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Psychotherapy in dizziness: A systematic review

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Abstract

Background: About 30% to 50% of complex dizziness disorders are organically not sufficiently explained or related to a psychiatric disorder. Of patients with such dizziness disorders, 80% are severely impaired by dizziness in their daily and working lives; nevertheless, they are often not diagnosed and treated adequately.

Objectives: This review aims to give a systematic overview of psychotherapeutic approaches and their efficacy regarding the treatment of dizziness that is medically not sufficiently explained or related to a psychiatric disorder.

Methods: We conducted a systematic literature search in Medline, PSYINDEX, and PsycINFO. We included in this systematic review (randomized) controlled trials (RCTs) concerning psychotherapy in patients with dizziness medically not sufficiently explained or associated with a psychiatric disorder. If possible we used Hedges' g to express the effect sizes (ES) of the treatment. We assessed heterogeneity using the Q statistic. We also rated the quality of the studies.

Results: We included three (R)CTs. All studies used cognitive-behavioural treatment methods in combination with relaxation techniques or vestibular rehabilitation. All studies suggested that psychotherapy may provide improvement. The mean ES in the treatment groups was 0.46 (95% CI 0.05; 0.88) for dizziness-related outcome, 0.10 (-0.44; 0.64) for anxiety, and 0.17 (-0.24; 0.58) for depression, whereas in the control groups the mean dizziness-related ES was -0.04 (-0.44; 0.37), anxiety-related ES was -0.03 (-0.43; 0.38), and depression-related ES was -0.02 (-0.42; 0.38). The quality of the studies was average. The sample sizes were small, however, and there was a lack of long-term studies.

Conclusion: This systematic review provides some preliminary evidence that psychotherapy may be effective concerning patients with dizziness that is medically not sufficiently explained or due to a psychiatric disorder. The results should be replicated in larger samples and follow-up RCTs.

Introduction

Dizziness and unsteadiness¹ are common symptoms presented to general practitioners or neurologists. For individuals over the age of 75 years these symptoms are the most frequent reason for visiting a physician.² Their lifetime prevalence is about 20% to 30%.³

Approximately 30% to 50% of complex dizziness disorders (i.e., dizziness is the cardinal symptom and persistent) are not fully explained by an identifiable medical illness and are related to phobic, panic, anxiety, depressive, dissociative, or somatoform disorders.⁴⁻⁷

Dizziness can occur without a prior organic vestibular disorder or as a consequence of an organic vestibular disorder, particularly in patients with a vestibular migraine or Menière's disease.⁸ About 30% of all patients with peripheral vestibular vertigo subsequently develop dizziness or unsteadiness that is not fully medically explained or related to a psychiatric disorder.⁵ Godemann et al.⁹ found that a lack of social support, a high burden of suffering, and moderate to severe impairment of self-experience were associated with the development of a panic disorder after an episode of an acute vestibular disorder. Phobic postural vertigo (PPV) frequently follows a period of an organic vestibular disorder, a serious illness, or emotional stress,¹⁰ and is characterized by a combination of non-rotational vertigo with subjective postural and gait instability.¹¹ It is often associated with anxiety, is context-dependent (e.g., occurs in large crowds), and results in avoidance behaviour. The symptoms improve when the patient has taken a small amount of alcohol or engages in sports.¹²

There seems to be a link between anxiety and balance disorders.¹³ Patients with panic or anxiety and with vestibular disorders frequently present with similar behaviour, namely, avoidance and similar complaints, i.e., dizziness, spatial disorientation, and anxiety in particular environments.¹⁴ Additionally, increased visual dependence (i.e., subjects who preferentially use vision for spatial orientation and postural control) and thus increased body sway can be observed both in patients with primary vestibular disorders and in patients with anxiety disorders.^{15, 16} Therefore, the hypothesis was discussed that vestibular or balance dysfunctions occur particularly in panic patients with moderate to severe agoraphobia.⁷

About 80% of patients with dizziness that is medically not sufficiently explained or related to a psychiatric illness feel impaired in their daily and working lives or are even unable to work due to the dizziness.⁵ Because of this substantial impact of dizziness on daily functioning, an adequate intervention is necessary. However, these patients often undergo an odyssey of visits to different physicians until the correct diagnosis is made and an appropriate treatment can be administered. The therapy has to include a discussion on a psychosomatic illness concept and a demonstration of associations between organic and psychological states and sensations. Mild forms can be treated with short-time interventions,¹⁷ whereas complex dizziness syndromes require specific interdisciplinary and integrative treatment that includes physiotherapy (e.g., vestibular rehabilitation), pharmacotherapy, and psychotherapy.^{5, 12, 18, 19}

Dizziness-specific treatment requirements

To determine the appropriate management of dizziness and unsteadiness, the patient has to be asked how far dizziness affects his or her life.² For example, some patients may have no unsteadiness while walking, but can no longer play golf or tennis due to their imbalance. These patients require limited vestibular rehabilitation, while patients severely affected by their dizziness (i.e., they are unable to leave their house or go to work) need extensive counselling and physical therapy. In the following paragraphs, some dizziness-specific treatment elements are described.

