Psychology and Behavioral Science
International Journal
ISSN 2474-7688

Juniper Publishers
key to the Researchers

Mini Review
Volume 22 Issue 5 - January 2025
DOI: 10.19080/PBSIJ.2025.22.556096

Psychol Behav Sci Int J

Effectiveness of Anxiety Reduction in Adults by Weighted Blanket Interventions: A Mini Review

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Submission: December 18, 2024; **Published:** January 08, 2025

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Abstract

Recent approaches in anxiety treatment combine pharmaceutical or psychological methods with sensory integration modalities to improve emotional regulation. Deep pressure stimulation (DPS) applied by weighted blankets has been shown to improve sleep in people with sleeping disorders, suggesting a similar effect may be achieved in anxiety reduction. This short review examines the effectiveness of weighted blankets in reducing anxiety on mentally healthy adults and on those diagnosed with mental disorders. The studies reviewed here indicate that weighted blanket use, whether a single time or repeated, significantly reduces anxiety without incurring any adverse effects. The weighted blanket intervention was found to be most effective in individuals with higher baseline anxiety levels. While promising, gaps remain regarding the optimal intervention duration, and long-term effects. In conclusion, weighted blankets show promise as a safe, non-invasive tool for anxiety reduction in mentally healthy individuals and in those with mental disorders, warranting further standardized research.

Keywords: Anxiety; Deep Pressure Stimulation; Weighted Blanket

Abbreviations: AME: Alprazolam milligram equivalents; DPS: Deep pressure stimulation; MME: Morphine milligram equivalents; MNAS: Mini Nutritional Assessment; PROMIS: Patient-Reported Outcomes Measurement Information System for anxiety and depression; QOL: Quality of Life; RAID: Rating Anxiety in Dementia Scale; STAI: State-Trait Anxiety Inventory; SUDS: Subjective Units of Distress Scale; VAS: Visual Analog Scale

Introduction

Anxiety is one of the most common mental states and disorders. The Centers for Disease Control and Prevention data show that symptoms of anxiety disorder affected 8.1% of adults 18 years or older in the US in 2019 [1]. Analyses estimate that more than 30% of the US population are affected by an anxiety disorder over their lifetime [2,3]. Globally, 45.82 million people were newly diagnosed with anxiety disorders in 2019, and the prevalence was estimated at more than 300 million [4]. Aspects of anxiety disorders include worry, panic attacks, social and performance fears, anticipatory anxiety, and avoidance behaviors (see for example [5,6]). Often, they are manifested in physical symptoms such as dizziness, palpitations, or shortness of breath, [6]. These mental and physical symptoms can substantially affect the quality of life and functioning of people with anxiety disorders [7,8]. Both pharmacotherapy and psychotherapy, especially cognitive behavioral therapy, are used as first-line treatments for anxiety disorders [7,8]. Sensory integration modalities are used to improve emotional and physical regulation, have been applied as complementary therapy to people with mental disorders (see for example [9]). One form of sensory modality is deep pressure stimulation-DPS (see for example [10]). Studies suggest that DPS activates pressure receptors underneath the skin so that cortisol level decreases, while vagal tone increases [11]. This leads to an increase in parasympathetic arousal of the autonomic nervous system while reducing sympathetic arousal, providing a calming effect [11]. However, some DPS methods such as massage therapy require administration by a provider, thereby limiting frequency and availability. Moreover, some mental health patients may prefer to avoid touch by others (see for example [12-14]. Weighted blankets offer an alternative noninvasive, self-applied form of DPS that is available to the patient when needed without direct interaction with a provider [15]. To date, weighted blankets were shown to improve sleep quality in people with insomnia and daytime fatigue, older people living in nursing homes, and children with sleep disorders associated with, for example, Attention Deficit/Hyperactivity Disorders [16-18].

