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Anxiety disorders and other psychiatric subgroups in patients complaining of dizziness

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Abstract

Two hundred and two consecutive patients with dizziness were evaluated using blind neuro-otological testing and examination, blind psychiatric examination, including structured interviews (according to DSM-IV), the Symptom Check-List (SCL 90 R), and the State-Trait Anxiety Inventory (STAI). In 28% of the patients ($N = 50$) dizziness was of organic origin (O group); in 55.3% ($N = 99$) of psychogenic origin (P group) and in 16.8% comorbid psychiatric disorders were found (Mixed group). In 5.3% ($N = 10$) neither organic nor psychiatric results could be found, which could explain the dizziness (Ideopathic group). Compared with the Organic group the patients with psychiatric disorders (P and Mixed group) had much more extensive workups for dizziness, intense emotional distress (anxiety, depression), greater handicaps, and high somatization scores. In the P and Mixed groups three main subgroups of psychiatric disorders could be found: anxiety ($N = 56$), depressive ($N = 20$), and somatoform disorders ($N = 53$). Patients with anxiety and depressive disorders showed the greatest emotional distress and handicaps. The results indicate that psychiatric disorders, above all anxiety disorders, should be included in the differential diagnosis in patients with a long duration of dizziness and great handicaps. An interdisciplinary treatment (including psychiatric treatment) would be superior to an exclusive somatic one.

Keywords: Dizziness; Vestibular disorders; Vertigo; Anxiety disorders; Depressive disorders; Somatoform disorders; Agoraphobia

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1. Introduction

Dizziness is one of the most frequent general medical symptoms presenting in hospitals and medical practices. After headaches, dizziness is the most commonly occurring chief symptom in neurology (Brandt, 1996). In 20–50% of all dizziness states, psychiatric disorders appear to exert an important influence on the course of the illness (Alvord, 1991; Clark et al., 1994b; Eagger, Luxon, Davies, Coelho, & Ron, 1992; Kroenke et al., 1992; McKenna, Hallam, & Hinchcliffe, 1991; Yardley, Beech, & Weinman, 2001; Yardley & Redfern, 2001; Yardley et al., 1999). In longitudinal studies, patients with mixed physical and psychological symptoms are the ones most likely to remain symptomatic and handicapped (Kroenke et al., 1992; Yardley, 2000), while at the same time having the highest levels of handicap.

Dizziness patients may, on the one hand, develop reactive psychic disorders. This particularly affects those who demonstrate delayed vestibular compensation following a vestibular lesion (i.e., Neuritis vestibularis) or have a latent vestibular disorder, such as Mal de debarquement Syndrome (Murphy, 1993), or those in whom ''space phobia'' (Marks, 1981) is suspected and then often suffer from unspecific symptoms such as space and motion discomfort, and/or subjective postural imbalance and unsteadiness of gait, inter alia (Bronstein, 1995; Jacob, Lilienfeld, Furman, Durrant, & Turner, 1989; Jacob et al., 1993; Jacob, Redfern, & Furman, 1997b; Mair, 1996). On the other hand, the combination of psychic and somatic disorders (in the presence of an acute psychiatric illness) can have an especially negative effect on the course of the illness, leading to chronification and greater handicap. Particularly in these cases a comorbid or reactive psychiatric disorder is often overlooked and consequently left untreated.

Until now, the following psychiatric disorders have been described in patients with dizziness illnesses: anxiety disorders, depressive, and somatoform disorders (Eckhardt-Henn, Hoffmann, Tettenborn, Thomalske, & Hopf, 1997; Yardley, 2000).

Anxiety patients comprise the best-examined and most important subgroup of those suffering from dizziness. A number of empirical studies determined high values for anxiety in patients who complained primarily of dizziness (Asmundson, Larsen, & Stein, 1998; Brandt, 1996; Clark et al., 1993; Clark, Hirsch, Smith, Furman, & Jacob, 1994a; Eagger et al., 1992; Eckhardt et al., 1996; Kroenke et al., 1992; Nazawa, Imamura, Hashimoto, & Murakami, 1998; Nedzelski, Barber, & McIlmoyl, 1986; Stein, Asmundson, Ireland, & Walker, 1994).