Vestibular rehabilitation

Vestibular rehabilitation (VR) has been recommended as the treatment of choice for patients with persistent vertigo due to vestibular dysfunction. The central element of VR is a set of exercises that promote central compensation by providing the central nervous system with repeated exposure to a range of eye, head, and body movements that require the patient's compliance and active collaboration.²⁰⁻²² This approach aims at the habituation or remediation of dizziness, improvement of gaze, retraining of balance, and enhancement of physical fitness. The mechanisms of balance and vestibular compensation are explained to the patient in detail so that the patient can understand why physiotherapy is reasonable.²² In

controlled studies VR has been shown to be efficient in patients suffering from vertigo and balance disorders.²³ Furthermore, VR has positively influenced the emotional condition of patients with chronic vestibular deficits²⁴ and improved both the independence in daily living activities²⁵ and the patients' quality of life.²⁶

Cognitive-behavioural approaches

The cognitive-behavioural approach aims to develop an integrative explanation model for dizziness considering medical and psychological factors.²⁷ With the use of behaviour analysis, the first dizziness attack, in particular, has to be explored extensively. Additionally, factors that trigger, sustain, or intensify the dizziness have to be analysed and evaluated, e.g., irrational cognitions.²⁸ In-vivo exposures to dizziness-triggering stimuli and exercises form part of the treatment.²⁹ In terms of exposure procedures cognitive-behavioural approaches are similar to VR. Moreover, relaxation techniques are taught, and there is a focus on how the person can minimize the disorienting affects of visuovestibular mismatch.³⁰ Furthermore, patients suffering from dizziness related to a psychiatric disorder increasingly activate their posture musculature due to anxiety, and thus show a reduced horizontal and an increased vertical sway-path that can be normalized within a short-term behavioural therapy.³¹

Aim of this systematic review

In summary, the psychotherapeutic treatment of dizziness that is medically not sufficiently explained or due to phobic, panic, anxiety, depressive, dissociative, or somatoform disorders is so far subject to expert-opinion review only; there is a lack of systematic reviews concerning controlled trials or evidence-based guidelines. Thus, we want to give an overview of psychotherapeutic approaches that are available for dizziness and their efficacy in the form of a systematic review considering all (randomized) controlled trials (RCTs) obtainable at present. This can be seen as a first important step to identify future directions and to work out guidelines for treating dizziness that is medically not sufficiently explained or related to a

psychiatric illness and – if applicable – to develop a therapy manual for these dizziness disorders.

Methods

Relevant articles were identified by searching Medline, PSYINDEX, and PsycINFO from 1900 through June 2010. The following keywords were searched: dizziness, vertigo, Menière, vestibular migraine, benign paroxysmal positional, and vestibular neuritis. These terms were cross-referenced with the following keywords: controlled trial, psychotherapy, psychotherapeutic treatment, intervention, and behaviour therapy. In addition, to ensure a comprehensive review of the literature, we searched for further relevant citations by checking the reference lists of the initial studies identified and of review papers. This searching strategy revealed more than 1000 papers (see Figure 1).

Insert Figure 1 about here.

Studies were included if they were in English or German; if they had been conducted on humans suffering from dizziness medically not sufficiently explained or associated with phobic, panic, anxiety, depressive, dissociative, or somatoform disorders, or persistent dizziness after an organically explained condition; if the therapy described was a psychotherapy, e.g., a cognitive-behavioural therapy; if the paper was not a review paper with expert opinions; and if the study design was an (R)CT. With the use of that strategy, up to the end of June 2010 a total of four original papers (or three studies) that met the inclusion criteria emerged (see Figure 1).^{17, 32-34} Literature research and selection was carried out independently by two researchers (the first and the last author, GS and CL). In addition, the inclusion of studies was discussed between GS and CL. Two conference papers^{31, 35} were not included in this review as the data reported were not detailed enough to compute effect sizes and further data were not available from the authors as the data have not yet been published.

