WHAT INTERVENTIONS ARE SUCCESSFUL IN THE TREATMENT OF SLEEP

DISTURBANCES IN VETERANS WITH PTSD?

AN INTEGRATIVE LITERATURE REVIEW

by

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TABLE OF CONTENTS

TABLE OF CONTENTS – CONTINUED

LIST OF TABLES

ABSTRACT

Posttraumatic stress disorder (PTSD) is the most common mental disorder associated with military combat and is a significant health risk for military veterans (Nayback, 2009). The sleep disturbances associated with PTSD are some of the most disabling and difficult to treat aspects of the disorder (Nayback, 2009). The nightmares experienced by veterans are often resistant to typical psychological and pharmacological interventions and require a specifically tailored treatment to improve sleep (Nappi, Drummond, Thorp, & McQuaid, 2009). Interventions for sleep disturbances have not been widely studied in populations with PTSD (Swanson, Favorite, Horin, & Arnedt, 2009).The purpose of this integrative literature review was to gain knowledge of successful interventions for sleep disturbances in veterans with PTSD. Current literature was reviewed and analyzed to increase knowledge of the interventions available for improving sleep in this population. A total of seven articles met inclusion criteria and were utilized in the literature review. Articles were located by searching electronic databases and by hand searching abstracts and reference lists. A constant comparison method was utilized in which data were extracted from the research articles and then compiled into systematic categories (Whittemore & Knafl, 2005). The data were assembled into a large matrix allowing for the comparison of each research study (Whittemore & Knafl, 2005). When performing this literature review, it became evident that there are few interventions available to treat sleep in veterans with PTSD. There did not appear to be a single intervention that was most effective in treating sleep in veterans with PTSD. This review did find literature suggesting that Cognitive Behavioral Therapy (CBT), Imagery Rehearsal Therapy (IRT), and prazosin have all shown varying degrees of effectiveness in the treatment of sleep disturbances in veterans with PTSD. This review of literature suggests it may be beneficial for future research to focus on a combined approach of CBT, IBT, IRT, and prazosin.

CHAPTER ONE

RESEARCH PROBLEM

Introduction

Posttraumatic stress disorder (PTSD) is the most common mental disorder associated with military combat and is considered a significant health risk for military veterans (Nayback, 2009). According to Nayback (2009), "sleep disturbances associated with PTSD are some of the most disabling and difficult to treat aspects of the disorder" (p.44). In the past two decades, clinical interest has increased regarding the impact of nightmares on the morbidity of PTSD (Moore & Krakow, 2010).

Several large studies comparing veterans with PTSD to veternas without PTSSD have been performed. These studies found that veterans with PTSD report more chronic health conditions and an overall poorer perception of health than veterans without PTSD (Galovski, Monson, Bruce & Resick, 2009). It is purposed by Calohan, Peterson, Peskind, & Raskind (2010) that "the distressing and difficult to treat symptoms of PTSD impair soldiers' ability to respond optimally to the demands of the combat environment" (p. 645). These symptoms also negatively impact the veteran's ability to perform common occupational, social, and family responsibilities after combat (Calohan, Peterson, Peskind, & Raskind, 2010). Some of these distressing symptoms consist of intrusive thoughts and feelings and somatic sensations related to the traumatic event (Germain, 2012).

Sleep issues such as nocturnal panic attacks, sleep terrors, and motor and vocal behaviors that occur while sleeping are also associated with PTSD (Germain, 2012). In addition, there is a higher incidence of sleep-disordered breathing and sleep-related movement disorders in those with PTSD (Germain, 2012).

Background and Significance

According to Ulmer, Edinger, & Calhoun (2011), more than 1.6 million U.S. military personnel were deployed to Afghanistan and Iraq from the time period between 2001 and 2008. Approximately 21% of these soldiers received a diagnosis of PTSD following their combat experience. Within this group of veterans diagnosed with PTSD, 70-90% also reported sleep difficulties. Ulmer, Edinger, & Calhoun (2011) stress the importance of treating these sleep disturbances.

> Given the burden of PTSD on our veterans and the systems responsible for providing their health care, interventions addressing their sleep disturbances are vitally important for ameliorating current distress and preventing the consequent adverse health problems in the longer term (p. 57).

Recurring nightmares are common in veterans with PTSD and significantly impact the severity of the veteran's insomnia (Nappi, Drummond, Thorp, & McQuaid, 2009). According to Germain (2012), "Nightmares related to PTSD are often replays of the traumatic event or are morphed depictions of the emotional, physical, or cognitive aspects of the trauma" (p.1). The nightmares experienced by veterans with PTSD are often resistant to typical psychological and pharmacological treatment. This suggests veterans with PTSD require specifically tailored treatments to improve sleep (Nappi,

Drummond, Thorp, & McQuaid, 2009). Galvoski, Monson, Bruce & Resick (2009)

suggest the effective treatment of PTSD significantly improves the veteran's quality of

life by reducing physical symptoms related to PTSD and by improving overall sleep

quality.

Statement of the Problem

Insomnia and nightmares are frequently symptoms associated with PTSD

(Swanson, Favorite, Horin, & Arnedt, 2009). Approximately 50% of PTSD dreams are

replications of traumatic events (Nisenoff, 2008). Sleep disorders have a significant

impact on the veteran's physical and mental health. Currently, there is little research that

examines PTSD in veterans (Nayback, 2009).

Due to the severity of the sleep disturbances associated with PTSD; veterans

frequently condition themselves to stay awake to avoid the anxiety induced by their

trauma related nightmares (Nisenoff, 2008). Unfortunately, treatments for sleep

disturbances have not been widely studied in populations with PTSD (Swanson, Favorite,

Horin, & Arnedt, 2009).

Purpose

The purpose of this study was to review the literature to gain knowledge of

successful interventions for sleep disturbances in veterans diagnosed with PTSD. The

current literature will be reviewed and analyzed in order to gain an awareness of the

interventions available for improving sleep in this population. This literature review will

help identify methodologies and research techniques that have been used while studying this problem. It will look at the successes of these interventions by evaluating the data collected from the research studies. This study will examine the significance of previous research in this area and determine if further study is indicated. It will also provide implications for practice and future nursing research.

<div align="center">Theoretical Framework</div>

Sister Callista Roy developed her adaptation theory while working as a pediatric nurse in Los Angeles. She was inspired by the resiliency and coping ability of the children undergoing medical treatment (Phillips, 2010). Roy purposed that adaptation was an appropriate conceptual framework for nursing (Phillips, 2010). "Roy's Adaptation Model (1989) can be an effective framework for nurses to understand the phenomenon of PTSD in the combat veteran population" (Nayback, 2009, p. 304). The model considers the concept of the veteran as a human adaptive system (Nayback, 2009). Roy & Andrews (1999) describe adaptation as a process and an outcome in which people use conscious awareness and choice to create human and environmental integration (Phillips, 2010).