Sleep studies suggest that the use of weighted blankets at night may improve daytime anxiety in people suffering from sleep disorders [18]. Ekholm, et al [19] found a statistically significant decrease in anxiety, when compared to controls, in adult psychiatric inpatients suffering from insomnia. However, these studies focused on people with sleep disorders where the main effect of the blankets was to improve sleep quality. Therefore, it is not clear if weighted blanket DPS interventions can directly affect anxiety independently of sleep improvement. An earlier review by Eron, et al. [15] from 2020 concluded that the use of weighted blankets as a therapeutic tool may reduce or relieve anxiety. However, only five papers related to the topic were available at the time: One of these had inconclusive results based on a sample of 3 pediatric participants [20]; Three studied the effects on healthy subjects [21-23], and one [24] examined the effect on individuals with mental health issues. The reviewers noted several limitations of these studies (e.g. small sample sizes), as well as diversity in methodology, study populations, and small sample sizes reduce the ability to draw definitive conclusions [15]. Therefore, despite some promising results, the efficacy of weighted blanket DPS in addressing anxiety remains unclear.

The goal of this review is to review the efficacy of weighted blanket intervention in anxiety reduction. We focus on recent papers that were published after the review Eron, et al [15], namely 2019-2024. To clearly decouple the link between sleep and anxiety, we exclude papers where the main diagnosis of the participants was sleep disorders.

This paper follows the method developed by Whittemore and Knafl [25] for integrated, systematic reviews. We also apply additional components taken from PRISMA 2020 [26]. The process includes identification and framing of the problem, literature search, data extraction, evaluation and analysis, and finally synthesis and presentation of the results. The databases searched for articles published between 1980 and 2024 include APA PsycNet, ISI Web of Science, PubMed and Scopus. The search and subsequent elimination yielded 9 relevant papers. They are listed in Table 1, with details regarding the participant population, main diagnosis, and some of the intervention measures. For clarity, we divided the studies into two categories: Those conducted on mentally healthy participants, and those whose population was diagnosed with a mental health disorder. Within each category, we distinguished between single-time interventions (namely, where the weighted blanket was applied once and data collected immediately post-intervention) and studies where the blankets were used multiple times and data collected at the end of the study period.

Weighted Blanket Effect on Anxiety in Mentally Healthy People

Four papers examined the effect of weighted blanket use on anxiety in participants without diagnosing mental health issues that were experiencing pain or facing a medical procedure. Two papers studied the effect of weighted blanket use on anxiety in people before a medical procedure. Vinson, et al [34] examined the effect of weighted blanket DPS on anxiety levels in cancer patients receiving chemotherapy infusion in an outpatient facility. Payne, et al. [32] studied the effects of weighted blanket use on pre-operative anxiety in adults undergoing elective surgery requiring general anesthesia. Procedures in the two studies differed: Vinson, et al. [34] used a crossover design where some patients received a weighted blanket intervention during their first chemotherapy session and no intervention in the 2nd one, while the others received the intervention only during their 2nd infusion. Payne, et al. [32] compared an intervention group to a control group. Both studies asked participants receiving the intervention to use it for at least 15min and evaluated anxiety using Visual Analog Scale-Anxiety (VAS-A). However, Vinson, et al. [34] also collected data using the Adults Form Anxiety and Depression (STAI-AD), while Payne, et al. [32] performed an evaluation by a researcher. Both studies found that weighted blanket intervention reduced anxiety, in a statistically significant manner, when compared to the no-intervention/control group. Anxiety levels decreased more with weighted blanket use over the first 30min of chemotherapy infusion and at discharge, when compared to the no-blanket sessions [34]. Similarly, a 15min blanket use in participants awaiting surgery decreased anxiety scores more when compared to the control no-intervention group [32].