To evaluate the efficacy of the interventions, effect sizes (ES; Hedges' g) and the 95% confidence intervals (95% CI) were calculated concerning dizziness-, anxiety-, and

depression-related outcomes (see Figures 2a-c). Hedges' g statistic was computed as this is an estimate of the standardized mean difference that is bias corrected for small sample sizes.³⁶ The ES was interpreted as follows: small effect if $0.2 \leq |ES| < 0.5$, medium effect if $0.5 \leq |ES| < 0.8$, and large effect if $|ES| \geq 0.8$.³⁷ To ensure an appropriate interpretation of the results the Z statistic (test of null) was estimated and the p value was set at $p < .05$. Furthermore, tests for heterogeneity were carried out using the Q statistic ($p < .05$) to evaluate whether the variation in study outcomes between studies was significant.³⁸ Statistical analyses were conducted using Comprehensive Meta-Analysis Version 2.³⁹ Furthermore, GS and a research assistant independently rated the quality of all reviewed studies using the CCDAN quality assessment rating scale by Moncrieff et al.⁴⁰ The 23 items were rated on a 3-point scale (0=criterion not fulfilled, 1=half fulfilled, 2= fulfilled) and assessed topics such as objectives and specification of main outcomes, adequacy of sample size, clear description of treatments, recording of exclusion criteria, report of number of exclusions and refusals, sample demographics, clear description of outcome measures or use of validated instruments, appropriateness of statistical analyses, and conclusions. Table 1 reports the mean quality assessment rating scores by GS and the research assistant and the proportions for each study.

Results

Table 1 summarizes the (R)CTs. An overview of the case reports and uncontrolled studies is given in the appendix (Tables I and II).

Patients

The studies reviewed included a total of 87 patients (60 women and 27 men) with a range over the studies of 22 to 36 patients. The patients suffered from PPV,¹⁰ vestibular dysfunction, tension-related medically unexplained dizziness, previous diagnosis of Menière's disease, whiplash or neck-related problems, or mixed problems. They were either recruited via newspaper advertisements or were referred by neurotological specialists. Table

1 shows the inclusion criteria for each study. The duration of treatment ranged from 5 to 12 sessions (see Table 1).

Insert Table 1 about here.

Treatment approaches and measures

All studies used cognitive-behavioural treatment methods, combined with relaxation techniques and/or VR, and consisted of the following elements: information and education about dizziness and the balance and vestibular system; explanation and discussion of associations between assumptions (about dizziness), arousal, thoughts, moods, and behaviours; (self-controlled) exposure to fear-triggering and avoidant situations; coping strategies; balance exercises; and self-observations and written recordings. In two studies cognitive-behavioural therapy (CBT) was combined with VR. The purpose of providing VR within a CBT framework is to facilitate exposure to movements and to teach strategies to cope with associated thoughts and beliefs concerning the dizziness.

The studies provided as outcome measures dizziness-related factors (i.e., severity, frequency, handicap and distress due to dizziness, imbalance, walking time), and in addition, depression and anxiety were assessed. For measuring treatment outcome all studies used standardized questionnaires, e.g., the Dizziness Handicap Inventory⁴¹ or the Beck Depression Inventory⁴² (see Table 1).

Treatment outcomes

All studies suggest that psychotherapy, i.e., cognitive-behavioural interventions combined with VR or relaxation techniques, provides improvement in patients suffering from dizziness (e.g., PPV, medically unexplained, previous Menière's disease) (see Table 1). However, only one study conducted a follow-up and found no long-term effect: at one-year follow-up the test results were similar to those obtained before treatment, indicating that the CBT effects were not persistent in patients with PPV.³⁴

Efficacy of treatments

The effect sizes were divided into three outcome domains: dizziness-, anxiety-, and depression-related (see Figures 2a-c).

Tests for heterogeneity

Neither in the treatment nor in the control groups were the tests for heterogeneity significant concerning dizziness ($Q_{\text{treatment}} = 0.03$, $df_{\text{treatment}} = 2$, $p_{\text{treatment}} = .99$; $Q_{\text{control}} = 0.68$, $df_{\text{control}} = 2$, $p_{\text{control}} = .71$), anxiety ($Q_{\text{treatment}} = 3.40$, $df_{\text{treatment}} = 2$, $p_{\text{treatment}} = .18$; $Q_{\text{control}} = 0.04$, $df_{\text{control}} = 2$, $p_{\text{control}} = .98$), or depression ($Q_{\text{treatment}} = 1.72$, $df_{\text{treatment}} = 2$, $p_{\text{treatment}} = .42$; $Q_{\text{control}} = 0.24$, $df_{\text{control}} = 2$, $p_{\text{control}} = .89$), indicating that there were no significant variations in study outcomes between studies.

