307] or wrong population [119] [226].
The full text of four other studies was not available at the time of analysis. These studies are in the italicized in the relevant tables but were not appraised [45, 57, 212, 266]. Data were extraction and analysis was performed on 45 included studies (41 full text and 4 abstracts) [34, 36, 45, 57, 61, 72, 74, 75, 96, 107, 133, 138, 142, 144, 148, 150, 152, 165, 166, 179, 191, 197, 200, 211, 212, 216, 238, 241, 245, 248, 249, 263, 266, 267, 269, 275, 277, 281, 282, 285, 289, 291, 299, 300, 304].

Study variables

Age of children

The age of children was assigned to the life stages used for the mapping: infancy (0-2 years), preschool (2-5 years), middle childhood (5-12 years), adolescence (12-18 years) and adulthood (18+ years) and every stage was given the code number from 1 to 6. Another 2 categories were all ages (1-18 or 1-18+ years) and age not determined (ND). The distribution of studies with these life stages was as follows shown in Table 18. In summary, there were 12 studies of children in middle childhood, 12 studies for ages spanning both middle childhood and adolescence, eight studies of adolescents, five studies of adult offspring, and three studies which included all age groups, 2 studies where the age of children was not specified.

Table 18. Lynch's Life stages of child development

Life Stage	***Life Stage Code***
Conception - birth	1
Infancy 0-<2 years	2
Preschool 2-<5	3
Middle childhood 5-<12	4
Adolescence 12-<18	5
Adulthood 18+	6
All ages	All
Not Determined	ND

Populations

The 45 included studies were divided into four broad, mutually exclusive populations of sons and daughters of:

1. General Military (N=23)
2. Deployed during war (N=5)
3. Vietnam veterans (N=14)
4. Prisoners of war or fathers missing in action (POW/MIA; N=3)

Forty two of the studies were performed in USA, two in Australia [75, 304] and one in Canada [266]. The populations of individual studies are presented in detail in Table 19 which is located at the end of this section.

Stressors

The main stressors were chosen based on the outcomes found in mapping the literature to the Lynch model [5].

1. Military-social factors (Distal Social Environments in the Lynch model)
    - Military duty (deployment, combat, atrocities, POW/MIA),
    - Military rank (which is strongly confounded being connected to socioeconomic status and education),
    - Family mobility (school transfers, support/isolation, number of moves
    - School characteristics
2. Family factors (Proximal Social Environments in the Lynch model)
    - Family structure and resources (divorce, intactness)
    - Family functioning (marital relationships & satisfaction, interpersonal violence
    - Spouse mental health (PTSD, depression and anxiety, alcohol and drug abuse)
    - Spouse psychosocial outcomes (coping and adaptation, self esteem, efficacy)
    - Parenting behaviours and beliefs (parenting styles, skills, attitudes, parenting satisfaction, parent-child relationship, educational beliefs)
3. Child factors
    - Mental and psychosocial (previous psychological problems, temperament, previous health risk behaviours)
    - Gender, age and position in family

The following stressors were observed in the 45 included studies these stressors were observed with different frequencies and some studies investigated more than one stressor. Some of the stressors listed above, especially those classified as family factors, were confounding factors from the perspective of this review. All the affecting/correlating stressor variables for each study are presented in Table 20.

General Military

In the General Military population, the main categories of stressors were: separation [133, 191, 289], mobility [45, 96, 150, 166, 200, 212, 263, 282, 300], type of school [34, 269], family and child factors [142, 152, 165, 267], socio-economic status and military rank [277, 291], and being military dependant not further specified [138].

Deployment

In the deployed population the main stressor was separation, with secondary factors such as child specific factors such as age or gender [148, 216], previous difficulties [238, 241, 285, 304], or factors relating to their mother or siblings [238].

Veterans

In the Vietnam veterans population the main stressors were parental PTSD [61, 72, 107, 144, 241, 245, 275, 285, 304], combat exposure [61, 72, 74, 197, 241, 275, 285], participation in abusive violence during war [241], and other family factors [197, 281].

Prisoners of war

In two studies the main stressors were in relation to the father's POW experience or the child/families response to their father missing in action. In two further studies these were secondary stressors, child factors and family factors [266].

Outcomes

There were 4 main categories of outcome variables assessed in the included studies. Each of these was further subdivided into the following subcategories: The detailed division of studies grouped in the four military populations and sorted by outcome are presented below and in detail in Table 20.

General Military

- Physical: fitness, obesity, physical wellbeing, somatisation (n=2)
- Mental: emotional and behaviour problems, PTSD, depression, anxiety, grief, distress (n=7)
- Psychosocial: self-esteem, coping and adaptation, social competence, risk-taking behaviour, attachment, interpersonal relationship, violence (n=15)
- Cognitive and education: school achievement, absenteeism, attitude to school and cognitive development, creativity. (n=11)

Deployment

- Mental: emotional and behaviour problems, PTSD, depression, anxiety, grief, distress (n=3)
- Psychosocial: self-esteem, coping and adaptation, social competence, risk-taking behaviour, attachment, interpersonal relationship, violence (n=1)
- Cognitive and education: school achievement, absenteeism, attitude to school and cognitive development, creativity. (n=1)

Veterans and POW/MIA

- Mental: emotional and behaviour problems, PTSD, depression, anxiety, grief, distress (n=10)
- Psychosocial: self-esteem, coping and adaptation, social competence, risk-taking behaviour, attachment, interpersonal relationship, violence (n=7)

Emotions and Behaviour (5 studies [72, 144, 241, 281, 285]) and PTSD/depression/ anxiety/grief/distress (5 studies [72, 74, 75, 107, 304]) as the main subcategories of the Mental outcome.

Outcome measures

Outcome measures in the included studies depend partly on the design of the study and age of the child. Generally only adolescent and adult sons and daughters filled self-reports/questionnaires. For younger children reports/questionnaires/assessments were filled by parent (generally mother) or teacher introducing a strong confounding element of subjectiveness (i.e. effect of mother's wellbeing on the assessment of child's wellbeing). Objective measurements such as school records or were used only in a few studies [34, 216, 269]. Parent-reported questionnaires ranged from established, validated measures (i.e CBCL - Behaviour Problems Score from the Child Behaviour Checklist or The Mississippi Scale for PTSD –civilian version) through study-designed questionnaires to unstructured interviews in qualitative studies. The selection of outcome measures was one of the 6 points that was used to decide study quality in this review. The list of outcome measures employed in included studied is presented in Table 20).

Study design

Out of the 45 studies, 28 had cross-sectional design, 5 were retrospective, 3 longitudinal, 2 prospective, 4 qualitative, 2 studies had a mixed design with part of the data presented as cross-sectional and part as longitudinal or intervention, and one study design was not determined due to lack of full text (See Table 21).

Size of studies

There were 7 large scale studies with population size of around or above 1000 [34, 138, 197, 238, 267, 269, 291], 13 studies with population size of 100-1000 [45, 75, 142, 144, 150, 152, 165, 179, 216, 241, 277, 281, 300], 23 studies with population size of 10-100 [36, 57, 61, 72, 74, 96, 107, 133, 148, 166, 179, 191, 200, 211, 245, 248, 266, 275, 285, 289, 299, 304], 2 studies with N = 10 and 3 [249, 263], and one study with size undetermined [212]. Details of study sizes are presented in Table 21.

Controls

Thirteen of the studies had a control group or were compared with a national/state average, 10 studies were compared within clearly defined subgroups or comparison was made before/after, 13 studies performed correlations of outcomes with influencing variables and 9 were uncontrolled and uncorrelated (See Table 21).

Appraisal results

Out of 45 studies, eleven did not reach the cut-off score of 7 or did not have full text articles, seven were in the General Military population [34, 45, 150, 200, 212, 263, 267], one in each of Deployment [249], and Veterans populations `[299], and two in the MIA/POW population [57, 266]. Four of these papers were excluded as full text papers were not available for analysis [45, 57, 212, 266] were excluded. Although low

quality studies have not been excluded from general tables, their results are uncertain. In the tables they are marked by using the italic font.

Results for individual studies are presented in Table 20. Studies in this table were sorted by population and outcomes, and for each category, are listed in the order decreasing quality (appraisal score). The main stressors are included in Table 20. Objectivity and relevance of outcome measures, size of studies and the presence of controls/study design were prominent in assigning the score to the quality of study. The above parameters for all included studies are presented in Table 21.

In all 45 studies, there were 18 studies with adverse effects, 5 studies with inconclusively adverse effects, 10 studies that showed no effect, 4 studies with beneficial effect and 8 studies with inconclusive results due to descriptive design of the study (7 studies) or mixed positive and adverse results (one study [216]). Results show a better pattern when results are analysed by population.

General Military

In total, there were 8 studies with adverse effects, 1 study with inconclusively adverse effects, 8 studies that showed no effect, 4 studies with beneficial effect and 8 studies that showed no effect, 1 study with inconclusively and 6 studies with inconclusive results.

Physical outcomes

For physical outcomes, the results of both studies were adverse. Stephens 2003 [277] showed that military children are less fit than civilian children and watch TV for longer periods. These results were worse for children of enlisted compared with officers. The results were in agreement with those of Tiwary 1992 [291]that showed the adverse effect of parental factors within military. The incidence of obesity and its severity is higher for middle rank compared to officers and enlisted, retired verses active duty and older parents verses younger parents.

Mental outcomes

Five studies (11%) [96, 133, 191, 211, 289] showed no effect on mental outcomes. The stressors in those studies were: separation [133, 211, 289], mobility [96], effect of counselling program [191]. Inconclusive results were obtained investigating effect of socio-economic status[248]. One very good study by Jensen 1991[142] in 213 children of age 6-12 of senior enlisted personnel on active duty, showed the importance of family and child's factors on the outcome. It showed that there is no effect (normal score on anxiety and behavioural problems scales) when outcome is based on children's own or teachers or reports, or the score is above normal for girls as reported by teachers. However, adverse effect (below normal scores on anxiety and behavioural problems scales) was perceived by mothers, high stress parents or low-rank enlisted personnel. In another study of 57 disturbed (attending outpatient Child Psychology Service in Walter Reed General Hospital) and nondisturbed (age- and other demographic variables-matched control, with no problems reported by parents or school) dependents of military parent age 11-15, male showed no effect of fathers absence when comparison was made between groups. The effect of family factors was

shown by mothers personality being more strongly correlated with child's disturbed behaviour than father's personality or his presence [211].

Psychosocial outcomes

Two studies showed beneficial effect Hutchison 2006, Manning 1988 on risk taking behaviour and aggressive behaviour, respectively [138, 165]. Both studies were controlled, first compared with a national average, the latter compared military personnel with civilians.

The psychosocial outcomes were not affected by stressors such as mobility and family factors in four studies [96, 166, 191, 300], type of school in one study [34] and separation in two studies [133, 289]. Inconclusive results were obtained investigating effect of child's factors [152], socio-economic status [248] and mobility [150, 212]. Adverse results of mobility were seen by Shealy [263] and of child/ethnic factors by Smith [267]. The last 4 studies were low quality studies. The revision of studies investigating i.e. mobility on psychosocial outcomes show that better quality studies show no effect or even beneficial effect, while adverse effect is shown by studies with no proper controls and of low quality.