Interestingly, both studies show that the magnitude of the blanket effect on anxiety depended on the baseline anxiety of the participant. Vinson, et al. [34] found that the decrease in VAS-A in participants after 30min weighted blanket intervention during the 1st infusion was more pronounced than in those receiving the blanket during their 2nd infusion (13.03 compared to 11.08). This difference was much more striking when comparing the decrease in anxiety between admission and discharge (23.09 decrease for 1st infusion vs. 13.79 in the 2nd) [34]. Although the paper does not provide the baseline anxiety level for each session, previous studies have shown that the anticipatory anxiety in cancer patients receiving chemotherapy is much higher before the 1st infusion than before the 2nd infusion [36]. Therefore, the Vinson, et al. [34] data suggests that as the initial (pre-infusion) anxiety level decreases, so does the effect of the weighted blanket. Similarly, Payne, et al. [32] found the reduction in anxiety levels due to the use of a weighted blanket pre-anesthesia increased with the admission level anxiety. Numerous studies have shown that pain levels are moderated by anxiety (see for example [37-39]). Therefore, it is of interest to determine if weighted blankets can reduce anxiety in people experiencing pain, and- if so- whether the reduced anxiety reflects on pain levels. Two papers studied the effect of weighted blanket DPS on anxiety and pain, one in patients with chronic pain [27] and one on patients hospitalized in acute trauma units [35]. In contrast to the Vinson, et al. [34] and the Payne, et al. [32] studies where the blanket intervention was a one-time occurrence, these studies asked participants to use the weighted blankets regularly over a period of five [35] to seven [27] days.

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Table 1: Papers reviewed.

Paper	Intervention Group				Control Group				Intervention Procedure		
	Size	Avg. Age ±s.d	M/F	Primary diagnosis (most participants)	Size	Avg. Age ±s.d	M/F	Primary diagnosis	Blanket Weight	Duration/ frequency	Measures
Baumgartner [27]	48	43.8±12.8**	20%/80% #	Chronic pain	47	43.8±12.8**	20%/80% #	Chronic pain	15 lbs; (5 lbs for control)	7 nights	PROMIS [b]; The UCLA Loneliness Scale
Becklund [28]	61	39.8±14.7	20/41	Bipolar; depression	61	39.5±13.9	23/38	Bipolar; depression	5, 14, 20 lbs	20min/ single	STAI [a]
Dickson [29]	4	30.5±7.3	1-Mar	Depression*	5	44.4±15.4	1-Apr	Depression*	15 lbs	15 min/ single	PROMIS [b]; Brøset Violence Checklist
	6	30.2±6.9	2-Apr	Depression*					15 lbs	30 min/ single	
Harris [30]	20 $	77.7 ±10.2	13/7	Dementia					10lbs /12 lbs &	At least 20min per day/4 weeks	RAID [c]
Ohene [31]	11	23±5.7	10-Jan	Anorexia Nervosa; Avoidant-Restrictive Food Intake Disorder	12	30±12.9	11-Jan	Anorexia Nervosa; Avoidant Restrictive Food Intake Disorder	1 lb ± 10% of patientadmission weight	At least 5min/as needed over hospitalization period (~20days)	Beck Anxiety Inventory; SUDS [d]
Payne [32]	74	51.93 ±17.4	25/49	Elective surgery requiringgeneral anesthesia	74	49.85 ±15.58	25/49	Elective surgery requiring-general anesthesia	8.5 lbs	At least 15min/ single use (pre anesthesia)	VAS-A [e]
Telhede [33]	68 $	88	16/52	Dementia					10% of body weight	28 nights	QOL-AD [f]; MNAS [g]; Medication use $$
Vinson [34]	58##	63.2±10.8	20/38	Cancer (receiving chemotherapy)					Not specified	15 min or more/ single	STAI-AD [a]; VAS-A [e]
Warner [35]	12	42±16	2-Oct	Trauma (acute pain)	12	42±18	2-Oct	Trauma (acute pain)	25lbs	As needed/5 days	MME [h]; AME [i]; self-reported anxiety and pain questionnaires

*-Diagnosis information was provided for the three test groups combined

**-Average of all participants - intervention and control groups.

#-75F (80%) of all participants - intervention and control.

##-Crossover design; some patients used blankets during their first infusion and none during the second, others the opposite. The session with no blanket intervention was used as a control.

$-Pre/post design: Used baseline (pre-intervention) as control.

@-10 lbs for participants <120lbs; 12lbs for >120lbs.

$$-More measures than those listed were used. However, those did not assess measures related to anxiety.

a-State-Trait Anxiety Inventory for Adults Form Y-1.

b-Patient-Reported Outcomes Measurement Information System for anxiety and depression.

c-Rating Anxiety in Dementia Scale.

d-Subjective Units of Distress Scale.

e-Visual Analog Scale- Anxiety.

f-Quality of Life-Alzheimer's Disease.

g-Mini Nutritional Assessment (Short Form).

h-Morphine milligram equivalents.

i-Alprazolam milligram equivalents.