Efficacy of treatment and control groups

Both Johansson et al.³² and Andersson et al.³³ reported small but clinically not relevant effects concerning dizziness, and a small but not significant deterioration regarding anxiety and depression with their combined CBT and VR approach. In contrast, Holmberg et al.¹⁷, who conducted CBT, achieved medium but not significant effects with respect to dizziness and anxiety and an almost medium but clinically not relevant effect concerning depression (see Figures 2a-3c). At follow-up at one year after treatment, however, none of their patients were symptom-free, and test results were similar to those before treatment.³⁴ Overall, the three CBT approaches reached a small and clinically relevant effect concerning dizziness and no effects in terms of anxiety and depression (see Figures 2a-3c).

There were no effects in the control groups (waiting list or self-treatment), nor were the overall control group effects significant in terms of dizziness, anxiety, or depression (see Figures 2a-3c).

Concerning dizziness, the effect size difference between the treatment and the control groups was $|0.5|$. With 40 or 39 persons in each group, the power to detect differences would be 0.60, and thus, it would be doubtful to prove statistically significant group difference.⁴³

Insert Figures 2a-c about here.

Quality assessment rating of studies

The quality score of the studies ranged between 24 and 27 which corresponds to 52.2% and 58.7% of the 46 possible points of the CCDAN quality assessment rating scale (see Table 1).

Discussion

This systematic review aimed to give an overview of psychotherapy approaches concerning dizziness and their efficacy. In summary, all (R)CTS used CBT approaches. Two of these studies conducted a combination of CBT and VR. All studies reported an improvement after treatment, particularly in terms of dizziness. However, all studies had methodological shortcomings such as small sample sizes and/or lack of follow-up.

As the tests for heterogeneity were not significant, one can assume that the effect sizes of the different studies were homogeneous.³⁸ Furthermore, the studies were predominantly uniform regarding sample sizes, treatment methods, and duration of treatments. In addition, all studies measured dizziness, anxiety, and depression before and after treatment using standardized questionnaires. Thus, the results and outcome measures may be comparable, and the studies can be considered together. However, the patients in the study of Johansson et al.³² were much older than the patients in the two other studies.^{17, 33} Additionally, the recruitment methods differed (see Table 1), which may have led to a sample bias, i.e., the participants may not be representative but especially impaired or motivated. Finally, the level of impairment was not specified or determined, which might have caused a result bias. Thus, the results should be replicated with representative and larger samples.

All three studies together reached small but significant ES in terms of dizziness. The unpublished and preliminary results of Best et al.³¹ and Tschan et al.³⁵ support the hypothesis that short-term CBT may be effective – even in the long-term – in normalizing the patients' body posture, in reducing the severity of dizziness symptoms, and in modifying dysfunctional illness experiences. However, Holmberg et al.^{17, 34} found no significant difference between the psychometric test results before treatment and one year later, and none of the patients were symptom-free at follow-up.³⁴ Holmberg et al. argued that this result confirms the observation that the treatment of PPV is complex, and that their CBT method,

which was developed during their project, needs further attention and might lead to better results in a manualized intervention.

Both Johansson et al.³² and Andersson et al.,³³ who conducted a combination of CBT and VR, could show in RCTs small but clinically not relevant ES concerning dizziness in patients with mixed dizziness diagnoses and a broad age range. Combining CBT and VR seems to be reasonable as VR programs already cover implicitly some psychotherapeutic elements, i.e., both approaches address the functional impairment due to the disorder, develop an individualized treatment plan, and provide exposure to reach habituation. In addition, it has been shown that a combination of VR and a 30-minute therapy session improved the postural control, subjective symptom report, and emotional well-being, even in the long-term.⁴⁴ Yardley et al.⁴⁵ found that exercises that stimulate the vestibular system and provoke dizziness can modify negative beliefs about the consequences of dizziness. Patients with both panic disorder and vestibular dysfunctions may benefit in particular from the combination of CBT and VR.¹⁴ In further research, the efficacy of the CBT/VR approach should be tested against other interventions, with larger samples, and in the long-term course.