Cognitive outcomes

There were two studies that investigated the effect of type of school on cognitive/school outcomes. One study showed better outcomes on school achievement for all students of Department of Defence (DoD) schools compared with civilian schools and smaller gap between ethnic minorities and whites than for national average [269]. This study was large and used objective outcome measures, however, it could be criticised for using only two measure tests (reading and writing scores) for students of a specific age (grade 8 students). It is not certain whether this effect may be generalised to other school subjects and other student ages. Another study [34] showed only a trend that DoD schools do better compared with civilian schools; however the lack of clear result could be explained by the population not being clearly defined from the point of view of this review (schools with different proportion of military dependants were compared).
Two studies [133, 289] investigated the effect of separation with a parent on school achievement, and/or attitude to school and results were inconclusive and no difference, respectively.

Seven studies investigated the effect of mobility on school achievement. Two studies showed no effect of mobility [166, 300], One study implied a beneficial effect of mobility on school achievement [282]. However, this study was not controlled, therefore, the effect is uncertain. One study was inconclusive [200] and three studies showed adverse effect [45, 150, 212]. Again, the higher quality of the study and the more objective outcome measures, the more difficult it was to show an adverse effect of mobility on school outcomes.

Deployment

Cognitive outcomes

One study [216] investigated the effect of separation on school achievement in children of deployed and non-deployed personnel. An adverse findings for reading was seen in girls, but no difference for writing and maths for either gender. As the reading results were compared only for one year and groups were small, results were inconclusive.

Mental outcomes

In three studies that investigated the effect of separation on the emotional and behavioural problems, the effect was adverse [36, 148, 238].

Psychosocial outcomes

One low quality study of qualitative design [249] implied that the separation has an adverse effect and different coping strategies, but results were appraised as inconclusive.

Veterans

The results in this group was almost universally adverse (10 studies), two were inconclusive [275, 299] and two showed no effect [75, 304].

Physical outcomes

One study that investigated somatisation outcome showed no adverse effect [304].

Mental outcome

Nine studies in this population investigated mental health outcomes of children [61, 72, 74, 75, 107, 144, 241, 281, 285, 304]. With the exception of two studies [75, 304] the effect was uniformly adverse on outcomes such as PTSD, emotional problems, or emotional distress

Psychosocial

Seven studies investigated psychosocial outcomes [74, 75, 197, 245, 275, 299, 304]. Murphy 2005 [197] showed an adverse effect on attachment to parent. Dansby 1999 [74] showed no effect on any psychosocial outcomes. Davidson 2001 [75] showed no effect on self-esteem. Three of these seven studies were of low quality and results should be assessed as inconclusive [245, 275, 299].

Cognitive outcomes

One study reported an adverse effect on behaviour at school (attitude to school) and decreased creativity [74].

The recurring motif in this population is a clear adverse effect of veteran's emotional state on their spouses and family functioning, which was apparent in every study that investigated this outcome. In a very interesting study by Dan 1996 [72], the adverse effect on child is dependent on who is the person filling the questionnaires. This study

investigated 70 children (age 12-18) of Vietnam veterans with PTSD (from 32 families) verses 20 age-matched children of military Vietnam era veterans with substance abuse/dependence (14 families) but not PTSD. Scores were also compared with published norms. Results show that 70 percent of fathers had major depression and the majority had alcohol dependence, and 66 percent were on disability pensions. According to parent reports, children performed poorer on every subscale measurement of emotional distress compared to normative data. According to child report, there were no differences compared to norms. The possibility of minimising adverse effect by children is negated by children reports being worse on all subscales in children of substance abusers.

Street [281] investigated 260 dyad of Vietnam vets with their spouses (partners) and all_their children age 6-16 years currently living in the household. This sample contained male perpetrators of family violence (the same population as in Jordan 1992). The adverse effect of father's violence and mother/father negative assessment of family functioning on child's behavioural problems was observed, but it was more strongly correlated with mother's psychological distress than directly with father's violence.

These finding suggests that the adverse effects observed in children maybe mediated indirectly through emotionally distress of the mother, and reports effects are not objective but a perception of the distressed parent. Whenever measured, child distress was affected/correlated with fathers and mothers distress, and in one study only indirectly with fathers via mother [281].

Prisoner of war

Three studies investigated mental health outcomes [57, 179, 266] and two studies of these studies also investigated psychosocial and physical (somatisation) outcomes [57, 179]. All three studies showed an adverse effect. McCubbin [177], showed adverse effect on emotional wellbeing, but no effect on physical wellbeing or psychosocial or cognitive outcomes. Two studies [57, 266] showed adverse effect on emotional wellbeing, but these are low quality studies.

Critical appraisal summary: Child health and wellbeing

There were very few good quality, large and properly controlled studies that investigated trans-generational effect of military service on children. Assuming that only child-filled questionnaires (in prospective or cross-sectional, but not retrospective studies) maintain some objectivity regarding a mental state of the child, with the teachers-filled questionnaires and parents-filled questionnaires possibly erring on the side of underreporting over-reporting problems, very few of these studies try to use objective outcome measures that are independent of confounding factors such as family factors, especially mother (parent) state of mind. There is a clear adverse effect of various aspects of the military life on military spouses and family functioning. This was most obvious in the veteran population particularly in relation to combat related parental PTSD. The effects of military service on spouse/mother may have a real adverse effect on the sons and daughters as seen in some studies, or it may be a reflection of the parents' mental health. Inversely, in children's own reporting, the effect of father mental state is not as large an influence as the mother's mental state. This suggests that future prospective studies are required to assess the impact of military service on the triad of father, mother and child.

Table 19: Summary table study populations for child health and wellbeing outcomes

Study ID	Population
General military	
Physical outcomes	
Stephens 2003	Third grade Elementary School Students (Age 5-12) of military (officers and enlisted) and civilian parents, from 2 public schools in San Diego, CA, US
Tiwary 1992	All children age 1-18 attending 2 military clinics in April-June 1990, US. Stratified by military rank (officer, sergeant, enlisted), duty status: active duty/retired, child's age
Mental outcomes	
Jensen 1991	Families at one southwest Army base with at least 1 child age 6-12, living on and off-base. Fathers: officers of senior enlisted personnel on active duty, but there were no significant periods of separation. Children-living on-base attended the same public school, living off-base attended different schools
Pedersen 1966	Disturbed and non-disturbed dependents of military parent age 11-15, male, Caucasian. Disturbed: attending outpatient Child Psychology Service in Walter Reed General Hospital. Non-disturbed: age- and other demographic variables-matched control, with no problems reported by parents or school. Washington, US
Psychosocial outcomes	
Hutchison 2006	Adolescents attending 2 military clinics (Army and Air force), US
Manning 1988	Soldiers in a combat battalion randomly selected from all units of Calvary Division in Ft Hood, US, with children age 5-17. Control age-matched children of blue-collar civilians from Boston area. Note: soldiers in the 'combat battalion " were not in combat or in deployment separation.
Kinley-Albers 2000	301 children grade 2-6 (age 5-12) of US troops stationed in Berlin, facing the closure of the base. It was an incidental population selected for common stressors: mobility, loss of social network. Comparisons were made between problem children with normal, girls vs. boys and different ages.
Smith 1995	*Black and white adolescents (12-18) attending high schools in South Carolina. Schools divided into those with military presence and without. Population is not defined enough for purpose of this review.*
Shealy 2003	*Adult (age 37-54) children of military fathers, remembering how the experience of being raised a military brat coloured their life.*
Mental and Psychosocial outcomes	
Finkel 2003	Mother-child pairs from traditional military families in US. Mean age of children 12±2
Mitchum 1999	Children (Age 5-12, 30 boys, 35 girls) of enlisted military personnel attending elementary schools near the Norfolk Naval Base, US.
Ryan-Wegner 2002	Children age 8-11 from families of active duty and reserve soldiers and civilians, US
Cognitive outcomes	

Study quality for	Study quality for
Smrekar 2001	Children from 8th grade (White, Black Hispanics and total) attending DoD schools overseas (DoDDS) or in US (DDESS) compared with respective National average and individual states. DoD population had: high mobility-35% moved each year, high proportion relatively poor- 50% free lunch, modest education - 94% parents enlisted, high proportion of ethnic background-40% Blacks or Hispanic. Control- National average and individual states averages.
Strobino 2000	Adolescent students age 10-18, children of military parents. 60% attending public schools of base, 19% -on base and 12% at DoDDS (outside US). Mostly from all over US, all branches of military, 50% white, 12% black, 30% other. No of school transitions 1-10, median 5
Napierkowski 1989	*Children (Age 5-18) of military parents on active duty, their family and teachers from K12 schools, all branches of service, US (mostly WA state).*
Bower 1995	*Sixth grade students in overseas schools run by the US military (Age 12). Population not clearly defined in abstract. Investigated: no of moves, elements of family structure.*
Cognitive and Psychosocial outcomes	
Marchant 1987	Military families with children age 6-12 attending elementary school at the Fort Jackson Army Base, US.
Weber 2005	Adolescent children (age 12-18) of military parents from separate regions of US and all 4 branches of military service. The average number of relocations experienced by the adolescents was 5 mean age 16, grade level-10, parent's years of military service-18. *Ethnic background and military rank not defined. Stratified into subgroups with low (0-2), moderate (3-4), high (5-6) and very high (≥7) number of relocations, with 25, 60, 62, 32 in each subgroup*
Berg 2000	*Primary, middle and high school students (age 5-18) from schools with high proportion of DoD or federal dependents (19-71%) Hawaii US*
Khleif 1978	*Grade 6 pupils (age 12) of federally-impacted schools. Part of a bigger study of 18800 pupils in 58 classrooms of federally impacted schools (with % of military and federal dependants). Military dependants-mobile, federal and locals-non-mobile. For this sub-study population size was not defined clearly, different for each test. US*
Pee 2003	*High ability male dependents from Navy families, US (school age, not defined further)*
Mental, Psychosocial and Cognitive outcomes	
Thompson 1998	Students age 5-12, attending airbase public school in Arizona, US. Average No of separations 2-6., average duration of separation 3-4 months. Military father-76%
Hiew 1992	Elementary Canadian school children (age 5-12) with fathers deployed.
War deployment (Gulf war, Irak/Afganistan)	
Cognitive outcomes	
Pisano 1996	Grade 7 pupils (age 13) from Junior High School at Fort Brags military base during 199-1991. Some parents deployed in Desert Storm in 1991. US