"Roy's model is comprised of four adaptive modes in which the behaviors of individuals, in response to coping activities, can be observed" (Nayback, 2009, p.306). According to Roy (1991), nursing fulfills a unique role by being a facilitator of adaptation and by assessing behavior in the four adaptive modes. (Phillips, 2010). Nursing interventions have a purpose of strengthening adaptation and changing ineffective behavior into adaptive behavior (Phillips, 2010).

This integrative literature review will promote the human adaptive process by increasing knowledge of successful interventions that improve sleep in veterans with PTSD. Nurses can utilize Roy's framework to enhance the veteran's adaptation by implementing these specific interventions to promote their ability to cope with ineffective sleeping patterns. "Nurses are in the unique position to implement current study findings and have the ability to make a positive impact on veterans with PTSD though practice and research" (Nayback, 2009, p. 308).

Definitions of Search Terms

It is important to define the specific concepts of the research question to ensure that there is a clear understanding of what was investigated in this study. The definitions of these research components include the following:

1. Sleep Disturbances: encompass disorders of initiating and maintaining sleep, disorders of excessive somnolence, disorders of sleep–wake schedule, and dysfunctions associated with sleep, sleep stages, or partial arousals (Cormier, 1990).

2. Interventions: "care provided to improve a situation, especially medical procedures or applications that are intended to relieve illness or injury" (TheFreeDictionary.com, 2012).

3. Post-traumatic stress disorder (PTSD): According to the *Diagnostic and Statistical Manual-IV (*American Psychiatric Association, 2000*)* as cited in Nayback (2009), "a psychiatric disorder that can occur following the experience

of witnessing life-threatening events such as military combat, natural disasters, terrorist incidents, serious accidents, or violent personal assaults like rape. People diagnosed with PTSD experience three symptom clusters: (1) avoidance through emotional numbing, anxiety, and depression; (2) hyper arousal symptoms such as irritability, impaired concentrations, hypervigilance, and increased startle response; and (3) reliving the trauma through dissociation, flashbacks, and nightmares" (p. 304).

4. Veteran: "a person who has served in a military force, especially one who has fought in a war" (Dictionary.com, 2012).

Assumptions

Assumptions guided by Sister Callista Roy have been influential in the understanding of humans as an adaptive system (Phillips, 2010). A scientific assumption of Sister Callista Roy is that human adaptive systems are complex as they respond to environmental stimuli to achieve adaptation (Phillips, 2010). This assumption can be equated to this research as it is believed that the implementation of successful sleep interventions will improve the veteran's ability to adapt to a stressful environment. This adaption will result in a decrease in sleep difficulties.

Another assumption related to this research is that effective treatment of insomnia will result in reduction of other PTSD symptoms. It is also assumed that ongoing sleep disturbances can exacerbate other health problems. An example from the literature to support these assumptions is: "sleep disruption in patients with PTSD may negatively

affect their ability to recover from PTSD, as sleep serves as a restorative function and sleeplessness represents a physiological stress that can lead to impaired function and health" (Maher, Rego, & Asnis, 2006, p. 569).

Summary

Sleep disturbances are among the most frequent and debilitating symptoms associated with PTSD (Germain, 2012). Significant research has shown that sleep disturbances, such as nightmares and insomnia, are present in a majority of military veterans (Harb,Cook, Gehrman, Gamble & Ross, 2009). The severity sleep disturbances contribute to depression, suicidality, anxiety, alcohol abuse, and affect overall quality of life (Germain, 2012).

Treatments for sleep disturbances have not been thoroughly studied in populations with PTSD (Swanson, Favorite, Horin, & Arnedt, 2009). The results of this integrative literature review will provide information regarding effective treatment interventions to improve sleep among veterans with PTSD. The implementation of these interventions may also have significant impact on other aspects of the veteran's quality of life.

CHAPTER TWO

SEARCH METHODS

<u>Literature Search</u>

The purpose of this section is to provide a comprehensive analysis of existing research on successful sleep interventions in veterans with PTSD. This literature search will increase knowledge regarding the evolution of this topic and provide insight into directions for future research (Goldman & Schamlz, 2004). This literature review will examine this research in relation to Sister Callista Roy's Adaptation Model. Roy's concepts of systems and adaptation to person and the nursing process will be used as a guiding framework.

<u>Search Methods</u>

The information provided in a literature search expands upon the knowledge of existing literature to build new perspectives on the topic (Torraco, 2005). Information that currently exists will be summarized to help develop guidelines for nursing practice (Norwood, 2010, p. 126). This literature search was performed using multiple search strategies.

<u>Computerized Databases.</u> Computerized databases were the primary method for conducting this literature search. According to Whittemore and Knafl (2005), computerized databases are both effective and efficient; but may yield approximately 50% of eligible studies. Therefore, to increase results, reference lists and abstracts of

articles meeting inclusion criteria were also reviewed. This literature search includes a total of three search strategies: computerized database, reference lists, and abstracts.

Computer database searches were performed in the following databases; the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature On-Line (MEDLINE), and PsycINFO. According to Norwood (2010), these databases are considered to be useful electronic databases for the literature review process. Cochrane Library was a fourth computerized database utilized. It was searched because it provides a collection of evidence-based journal articles on interventions in healthcare.

Supplemental Search Methods. The reference lists at the end of all articles meeting inclusion criteria were hand searched. The reference lists provide documentation of the research cited and offers the information required to locate the articles. This information includes the title of the journal article, the name and volume number of the specific journal, (Goldman & Schmalz, 2004).

Abstracts were also utilized as a supplemental search method. An abstract is an abbreviated description of the research study. By reviewing the condensed summary, useful leads could be provided to determine if the complete study would be a possible source (Goldman & Schmalz, 2004).

Search Terms. The research question provided key research terms for this literature review. The search terms utilized in this research included; *(a) interventions, (b) sleep disturbances, (c) veterans, and (d) PTSD.* Post-traumatic stress disorder was abbreviated to PTSD because it is a common abbreviation for this disorder. More articles

were obtained using the term PTSD as opposed to post-traumatic stress disorder in

CINAHL, Medline, PsycINFO and Cochrane Library.

Inclusion/Exclusion Criteria

    The primary inclusion criterion for this paper was that the research articles

specifically discussed sleep interventions for veterans with PTSD. This was a required

criterion because veterans have unique stressors and experiences that differ from the

general population. Sleep interventions may impact veterans differently than other

population types that are diagnosed with PTSD.

    The articles included in this literature review were required to be peer-reviewed

journal articles. The inclusion of only peer-reviewed journal articles ensures that high

quality research is utilized. According to Goldman & Schmalz (2004), a peer-reviewed

article must be evaluated through a process of review by colleagues with similar

expertise. The literature search was limited to studies published within the past five years

(2009-2013) to ensure that only current literature was utilized.

Findings

    Each key term was searched individually, paired, and all inclusively. The search

of single terms produced a large number of results. The articles that were matches from

the use of single terms were not reviewed due to the large quantity.

    The combination of terms *(a)interventions* and *(b)sleep disturbances*; the

combination of terms *(a)interventions* and *(c)veterans*; and the combination of terms

(a)interventions and *(d)PTSD* also produced many results which decreased the possibility

that these combinations of search terms would be applicable to the research question. The

large number of search results was decreased when additional search terms were

combined.