However, none of Johansson et al.,³² Andersson et al.,³³ or Holmberg et al.¹⁷ achieved any clinically relevant improvement concerning anxiety or depression. This indicates that the CBT treatment approach (in combination with VR) should be expanded to address these issues, for example, by focussing on anxiety symptoms other than dizziness, particularly cognitive symptoms.⁴⁶ To enhance existing treatment programs it may be reasonable to offer a basic psychotherapeutic module to all patients suffering from dizziness and unsteadiness. This basic treatment should consist of education and information about the natural body sway, unsteadiness, dizziness, and the function of balance, exercises to improve balance, and exposure to dizziness-triggering situations. Additionally, specific treatment modules tailored for patients with depression-, anxiety-, phobic-, panic-, or somatoform-related dizziness should be offered. For example, patients with somatoform-related dizziness should participate in the somatoform module consisting of enhancement of bodily activities,

improving the distinction between bodily complaints and affects, and affect regulation. The multicenter PISO study currently evaluates a new three-phased short-term psychodynamic intervention that is tailored for pain-predominant somatoform disorder.^{47, 48} This therapy approach may be adequate for patients with dizziness related to a somatoform disorder as well.

In summary, the present systematic review provides some preliminary evidence that psychotherapy may be effective in patients suffering from dizziness, such as PPV, medically unexplained, or a previous Menière's disease. More pronouncedly, however, it reveals a lack of (R)CTs and long-term follow-up studies. In addition, the results are not generalizable as the samples were not representative and sample sizes were very small. In further research, the efficacy of psychotherapy in dizziness should be replicated applying RCTs with larger, representative samples and standardized psychotherapy manuals that could be developed considering the results of this review.

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Table

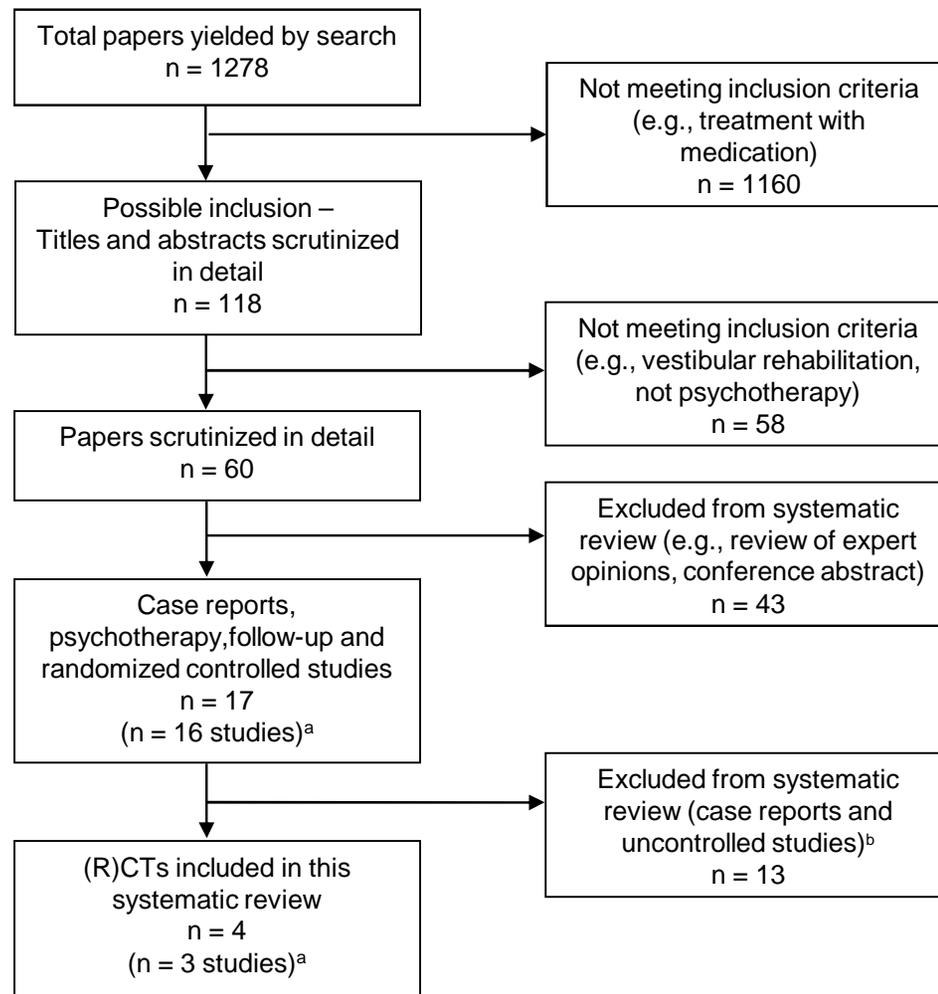
Table 1. Summary of Reviewed Controlled Trials.