Table 19 continued……

Mental outcomes	
Kelley 1994	Mothers of school-age children (age 5-13) from south-east Virginia, US, with fathers deployed for 6-7 month during 1989-91. 47 had peacetime Navy deployment in Mediterranean, 14-had war Navy deployment in during Gulf war. For comparison of peace-time with war deployment, 14 matched with 14 peace-time for child's age, gender and fathers rank. SV Gulf Mf current US
Birghenheier 1993	Active duty soldiers or their spouses, with children age 6-15, assigned to medical centre. Gulf war, US
Rosen 1993	Children age 1-18 of fathers deployed during Gulf war. Only first and second child analysed. US
Psychosocial outcomes	
Sahni 2005	*Boys (age 7-11) and families of a reservist father deployed during wartime (current Iraq/Afghanistan). US*
Vietnam veterans	
Mental outcomes	
Dan 1996	70 children (age 12-18) of Vietnam veterans with PTSD (from 32 families) vs. control 20 controls: age-matched children of military fathers with substance abuse/dependence (14 families) but not PTSD. Control fathers served during Vietnam war, but were not in Vietnam. Scores also compared with published norms. Results show that 70% of fathers had major depression and ~100% had alcohol dependence, 66% were on disability pension.
Jordan 1992	374 triad of Vietnam vets with and without PTSD, their spouses and all children ages 6-16 years currently living in the household. US.
Rosenheck 1998	Children aged 6-16 of Vietnam vets, divided into 3 groups: 1/vets participating in abusive violence in Vietnam or 2/vets exposed to high combat but not abusive violence and 3/vets with PTSD
Caselli 1995	40 children age 4-16 (mean 12.7), 17M, 23F of Vietnam veterans, US. Some had PTSD or/and combate exposure, some not, numbers not presented.
Glenn 2002	Help-seeking male Vietnam vets with PTSD with spouses and children. US.
Street 2003	All children age 6-16 years currently living in the household of 260 of Vietnam vets and their spouses. This sample contained male perpetrators of family violence. Population sample was based on that developed by **Jordan 1992**
Suozzi 2004	Adult offspring (Age 18+) living together with their Vietnam combat veterans fathers. No of vets=40, age of vets - mean 52 years, offspring's age-25y, sex-36 male, 17F. All vets had combat exposure and PTSD diagnosis. High combat exposure:18 vets, 21 offspring, Low combat exposure: 22 vets, 32 offspring's, subgroups divided by median score on Combat exposure scale. US.
Psychosocial outcomes	
Murphy 2005	Adult children (age 18+) of veterans younger than 60y, who are homeless and are in a residential psychiatric care. Mainly male vets, only 3% female vets. US.
Stein 1995	*Adolescent sons (Age 12-18) living with of Vietnam Vet fathers exposed to heavy combat, with diagnosis of PTSD. US.*
Ruscio 2002	*All children (age 0.5-39) of Vietnam vets with PTSD attending Centre for PTSD. US.*
Weber 2006	*Adult (Age 18-35) children of Vietnam Veterans, some may have PTSD. US.*

Table 19 continued……

Mental and Psychosocial outcomes	
Davidson 2001	Oldest children (age over 15) of male Vietnam vets and age matched civilians. Australia
Mental, Psychosocial and Cognitive/school outcomes	
Dansby 1999	Adolescent children of combat Vietnam vets and age matched controls of non-serving fathers (not clear, but probably civilians). US.
Mental, Psychosocial and Physical (somatisation) outcomes	
Westerink 1999	Children older than 15 years (adolescent and adults) and partners of Vietnam vets receiving treatment for PTSD at PTSD clinic. Controls: volunteers from University and Hospital, both sexes, matched for age and family status (non-military), but not for socioeconomic status (could be higher than in Vets). Comparison between vet spouses and control adults, vet children and control children. Size: vet partners-32, control adults-15, vet children-22, control childdren-14. Australia
Father MIA/POW	
Mental, Psychosocial and physical (somatisation) outcomes	
McCubbin 1975	POW/MIA wife's with children (age ND). US.
Campbell 2000	*Adult children (Age 29-48) of missing in action fathers. Fathers: military personnel, war, still missing after 25 years. Probably from Vietnam war. US*
Mental outcomes	
Sigal 1976	*Families of Canadian soldiers hold for ~4years as Japanese prisoners of war. Age of children ND.*

Table 20. Summary table study of stressors, outcomes and results for child health and wellbeing outcomes

Study ID	Life stage	Stressors	Outcomes	Results
General military				
Physical outcomes				
Stephens 2003	4	Socio-economic status (military rank), lifestyle (culture of physical fitness)	Physical fitness	Adverse. Military children performed worse than civilian and had higher time of watching TV. Children of enlisted

				performed worse than children of officers and watched TV longer.
Tiwary 1992	All	Socio-economic Factors (military rank: officer vs. sergeant vs. enlisted, service status: active duty vs. retired), Childs Factor (age)	Obesity: normal, overweight (BMI 111-120% normal), obese (BMI 121-140% normal) and very obese (BMI >140% normal)	Adverse effect of parental factors within military. The incidence of obesity its severity is higher for sergeants compared to officers and enlisted, retired vs. active duty and older vs. younger.
Mental outcomes				
Jensen 1991	4	Family and Child's Factors: parental stress (high/low), socio-economic status (military rank, enlisted vs. officer), child's gender	Levels of stress and behavioural problems (perceived by mothers, fathers and teachers)	No effect based on teachers or children reports. Adverse effect perceived by mothers, high stress parents or low rank enlisted. Beneficial effect for girls perceived by teachers.
Pedersen 1966	4+5	Separation (fathers absence), Family Factors (father and mother personality)	Disturbed behaviour (Between groups: effect period of father absence on disturbance, within the group: correlation of disturbance with father and mother personality factors)	No effect. Strong effect of child's factors. Positive or no effect for non-disturbed, adverse for disturbed children. Mother factors have stronger effect than fathers or his presence.
Psychosocial outcomes				
Hutchison 2006	5	Not further specified	Risk-taking Behaviour: sexual activity and alcohol, cigarette and marihuana use	Beneficial effect. Sexual activity and alcohol, cigarette and marihuana use lower than the national average
Manning 1988	4+5	Family Factor (father's type A personality)	Prevalence of child's type A personality	Beneficial or neutral. Military children scored lower on impatience/aggression scale. Not clear whether fathers of civilian children had A-type personality.

Table 20 continued…..

Kinley-Albers 2000	4	Child's Factors (age, sex, problematic behaviour vs. normal, type of coping strategies)	Type of coping strategy (direct-problem focused vs. indirect (depending on sex, age, size of social support, normal behaviour)	Inconclusive. Direct (active, problem focused) coping strategies are correlated with better well-being and lower anxiety in normal children but not in problem children. Girls, children with more social network and younger children employ more direct coping strategies than boys, children with less social network and older children. *Result did not show which children and how many had lower anxiety.*
Smith 1995	*5*	*Ethnicity (white/black), Child's Factors (sex)*	*Risk taking behaviour (including alcohol intake, driving behaviour and school behaviour)*	*Adverse. Adverse effect on attitude towards parents for all children and alcohol intake only for white children. Family intactness does not affect alcohol drinking, but race does (Blacks drink less). Exclude.*
Shealy 2003	*6*	*Mobility (support/isolation), Family Factors (unstructured, no correlations drawn)*	*Perceptions of childhood a military brat and how it affected child's life (CH psychosocial: identity formation, self esteem, risk taking behaviour, interpersonal relationships. These outcomes can be seen in individual interviews).*	*Impressions generally adverse. Exclude.*
Mental and Psychosocial outcomes				
Finkel 2003	4+5	Mobility (mobility and length of stay at current residence), family factors (cohesiveness, relationship with mother, maternal depressive symptoms)	Psychological adaptation (feeling of loneliness) 2/peer relationship 3/self-esteem 3/depressive/anxious behaviour	Mobility-no effect mental and positive on psychosocial. Family factors (maternal depression and bad mother-child relationship)-adverse effect.
Mitchum 1999	4	Primary stressor (6-week counselling programme). Secondary: Family Factors (parents demographics and mother's depressive symptoms)	Self-esteem, anxiety, and behaviour: 1) effects of group counselling on these outcomes, 2) correlation with maternal, family and socio-economic factors	No effect of the intervention on mental or psychosocial. Secondary: Child's anxiety correlated to maternal, family and socio-economic factors. Self-esteem correlated to the child's factors (previous level of anxiety).

Table 20 continued…..

Ryan-Wegner 2002	4	Military status/socio-economic status (active duty vs. reserve)	Anxiety, coping, emotional indicators and perception of war.	No effect. Children may have different fears or coping strategies but are not worse adjusted.
Cognitive outcomes				
Smrekar 2001	5	School - Type of school (DoD vs. civilian), ethnicity	1/School achievement of all students in military school vs. state averages, 2/gap between Blacks or Hispanics vs. Whites in DoD and US civilian schools	Beneficial. Better outcomes on school achievement for all students of DoD schools compared with civilian schools and smaller gap between ethnic minorities and whites than for national average. Good large study
Strobino 2000	4+5	Mobility (school transitions). *Secondary: demographic and family factors (parents education, involvement at home and at school) - these were only described not compared.*	School achievements (Grades in English., Math, Science and social Science), attitude to school and involvement in social activities	Implied beneficial, but there is no comparison with control. About 70% of students have average or better than average grades, and 37-48% have grades A in different subjects. Majority reports positive attitude towards school and participation in a mean of 2 extracurricular activities
Napierkowski 1989	*4+5*	*Mobility (school transfer, social isolation), separation (absence of military parent). Socio-economic factors (military rank), Child's factors (age, sex)*	*School achievement (ratings on reading, writing, language, math), attitude (school behaviour problems, need for support in classroom)*	*Inconclusive. Effect on school achievement descriptive. Different coping strategies are age and sex related*
Bower 1995	*4*	*Mobility, Family Factors (family cohesion, organisation)*	*School achievement and attitude towards school, absenteeism*	*Adverse. Mobility negatively correlated with school achievement. Family organization negatively correlated with school attendance.*
Cognitive and Psychosocial outcomes				
Marchant 1987	4	Mobility and Family Factors (parents beliefs-identification with military)	School achievement, social competence.	No effect. School achievement slightly correlated with mobility and social competence
Weber 2005	5	Mobility (frequency of relocations)	School achievement and attitude to school (suspensions, repeated grades, psychological evaluations, any school problem)	No effect. No differences on objective measures (Suspensions, repeated grades, psychological evaluations). School problems and social competence adversely correlated with medium mobility but beneficially with very high mobility.

Table 20 continued…..

Berg 2000	*4+5*	*School - Type of school (% DoD military, civilian dependents and federal dependents, size of school), socio-economic factors (% receiving free lunch and with limited English)*	*School -attitude and achievement (Rate of offences leading to suspension, absenteeism, attitude to learning, graduation completion rate)*	*No effect. Result could be due to population not defined enough. Trend of schools with high proportion of DoD or federal to do better on: rates of Offences (all but smoking) and on School factors: completion rate, truancy, attitude to learning.*
Khleif 1978	*4*	*Mobility*	*Self-perception of schooling situations*	*Inconclusive. Mobile students (implied military) have different emotional experiences at school and differently located friends. Not clear by how much different or if adverse or not*
Pee 2003	*ND*	*Mobility (school transfers)*	*Social, emotional and cognitive development*	*Inconclusive. High expectations and goals for achievement, adapting to change, participation in sports, and pride in the Navy lifestyle helped to make transition after relocation.*
Mental, Psychosocial and Cognitive outcomes				
Thompson 1998	4	Separation (temporary absence due to duty assignment)	School performance and Emotional state before and during separation	No effect.
Hiew 1992	4	Separation (exercise or deployment overseas)	Attitude to school and coping (behaviour in classroom as reported by teachers, emotional and separation adjustment as reported by mother and child, coping strategy as reported by child)	Inconclusive. Adverse effect of maternal factors (mothers perceived lack of support which is related to father's absence).
War deployment				
Cognitive outcomes				
Pisano 1996	5	Separation from father, child's sex	School achievement (reading, writing, math)	Inconclusive. Adverse for reading in girls, but no difference for writing and math, or for boys.
Mental outcomes				
Kelley 1994	4	Separation, war-time vs. peace-time. Correlating factors: child's age (below/above 8) and gender.	Emotional and behavioural problems *(assessed by mother)*	Adverse effect of deployment on child behaviour and family. War deployment has stronger effect than routine.

Table 20 continued…..