Table 1 shows the key terms and the combination of key terms used in this

literature search. The table also includes the number of matches that were available in the

databases CINAHL, Cochrane Library, MEDLINE and PsycINFO.

Table 1

Number of Articles Found by Database, Search Term, and Search Term Combinations

Key Terms	CINAHL	Cochrane Library	MEDLINE	PsycINFO
(a)	86,616	5,985	260,366	5,445
(a) + (b)	40	489	183	2
(a) + (c)	743	354	3,486	205
(a) + (d)	317	76	2,058	155
(a) + (b) + (c)	3	9	8	2
(a) + (b) + (d)	3	23	10	2
(a) + (b) + (c) + (d)	1	7	5	2
(b)	294	489	5,230	40
(a) + (c)	6	47	2,448	3
(b) + (d)	8	23	60	1
(b) + (c) + (d)	0	7	17	58
(c)	13,314	258	92,975	2,747
(c) + (d)	711	18	4,358	546
(d)	3,127	76	26,319	1,515

Note: (a) interventions; (b) sleep disturbances; (c) veterans; (d) PTSD

Cumulative Index to Nursing and Allied Health Literature (CINAHL). The

CINAHL database was searched using each key term individually, paired, and all

inclusively. The combined terms *(a) interventions, (b) sleep disturbances,* and *(c)*

veterans yielded three results. The combination of the search terms *(a) interventions*, (*b*)

sleep disturbances, and *(d) PTSD* also resulted in three articles in CINAHL.

After reviewing these articles, it became evident that the search needed to be

further refined because the results were mostly related to PTSD as a result of sexual

trauma. The search was then narrowed by combining all four search terms (a)

interventions, (b) sleep disturbances, (c) veterans, and (d) PTSD. This combination

resulted in one article that met inclusion criteria (Calohan et al., 2010). A total of one

article was obtained in CINHAL for this integrated literature review (see Table 2).

Table 2
Evidence Table of CINAHL Search Returns that Met the Inclusion Criteria

Study Year	Design	Purpose	Sample	Intervention
Calohan et al., (2010)	Self-report	To determine if prazosin reduces sleep disturbances	N=13 soldiers engaged in combat operations in Northern Iraq; 11 men and 2 women	Administration of nightly prazosin

Note. Prazosin is an alpha-1 adrenoreceptor antagonist that crosses the blood-brain barrier and reduces the brain's stress response to the neurotransmitter norepinephrine (Calohan, Peterson, Peskind, & Raskind, 2010). It is primarily utilized as a hypertensive agent and has been shown to reduce nightmares in PTSD patients. (Moore & Krakow, 2010).

MEDLINE. A search in the MEDLINE database using the combined terms *(a)*

interventions, *(b) sleep disturbances* and *(d)* *PTSD* resulted in nine articles. This search

was then refined by adding the term *(c) veterans*. When the search term *(c) veterans* was

added, the number of articles decreased, resulting in two articles that met inclusion

criteria (Swanson et al., 2009; Gellis & Gehrman, 2011). MEDLINE yielded a total of

one article that was used in this literature review (see Table 3).

Table 3
Evidence Table of MEDLINE Search Returns that Met the Inclusion Criteria

Study Year	Design	Purpose	Sample	Intervention
Gellis & Gehrman, (2011)	Pilot Study	To analyze the effectiveness of Cognitive Behavioral Therapy- Insomnia (CBT-I) for treating sleep disturbances	N= 8 Male veterans only	5 weekly sessions of CBT
Germain et al., 2012	Randomized Controlled Trial	To compare the effects of prazosin, Behavioral Sleep Intervention (BSI), and placebo on sleep and nightmares	N=50 U.S. Military Veterans	8 weekly sessions of Behavioral Sleep Intervention BSI or nightly dosages of prazosin or placebo
Harb, Cook, Gehrman, Gamble & Ross (2009)	Pilot Study	To examine the efficacy of IRT combined with CBT	N=7 Iraq War veterans	7-8 individual sessions of combined Imagery Rehearsal Therapy IRT and CBT-I

Note. Behavioral Sleep Intervention (BSI) is treatment modality that combines
education and behavioral techniques to reduce nightmares and insomnia (Germain et al.,
2012). The interventions include stimulus control, sleep restriction, and imagery
rehearsal therapy (IRT) (Germain, et al., 2012); Cognitive-Behavioral Therapy for
Insomnia (CBT-I) consists of a series of behavioral techniques that can be utilized to
reduce sleep latency, decrease the number and duration of nocturnal awakenings, and
improve overall sleep quality (Germain, 2012). Some interventions that are included in
CBT-I include adhering to a strict sleep and wake schedule, implementing sleep
restriction, and learning cognitive restructuring techniques (Germain, 2012). CBT-I
techniques are intended to increase relaxation at bedtime and decrease behaviors that are
associated with poor sleep quality (Niesenoff, 2008); Imagery Rehearsal Therapy (IRT)

Table 3 Continued

is an intervention that is often a brief treatment for nightmares. Patients are instructed to re-write and practice their nightmare by using a new script (Niesenoff, 2008) There is rationale that nightmares are learned cognitive behaviors that can be changed by repeatedly rehearsing new dreams (Germain, 2012).

PsycINFO. The combination of the search terms *(a) interventions, (b) sleep disturbances, and (d) PTSD* resulted in two articles in the PsycINFO database (Cook et al., 2010; UIlmer et al., 2011). When the search term (c) *veterans* was added to this combination, the same two articles were found. Both of the articles were reviewed and met inclusion criteria. The articles found in the PsycINFO databases are summarized in the table below. (see Table 4).

Table 4
Evidence Table of PsycINFO Search Returns that met the Inclusion Criteria

Study Year	Design	Purpose	Sample	Intervention
Cook et al., (2010)	Randomized Controlled Trial	To test the efficacy of imagery rehearsal group therapy vs. sleep and nightmare management therapy	N=124 Vietnam War Veterans	6 sessions of imagery rehearsal therapy delivered in a group format
Ulmer et al., (2011)	Randomized Controlled Trial	To assess feasibility of multi-component Cognitive Behavioral Therapy for Insomnia (CBT-I)	N=22 Veterans; 15 males and 7 females	Combination of CBT-I and Imagery Rehearsal Therapy (IRT)

Cochrane Library. When the search terms (a) *interventions, (b) sleep disturbances, (c) veterans*, and (d) *PTSD* were combined, seven articles were found in the Cochrane Library database. The abstracts of each of the seven articles were then

reviewed. Even though the search terms were included in the articles, the primary content

of the articles were not related to veterans with PTSD. As a result, none of the articles

from Cochrane Library were utilized in this literature review.

Hand Searches. The reference lists of all articles meeting inclusion criteria were

hand searched to locate additional articles that were not obtained in the electronic

database search. One article (Swanson et al., 2009) was acquired utilizing the hand

search method. This article met inclusion criteria and is summarized below (see Table 5).