Study	Study design	Sample, diagnoses, inclusion criteria	Control group	Intervention, duration	Measurements	Results	Quality assessment rating ^a
Johansson et al. (2001)	Prospective RCT; assessment points: before and after treatment	Initially: n=22 (n=16 women, n=6 men; mean age 71.8 years); recruited via newspaper advertisement; dizziness (mixed diagnoses); inclusion criteria: age between 65 and 80 years, recurrent vertigo for at least the last month, not only spontaneous attacks, no diagnosis of e.g., Parkinson's disease or cerebral hemorrhage; After treatment: n=19 (TG n=9; CG n=10)	Yes (waiting list)	CBT and VR (individualized): education about dizziness, function of balance, fight-and-flight response; exercises; exposure; applied relaxation; associations between thoughts, moods, behaviours; duration: 7 weeks (5 sessions, one phone call)	Questionnaires: DHI, VSS, BDI, STAI-t; measures: walking time; balance	After treatment: TG: better performance (walking, head noddings); greater improvement concerning the DHI than CG	24 (52.2%)
Andersson et al. (2006)	Prospective RCT; assessment points: before and after treatment	n=29 (n=26 women, n=3 men; mean age: 50.9 years); recruited via newspaper advertisement; dizziness (mixed diagnoses); inclusion criteria: age between 18 and 64 years; recurrent vertigo for at least the last month; not only spontaneous attacks; no diagnosis of e.g., Parkinson's disease, cerebral hemorrhage,	Yes (waiting list)	CBT and VR (individualized): (see Johansson et al., 2001); duration: 6 weeks	Questionnaires: DHI, VSS, CEA, STAI-t, BDI, PSS; behavioural measures: time for exercises; rating of dizziness after each exercise; Romberg Test; diary registrations: dizziness and imbalance	After treatment: TG: improved DHI and VSS, improved head shaking / nodding; less experienced dizziness and distress due to dizziness; CG: no improvements	24 (52.2%)

		primary psychiatric condition; 2 groups: n=29 (TG n=14; CG n=15)					
Holmberg et al. (2006; 2007)	Controlled study; assessment points: before and after treatment; Follow-up study: one year	n=36 (n=18 women, n=18 men; age median 43.5 years); referred by otoneurological specialists; PPV; inclusion criteria: normal (oto-)neurological examination results; Before treatment: n=36 (TG n=18; self-treatment group n=18) After treatment: n=31 (TG n=16, self-treatment group n=15) At follow-up: Response rate: n=20 (n=11 women, n=9 men; mean age 43 years) of 24 patients (83.3%) who had completed CBT (self-treatment group had been offered CBT afterwards, too)	Yes (self-treatment) at follow-up: no	Self-treatment group: self-exposure to provoke dizziness; TG: CBT (individualized): self-observations; explanation of avoidance; information about natural body sway; evaluation of fear of falling and social embarrassment; relaxation techniques; duration: 8-12 sessions	Questionnaires: DHI, VSS, VHQ, HADS;	After treatment: TG: improvement in DHI total, emotional, and functional; VHQ; HADS total, anxiety, and depression; Self-treatment group: improvement in VSS severity and VHQ. After treatment to follow-up: deterioration of DHI total and emotional, VHQ, HADS total and depression; Before treatment to follow-up: no significant differences	27 (58.7%)

^a The quality assessment rating score (Moncrieff et al., 2001) could range between 0 (very poor study quality) and 46 (excellent study quality); in parentheses the proportion (in per cent) is reported.