The percentage of anxiety disorders reported in different studies for patients *with* vestibular dysfunction varies between 3% (Sullivan, Clark, & Katon, 1993) and 41% (Eagger et al., 1992) and for patients *without* vestibular dysfunction between 6% (Sullivan et al., 1993) and 76% (Simpson, Nedzelski, Barber, & Thomas, 1988). These differences underline the need for more reliable percentages of anxiety-disorder patients based on larger samples of dizziness patients.

The connection between anxiety and dizziness is relatively well researched. Various interesting perspectives exist on this connection. For instance, it has been

hypothesized that dizziness and panic symptoms may co-occur as a result of central-neurologic links between the vestibular and the autonomic systems (Balaban & Porter, 1997; Balaban & Thayer, 2001; Clark et al., 1994a, 1994b; Furman, Jacob, & Redfern, 1998; Gorman, Liebowitz, Fyer, & Stein, 1989; Sklare, Konrad, Maser, & Jacob, 2001; Sklare, Stein, Pikus, & Uhde, 1990). For a more detailed review of recent literature concerning the relation between anxiety disorders and vestibular disturbance we refer the reader to Asmundson et al. (1998), Simon, Pollack, Tuby, and Stern (1998), Balaban and Jacob (2001), Jacob and Furman (2001a, 2001b), and Furman and Jacob (2001). Regarding the existence of other psychiatric disorders in patients with dizziness as the chief symptom, few details are available.

The depressive disorders found range from 6% (Kroenke et al., 1992) to 62% (Eagger et al., 1992; Frommberger, Schmidt, Dieringer, Tettenborn, & Buller, 1994; Sullivan et al., 1993). One report mentioned presence of somatoform disorders (Yardley, 2000), but no details were given. As far as we know, at the present time no studies have been conducted on large patient collectives (more than 100 patients) attempting to systematically classify dizziness patients into potential psychiatric subgroups according to the widely accepted criteria of the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM-IV) (1994). Better knowledge about proportions of clinically relevant subgroups in dizziness collectives is needed, as is knowledge about the differences between subgroups. Most of the existing studies fail to provide a differentiated clinical–psychiatric diagnosis based on DSM-IV criteria. With few exceptions (Frommberger et al., 1994), data on the psychic disorders were usually gathered using individual psychometric instruments. In accordance with Asmundson et al. (1998), we believe that a replication and extension of existing epidemiological and clinical studies is warranted.Thus, the main purpose of our investigation is to estimate or replicate the proportions of somatic and psychiatric disorders in dizziness patients as reported in the literature using a comparatively large sample, and to answer the following questions:

- Can differences be identified or replicated with regard to emotional distress, handicap, and the course of illness between patients with organic dizziness, non-organic dizziness, organic dizziness plus comorbid psychiatric disorders, and ideopathic dizziness?
- How high is the respective percentage of potential psychiatric subgroups in patients with non-organic dizziness and in those with comorbid psychiatric disorders (anxiety and phobic disorders, depressive and somatoform disorders)?
- Can any differences be found along psychosocial dimensions (psychometric measures) between the resulting psychiatric subgroups?

Detailed knowledge of such differences would be of great importance for the early differentiated psychotherapeutic/psychiatric diagnosis of psychically

caused dizziness, thereby allowing specific interdisciplinary treatment for patients with complex dizziness disorders. In doing so, this could prevent possible chronification with the accompanying restrictions in work and daily life as well as the high medical costs.