Birghenheier 1993	4+5	Separation, mother vs. father vs. no separation	*Behavioural problems and social* competence *(reported retrospectively by a guardian)*	Adverse. Mental state, behaviour and emotion adversely affected for both parents absent, but individual subscales differently affected mother/father absent
Rosen 1993	All	Separation from father, secondary, family factors (mother, siblings), child factors (previous difficulties)	Child emotions and behaviour	Adverse. Deployment causes feeling of increased sadness. More serious problems correlated with mothers, sibling and child own history factors. .
Psychosocial outcomes				
Sahni 2005	*4*	*Separation*	*Coping strategies, Vietnam war perceptions*	*Inconclusive-adverse. Children missed their dads, had rituals to cope, emerging theme: sons as little soldiers.*
Vietnam veterans				
Dan 1996	5	PTSD, combat exposure, substance abuse	PTSD, depression/anxiety, emotional and behavioural problems	Adverse (or inconclusive). Result dependent on point of view. Compared to norm: parent report - worse all subscales, child point report - no difference. In children of substance abusers, child report -worse on all subscales.
Jordan 1992	4+5	PTSD	Behavioural problems, spouse mental and marital problems	Adverse. Adverse effect on child as assessed by spouse (higher proportion of children with behavioural problems in mild clinical range). Adverse effect on family functioning and on spouse well being.
Rosenheck 1998	4+5	Participation in abusive violence during war, combat exposure, PTSD, demographic and family factors	Disturbed behaviour	Adverse: Children of veterans who participated in abusive violence showed more behavioural disturbance. High combat exposure and PTSD had little effect
Caselli 1995	3+4+5	PTSD, combat exposure	Behavioural problems (and spouse marital adjustment as a separate outcome, not a stressor for the child)	Adverse. Correlation between: Vets PTSD and children behavioural problems. Combat exposure separately was not a a significant factor in children, but both were significant for spouse outcomes.

Table 20 continued…..

Glenn 2002	5+6	PTSD	PTSD	Adverse. Correlations between: Vets combat exposure vs. hostility/violence in children, vets PTSD symptoms vs. hostility/violence in children and hostility/distress in partners. Veteran's violent behaviour vs. with children violent behaviour, but not with other children's and partners variables.
Street 2003	4+5	Male family violence, Family factors (family functioning, spouse psychological distress)	Behavioural problems. Family Functioning (husband and spouse perspective), Spouse psychological distress	Adverse indirectly. Adverse effect of father's violence and mother/father negative assessment of family functioning affects children only indirectly through mother's psychological distress.
Suozzi 2004	6	Combat exposure, PTSD	Emotional distress (Explanation how it is transferred)	Adverse. Higher levels of anxiety but not to clinical level
Psychosocial outcomes				
Murphy 2005	6	Combat exposure, Father's factors: socio-economic (work/employment/homelessnes s) and seriousness of mental problem, family structure (direct custody), child's factor (sex)	Attachment to parent (children's involvement in veteran parent psychiatric treatment)	Adverse: Exposure to combat fire affects child's psychosocial factor such as attachment to parent (participation in parent psychiatric treatment) Some demographic factors (female gender, better financial wellbeing, family structure) have a positive effect.
Stein 1995	*5*	*Combat exposure, PTSD, fathers personality and type of personal communication*	*Personality/communication type (as measured by RA score)*	*Inconclusive. Does not say whether fathers and sons PTSD are correlated. In some groups of fathers negative effects of PTSD in sons are related to father's vividness of communication of gory details.*
Ruscio 2002	*All*	*PTSD (total severity and 5 individual symptom clusters of PTSD)*	*Parent-child relationship (misbehaviour, disagreement, positive sharing, contact, overall quality of contact)*	*Adverse effect seen when parent-child contact seen from vets perspective. Emotional numbing correlated to perceived quality of all relationship domains (after controlling for fathers' family-of-origin stressors, combat exposure, depression, and substance abuse).*

Table 20 continued…..

Weber 2006	*6*	*Not specified*	*Not formulated clearly*	*Inconclusive. Results not presented clearly.*
Mental and Psychosocial outcomes				
Davidson 2001	5+6	Service in Vietnam	PTSD, self-esteem	No significant differences in offspring
Mental, Psychosocial and Cognitive/school outcomes				
Dansby 1999	5	Combat exposure	PTSD, Social and personal adjustment, attitude towards parents, personality development	Adverse. Adverse on behaviour at home, in school, anxiety, tension and creativity.
Mental, Psychosocial and Physical (somatisation) outcomes				
Westerink 1999	5+6	PTSD *and everything than differs veterans from civilians*	Depression/anxiety, social dysfunction, somatic symptoms. Family functioning: (cohesion, expressiveness, conflict), spouses personal growth and self-esteem.	No effect on psychosocial, physical.. Trend towards adverse effects, mostly distress range. Adverse effects on spouses.
Father MIA/POW				
Mental, Psychosocial and physical (somatisation) outcomes				
McCubbin 1975	ND	POW/MIA	Physical and emotional wellbeing. *Wife emotional wellbeing, family structure (divorce) and marital satisfaction*	Adverse effect on children emotional well-being as reported by mother. No effect on psychosocial or cognitive. Adverse effect on wife, family structure, marital satisfaction.
Campbell 2000	*6*	*MIA*	*Emotional distress, grief, and family hardiness*	*Adverse. Participants still had unresolved grief after 25 years. Family hardiness helps with family adaptation.*
Mental outcomes				
Sigal 1976	*ND*	*POW, secondary: sex, age-position in the family*	*Emotional distress (depression, quick-temper, excessive withdrawal) or psychosomatic disorder (rheumatoid arthritis).*	*Adverse reaction seen mainly in oldest child, and oldest girls. Emotional distress (depression, quick-temper, excessive withdrawal) or psychosomatic disorder (rheumatoid arthritis).*

Table 21. Study quality for child health and wellbeing outcomes

Study ID	Study design	Size	Control group	Statistics	Outcome measurement tools	Appraisal score
General military						
Physical outcomes						
Stephens 2003	Prosp	340, groups 170, 86, 84	Yes, military, vs civilian	ANOVA, linear regressions	Investigator-administered test: MBI, Mile-run time, Sit-and-reach score, TV watching time on weekday and weekend.	11
Tiwary 1992	C-S	1715	No, correlations	Descriptive	Investigator-administered test for BMI	11
Mental outcomes						
Jensen 1991	C-S	213	Yes, between subgroups	yes	Mother-, father- and teacher-administered questionnaires: 1) Child Behaviour Checklist (CBCL, Achenbach 1978) and 2) Teacher Report Form (RTF, Achenbrock & Edelbrock 1983) for behavioural problems, 3) Child Depression Inventory (CDI, Kovacs & Beck 1977) , 4) Revised Children Manifest Anxiety Scale (RCMAS, Reynolds & Richmond 1978) , 5) Lifes's Events Record (Coddington 1972).	12
Pedersen 1966	C-S	57	Yes, between subgroups	ANOVA	Mother, father and child-administered questionnaires. Child: Rogers Test of Personality Adjustment (5 factors plus total score) for maladjustment of children (Rogers 1931); Mother, father: Minnesota Multiphasic Personality Inventory (MMPI) for disturbance in mothers and fathers (Welsh 1956).	9
Psychosocial outcomes						
Hutchison 2006	C-S	908	Yes, with national average	Variance	Self-administered computer survey. Questions similar to those in Youth Risk Behaviour Surveillance (YRBS) (Grunbaum, Kahn, Kinchen et al 2003).	11
Manning 1988	C-S	337 children: 272) 65 combat/civilian	Yes	Variance	Father-administered questionnaires. Matthew Youth test for health (MYTH) measures Type A behaviour on 2 sub-scales: competition and impatience/aggression (Matthews, Angulo 1980 &Wolf, Sklov, Wensl et al 1982). Higher than normal prevalence of type A behaviour in combat soldiers was confirmed previously on JAS scale (Jenkins Activity Survey) (Jenkins, Zyzanski, Rosenman 1979)	10

Table 21 continued…..

Kinley-Albers 2000	Longitud	301	No	Descriptive and correlations	Self-, teacher and parent-administered questionnaires. CAMI-Control, Agency, means-End Interview (Little 1994), BISC-Behavioural Inventory of Strategic Control (BISC; Lopez & Little 1994), STAIC-State-Trait Anxiety (STAIC; Spielberger 1972).	9
Smith 1995	C-S	*1911, 1231 white, 680 black*	*Yes, black vs. white*	*Variance*	*Appear to be study-designed self-administered questionnaires: 1) measure of family intactness, 2) measure of family influence (5-question scale) , 3) measure of peer group influence (7-question scale) , 4) school truancy (alcohol intake, suspensions etc)*	*4*
Shealy 2003	*Qual*	*10*	*no*	*None*	*Unstructured interview*	*3*
Mental and psychosocial outcomes						
Finkel 2003	C-S	86 dyad	No	Variance	Self and mother-administered questionnaires. By mother (6) : 1) Family adaptability and Cohesion Evaluation Scale (Olsen, Sprenkle, Russell 1979), 2) Kansas Marital Satisfaction Scale (Schumm, Paff-Bergen, Hatch, Obiorah, Copeland, Bugaighis 1986), 3) Center for Epidemiologic Studies Depression Scale (Radloff 1977), 4) The Perceived Stress Scale (Cohen, Kamarck, Mermelstein 1983), 5) Child Behaviour List (Achenbach 1991), 6) Demographic Survey; By child (5) : 7) The loneliness scale (Asher & Hymel 1984), 8) The Social Anxiety scale For Children (LaGreca, Dandes, Wick, Shaw, Stone 1988), 9) Index of Peer Relations (Hudson 1982), 10) Self-perceived Profile for Children (Harter 1982), 11) Childs Attitude Towards Mother (Hudson 1982).	9
Mitchum 1999	Interv & c-s	65	Yes- for primary	ANOVA	Established mother and teacher administered questionnaires: Mother: Coopersmith Self-Esteem Inventory (SEI Coopersmith 1969) , State-Trait Anxiety Inventory for Children (STAIC) Spielberger 1973), Child Behaviour Checklist for Parents (CBCL) for internalising and externalising behaviour (Achenbach 1978: Achenbach & Edelbrook, 1979) , and Teacher: Child Behaviour Checklist - Teacher's Report Form (TRF) (Achenbach 1991).	10

Table 21 continued…..

Ryan-Wegner 2002	C-s	91 (active-18, reserve-25, civilian 48)	Yes	Yes	Self-administered questionnaire and drawing test: 1) Study-designed questionnaire based on Child Assessment Interview (Hodges, Kline, Stem, Cytryn, & McKnew, 1982; Hodges, McKnew, & Cytryn, 1982), 2) Revised Children manifest Anxiety Scale (RCMAS) (Reynolds & Richmond 1985) and 3) Human Figure Drawing for assessment of emotional indicators (Poster 1989).	8
Cognitive outcomes						
Smrekar 2001	C-S	Thousands - all children grade 8 in US and in military overseas	Yes- state and national averages	Variance	Data record: 1998 National Assessment of Educational Progress (NAEP) , measured on 2 points: 8th grade reading and 8th grade writing (Pellegrino et al, 1999).	11
Strobino 2000	C-S	6293	No	No - only %	Self-administered questionnaires to recall grades and assess attitude to school and involvement in social activities	9
Napierkowski 1989	C-S	*65 children, 58 parents, 37 school persons*	*No*	*No - only %*	*School personnel, parents and children -administered questionnaires. Data qualitative, subjective and not compared with anything*	*6*
Bower 1995	C-S	*154*	*No*	*Correlations*	*Self report to recall school attendance, school achievement and attitude towards school*	*?*
Cognitive and psychosocial outcomes						
Marchant 1987	C-S	40	No	Correlation and chi square	Military person, spouse and school-administered questionnaires: 1) General Well-Being Schedule for self-perceptions (Dupuy 1970), 2) of physical and psychological health (, 3) Identification with the Military Scale (IMS) (Pederson & Sullivan 1964) , 4) Revised Achenbach Child Behaviour Checklist (Achenbach 1981), 5) The Social Competence subscale (Achenbach 1981); School administered: 6) Metropolitan Achievement Test (MAT, 1978) for school achievement.	8
Weber 2005	C-S	179, subgroups: 25, 60, 62, 32	Yes, between subgroups	Variance	Parents-administered questionnaires: The Behavioural Problems Index (BPI) part of National Health Interview Survey on Child Health (Zill 1990). Additional questions that assessed 1) the number of relocations the child had experienced, 2) child's history of aberrant behaviour (parental perception) and 3) parental perceptions of moving	9

Table 21 continued….