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Baumgartner, et al. [27] found that lower anxiety predicted lower pain scores. In participants reporting low social connectedness and high anxiety at baseline, the blanket intervention significantly reduced pain levels when compared to the control group [27]. The authors did not provide explicit data regarding changes in anxiety levels. However, the link found between pain and anxiety suggests that the reduction in pain levels in the low social connection intervention group is linked to a reduction in anxiety [27]. Warner, et al. [35] examining the effect of weighted blanket DPS on pain and anxiety in hospitalized acute trauma patients. They found that at the end of the study period participants in the intervention group reported much lower levels of anxiety when compared to the control group. The intervention was also found to significantly affect pain levels as determined by use of morphine milligram equivalents (MME): In the first day of the intervention, MME use was statistically similar between the intervention and control groups. However, by the end of the study period (5 days) 78% of patients reported less pain while using the blanket, and MME use in the intervention group decreased on average by 22.9, when compared to the control group's increase of 6.2 ($p< 0.05$) [35]. As in the Vinson, et al [34] and the Payne, et al [32] studies, Baumgartner, et al. [27] found that the impact of the weighted blanket intervention was greater in participants with initial high anxiety levels, while the results for participants with high social connectivity and low anxiety levels at baseline were largely unaffected by the intervention [27].

Weighted blanket effect on anxiety in people with diagnosed mental disorders

A number of studies examined the effect of weighted blanket intervention on anxiety levels in people diagnosed with a range of mental disorders. Some were conducted in facilities, while others at home. Interventions ranged from a single use to weeks-long application. Two studies examined the effects of weighted blanket DPS on elderly people suffering from dementia over an intervention period of 4 weeks [30,33]. Harris and Titler studied dementia patients cared for at home [30], while Telhede, et al. [33] examined the effect of weighted blanket DPS on elderly people with dementia living in nursing homes.

Harris and Titler evaluated anxiety levels using the Rating Anxiety in Dementia Scale (RAID). 100% of caregivers and 50% of the participants completed the pre/post evaluation. Caregivers evaluated a noticeable, though not statistically significant, decrease in the anxiety levels with the blanket intervention. In contrast, participants assessed their initial anxiety levels as much lower than those given by their caregivers, and did not report any change after the blanket intervention [30]. The majority of the participants in the Telhede, et al. [33] study was diagnosed with moderate or severe dementia; they also had some sleep problems, but at a level below the threshold for sleep disorders. Researchers did not measure anxiety directly. However, measures related to anxiety including psychological score, mental stress and the use of medications in the psychoanaleptic group showed a statistically significant decrease post-intervention [33]. Weighted blanket use over a period of order three or four weeks was also examined in patients with Anorexia Nervosa and Avoidant-Restrictive Food Intake Disorder, admitted to a small inpatient unit [31]. Both the intervention group and the control group showed a significant decrease in anxiety levels between admission and discharge (of order 20-24 days), as measured using the Beck Anxiety Inventory (BAI) and Subjective Units of Distress Scale (SUDS) scores [31]. The reduction in BAI scores was larger for the intervention group when compared to the control group, although in a non-statistically significant way [31]. However, it should be noted that both groups received many other therapeutic interventions (e.g. diaphragmatic and yogic breathing exercises, mindfulness-based cognitive therapy, aromatherapy) so that it is difficult to assess what role, if any, the weighted blanket played in anxiety reduction. A single weighted blanket intervention lasting order 5-30min was also found to have a significant effect on anxiety in people with various mental health issues. Becklund, et al examined the effect of a one-time weighted blanket intervention on inpatients in a mental health facility with primary diagnoses of depression and bipolar disorder that were not were not actively psychotic at the time of the study [28].