Table 5
Evidence Table of Hand Search Returns that Met the Inclusion Criteria

Study Year	Design	Purpose	Sample	Intervention
Swanson et al., (2009)	Self-Report	To evaluate the effectiveness of a combined treatments in a group setting	N=10 Male combat veterans enrolled in 3 treatment groups 9 Vietnam War veterans and 1 Gulf War veteran	Ten 90 minute group therapy sessions that included exposure, relaxation and rescripting therapy and CBT-I

Summary

A total of seven articles met inclusion criteria and were utilized in this literature

review. The electronic databases CINAHL, MEDLINE, PsycINFO, and Cochrane

Library were used to search for articles that met inclusion criteria. The search terms

(a)*interventions, (b) sleep disturbances, (c)veterans, and (d)PTSD* were searched individually, paired and all inclusively in this literature search. Six of the seven articles were located in the electronic databases search. One additional article was located by hand searching the reference lists of each article. The articles included in this integrative literature review were from the time period 2009-2013 and were peer-reviewed journal articles.

CHAPTER THREE

DATA ANALYSIS

Overview

Integrative literature reviews are the most comprehensive type of review method

and allow for the inclusion of both experimental and non-experimental research

(Whittemore & Knafl, 2005). "Integrative literature reviews reveal how a body of

knowledge evolved, what it currently comprises, and what has yet to be studied"

(Goldman & Schmalz, 2004, p. 5). Literature reviews have the potential to build nursing

science, research, practice, and policy initiatives (Whittemore & Knafl, 2005).   The goal

of this integrative literature review is to gain a comprehensive understanding of the

research that has taken place regarding sleep interventions for veterans with PTSD. This

chapter will discuss the methodology used to perform this integrative literature review.

Quality of the Literature

The literature meeting inclusion criteria was evaluated for quality. An integrative

literature review should have a diverse sampling frame and should have an approach to

evaluate quality (Whittemore & Knafl, 2005). According to Whittemore & Knafl (2005),

"explicit and systematic methods for data analysis specific to the integrative review

method are needed to protect against bias and improve accuracy of conclusions" (p. 546).

The research in this literature review was systematically critiqued to identify strengths

and deficiencies. Toracco (2005) suggests identification of strengths and deficiencies are

necessary steps toward improving the knowledge base for the topic of the literature review. The literature was also assessed for conflicting evidence which could establish if there is need for further research (Whittemore & Knafl, 2005).

Data Reduction

A constant comparison method was utilized in which data were extracted from the research articles and then compiled into systematic categories (Whittemore & Knafl, 2005). In order to facilitate comparison of data, the research was categorized according to (a) study year/authors; (b) design; (c) purpose; (d) sample; (e) and interventions. The data were assembled into a large matrix which allowed for the comparison of each research study's characteristics (Whittemore & Knafl, 2005).

Identification of Patterns and Themes

The categories within the matrix were evaluated to identify patterns, themes, and relationships (Whittemore & Knafl, 2005). According to Whittemore & Knafl (2005), "the process of data visualization and comparison can provide clarity to the empirical or theoretical support emerging from early interpretive efforts" (p.551). The data from the large matrix was then compiled into individual tables. The individual tables were organized according to the similar relationships that exist within the studies.

Instrumentation

The primary instrument in this integrative literature review was the large matrix which consisted of multiple categories. The development of individual tables relating to each pattern or theme in the matrix was a second measuring device in this study. The

matrix and tables were reviewed to develop conclusions regarding emerging themes. According to Whittemore & Knafl (2005), "the conclusions should then be interpreted into a higher level of abstraction, subsuming the particulars into the general" (p. 551).

<u>Planned Data Analysis</u>

The final step in the literature review includes the process of synthesis. "Synthesizing the literature means that the review weaves the streams of research together to focus on core issues rather than merely reporting previous literature" (Toracco, 2005, p. 362). The synthesis will include a description of the outcomes of the review based on the information abstracted in the matrix (Goldman & Schmalz, 2004). According to Toracco (2005), "The synthesis of literature provides new knowledge despite the fact that the review summarizes previous research" (p. 362). The data analysis findings are presented in chapter four.

CHAPTER FOUR

PRESENTATION OF FINDINGS

<u>Overview</u>

Seven research studies met criteria for this paper and are presented in Table 6.

This chapter also includes several smaller tables that directly compare specific study

components. The categories compared in the tables include: Study design, sample size,

interventions, clinical outcome measures, length of follow-up, results, and discrepancies.

Comparing specific study components will provide information to help identify patterns,

themes, and relationships within the research articles (Whittemore & Knafl, 2005).

Table 6
Studies Reviewed

Study Authors/Year	Design	Purpose	Sample	Intervention
Calohan , Peterson, Peskind & Raskind, (2010)	Self-Report	To determine if prazosin reduces sleep disturbances	N=13 Soldiers engaged in combat operations in Northern Iraq 11 men and 2 women	Administration of nightly prazosin
Cook et al., (2010)	Randomized Controlled Trial	To test the efficacy of imagery rehearsal group therapy vs. sleep and nightmare management therapy	N=124 Vietnam War Veterans	6 sessions of IRT delivered in a group format

Table 6 Continued

Gellis & Gehrman (2011)	Pilot Study	To analyze the effectiveness of CBT-I in treating insomnia	N= 8 male veterans only	5 weekly sessions of CBT-I
Germain et al., (2012)	Randomized Controlled Trial	To compare the effects of prazosin, BSI and placebo on sleep and nightmares	N=50 U.S. military veterans	8 weekly sessions of BSI or nightly dosages of prazosin or placebo
Harb, Cook, Gehrman, Gamble & Ross (2009)	Pilot Study	To examine the efficacy of IRT combined with CBT-I	N=7 Iraq War veterans	7-8 individual sessions of combined IRT and CBT-I
Swanson, Favorite, Horin & Arnedt (2009)	Self- Report	To evaluate the effectiveness of a combined treatments in a group setting	N=10 Male combat veterans enrolled in 3 treatment groups 9 Vietnam War veterans and 1 Gulf War Veteran	Ten 90 minute group therapy sessions that included exposure, relaxation and rescripting therapy and CBT-I
Ulmer, Edinger & Calhoun, (2011)	Randomized Controlled Trial	To assess feasibility of multi-component cognitive-behavioral sleep interventions	N=22 15 male and 7 female veterans	Combination of CBT-I and IRT

Summary of Literature

Quality

The research articles included in this study were selected by reviewing specific

standards of quality. The research articles analyzed in this study were required to include

4 key terms: *(a) interventions; (b) sleep disturbances; (c) veterans; and (d) PTSD*. This was considered a quality measure so the most relevant information related to the research question was reviewed. Studies included in this paper were peer-reviewed and were required to contribute to the knowledge base of the research question. The studies were also required to include independent, balanced, and objective approaches to the research.

Study Location

Six of the seven studies took place in the United States. One study was conducted in Northern Iraq while participants were in active duty. Three of the studies conducted in the United States were performed in Philadelphia, Pennsylvania at the Veteran Affairs (VA) Medical Center.