Abbreviations: BDI=Beck Depression Inventory; CBT=Cognitive-behavioural therapy; CEA=Confidence in Everyday Activities questionnaire; CG=control group; DHI=Dizziness Handicap Inventory; HADS=Hospital Anxiety and Depression Scale; PPV=Phobic postural vertigo; PSS=Perceived Stress Scale; RCT=randomized controlled trial; STAI(-t)=State-Trait Anxiety Inventory (trait form); TG=treatment group; VHQ=Vertigo Handicap Questionnaire; VR=vestibular rehabilitation; VSS=Vertigo Symptom Scale;

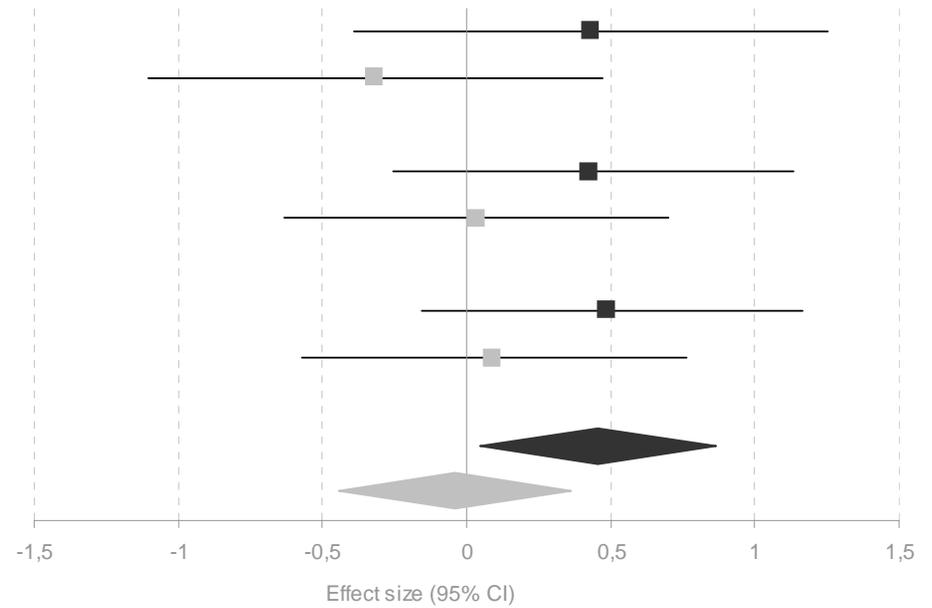


^a Two papers (Holmberg et al., 2006; 2007) covered the same sample (initial treatment and follow-up); thus, the two papers were handled as one study.

^b An overview of these papers is given in the Appendix, Tables I and II.

Figure 1. Process of Choice and Inclusion of Papers Reported in this Systematic Review.

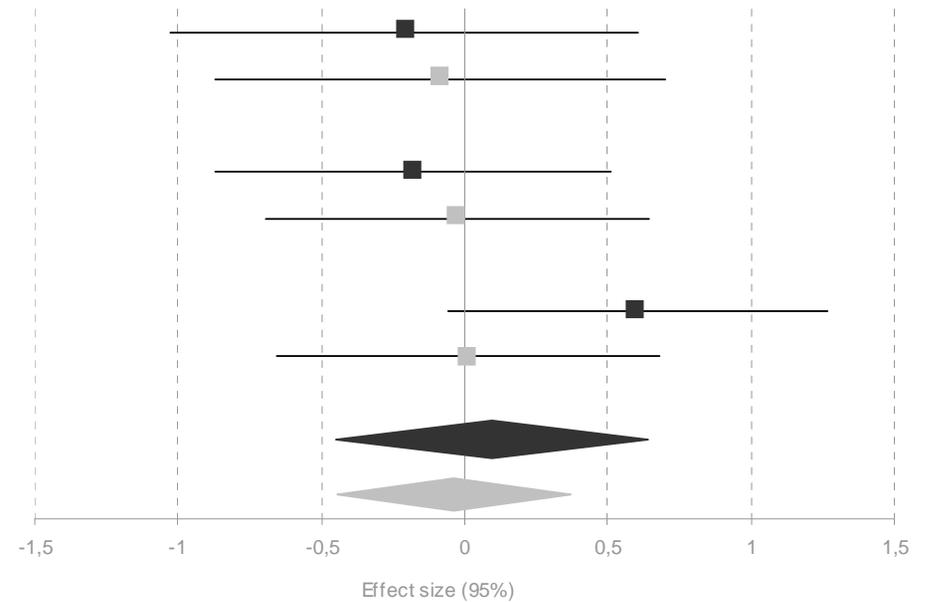
Source	Group	Sample size (n)	Effect size (95% CI)	Total Z (p)
Johansson et al., 2001 ^a	Treatment	9	0.43 (-0.39; 1.25)	
	Control	10	-0.32 (-1.10; 0.47)	
Andersson et al., 2006 ^a	Treatment	14	0.44 (-0.26; 1.13)	
	Control	15	0.03 (-0.63; 0.70)	
Holmberg et al., 2006 ^a	Treatment	16	0.51 (-0.15; 1.17)	
	Control	15	0.10 (-0.57; 0.76)	
Total	Treatment	39	0.46 (0.05; 0.88)	2.20 (.03)
	Control	40	-0.04 (-0.44; 0.37)	-0.17 (.86)



^a Dizziness was measured by the Dizziness Handicap Inventory (DHI).