Berg 2000	*Ret?*	*190,000 students from 48 schools*	*Yes, with 3-year state average*	*Variance*	*Record data: 1) Last 3 years of school-level data from Hawaii DoE* (Berg & Berg 2000)*, 2) 1997 Youth Risk behaviour Survey ((SSIR)* (Saka & Lai 1998a) *3) 1998 Hawaii Student Alcohol And Drug Use Study* (Klingl & Miller 1999) *4) Fourth annual "Quality counts" report by Education Week magazine* (Berg & Berg 2000)	*6*
Khleif 1978	*Retro*	*125 for WAI*	*Yes, between subgroups*	*No*	*Self-administered unstructured questionnaires including WAI (Who Am I?)* (Khleif 1978)	*4*
Pee 2003	*Qual*	*?*	*no*	*No*	*Qualitative interview*	*?*
Mental, psychosocial and cognitive outcomes						
Thompson 1998	Longit	42	Yes, before-during	Descriptive	Self, parent and teacher-administered questionnaires. Students interview for emotional state and somatisation, parents survey measures, teachers survey for academic performance and personal adaptation (on a Lichert scale) . Most questions were study-designed	8
Hiew 1992	C-S	66 mother-children pairs	No	Descriptive and correlations (not fully presented)	Self-, mother- and teacher-administered questionnaires. Mather: 1) Supportive functions questionnaire (SFQ) (Tetzloff & Barrera 1987) , 2) Parent evaluation Form –for child's behaviour, emotional and separation adjustment (Pedro-Carroll & Cowen 1985), Teacher completed: 3) Classroom Adjustment Rating Scale-CARS – for classroom behaviour (Lorion, Cowen, & Caldwell 1975), 4) interview with children (Folkman & Lazarus 1984)	7
War deployment						
Cognitive outcomes						
Pisano 1996	Longit	158, F dep-57, F nondep-25, M dep-45, M non-deployed-	Yes, deployed vs. not deployed, sex stratified	Descriptive , t-test	School records and parent-administered questionnaires on deployment. Students achievement on CAT (California achievement test) (Pisano 1996), which provides relative ranking of individual student against national average. Scores for reading, writing and math obtained separately for boys and girls of deployed and non-deployed fathers in 1990 and 1991	11

Table 21 continued…..

Mental outcomes						
Kelley 1994	Prosp-longit	61 mother child dyads (only oldest in age range)	Yes, before-during-after	Descriptive	Mother-administered questionnaires. 1) Family Adaptability and Cohesion Evaluation Scale (FACES III) (Olsen, Sprenkle & Russell, 1979) , 2) Parenting Dimensions Inventory (Slater & Power 1987), and the 3) Child Behaviour Checklist (Achenbach 1991; Achenback & Edelbrock 1983).	10
Birghenheier 1993	Ret	57, 3 groups: no separation, mother absent, father absent (N=17) 20/20)	Yes, between subgroups	ANOVA	Guardian-filled questionnaire (retrospective) : 1) Achenbach's (1991)Child Behaviour Checklist (CBCL) for competence (20 items) and behavioural problems (3 subscales with ~8 syndromes)	8
Rosen 1993	C-S	1601	No	Variance, correlations	Mother-administered questionnaires: Child Health Inventory (CHI) . Out of 17-item checklist of symptoms, five items were used to check child's health before deployment, and ten items to check child's health during deployment (Rosen, Moghadan & Bain 1992); Hopkins Symptoms Checklist (HSCL) - to measure mothers symptoms (Derogatis, Lipmain & Rickels et al 1974); Siblings Symptom Score (SSS) , Also collected demographic data.	8
Psychosocial outcomes						
Sahni 2005	*Qual*	*3*	*no*	*none*	*Semi-structured interviews with boys and families.*	*5*
Vietnam veterans						
Dan 1996	C-S	90, groups 70 and 20	Yes, vets vs. substance abuse controls vs. published norms	Descriptive , t-test, Pearson correlations	Self-administered questionnaires. Tests for 1) PTDS: Child Post-Traumatic Stress Reaction Index-Revised (CPTSD-RI-Rev.) (Frederick et al 1992), 2) depression: Children's Depression Index (CDI) (Kovaks 1985), 3) anxiety: Revised Children's Manifest Anxiety Scale (RCMAS) (Reynolds & Richmond 1978) , 5) Behaviour problems using the Child Behaviour Checklist (CBCL) (Achenbach 1991a) and 6) Youth Self-Report (YSR) (Achenbach 1991b) . Vet-administered questionnaire FES (Moos & Moos 1976), MOS and CES (Keane et al 1989) (Family and Military Environment, Combat Exposure Scale)	10

Table 21 continued….

Jordan 1992	C-S	374, groups 252 without PTSD, 122 with	Yes	Descriptive	Mother/spouse-administered questionnaires: Total Behaviour Problems Score from the Child Behaviour Checklist (CBCL assessed by spouses) (Achenbach 1978), 2 scales to assess PTSD (The Mississipi Scale; Keane, Caddell & Taylor, 1988) and 10 scales to assess spouses	10
Rosenheck 1998	C-S	276	Yes, between subgroups	Variance, correlations, linear regressions, multivariate analysis	Vet and spouse-administered questionnaires. Vet: NVVRS survey (Kulka et al, 1990a & 1990b), test for combat exposure, test for participating in violence, all the demographic pre-and post-military data, Mississippi scale for PTSD (Keane, Caddell & Taylor 1988). Spouse - administered questionnaires: Child Behaviour Checklist (CBCL) (Achenbach 1978); Family Adaptability and Cohesion Evaluation Scale (FACES II) (Olsen et al 1973) ; test for level of family violence	10
Caselli 1995	c-s	40 triads	No	Correlations, regressions	Vets and spouse administered questionnaires. Vets only: The Mississippi Scale for combat-related PTSD (Keane, Caddell & Taylor, 1988), Military Stress Scale (MSS, Watson, Juba & Anderson, 1989) for combat exposure, demographic information. Vet and spouse: Achenbach Child Behaviour Checklist (CBCL, Achenbach & Edelbrock, 1988) and Dyadic Adjustment Scale (DAS, Spanier 1976) for marital adjustment.	9
Glenn 2002	C-S	29 children and 31vet/spouse pairs	No	Descriptive	Vet, spouse, child-filled questionnaires with established measurement scales. Vets only: 1) Clinician administered PTSD Scale-Diagnostic version (CAPS) Combat Exposure Scale (CES) (Keane et al 1989), 2) The Mississippi Scale for combat-related PTSD (M-PTSD) (Kulka et al 1990), 3) PTSD Keane scale (PK) (MMP1-2; Butcher, et al, 1989), 4) MMPI-2- Family problem Content Scale (MMPI-2 Butcher et al, 1999), 5) FAM family problem scale; Vets, spouses and child: 6) Childhood physical punishment scale (PPSAE; Berger 1981), 7) Cook Medley Hostility Scale (Barefoot, et al 1989), 8) Violent behaviour index (Strauss 1979), Spouses and child only: 9) The Mississippi Scale for PTSD –civilian version (Vreven et al 1995), 10) Symptom checklist 90 revised edition (Derogatis 1983), 11) Psychological maltreatment of Women inventory (Tolman 1989).	9

Table 21 continued….

Street 2003	C-S	260 dyad of Vietnam vets and spouses with at least one child	No, correlation within	Variances and covariance.	Vets and spouse administered questionnaires: for 1) Family functioning measured by: a/ marital adjustment (Spanie'rs 1976, Dyadic Adjustment Scale, Dohrenwend's 1982, Marital Dissatisfaction Scale, & instruments by Campbell et al 1976 & Veroff et al 1981, b/family adaptability (Olsen et al 1978; 1983), c/family cohesion. Spouse administered questionnaires: 1) Wife's psychological distress measured by a/Violence against women scale (CTS; Straus 1979), b/Wife's social isolation scale, c/Wife's general wellbeing scale (Dohrenwend 1982), 2) Behavioural problems in children measured on Child Behaviour Checklist (Achenbach 1978; 1991)	8
Suozzi 2004	C-S	40 vets, 53 children, vet subgroups 18, 22	Yes, between subgroups	Variance	Mother and self -administered questionnaires. Spouse: BDI (Beck, Ward, Mendelson, Mock & Erbaugh 1961), IES (Horowitz, Wilner & Alvarez 1979), STAI (Spielberger, Gorusch, Luschene, Vagg & Jacobs 1983), MMPI-2 PTSD Scale PK (Keane, Malloy & Fairbank 1984), Mississippi Scale for Combat-Related PTSD) (Keane & Caddell 1986), Offspring completed all measures except the Mississippi Scale, Investigator administered Emotional Stroop Procedure (Stroop 1935).	8
Psychosocial outcomes						
Murphy 2005	Retro	3346	No	logistic regressions	Data records review (hospital and social security)	9
Stein 1995	C-S	*35 dyads*	*No*	*Correlations*	*Vets- and self-administered questionnaires, investigator-administered tests. Most questionnaires study-designed and not validated*	*6*
Ruscio 2002	C-S	*66*	*No*	*Variance, correlations, linear regressions, multivariate analysis*	*Vet-administered questionnaires: 1) The Child Misbehaviour and Discipline Problem Scale, 2) Positive Sharing and Support Scale, 3) The Child Disagreement/Disapproval Scale, 4) Contact frequency Scale, 5) Overall Quality Of Relationship* (from LISRES-A; Moos & Moos 1994)	*6*
Weber 2006	*Qual*	*25*	*No*	*None*	*Unstructured interview with offspring*	*3*

Table 21 continued……

Mental and psychosocial outcomes						
Davidson 2001	C-S	197, groups 59 vets, 55 vet's children, 44 civilians, 39 civilians children	Yes	ANOVA	Self-administered questionnaires: 1) The Family Assessment Device (FAD) for Family Functioning (Epstein, Baldwin & Bishop 1983, 2) The Rosenberg Self-esteem Scale (Blascovich & Tomaka 1991, 3) The Mississippi Scale for PTSD (M-PTSD) (Keane, Caddell & Taylor 1988;1991), 4) The Combat Exposure Scale (CES) (Keane, et al 1989).	11
Mental, psychosocial and cognitive/school outcomes						
Dansby 1999	C-S	56, 28 combat and 28 non-serving	Yes	ANOVA	Self-, father and school-administered questionnaires. Father variables by 1) Demographic questionnaire and 2) - Mississippi Scale for Combat-related PTSD (M-PTSD) (Keane et al 1988). Adolescent offspring variables by 1) School adjustment. 2) Behaviour Rating Profile (BRP) (Brown & Hammill 1986) , 3) The Beck Depression Inventory (BDI, for Social and personal adjustment,) (Beck et al 1979) 4) Child's Attitude Toward Father Mother (Hudson 1982), 5) High School Personality Questionnaire, Form A (HSPQ, Personality development) (Cattell et al 1987).	10
Mental, psychosocial and physical (somatisation) outcomes						
Westerink 1999	C-S	82, groups Vet part-32, control adult-15, vet child-22, cont child-14	Yes, vet spouses vs. control adults, vet children vs. control children	Descriptive	Self and spouses-administered questionnaires:: General Health Questionnaire (GHQ28 for psychological distress and somatic symptoms) (Goldberg & Williams 1988) , Family Environment Scale (FES- for family functioning and interpersonal relationship) (Moos & Moos 1994), Coopersmith Inventory-Adult Form (Coopersmith 1981)(for self-esteem, Lifestyle Questionnaire (general information) (Westerink & Giarratano 1999) . Note: vets did not give data.	10
Father mia/pow						
Mental, psychosocial and physical (somatisation) outcomes						
McCubbin 1975	Qual	215 spouses/ children dyads	No	None	Offspring structured interview with a panel of expert.	7
Campbell 2000	C-S	*20*	*No*	*?*	*Self report, interview: Resiliency Model of Family Stress, Adjustment and Adaptation*	*?*
Mental outcomes						

Child abuse

We have found 15 relevant papers investigating child abuse in the military. The purpose of studies could be broadly divided into four categories.