Study Design

Due to the limited number of studies related to this research topic, three study designs are included in this paper. These study designs include: Randomized controlled trials, self-reports, and pilot studies. Three of the studies were randomized controlled trials (Ulmer, Edinger & Calhoun, 2011; Cook et al., 2010; Germain et al., 2012). Two studies were self-report (Swanson, Faorite, Horin & Arnedt, 2009; and Calohan et al., 2010). Two studies were pilot studies (Gellis & Gehrman, 2011; Harb, Cook, Gehrman, Gamble & Ross, 2009).

Table 7
Study Design

Randomized Controlled Trial	Self-Report	Pilot Study
Cook et al., (2010)	Calohan et al., (2010)	Gellis et al., (2011)

Table 7 Continued

| Germain et al., (2012) | Swanson et al., (2009) | Harb et al., (2009) |
| Ulmer et al., (2011) | | |

Sample Description

Sample sizes varied greatly within the studies. The number of participants ranged from seven to 124.

Table 8
Sample Size

N= $\leq$20	N=$\leq$50	N=$\geq$100
Calohan et al., (2010)	Germain et al., (2012)	Cook et al., (2010)
Gellis & Gehrman (2011)	Ulmer et al., (2011)	
Harb et al., (2009)		
Swanson et al., (2009)		

Calohan et al., (2010) utilized active duty soldiers in Northern Iraq. In order to be considered for the study, participants met DSM-IV criteria for a diagnosis of PTSD. They also needed to be seeking relief from distressing nightmares. There were no other inclusion or exclusion criteria. The sample included 11 men and two women.

The study performed by Swanson et al., (2009) only included male veterans. Within this sample of ten veterans, the mean age was 59. Nine veterans were Vietnam veterans and one was a Gulf War veteran. Nine of the veterans were Caucasian and one veteran was African American.

The Germain et al., (2012) study included 50 U.S. military veterans of both male and female gender, although 90% of participants were male. The mean age of participants was 49.9. The veterans included in this study were 82% Caucasian and 82% were Army veterans. The veterans were recruited via television, radio, and newspaper.

The study conducted by Harb et al., (2009) only included male veterans. The seven veterans that completed the study were Iraq war veterans with an average post deployment time period of 14 months. The participants were recruited from the Philadelphia VA Medical Center's Mental Health Clinic. The average age within this group was 37.3. The sample included five African American veterans, three Hispanic veterans, and three Caucasian veterans.

The Cook et al., (2010) study included 124 male Vietnam veterans with severe PTSD. The veterans were recruited from mental health services at the Philadelphia VA Medical Center. Veterans were required to be male and their PTSD diagnosis was required to be directly related to combat in the Vietnam War. Veterans with severe mental illnesses, such as bipolar disorder and schizophrenia, were excluded from this study. Veterans with a history of substance abuse and sleep apnea were also excluded.

The study conducted by Ulmer et al., (2011) included 22 veterans that met specific criteria for PTSD. The participants were recruited from a VA Medical Center by placing flyers throughout the hospital and community veteran centers. Letters were also sent to deployed veterans in the area. The sample included 15 males and seven women. The average age of participants was 45.9. The majority of participants were African American (73%). Veterans with a diagnosis of sleep apnea were excluded from the study.

In the study performed by Gellis & Gehrman, (2011), veterans were recruited from providers in the mental health and sleep disorder clinics at the Philadelphia Veterans Affairs Medical Center. Female veterans were excluded from the study in an attempt to control menopausal changes. Only those over age 50 were included in the

study. The mean age of participants was 58.6. Over 87% of participants were African

American and 87.5% were Vietnam veterans. Additional exclusion criteria included non-

treated sleep disorders, a diagnosis of bipolar disorder, and a history of substance abuse.

<u>Interventions</u>

There were a total of five different combinations of sleep interventions utilized in

the studies. Two studies used a combination of CBT-I and IRT (Ulmer et al., 2011; and

Harb et al., 2009). Two studies utilized a combination of group therapy and CBT/IRT

interventions (Cook et al., 2010; Swanson et al., 2009). One study (Germain et al., 2012)

used either a behavioral intervention or prazosin to compare their effectiveness. The

Calohan et al. (2010) study utilized prazosin alone as a sleep intervention. The study

conducted by Gellis & Gehrman (2011) used CBT-I independently as an intervention.

The Calohon et al. (2010) study utilized prazosin as an intervention for PTSD

related insomnia. In this study, prazosin was prescribed to soldiers deployed to Northern

Iraq that were seeking relief from ongoing trauma nightmares. Prazosin was administered

nightly with the initial dosage being 1 mg one hour before going to bed for two nights.

The dose increased to 2 mg for a total of four nights, and then increased by 2 mg every

four nights to a maximum dose of 10 mg. Clinical observations were recorded by an

active duty army psychiatric nurse practitioner.

The study by Swanson et al., (2009) used a combined treatment program for

insomnia and nightmares which include ten 90-minute sessions of CBT incorporating

exposure and relaxation therapies. The intervention also involved nightmare rescripting

in which participants wrote and read aloud a detailed description of their worst

nightmare. Participants then rewrote the nightmare to address the core theme and were instructed to listen to the recording every night while visualizing the nightmare. The final two sessions focused on relapse prevention. The participants maintained a daily sleep and dream diary throughout this study; which included information such as sleep latency, time in bed, and time spent awake after sleep onset. Participants in this study also completed a self-report measure of sleep quality and PTSD symptoms before and after treatment.

The study by Germain et al., (2011) compared sleep targeted CBT to prazosin and a placebo. The specific CBT in this study is referred to as behavioral sleep intervention (BSI). For the BSI intervention, a master's level licensed therapist provided the treatment. Veterans receiving the medication were randomized to either the placebo or the prazosin. Those randomized to the prazosin were given four capsules per night 30 minutes before bed. The prazosin was increased from 1 mg to 15 mg over the eight-week period. The participants were instructed to provide a diary of all of their distressing dreams.

The study by Harb et al., (2009) included a combination of IRT and CBT for insomnia. The treatment was conducted over seven to eight individual sessions. Therapists conducting treatment were doctoral level clinicians as well as a board certified APRN. In this intervention, the participants examined content of recurrent nightmares, utilized imagery to control dream outcomes, and rehearsed new dreams. The interventions also included psychoeducation promoting good sleep practices. Participants worked on identifying problem areas of sleep and discussed different sleep solutions.

Progressive muscle relaxation was also utilized as an intervention to reduce sleep-related anxiety.

The research by Cook et al., (2010) included six sessions of imagery rehearsal therapy in a group format. Treatment was conducted by a doctoral level psychologist and a psychiatric clinical nurse specialist. The study consisted of 124 veterans randomized to either an imagery rehearsal group or a sleep and nightmare management group. Group sessions occurred weekly for six weeks. The sleep and nightmare management group included psychodeducation about PTSD and sleep disturbances. Some basic CBT techniques incorporated into the treatment. No nightmare content was discussed in the sleep and nightmare education group. In this IRT intervention group, the veteran chose a specific nightmare related to combat and altered the script by utilizing imagery. The new script was mentally rehearsed daily.