The intervention consisted of a one time 20 min application of a 5-pound lap pad, a 14-pound weighted blanket, or 20-pound weighted blanket while lying in bed. The results showed a statistically significant decrease in the intervention group in anxiety levels, as measured by the Spielberger State-Trait Anxiety Inventory shortened form-STAI: Y-6. In contrast, STAI: Y-6 scores increased in the control group, indicating an increase in anxiety over the same period of time [28]. Dickson, et al. [29] examined the efficacy of weighted blankets in reducing anxiety and anger in patients with preexisting psychiatric diagnoses admitted to an emergency department [29]. The results showed a larger decrease in pre-to post scores for anxiety in the intervention groups (15 min and 30 min long blanket use) when compared to the control. As measured by the Patient-Reported Outcomes Measurement Information System (PROMIS) Emotional Distress anxiety. However, the difference was not statistically significant for all groups, although the intervention groups commented that the blankets were "relaxing, comforting, and calming" [29]. The authors suggest that the lack of statistical significance is likely due to the extremely small size of the study, as well as variables such as the different participant diagnoses, administered medications, etc. In the Ohene, et al. [31] study of people with Anorexia Nervosa and Avoidant– Restrictive Food Intake Disorder, Subjective Units of Distress Scale (SUDS) data was collected after the first blanket intervention. This occurred during a supervised occupational therapy session and lasted at least 5 min. SUDS scores were found to decrease in a statistically significant way between pre and post session assessment.

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Discussion

Anxiety affects a large fraction of the world population. It may be temporary (e.g. when facing a daunting task or a medical procedure) or chronic, ranging from low levels to debilitating mental disorders [40]. DPS methods such as therapeutic massages been shown to effectively reduce anxiety (see for example [41-43]). Weighted blankets offer a form of DPS that is low cost, non-invasive, could be self-administered, and is easily available. Importantly, it is safe for use in people where traditional DPS cannot be applied, such as those with physical trauma injuries (see for example [35]) or that are touch-averse. The goal of this review was to assess current understanding regarding the effectiveness of weighted blanket interventions on anxiety in adults. A previous review by Eron, et al. [15] discussing papers published up to 2018 indicated that a single, 5-40min weighted blanket intervention reduced anxiety in healthy adults [21-23] and in patients in an acute inpatient mental health unit [24]. However, the small number of relevant studies and their small population sizes prevented formulating definitive conclusions. This review found 9 studies examining the effect of weighted blanket interventions on anxiety that were published after the Eron, et al. [15] review (see Table 1). These can be divided by the population studied, namely, mentally healthy participants vs. participants diagnosed with a mental health disorder, and by the of intervention type: Single/once vs. multiple days. Anxiety sources varied, from a one-time stressful event [32,34] to persistent pain [27,35] or as the characteristic of a mental disorder [28-31,33].

None of the studies reported significant adverse effects of blanket use, and most intervention group participants completed the minimal experimental time period, or even chose to extend it: For example, chemotherapy patients who were asked to use the weighted blankets for at least 15min chose to use them for an average of 156.6±108.9min [34]. Elderly dementia patients used the blankets an average of 3.7±3.9 hrs/day over 23.8 ± 6.4 days, when compared to the recommended minimal time of 20min/day [30]. Study participants with no mental health disorders facing a stress-inducing event showed a statistically significant reduction in measures of anxiety after a single weighted-blanket intervention, when compared to baseline and/or control [32,34]. Similarly, a single intervention reduced anxiety measures in individuals diagnosed with mental health disorders [28,29,31]. These results indicate that DPS by weighted blanket can reduce anxiety after a single, relatively short application time or order minutes to hours. The effects of multiple interventions (over several days or weeks) were studied in people who are mentally-healthy [27,35] and those with mental health disorders [30,31,33]. All showed a larger reduction in the intervention groups in anxiety levels or in indirect anxiety measures such as pain levels [27,35] and mental stress [33]. These results indicate that multiple weighted blanket interventions may reduce anxiety. Only one study examined the effect of a single weighted blanket intervention and a longer, multiple intervention period [31]. However, while the results for the single session showed a statistically significant reduction in anxiety, those relating to the entire period between admission and discharge were inconclusive [31], likely because of the large number of therapeutic interventions received. Therefore, it is not possible to assess whether repeated blanket use benefitted participants more than a single one.