Figure 2a. Dizziness-related Effect Sizes (ES) of (Randomized) Controlled Trials.

Source	Group	Sample size (n)	Effect size (95% CI)	Total Z (p)
Johansson et al., 2001 ^a	Treatment	9	-0.21 (-1.03; 0.61)	
	Control	10	-0.09 (-0.87; 0.70)	
Andersson et al., 2006 ^a	Treatment	14	-0.18 (-0.87; 0.51)	
	Control	15	-0.03 (-0.69; 0.64)	
Holmberg et al., 2006 ^b	Treatment	16	0.60 (-0.06; 1.27)	
	Control	15	0.01 (-0.65; 0.68)	
Total	Treatment	39	0.10 (-0.44; 0.64)	0.35 (.72)
	Control	40	-0.03 (-0.43; 0.38)	-0.14 (.89)

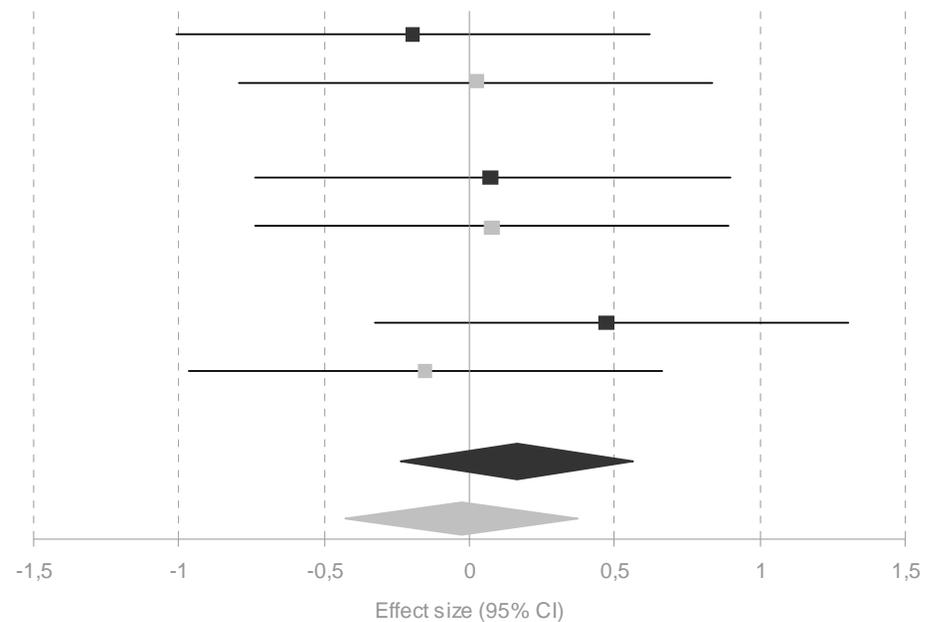


^a Anxiety was measured by the State Trait Anxiety Inventory (STAI-t) – trait anxiety.

^b Anxiety was measured by the Hospital Anxiety and Depression Scale (HADS) – anxiety.

Figure 2b. Anxiety-related Effect Sizes (ES) of (Randomized) Controlled Trials.

Source	Group	Sample size (n)	Effect size (95% CI)	Total Z (p)
Johansson et al., 2001 ^a	Treatment	9	-0.19 (-1.01; 0.62)	
	Control	10	0.02 (-0.76; 0.81)	
Andersson et al., 2006 ^a	Treatment	14	0.08 (-0.61; 0.77)	
	Control	15	0.08 (-0.59; 0.74)	
Holmberg et al., 2006 ^b	Treatment	16	0.49 (-0.17; 1.15)	
	Control	15	-0.15 (-0.82; 0.52)	
Total	Treatment	39	0.17 (-0.24; 0.58)	0.81 (.42)
	Control	40	-0.02 (-0.42; 0.38)	0.10 (.92)



^a Depression was measured by the Beck Depression Inventory (BDI).

^b Depression was measured by the Hospital Anxiety and Depression Scale (HADS) – depression.

Figure 2c. Depression-related Effect Sizes (ES) of (Randomized) Controlled Trials.