1. To investigating rates of different types of child abuse in the military and compare it to the respective rates of child abuse in civilian populations {Dubanoski, 1984 #2; Gessner, 1995 #3; Herman-Giddens, 2005 #4; McCarroll, 2004 #8; McCarroll, 2004 #9; Raiha, 1997 #15}. Four studies investigated generally all broad categories of abuse {Dubanoski, 1984 #2; McCarroll, 2004 #8; McCarroll, 2004 #9; Raiha, 1997 #15}. Two of these studies investigated a specific form of abuse, shaken baby syndrome {Gessner, 1995 #3} and homicide {Herman-Giddens, 2005 #4}.
2. To investigate trends of child abuse over time{Acord, 1977 #1; Herndon, 1983 #5; James, 1984 #6; McCarroll, 1999 #7; Mollerstrom, 1992 #11; Mollerstrom, 1995 #12; Myers, 1979 #13}.
3. To correlate incidence of abuse with demographic and psychosocial characteristics perpetrators and victims of abuse {Acord, 1977 #1; Dubanoski, 1984 #2; McCarroll, 2004 #8; Raiha, 1997 #15; Herndon, 1983 #5; James, 1984 #6; McCarroll, 1999 #7; Mollerstrom, 1992 #11; Mollerstrom, 1995 #12; Myers, 1979 #13}.
4. To investigate risk factors for child abuse in the military personnel {Merrill, 2004 #10; Schaeffer, 2005 #14}.

In this review we were not interested policy papers that describe policies, institutions and reporting procedures in the field of child abuse.

Data extraction, study design and quality

Two studies investigating predictors of child/family violence had cross-sectional design {Merrill, 2004 #10; Schaeffer, 2005 #14}, all remaining studies were a retrospective review of records.

It was not possible to apply the same criteria to appraise the study quality in child abuse as in the rest of the review. These studies were roughly appraised based of size of population, completeness of the data, and the quality of comparison and/or depth of analysis. All studies are summarised in the Tables 22-24 below, and the most relevant studies are presented in greater detail in the text below.

The following data was extracted from the papers whenever possible:

- Service arm,
- Time of data collection,
- Description and size of the military population,
- Description and size of the comparator civilian population,
- Type of abuse
- Rates (per 1000 of children at risk)
- Proportion of type of abuse per total cases of abuse
- Characterisation of the abuser and victim

Results

The most relevant studies are summarised below.

McCarroll 2004a {McCarroll, 2004 #9}

This study investigated total substantiated cases reported to Army Family Advocacy Central Registry for 1995-1999 and compared it with Total national data collected by the Children's Bureau of the US Department of Health and Human Services (2001). Overall rates of child abuse in the Army was about 2 times lower than in civilian population, which is mainly due to neglect, that constitutes about 50-60% of child abuse cases and is more than 2 times lower in the Army. Other types of abuse have similar rates in both populations. The rates of child maltreatment stratified by race/ethnicity were more uniform in Army, varying between 4.9 and 8.1 (per 1000 children at risk) for various ethnic groups than in civilian population, where rates varies between 4.4% and 25.2%. The strongest beneficial effect of Army was seen in Blacks (rate 8.1 in Army vs. 25.2% in civilian population) and American Indians (6.6 vs. 21.1 %). The national rate for Hispanics and Whites is about 2 times higher that rated in these groups in the Army and rates for Asian Americans/Pacific Islanders are similar. Higher proportion of male parent perpetrators compared to female parent perpetrator was seen in the army than in civilian population. Total maltreatment: 33% female parent and 34% male parent vs. 45% female parent and 16% male parent. Physical abuse by male parent 48% vs. 27%. Sexual Abuse: 32% VS 21%. When the rates of specific types of abuse were differentiated by victim sex and age, there was generally no differences between military and civilians populations. A notable exception was an increased rate of emotional abuse of females aged 16-17 (0.7 vs. 0.2)

McCarroll 2004b {McCarroll, 2004 #8}

This study investigated total substantiated cases reported to Army Family Advocacy Central Registry for 1994-95 and compared it with Washington State dataset of child maltreatment from the National Data Archive on Child Abuse and Neglect at Cornell University, NY. Overall rates of child abuse in Army lower than in civilian population of Washington State, although the differences were not as prominent as for the total national rate. Neglect constituted the largest proportion of the total maltreatments in both population, but not as large as in 1999 (see McCarroll 2004a), with Physical abuse coming close second. *The rates of abuse for individual types were calculated by the reviewer, who assumed that for the civilian population 31 % of investigated cases were from 315 of the total population.* The rates of all types of abuse in the Army were lower than in the Washington State civilians, with the exception of Emotional abuse, which was 3x higher in Army. The severity of abuse was lower in Army with highest number of cases in the mild category (65% vs. 44%) and the lowest in the severe category (7% vs. 10%). The severity of the sexual abuse could not be compared, because army treats all these cases as severe. Differences in neglect may be confounded by the family structure: in army only 55 of children were from the single parent family, in WS - 34% were single females.

Raiha 1997 {Raiha, 1997 #15}

This study investigated total substantiated cases reported to Army Family Advocacy Central Registry for 1992-93 and compared it with total national data from the National Centre on Child Abuse and Neglect of the US Department of Health and Human Services (1994, 1995). Results were stratified by type and severity of abuse, gender, age and sponsor rank. In 1992-3, The rates for Total maltreatments, Major physical, Minor physical, Neglect, Emotional and Sexual were: 7.5, 0.26, 2.81, 2.9,

0.70, 1.25 respectively. Major physical abuse. Victims were mainly young children (47% under the age of 1) of low ranking parents. 63% of major physical abuses was committed by privates or specialists (pay grade E1-E4), although their children constituted only 21% of Army children, resulting in the rate of 4.22 compared 0.26 for all other children. Gender of victims is represented equally. Minor Physical Abuse peaks during victim teen years and generally decreases with increasing rank and age of sponsor and the trend for both age and rank persisted when other factors were controlled for. Low rank sponsors abused significantly more girls then boys, the trend for officers was reversed. Neglect - Victims were mainly young children of low ranking sponsors, with both sexes equally represented. In Emotional abuse trends were not clear. This type of abuse generally did not depend on sponsors rank or victim gender. The most abused groups were toddlers and teens, with the highest rate (0.9) observed for teenage daughters of senior enlisted sponsors (E6-E9). Sexual abuse was mainly perpetrated on girls, peaking at victim's age 12-14, and the rates decreased with sponsor rank (1.17-1.59 for E1-E7 vs. 0.18 for O4-O10)

Dubanoski 1984{Dubanoski, 1984 #2}

This study presented data from Records of the Central Registry of Child Abuse for Hawaii. This agency collects all cases of abuse, and military-related cases were extracted from the total cases. The exact rates of abuse were not calculated in this paper, because the size of the military population of Hawaii was not known to authors. The cases were stratified by severity of abuse, and sex, age, ethnicity and personal traits of victims and perpetrators. Severity. Although cases differed in severity, the most prevalent type of abuse was minor physical (59% of cases) and in neglect, the lack of supervision (67% of cases). Sex. There was generally no differences between proportion of abused sons and daughters and perpetrating mothers and fathers. the notable exception was sexual abuse when fathers significantly more abusive than mothers (n=41 vs. n=2) and daughters were more frequent victims than sons (n=35 vs. n=8). Mothers were more often perpetrators of neglect then fathers (n=146 vs. n=20). Age. Very young mothers (<20y) and older fathers (40-49) tended to be more abusive than parents aged 20-39, very young children were more abused by mothers than by fathers, while teenagers were more abused by fathers than mothers. Race. Approximately half of the victims and perpetrators were of race other than Caucasians, which constituted about 77% of the military populations, indicating higher rated of abuse and neglect between non-Caucasian races. Personal factors. The main factors for abuse were loss of control and lack of tolerance, but there was no main causative factor for neglect. Stress factors that are correlated with abuse. For mothers, New Baby/Continuous Care, Relocation/Isolation and Family Discord were 3 main stress factors for abuse, while for fathers it was only Family Discord. Comparison with the civilian population. There were no significant differences between military and civilian population of abusers and victims. However, because the exact rates were not known, the comparison is only an approximation.

McCarroll 1999{McCarroll, 1999 #7}

This study presented total data from Army Central Registry for years 1975-97. Since the start of reporting in 1975, the number of child abuse cases increased steadily between 1975 and 1991 (from 9 to 4,350) and then decreased slowly to 2,900 in 1997.

As the number of children decreased between 1991 and 1997 from 600,000 to 450,000, the rate per 1000 decreased only minimally (7.25 to 6.4). Neglect. It constituted about 40-50% of all cases in all recorded years. There was a decrease in rates between 1991 and 1997 (from 3.47 to 2.65) but the changes were not consistent. Major Physical Abuse. The rates were relatively steady at 0.2-0.32 throughout the decade. Minor Physical Abuse. The rates were steady at ~3/1000 1988-1993 and then dropped steadily to 2.13/1000 in 1997, a decrease of 28%. The rates of Total Physical Abuse were similar to those of Minor Physical Abuse and the proportion of cases of Total Physical Abuse decreased by 25% between 1979 and 1997. Sexual Abuse remained relatively steady at about 1/1000 throughout the decade. The rates of Emotional Abuse doubled between 1988 and 1997 from 0.59 to 1.26 and the proportion of total cases increased from 8.5% to 19%. The severity and type of Emotional Abuse is not known from the records, therefore it is difficult to assess whether the increase in this type of abuse is real or resulted from the change in attitude and reporting.

Mollerstrom, 1995{Mollerstrom, 1995 #12}

Presented total data for years 1987-1992 of total cases collected by AF Central Registry. There is no apparent change in the trends in child abuse in Air force in years 1987-1992. The number of total substantiated cases did not change. The proportion of individual types of abuse did not change with the notable exception of Multiple Abuse that decreased steadily from 87 cases in 1987 to 4 in 1992. The number of deaths oscillated around 10 cases in all years. Neglect accounted for approximately 30% of cases, which appears a lower proportion than in Army or Navy. Physical Abuse accounted for more cases than Neglect, about 40-42%, and Sexual Abuse for about 12%.