A question of interest is whether the initial/baseline level of anxiety affects the ability of a weighted blanket intervention. The papers reviewed here show that the efficacy of the weighed blanket intervention depended on the initial anxiety level in mentally healthy people [27,32,34]: Anxiety decreased more substantially in people who had higher anxiety levels at baseline than those whose initial state was moderate or low level. This is in agreement with a review by Scholten, et al. [44] that examined the effect of cognitive behavioral therapy in patients with social anxiety disorder. They concluded that higher baseline symptom severity was associated with greater symptom reductions after therapy [44]. Similarly, Gold, et al. [45] found that the increase in WHO-5 Well Being Index scores improved more after 8 weeks of wellness interventions in participants with high or moderate anxiety when compared to ones with low anxiety or those within normal limits. The papers reviewed here, as well as those reviewed earlier [15] indicate that DPS by weighted blankets could be effective at reducing anxiety in both mentally healthy people and those diagnosed with mental disorders, several issues remain. However, the overall number of studies is small, and some examined a limited number of participants may affect the strength of their findings (e.g. [29,31]). In addition, the procedures used in these studies varied widely, preventing determination of best practices. Specifically: Blanket weight. Some studies used blankets that were approximately 10% of the participant body weight while others used the same blanket weight regardless of participant weight (see Table 1). The results for the latter studies (e.g. [27,32]) may suggest that the weight of the blanket does not necessarily affect its impact. However, without a systematic analysis of the correlation between relative blanket weight and anxiety reduction it is not clear whether such a conclusion is correct.

Intervention duration. The single application studies indicate that weighted blanket use can be effective at reducing anxiety by the end of the intervention, which was of order minutes to hours. The rapidity of weighted blanket effect has been quantified in sleep studies as well: Meth, et al. [46] showed that salivatory melatonin in young adults increased within 20min of a weighted blanket intervention more than in the controls (who used a light blanket). This trend continued up to one hour from baseline, although experimenters did not examine hormone levels beyond this point. Therefore, while there is evidence that weighted blankets can offer a nearly immediate relief from anxiety, it is not clear if there is a minimal, or optimal, session intervention time. Multiple interventions. Several studies found that anxiety was reduced after repeated application [27,30,31,33,35]. However, there is

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no information regarding the correlation between the duration of the intervention and anxiety reduction. Specifically- is anxiety reduced continuously with use, or is there an initial effect that plateaus over time? It is also possible that there is an 'intervention fatigue' where the effect of the intervention decreases with time. Long term effect of weighted blanket intervention. The studies reviewed here show that weighted blankets can reduce anxiety at the end of the intervention period. However, it is not clear whether the effect persists after the blanket is removed (in the single-use studies), or over long term (in the multiple use). Indeed, Gold, et al. [45] found that people with high initial anxiety showed improvement in their WHO-5 Well-Being Index scores after completing a 8 weeks of mindfulness intervention. However, by week 20 (namely, 12 weeks following the intervention end) their wellbeing scores decreased to nearly the original values [45]. Interestingly, in participants with low or moderate anxiety well being scores remained nearly constant between weeks 8 (end of intervention) and week 20 [45]. Therefore, the longer-term effect of weighted blanket interventions on people with high initial anxiety should be explored.

Conclusions

i. Weighted blankets provide a promising, safe, and accessible DPS intervention for anxiety reduction in adults. The studies reviewed here demonstrate the effectiveness of weighted blankets in reducing anxiety in both mentally healthy individuals and those with mental health disorders. The results suggest that some anxiety relief can occur after a single session. Prolonged use over days or weeks is also shown to be effective. However, limitations such as small sample sizes, variations in study protocols, and the lack of long-term follow-up highlight the need for further research. Future studies should focus on standardizing intervention protocols, exploring the optimal weight and duration of use, and assessing the sustained impact of weighted blankets to better understand their therapeutic potential.

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DOI: 10.19080/PBSIJ.2025.22.556096

How to cite: Orrie D. Effectiveness of Anxiety Reduction in Adults by Weighted Blanket Interventions: A Mini Review. Psychol Behav Sci Int J. 2025; 22(5): 556096. DOI: 10.19080/PBSIJ.2025.22.556096