In the research study by Ulmer et al. (2011), a multi-component treatment combining CBT and IRT was utilized. The interventions were combined against a comparison group of veterans. The study included three sessions of CBT specifically treating insomnia which focused on sleep hygiene and changing dysfunctional beliefs. The research also included three sessions of IRT in which participants were educated on visual imagery and nightmare rescripting. The CBT and IRT treatments were conducted by a licensed clinical psychologist that was randomized out of 13 other individuals with the same credentials.

The Gellis & Gehrman (2011) study analyzed the effectiveness CBT-I in veterans with PTSD. The utilization of CBT-I included interventions to promote relaxation at

night and provided education to change dysfunctional sleep patterns. The treatment in

this study included five weekly CBT sessions. In these sessions, treatment was provided

by a post-doctoral fellow and a psychology licensure candidate. The participants

completed an assessment after one week of treatment that included both subjective and

objective reports in a sleep diary. Participants also wore an Actiwatch on their wrist to

record body movements to estimate sleep and rest.

Table 9
Interventions

Combination of CBT and IRT	Combination of Group Therapy and IRT/CBT	Either Behavioral Intervention or Prazosin	Prazosin only	CBT only
Harb et al., (2009)	Cook et al., (2010)	Germain et al., (2012)	Calohan et al., (2010)	Gellis & Gehrman, (2011)
Ulmer et al., (2011)	Swanson et al., (2009)			

Clinical Outcome Measures

The studies primarily utilized subjective rating tools as clinical outcome

measures. Calohon et al., (2010); Harb et al., (2009); and Cook et al., (2010) used the

Clinician-Administered PTSD Scale (Blake et al., 1995) as a method of measuring the

severity of PTSD symptoms both before and after treatment. The Pittsburgh Sleep

Quality Index (Buysse et al., 1989) was a widely used method of measuring both patterns

and quality of sleep. Germain et al., (2012); Harb et al., (2009); Cook et al., (2010);

Swanson et al., (2009); Ulmer et al., (2011); and Gellis & Gehrman (2011) all used the

the Pittsburgh Sleep Quality Index (PSQI) as a subjective measuring tool. The Insomnia

Severity Index (Bastien, Vallieres & Morin, 2001) was used by Ulmer et al., (2011);

Gellis et al., (2012); Swanson et al., (2009); and Germain et al., (2012) to assess

treatment outcomes and determine clinical significance of findings. Another common

tool for assessing the effectiveness of sleep interventions was the sleep/dream diary.

Ulmer et al., (2011); Cook et al., (2010); Harb et al., (2009); Gellis & Gehrman., (2012)

incorporated this tool into their studies.

Gellis & Gehrman., (2012) and Germain et al., (2012) were the only studies to

utilize objective sleep tools as clinical outcome measures. Gellis & Gehrman., (2012)

used the Actiwatch as a tool to record body movements while it was worn on the

participant's wrists. The Actiwatch can estimate the time asleep and the time at rest.

Germain et al., 2012 utilized polysomnographic studies as a method of comparing restful

sleep pre-and post- intervention.

Table 10

Clinical Outcome Measures

Study Authors/Year	Clinical Outcome Measures
Calohan et al., (2010)	CAPS quantified with item B2 "recurrent distressing dreams" and D1 "difficulty falling or staying asleep" Clinical Global Impression of Change was used to evaluate rate of change
Cook et al., (2010)	CAPS to measure frequency and intensity of PTSD symptoms Nightmare Frequency Questionnaire (NFQ) Pittsburgh Sleep Quality Index (PSQI) Nightly sleep and nightmare diaries Secondary outcome measures included CAPS total score, Nightmare Effects Survey, Pittsburgh Sleep Quality Index Addendum for PTSD, PTSD Checklist-Military, Beck Depression Inventory, and the 36-Item Short Form Health Survey
Gellis & Gehrman., (2011)	One week assessment of objective sleep (actigraphy) Participants wore an Actiwatch on wrist to record body

Table 10 Continued

	movements (estimates sleep and rest)
	Subjective sleep assessments including sleep diaries and the Insomnia Severity Index (ISI) before and after treatment
Germain et al., (2012)	Self-reports of insomnia severity, sleep quality, and sleep disturbances
	ISI, PSQI, and Pittsburgh Sleep Diary (PghSD) as primary outcome measures
	Sleep diaries and polysomnographic studies pre and post intervention
Harb et al., (2009)	Primary Outcome measures were Nightmare Frequency Questionnaire (NFQ) and PSQI
	PTSD Checklist-Military (PCL-M) as a continuous severity measure
	Daily sleep and nightmare diaries
	CAPS to reassess PTSD severity 1 month post treatment
Swanson et al.,(2009)	Self-reported outcomes measured at baseline and post-intervention.
	ISI, PSQI, and Post Traumatic Diagnostic Scale
Ulmer et al., (2011)	ISI to assess treatment outcomes and to determine clinical significance of findings, PSQI
	Electronic sleep diaries to record multiple days of subjective sleep information (total sleep time, sleep onset latency, wake after sleep onset, sleep efficacy, and nightmare frequency)
	PTSD Checklist-Military Version to assess treatment outcomes and to determine clinical significance of findings
	Patient Health Questionnaire (PHQ-2) to assess frequency of depressed mood

Length of Follow-Up

Several studies did not include a follow up after initial treatment results were

evaluated. Calohan et al., (2010); Swanson et al., (2009); Ulmer et al., (2011); and Gellis

& Gehrman., (2011) only conducted an evaluation immediately following the

intervention. Harb et al., (2009); and Cook et al., (2010) completed follow-up evaluations

one month post treatment. Germain et al., (2012) completed follow up assessments four

months post treatment. Cook et al., (2010) completed follow-up evaluations one month,

three months, and six months after treatment to gain an ongoing measurement of

treatment response. Cook et al., (2010) did include a follow-up evaluation one month

after treatment, but did not include an evaluation immediately following the intervention.

Table 11
Length of Follow Up

No Follow Up	1 Month	3 Months	4 Months	6 Months
Calohan et al., (2010)	Cook et al., (2010)	Cook et al., (2010)	Germain et al., (2012)	Cook et al., (2010)
Gellis & Gehrman., (2011)	Harb et al., (2009)			
Swanson et al., (2009)				
Ulmer et al., (2011)				

Results

Calohan and colleagues (2010) found a single-dose of prazosin resulted in

significant decrease in nightmares and other sleep disturbances. Germain et al. (2012)

utilized a combination of prazosin and IRT as interventions in their study. They

concluded the combination of both treatments showed a reduction in insomnia severity as

well as a reduction in daytime PTSD symptoms. Cook et al., (2010) utilized the single

intervention of IRT and compared its effectiveness to a more traditional sleep

intervention called sleep and nightmare management. The study did not show a

difference in effectiveness between the two interventions. Gellis & Gehrman (2012)

utilized the single intervention of CBT in the study which showed mixed results. There

were improvement in subjective measures of sleep such as total sleep time, sleep onset,

and sleep efficacy. Actigraphy, an objective measure, revealed that overall sleep, nightmares, and PTSD symptoms were unchanged.