Characteristics of the abuser. Ethnicity: The racial representation of victims/abusers generally reflected the racial composition of Air Force at large, with a suggestion that Hispanic and Asian/Pacific Islanders victims may be somewhat overrepresented. The rate of neglect and abuse per 1000 of active duty AF personnel were associated with lower income and pay grade, being highest for low grade enlisted and lowest for high grade officers (i.e. in 1992 they were 7.13 for E1-E3, 5.01 for E7-E9 and 1.10 for O4-O7).

Characteristics of the victim. The average age of abused child was 7.6 years. Children of both sexes were neglected in equal measures. Sexual abuse was directed almost exclusively against girls (93-95% vs. 5-7%). Other forms of abuse were directed generally more often against boys than girls: physical abuse 62-67% vs. 33-38%, emotional abuse 56-65% vs. 35-46% and deaths 50-89% vs. 11-50%.

Merrill 2004{Merrill, 2004 #10}

This study examined psychosocial characteristics of individuals at risk for perpetrating both intimate partner violence (IPV risk) and child physical abuse (CPA) risk. The sample consisted of 775 female and 592 male Navy recruits. The demographic variables assessed were: gender, age, education level, ethnicity, socioeconomic status (SES), marital status and presence of children at home. The psychosocial variables assessed included symptoms of dysphoria, posttraumatic stress, self-dysfunction, alcohol-related problems, and drug use. Results: Out of five investigated psychosocial variables, only elevated dysphoria, posttraumatic stress and

self-dysfunction were significant and independent predictors of child physical abuse risk. Alcohol and drug use were not predictors of CPA risk (although they were predictors of IPV risk). Out of all investigated demographic variables, only low SES was an independent predictor of child physical abuse risk.

Schaeffer 2005{Schaeffer, 2005 #14}

This study examined potential of child abuse in Army personnel receiving services through New Parent Support Program. The sample included 590 fathers and 175 mothers and 16% families with substantiated cases of child abuse. Demographics of the sample were: father on active duty-93%, education: high school-52%, some college-35%; age approximately 25years, family status: married ~90%, ethnicity: White-59%, Black-18%, Hispanic-15%, other-8%. The following variables were correlated with potential for child abuse (for fathers and mothers separately): 1) demographic: age, education level, ethnicity and 2) psychosocial: depression, family functioning (cohesion, conflict, control, expressiveness, organization) total stress and social support.
Results: Depression, parental stress and family conflict predicted child abuse potential for both mothers and fathers, whereas poor marital adjustment, low satisfaction with social support, and low family cohesion were predictive of abuse potential only for mothers and low family expressiveness was predictive only for fathers.

Discussion

Comparison with civilian population

Studies that compare rates of child abuse in military services with those of civilian population have contradictory results. Those that investigated a particular type of severe physical abuse in a relatively small population, such as death from child abuse {Herman-Giddens, 2005 #4}or shaken baby syndrome{Gessner, 1995 #3}, both in North Carolina, found a significantly higher rate of abuse in military compared with civilians. The most comprehensive studies that reviewed total army records over several years and compared it with national {McCarroll, 2004 #9; Raiha, 1997 #15} or state {McCarroll, 2004 #8} rates, found that rates of abuse in army were significantly lower than those in civilian population. This appears to stem primarily from a neglect rate less than half of that reported in the general U.S. population. The lower neglect rate may reflect the presence in each military family of at least one parent who is employed, able to function effectively within a structured environment, and able to pass literacy and aptitude/intelligence tests, who is subject to elimination from the military population upon the discovery of major mental health problems, criminal conduct, or drug and alcohol abuse {Raiha, 1997 #15}. Rates for other types of abuse tend to be slightly lower than U.S. population rates {McCarroll, 2004 #8; McCarroll, 2004 #9; Raiha, 1997 #15}, including severe physical abuse {McCarroll, 2004 #8}. Also, the severity of the cases of abuse appears to be lower in the military compared with the civilian population {McCarroll, 2004 #8}. However, these differences were not significant, and the relative similarity of maltreatment rates other than neglect suggests that factors influencing physical, emotional, and sexual abuse may not differ markedly between military and civilian families.

Characterisation of abuser and victims

Majority of perpetrators were natural parents of the victim, young (in their twenties) and of low enlisted rank. The incidence of abuse decreased with rank and age of the perpetrator. Both rank and age were independent factors when tried in multivariate model Generally, physical abuse and neglect was perpetrated by both parent on children of both sexes. Victims of neglect were mainly young children with both sexes equally represented {Raiha, 1997 #15}. Majority of deaths was caused by young males {Myers, 1979 #13}. Sexual abuser was generally more mature male at higher enlisted grade {Myers, 1979 #13} and the abuse was directed almost exclusively against girls, with age of victim peaking at 12-14{Raiha, 1997 #15}.

Perpetrators of abuse were often themselves victims of child abuse, and had problems with use of alcohol and drugs and marital difficulties {Herndon, 1983 #5}. The racial representation of victims/abusers generally reflected the racial composition of military at large, with a suggestion that Hispanic and Asian/Pacific Islanders victims may be somewhat overrepresented {Mollerstrom, 1995 #12}. However, there was a beneficial influence of military, reflected in rates of child maltreatment for African Americans and American Indians was approximately 3 times lower in the Army than in the civilian population{McCarroll, 2004 #9}.

The majority of victims of major physical abuse were young children less than 1 year old {Raiha, 1997 #15; Gessner, 1995 #3; Herman-Giddens, 2005 #4}. Minor physical abuse peaks during victim teen years with low rank sponsors abusing significantly more girls then boys, while the trend for officers was reversed. In emotional abuse trends were not clear although the highest rate was observed for teenage daughters of senior enlisted sponsors {Raiha, 1997 #15}.

There are confounding factors that relate the rank of abuser to other influencing factors.
In general, lower rank is associated with higher rates of abuse. Lower rank can be associated with economic hardship, immaturity, lack of control over life, lower educational levels, and disadvantaged background. Impulsive behaviour and poor judgment may contribute to lower likelihood of promotion to higher ranks as well as to increased risk for child abuse. The poorest performers are removed from the Army and will never progress to higher ranks {Raiha, 1997 #15}.

Trends over time

The most comprehensive data of trends in child abuse were presented by McCarroll for Army 1975-1997. The number of child abuse cases increased steadily between 1975 and 1991 and then decreased slowly. Neglect constituted about 40-50% of all cases. The rates of major physical abuse were relatively. The rates of minor physical abuse dropped by 28%. Sexual abuse remained relatively steady. The rates of emotional abuse doubled {McCarroll, 1999 #7}. It is difficult to assess whether the increase in some types of abuse, i.e. emotional is real or resulted from the change in attitude and reporting.

In the early years of reporting the number of cases was small probably due to underreporting. The rates and trends for all branches of the military appear to be similar. It appears that rates for neglect and minor physical abuse decreased during 1988-1997, while those for emotional abuse increased. Calculation of exact rates

could be difficult because the exact number of military personnel especially during war (i.e. Desert Storm) is not known (McCarroll 1999).

All cases in this review were substantiated cases, which is another factor that may be influenced by confounders. The substantiation rate for child abuse cases in the military was generally approximately 50%, which is higher than the respective rate for civilian cases of 39% (Daro &McCurdy, 1991). In the Air Force the substantiation rate decreased steadily between 1987 and 1992 from 51% to 46%, but the number of substantiated cases remained generally unchanged {Mollerstrom, 1995 #12}. *The trend resulted from the higher reporting rate which may reflect higher awareness of child abuse and higher reporting rates.*

Predictors of risks for child abuse

The studies of predictors of risks for child abuse have severe limitations. The design of the study does not allow to link predicted risk for abuse with actual perpetration of abuse. Merrill 2004 {Merrill, 2004 #10} was a cross-sectional study that assessed the risk of child abuse among young population of mainly childless recruits. Although Schaeffer 2005 {Schaeffer, 2005 #14} assessed the risk in families with reasonably high proportion (16%) of substantiated cases of child abuse, in both studies the risk was assessed on the basis of CAPI score rather than actual child maltreatment. The question of how well this risk translated into the real life will not be answered until a well designed prospective study with a long follow up period will be performed to investigate how many of the parents with risk factor became actual perpetrators of the abuse.

Table 22: Child abuse in the military: comparison with civilian population

Study ID	Service arm	Data collection	Description of military population	Description of comparator civilian population	Numbers		Type of abuse	Rate per 1,000 or % of total cases	
					Military	Civilians		Military	Civilians
All types of abuse									
McCarroll 2004a	Army	1995-1999	Total substantiated cases reported to Army Family Advocacy Central Registry	Total national data collected by the Children's Bureau of the US Department of Health and Human Services (2001)	Rates in 1996 Total abuse 7.1	Rates in 1996 Total abuse 14.7	Total abuse Neglect Physical Sexual Emotional	1999 6.0 3.1 2.0 0.8 1.0	1999 11.8 6.9 2.5 1.3 0.9
McCarroll 2004b	Army	July 1994-June 1995	US Army FAP data from Army Central Registry (ACR) database	Washington State dataset of child maltreatment from the national data archive on Child Abuse and Neglect at Cornell University, NY	3,422 cases from population of 458,188, used all cases.	12,978 cases in population of 1,401,914. Used 31% cases: 4,019	Total maltreatment Neglect Physical Sexual Emotional Mild Moderate Severe	7.5 2.9–39% 2.82–38% 1.07–14% 0.64–9% 65% 28% 7%	9.25 3.79–42% 3.65–41% 1.51–17% 0.30–3% 44% 46% 10%
Raiha 1997	Army	1992-1993	Total substantiated cases reported to Army Family Advocacy Central Registry	Total national data from the National Centre on Child Abuse and Neglect of the US Department of Health and Human Services (1994, 1995)	N=8422 for 2 years. In 1992, N of cases per population of children was 4280/570,531.	—	Total maltreatment Neglect Physical Major physical Minor physical Sexual Emotional	7.4 2.9 3.05 0.26 2.81 1.25 0.7	— 7.25* 3.3* — — 2.1* 0.9*
Dubanoski 1984	Military in Hawaii	Jan 1978-Feb 1981	Records of the Central Registry of Child Abuse for Hawaii. This agency collects all cases of abuse, and military-related cases were extracted from the total cases.		Abuse N=357 Neglect: N=170	N= 1815** N = 937**	Abuse Neglect Minor physical	— — 59%	— — —
Shaken baby									

Gessner 1995	Military	Jan 1989-Feb 1993	Records of ICU from hospitals in North Carolina. All cases were collected, and military-related cases were extracted from the total cases. Cases were calculated per "ICU children population", numbering 44 and 480 military and total children	N=8 per 44	N=14 per 480	Shaken baby syndrome Odds Ratio with 95%CI, military vs. civilian	OR=3.45 (1.44-8.27) for <1y.o. OR=6.7 (2.94-15.31) for <2y.o.
Deaths							
Herman-Giddens 2005	Military	1985-2000	Records of deaths resulting from child abuse in children age 1-10 from hospitals in North Carolina counties with high military presence (Cumberland and Onslow). All cases were collected, and military-related cases were extracted from the total cases.	Total N=378 (in 16 years) State average Cumberland County Onslow County Military families in Cumberland County Military families in Onslow County			Total rate 0.022 0.046 0.043 0.050 0.049

*rates averaged across two years by a reviewer, to match data for civilians with those presented for military, **military cases subtracted from total to = civilian

Table 23: Child abuse in the military: trends and characteristisation of abuser and victims