Harb et al., (2009); Ulmer et al., (2011); and Swanson et al., (2009) utilized a combination of both IRT and CBT, but the results in the study by Swanson et al., (2009) differed significantly from those of Harb et al., (2009) and Ulmer et al., (2011). The study conducted by Harb et al., (2009) showed that the combination of both IRT and CBT reduced non-sleep related PTSD symptoms and increased overall sleep by an average of 37 minutes at night. The study concluded that the combination of these interventions did not change the frequency of nightmares. Ulmer et al., (2011) also concluded that the combination of IRT and CBT had significant impact in improving overall sleep and decreasing PTSD symptoms. The study determined that the combination treatments did not have significant impact on nightmare frequency and severity. In contrast, Swanson et al. (2009) concluded that the combination of IRT and CBT did not improve overall sleep or PTSD symptoms, but did have a significant impact on decreasing nightmares.

Table 12
Results

Study Authors/Year	Results
Calohan, Peterson, Reskind& Raskind, (2010)	Medication was effective and well tolerated Substantial reductions in sleep disturbances and nightmares Mean global change score was 1.9 (slightly better than moderately improved)
Cook et al., (2010)	Not a significant difference in improvement between IRT and sleep and nightmare management conditions Very few patients in either group had meaningful long term improvement

Table 12 Continued

Gellis & Gehrman., (2011)	Paired t tests revealed significant improvement in subjective sleep (total sleep time, onset, efficiency) Objective sleep measure (actigraphy) revealed that overall sleep was unchanged, nightmares were unchanged, and PTSD severity was unchanged
Germain et al., (2012)	Both prazosin and imagery groups showed greater reduction in insomnia severity and daytime PTSD symptoms Sleep improvements in 61.9% participants in active treatment groups; and 2% improvement in placebo group
Harb et al., (2009)	Moderate change in both self-reported and clinician rated PTSD symptoms Self-report showed sleep increased by 37 minutes No change in frequency of nightmares Concluded that the combination of IRT and CBT-I is feasible and promising for Iraq War veterans
Swanson et al., (2009)	Average of over 50% reduction in nightmares per week 46% reduction in total nightmare distress per week 86% adherence to relaxation 74% to imagery practice Non-significant reductions in PTSD symptoms
Ulmer et al., (2011)	Suggests that combined intervention is promising for improving sleep and decreasing PTSD Intent to Treat analysis showed medium to large treatment effect sizes for all sleep diary outcomes Very large treatment effects for insomnia severity, sleep quality, and PTSD symptoms Did not improve depression Remission rates were lower than expected for insomnia and sleep quality

Discrepancies

 Several discrepancies exist within the studies. There was no controlled condition

used in studies conducted by Calohon et al., (2010); Harb et al., (2009); Ulmer et al.,

(2011); or Gellis & Gehrman., (2011). Sample size was another common discrepancy

within the studies. Calohon et al., (2010) had only 13 participants, while Swanson et al.,

(2009) included ten participants. Harb et al., (2009) included seven participants; Gellis &

Gehrman., (2011) had eight participants; and Ulmer et al., (2011) included 22

participants. There was no follow up evaluation in several studies which made it difficult

to measure the success of the interventions on an ongoing basis. Calohan et al., (2010);

Swanson et al., (2009); Harb et al., (2009); and Ulmer et al., (2011) did not have a

follow-up evaluation post treatment. A summary of the discrepancies within the studies

are summarized in the table below.

Table 13
Discrepancies

Study Authors/Year	Discrepancies
Calohan et al., (2010)	No placebo condition Small sample size Treatment and evaluation both performed by same APRN No follow up evaluation
Cook et al., (2010)	No immediate assessment after intervention (only at 1 month) Only 2 therapists conducted both treatments No formal checks on reliability of administration of CAPS
Germain et al., (2012)	Lack of diverse population (majority of participants were Caucasian men)
Gellis & Gehrman., (2011)	Uncontrolled Female veterans excluded Lack of diverse population (7 out of 8 participants were African American)
Harb et al., (2009)	Small sample size Non-randomized No follow up assessment No comparison condition
Swanson et al., (2009)	No follow up assessments Uncontrolled design Small Sample Size

Table 13 Continued

	Lack of diverse sample (primarily Vietnam veterans and Caucasian)
Ulmer et al., (2011)	Small sample size No active control condition No follow up data Excluded veterans diagnosed with Obstructive Sleep Apnea (OSA)

Themes

 After reviewing the results of the seven studies, several themes emerged or were

identified. The types of interventions used in the studies were a common theme as they

all included either the utilization of prazosin, CBT, or IRT. It appears that there are a

limited number of interventions that exist in the treatment of sleep in veterans with

PTSD. The studies all had difficulty finding participants and there was a high participant

dropout rate due to the heavy time commitment. The studies included a large amount of

exclusion criteria, which may have made it difficult to maintain a large sample size.

Theoretical Framework

 None of the studies included in this paper discuss a theoretical framework, but

they relate to Sister Callista Roy's Theory of Adaptation. The studies provide examples

of how different interventions can be utilized in the field of nursing to improve veteran's

ability to adapt to their environment. The interventions promote adaptation by providing

education, tools, and techniques which veterans can incorporate into their lives to

improve sleep.

Gaps in Literature

After a review of research studies, several gaps in literature were apparent. There are numerous articles written regarding PTSD, but few that actually addressed sleep related issues in the veteran population. Several of the articles stated that it has been difficult to find effective treatments for the veteran population and there has not been significant research regarding this subject.

The research that was available in the literature had limited numbers of participants and often did not include control groups. The studies analyzing treatment effectiveness were often vague and relied solely on the participant's verbalized experience regarding the improvement of symptoms after treatment.

There were only two articles found in this review process that were obtained from a nursing journal and were authored by a nurse, but these were not research studies. The research studies included in this paper were written by non-nursing disciplines, therefore it can be concluded, that there is a significant gap in nursing literature related to this topic.

Conclusions

In conducting this integrative literature review, the goal was to determine effective interventions used to treat insomnia in veterans with PTSD. The literature search revealed only seven articles that met specific inclusion criteria. Only three of the seven articles were randomized controlled trials. Sample sizes ranged from seven

participants to 124 participants. The veterans included in the studies were Iraq War Veterans, Gulf War Veterans, and Vietnam War Veterans.

When performing this literature review, it became evident that there are few interventions available to treat sleep in veterans with PTSD. The seven articles reviewed utilize prazosin, IRT, or CBT as interventions. There did not appear to be a single intervention that was most effective in treating sleep issues in veterans with PTSD. All of the studies showed that some aspect of sleep was improved when the interventions were utilized. The research conducted by Harb et al., (2009); Ulmer et al., (2011); and Swanson et al., (2011) utilized a combination of IRT and CBT. Germain et al. (2012) utilized a combined intervention of prazosin and IRT.

There is conflicting evidence within some of the studies. For example, the study by Ulmer et al., (2011) showed that the combination of IRT and CBT improved overall sleep and decreased PTSD symptoms, but did not decrease nightmare frequency and severity. While the study conducted by Swanson et al. (2009) did not find that the combination of IRT and CBT improved sleep or PTSD symptoms, but did decrease nightmares. There were no studies available in this search that utilized a combination of all three interventions; prazosin, IRT, and CBT. The implementation of all three interventions in a study may be a useful in future studies to improve success rates.

CHAPTER FIVE

DISCUSSION AND SUMMARY

Discussion

The purpose of this integrative literature review was to determine the most

effective sleep interventions for veterans with PTSD by reviewing research articles. After

reviewing the seven research articles that met inclusion criteria, it became evident that the

medication prazosin and the psychotherapeutic interventions of CBT and IRT have all

shown to be beneficial in the treatment of sleep difficulties in veterans with PTSD.

Research does not indicate that one of these interventions is superior in the treatment of

sleep disturbances in veterans with PTSD. There is a limited amount of research that

discusses the effectiveness of other sleep interventions for this population.

The combination interventions of IRT and CBT as discussed in Harb et al.,

(2009); Ulmer et al., (2011); and Swanson et al., (2011) showed promising results. This

literature search revealed that there were some conflicting results between Ulmer et al.,

(2011) and Swanson et al., (2009). Ulmer et al., (2011) concluded that the combination of

IRT and CBT improved sleep and PTSD symptoms, but did not reduce nightmares. In

contrast, Swanson et al., (2009) concluded that IRT and CBT did not improve sleep or

PTSD symptoms, but did decrease nightmares. The combination approach of IRT and

prazosin showed positive results as discussed in Germain et al., (2012).

Strengths

There were several strengths that existed within the articles analyzed in this integrative literature review. For example, three of articles were randomized controlled studies (Germain et al., (2012); Cook et al., (2010); and Ulmer et al., (2011) which are considered the gold-standard for research. Two of the studies utilized a larger sample size, which is a strength because recruiting veterans proved to be a challenge in all of the studies. The Cook et al., (2010) study included 124 participants, and the study by Germain et al., (2012) included 50 participants.

Germain et al., (2012) and Gellis & Gehrman (2011) used both subjective and objective tools as outcome measures. Polysomnography studies were utilized by Germain et al., (2012) to monitor for changes in sleep. Gellis & Gehrman (2011) used actigraphy to record sleep improvements after the intervention.

Limitations

One limitation in this study is that the research articles were collected only from databases available through the Montana State University library. The Montana State University library system has several different databases available, but may not be comprehensive of all articles published on this topic.

A second limitation to this research is that the journal articles reviewed were restricted to the time frame between 2009 and 2013. The research articles reviewed were required to be peer-reviewed and written in the English language. These specific limitations were included to ensure: 1) that the most current research was utilized; 2) to maintain a reasonable number of articles for review; and 3) to allow this author to

thoroughly read and understand the literature as this author is fluent in the English language.

There is limited research available on this subject; therefore, it was necessary to include study designs that were not randomized controlled trials. Two of the articles reviewed were pilot studies and two of the articles were self-report studies. The lack of consistency in study design made it difficult to compare the studies and make conclusions regarding the effectiveness of the interventions utilized. The small sample size in several of the studies made it challenging to generalize the results to a larger population. Finally, four of the seven studies did not include a follow-up assessment. This made it impossible to determine if the interventions have long-term effectiveness.

Implications for Clinical Practice

This integrative literature review revealed that CBT, IRT, and prazosin have all shown some effectiveness in treating sleep issues in veterans with PTSD. It also revealed that the extent in which these interventions are effective varies from study to study. Nayback (2009) describes the direct role that nurses can have in treating veterans with PTSD. In clinical practice, the role of the nurse can include providing education to veterans regarding the signs and symptoms of PTSD and communicating interventions for sleep (Nayback, 2009). The possibility of utilizing CBT, IRT, and prazosin as effective sleep interventions can be incorporated into this education.

Advance Practice Registered Nurses and other clinicians should have contact information available and make referrals to local resources that offer CBT or IRT for veterans with PTSD. Clinicians with prescribing authority should also consider the

utilization of the medication prazosin for veterans that are experiencing nightmares.

Pharmacotherapy is the most frequently used treatment modality for veterans with PTSD

related nightmares (Germain, 2012). Clinicians should be familiar with prescribing

protocols for prazosin. Research has concluded that effective doses range from 4 mg to

10 mg of prazosin nightly (Germain, 2012). It is also important that clinicians educate

their patients that tolerance and dependence are not side effects associated with prazosin

(Germain, 2012).

The interventions of CBT, IRT, and prazosin can be utilized in practice to help

veterans improve the adaptive functions that are described by Roy & Andrews (1999).

These interventions can be incorporated into practice to assist veterans strengthen their

ability to adapt to their environment by changing ineffective behavior (Phillips, 2010).

Veterans should be informed that data varies regarding the effectiveness of each

intervention, but this research has resulted in the conclusion that all three interventions

can have promising results.

Implications for Research

Even though there is limited research regarding the treatment of sleep

disturbances in veterans with PTSD, this integrative literature review revealed valuable

information about successful interventions. In future studies, it may be beneficial to

perform research within specific populations of veterans such as females only. Studies

could also be conducted based upon veteran types such as those that served in the

Vietnam War, the Gulf War, or the Iraq War. This may help identify themes based upon

specific population types. This knowledge can also be expanded with larger research studies that are better controlled.

This literature review indicates that there is limited research involving nursing and the treatment of sleep issues in veteran's with PTSD. Nayback (2009) explains that future nursing research can utilize Roy's model as a guiding framework to better understand the effects of coping during combat and the impact of training soldiers in a more active approach-based coping style. Nayback (2009) also suggests that interventional research should be conducted to help improve risk factors for PTSD.

This literature search did not include any research articles that studied the effectiveness of a combination of CBT, IRT, and prazosin. It may be useful for future research to examine the effectiveness of the combination of all three interventions. This multidimensional approach may help to further reduce sleep issues in veterans with PTSD.

Summary

This integrative literature review has resulted in an increased awareness that there is limited research involving sleep interventions for veterans with PTSD. It has also increased knowledge of the interventions that have been shown to improve various aspects of sleep in veterans with PTSD. The nursing profession can utilize Roy's framework to influence the veteran's adaptation by implementing these specific interventions to promote the veteran's ability to cope with ineffective sleeping patterns. Both nurses and clinicians can promote the human adaptive process by educating

veterans on these interventions and by referring veterans to local resources that provide CBT and IRT to veterans. Clinicians can also utilize the medication prazosin as a treatment intervention to reduce PTSD associated nightmares.

This integrative literature review did not result in finding a sleep intervention that is most effective for veterans with PTSD. This review did find literature suggesting that CBT, IRT, and prazosin have all shown varying degrees of effectiveness in the treatment of sleep in veterans with PTSD. Some of the research also suggests that a combination of CBT and IRT and a combination of prazosin and IRT may further improve results. This review of literature also suggests that it may be beneficial for future research to focus on a combined approach utilizing all three interventions.

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