Study ID	Service arm	Data collection	Population	Type of abuse	Numbers, % of total case or Rates per 1,000	Characteristics of abuser and victim
Accord 1977	Navy	1974 - 1975	Records of Navy and Marine medical facilities	Total N Physical Neglect Sexual Death Other+Unknown	430 (100%) 67% 22% 6% 3% 3%	Abusers and victims were not characterised in this paper
Myers 1979	Air Force	1975 - 1977	Air Force. Data collected by AFCAP. *Data for 1975 not complete, not presented in this table*	3-year data Total N Death Physical Neglect Sexual	 1328 6-2% 61-66% 14-19% 14-19%	Abuser Majority of deaths was caused by young males (25y), with low rank ((E1-E4). Physical abuse and neglect was perpetrated mainly by young dependent wives. Sexual abuser was generally more mature male at higher enlisted grade (30yo, E5-E9). Majority of perpetrators were natural parent of the victim. Victim The mean age of victims was 1.2 for death, 4-5y for neglect and physical abuse and 11.2 for sexual abuse. The sex was generally male for death, neglect and physical abuse and female for sexual abuse.
Herndon 1983	Navy	1975 - 1982	Data collected by Child Advocacy Record at Naval Regional Medical Centre at Portsmouth Virginia	6-year Data N per year: Total N Death Physical Neglect Sexual	 17-68 273 2 67† — 68	Abuser Majority of perpetrators were fathers (97) or mothers (72) or both (38) or others like uncles, boyfriends (66). Abusers were mostly young and of low rank. Influencing factors: often (% not given): themselves victims of child abuse, use of alcohol and drugs, marital difficulties. Victim Age of children. majority of children were <3y old: 58% of all abuse/neglect cases and 94% of fractures.
James	Army	1978	Total	27-month data	Total population	Abuser

1984		- 1980	population and representative sample	Rate (per 1 year) Total N Physical Death Neglect Sexual Physical+Neglect Other	2.5 4029 (100%) 1719 (43%) 26 (1%) 1459 (39%) 398 (10%) 288 (7%) 139 (3%)	This analysis was performed on a representative sample of 1126 cases. Majority (78%) of perpetrators were fathers (476) or mothers (404) and only 45 were from outside family. The number of incidents perpetrated by whites was comparable to “expected” but twice higher for non-whites. 58% was in their twenties. The rank of sponsor: 94% enlisted. <u>Victim</u> Abuse decreased with age, children<4y=53%. Sexes uniformly represented, with exception for sexual abuse (106F vs. 10M)
Mollers trom, 1992	Air Force	1988	Total cases collected in 44 AF medical facilities by Family Advocacy Central Registry	Total N Physical Neglect Sexual Emotional Low severity Moderate Severe	559 (100%) 254 (45%) 224 (40%) 25 (0.4%) 56 (1.0%) 54% 41.5% 4.5%	<u>Abuser</u> 20% had alcohol problems, 2.4% had drug problems and 25% had family history of child abuse. Education: Majority (57%) had high school , 30% some college and 7.2% full college. It is not clear whether it reflects the educational composition of AF. Ethnicity: The proportion of non-White abusers was higher than indicated by their representation in AF. <u>Victim</u> Both sexes were represented equally, mean age was 7.6y.
Mollers trom, 1995	Air Force	Total data for years 1987 - 1992	Total cases collected by AF Central Registry	Total cases Physical Neglect Sexual Emotional Multiple Deaths	<u>1987</u> N (Rate) 3174 *(6.38)** 1348 (2.71) 1019 (2.05) 521 (1.05) 199 (0.40) 87 (0.17) 2 — **sum of all rates*	<u>1992</u> N (Rate) 3305 *(7.04)** 1306 (2.78) 1113 (2.38) 497 (1.06) 385 (0.82) 4 (0.01) 9 — The trends in the number of total cases, the rate per child at risk and the type of abuse did not change.
						<u>Abuser</u> Ethnicity: The racial representation of victims/abusers generally reflected the racial composition of Air Force at large, with a suggestion that Hispanic and Asian/Pacific Islanders victims may be somewhat overrepresented. The rate of neglect and abuse per 1000 of active duty AF personnel were associated with lower income and pay grade, being highest for low grade enlisted and lowest for high grade officers (i.e. in 1992 they were 7.13 for E1-E3, 5.01 for E7-E9 and 1.10 for O4-O7). <u>Victim</u> The average age of abused child was 7.6 years. Children of both sexes were neglected in equal measures. Sexual abuse was directed almost exclusively against girls (93-95% vs. 5-7%). Other forms of abuse were directed generally more often against boys than girls: physical abuse 62-67% vs. 33-38%, emotional abuse 56-65% vs. 35-46% and deaths 50-

								89% vs. 11-50%.	
McCarroll 1999	Army	1975 - 1997	Data from ACR (Army Central Registry): 1975-97: % of total cases, 1988-97-rates	Year	1991	1997	Rates 1988-1991	Rates 1992-1997	Abusers and victims were not characterised in this paper
				Total N	4,907	3,334	—	—	
				Major Physical	3%	5%	0.22-0.31	0.23-.032	
				Minor Physical	36%	31%	2.74-2.96	2.97-2.13	
				All Physical	39%	36%	2.95-3.22	3.26-2.44	
				Sexual	12%	12%	0.84-1.00	1.39-0.89	
				Emotional	8%	19%	0.59-0.62	0.79-1-26	
				Neglect	48%	42%	3.1-3.5	2.6-3.2	

†57 fractures + 10 battered syndrome

Table 24: Child abuse in military: Risk Predictors

Study ID	Service arm	Data collection	Population	Variables assessed	Measurement tools	Results
Merril 2004	Navy	Jan-Apr 1994	Navy recruits. N=1367, Sex: 775M, 592F. Age: 17-34, mean 20±2, Education: high school-46%, some college-36%. Ethnicity: White-75%, Black-14%, Hispanic-6%, other-5%. SES od family of origin: income <$25,000-39%, $25,000-$50,000-42%, >$50,000-19%. Family status: single-88%, maried -8%, other-5%. Had children at home-21%	Psychosocial: dysphoria, posttraumatic stress, self-dysfunction, alcohol-related problems, and drug use. Demographic: gender, age, education level, ethnicity, socjoeconomic status (SES), marital status and presene of children at home.	-Child Abuse Potential Inventory (CAPI), Physical Abuse Subscale (Milner, 1986, 1994), -Trauma Symptom Inventory (TSI, Briere, 1995) for dysphoria, posttraumatic stress, self-dysfunction, -Michigan Alcoholism Screening Test (MAST, Brady et al 1982, Selzer 1971) for alcohol-related problems, -10-question survey for drug use.	Out of five investigated psychosocial variables only elevated dysphoria, posttraumatic stress and self-dysfunction were significant and independent predictors of child physical abuse risk. Alcohol and drug use were not predictors of CPA risk (although they were predictors of IPV risk). Out of all investigated demographic variables, only low SES was an independent predictor of child physical abuse risk.
Scheffer 2005	Army	Not clear	Army personel receiving services through New Parent Support Program. N=765 Sex- 590Fa, 175Ma Families with substantiated cases of child abuse-16%. Parents at high risk of child abuse (as assessed by CAPI)-26%Ma and 22% Fa. Active duty parent-Fa-93%. Education: high school-52%, some college-35%. Age:mean 24±5 for Mo 26±6 for Fa. Family status: maried -88%Ma, 92%Fa.Ethnicity:	Demographic: age, education level, ethnicity Psychosocial: depression, family functioning (cohesion, conflict, control, expresiveness, organization) total stress and social support These variables were correlated with potential for child abuse for fathers and mothers separately.	-Centre for Epidemiological Studies Depression Scale(CES-D; Radloff,1977) to measure depression, -Child Abuse Potential Inventory (CAPI), Abuse Subscale (Milner, 1986), -Family Environment Scale, Real Form (FES-R; Moos&Moos,1994) to assess family functioning, -Revised Dyadic Adjustment Scale (RDAS; Busby etal.,1995) to assess marital satisfaction, -Parenting Stress Index, Short Form (PSI-SF; Abidin,1990) to assess stress of parenting,	Basic differences between fathers and mothers: mothers were more depressed and had less satisfying social network. Predictors of child abuse for: -both parents: depression, parental stress and family conflict -mothers only: poor marital adjustment, low satisfaction with social support, low family cohesion: -fathers only: low family expresiveness

	White-59%, Black-18%, Hispanic-15%, other-8%.	-Social Support Questionnaire, 6 ItemVersion (SSQ6; Sarason, Sarason, Shearin & Pierce, 1987).

Summary

This systematic literature review sought to identify a wide range of research studies into the effects of military service on spouses, family functioning and children. This was achieved by using broad descriptors and searching databases that specialized in research from different disciplines. Approximately 290 relevant papers were included in the initial phase of the review process. These papers were mapped to an ecological model of health to gain an understanding of the breadth of research carried out in this area, to identify research themes, and identify gaps in the research. Fifty seven percent of the papers identified assessed child outcomes. Of particularly relevance to this review, themes that emerged included risk of adverse child physical outcomes in relation to parental exposure to toxins, the effects of family mobility, deployment and combat exposure on the health and wellbeing of both spouse and children. The areas of child abuse and interpartner violence were significant areas of research. Important under researched areas included the possible impact of upstream (macro and distal) factors such as social climate and policy, midstream (proximal) factors such as parent-child relationships, and downstream factors such as child-parent attachment, and studies investigating salient development stages of child development and periods of transition. A limited number of studies investigated the impact of military service across multiple levels of the ecological model. Importantly, few studies specifically sought to causally link upstream and proximal environmental factors specifically to child outcomes.

To make causal links prospective long term studies are required. However, very few prospective studies were identified. The vast majority of studies were of a cross-sectional nature. The few more recent longitudinal studies, from the Gulf war in particular, are currently of limited duration. There are few large scale studies using representative random samples. This is particularly evident in the important areas investigating the effects of paternal mental health on spouse and children.

Approximately 150 papers were included in the critical appraisal. These were divided into studies investigating the effects of military service on spouses and family functioning (94), and the effects on child outcomes (55). In both areas the studies were further divided in relation to the military study populations of general military service, deployment, Veterans, prisoners of war.

Studies of current military service on spouse and family functioning outcomes did not find significant adverse effects, although several studies were suggestive of greater health service utilization for children of military personnel. There is a suggestive evidence that there are higher rates of severe IPV within the current military population. Studies of deployment to the Gulf war found greater length of deployment were related to poorer interpersonal functioning and spousal stress, family functioning, and IPV. Although, no significant differences were found in spouse mental health ten years post war. Interpersonal violence was not found to be higher in veterans in general, but was a problem within subpopulation of veterans with PTSD and high combat exposure. The important area of the impact of combat exposure and PTSD in veterans is hampered by small study sizes, and the use of clinical or

convenience samples. However, there was a consistent theme of adverse associations between veteran combat exposure and PTSD and problem of interpersonal relationships, martial relationships and increased carer burden.

In children the outcomes from the ongoing IOM [316] appraisal of research in the area of herbicides has concluded that there is adequate evidence associating spina bifida in children with parental exposure to agent orange. However, there is still currently inadequate evidence linking other birth defects and childhood cancers to parental exposure to agent orange. In relation to child health and wellbeing outcomes, very few studies were of sufficient sample size and properly controlled. The most consistent finding was the negative association between combat exposure and parental PTSD and child outcomes. This maybe mediated via spouse mental health indicating that future studies should include the whole family. Further, to establish causal links between parental military service with child outcomes long term prospective studies are required that follow the children through salient developmental stages.

Overall, few large scale epidemiological studies investigating health and wellbeing of families and particularly children of military personal. Prospective studies investigating the effects of deployment and military service across a range of developmental ages.

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