2. Method

2.1. Subjects

The data presented in this paper were derived from a larger project exploring psychiatric aspects of dizziness.[1]

The study subjects were unscreened patients consecutively referred over a 3-year period to a neurologic outpatient clinic (Johannes Gutenberg University Hospital, Mainz, Germany) for evaluation of vertigo or dizziness. They were included in the study if they fulfilled the following criteria:

- dizziness as the chief symptom,
- very good command of the German language,
- age >18 and <65 years,
- no malignant or known central nervous disease,
- no formal application pending for early retirement,
- no cognitive impairment due to a current cerebral or psychotic illness,
- no current psychotherapy,
- no psychotropic medication at the time of testing,
- participation in the entire interdisciplinary diagnostics. If they missed one part (i.e., the psychometric assessment), they were not included in the final analysis.

All subjects gave written informed consent before participating. Participation in the investigation was only rejected by roughly 5% of the patients asked. The reason given was the length of time involved. These patients often came from far-removed residential areas. Unsystematically gathered information and demographic data did not give any hint of specific selection effects. Overall compliance of the patients was very high.

In the end, 202 patients between the ages of 19 and 64 were investigated. Due to the exclusionary criteria mentioned, incomplete data material, and a trial run (these data were not included), 13 patients had to be excluded from the analysis, resulting in a total sample size of 189 dizziness patients. All patients underwent the same diagnostic procedure consisting of three parts, as follows.

[1] Part of the sample presented here was based on a German publication dealing with other specific research questions (Eckhardt-Henn et al., 1997). An intermediate analysis of preliminary results was published in German (Eckhardt-Henn et al., 1996).

2.1.1. Neuro-otologic examination and vestibular tests

A clinical neurovestibular examination and vestibular tests were administered by a senior clinician in the neurological disorders clinic who was *blind* to the subjects' psychiatric and psychometric status. The *neurologic assessment* included a standardized interview to establish the history of the present illness and a clinical neurovestibular examination with positional tests. Electronystagmography with bi-thermal caloric testing and rotational test was used to investigate oculomotor and vestibular function. A unilateral paresis was diagnosed using standard formula and slow-phase velocity as the variable in the caloric test

$$\frac{(\text{Right}\,44 + \text{Right}\,30) - (\text{Left}\,44 + \text{Left}\,30)}{\text{Right}\,44 + \text{Right}\,30 + \text{Left}\,44 + \text{Left}\,30} \times 100,$$

when the result exceeded 25%. A directional preponderance was diagnosed when the result of the following standard formula exceeded 30%

$$\frac{(\text{Right}\,44 + \text{Right}\,30) - (\text{Left}\,44 + \text{Left}\,30)}{\text{Right}\,44 + \text{Right}\,30 + \text{Left}\,44 + \text{Left}\,30} \times 100.$$

Rotational testing was performed with constant acceleration until a velocity of 90 /s was reached. Postrotational nystagmus was elicited by abrupt stopping after perrotational nystagmus had ceased. There was no specific test for otolith dysfunction beyond the clinical examination. Electrophysiological tests with topodiagnostic value, such as brainstem auditory evoked potentials (BAEP), masseter and blink reflex, were analyzed. The masseter reflex shows pontomesencephalic lesions and the blink reflex pontomedular lesions. If the masseter reflex showed a pathological finding but all other findings were normal, then Magnetic Resonance Imaging (MRI) was performed. If the findings here were normal, then the patient was not classified into the Organic group, i.e., an isolated pathological masseter reflex was not regarded as the cause of an organically caused dizziness disorder. Additionally, a transcranial vertebrobasilar Doppler sonography was performed. The otologic clarification included an audiogram. Cranial imaging with Computerized Tomography (CT) and/or MRI, cardiologic, audiologic, and ophtalmologic assessment were performed as required.[2]

2.1.2. Psychiatric examination

The patients received a standardized psychiatric evaluation. This consisted of one to three extensive, semi-structured diagnostic interviews that systematically checked the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (American Psychiatric Association, 1994). These interviews were conducted by a senior psychiatrist who was *blind* to the patient's neurovestibular status and psychometric results. This clinician was well familiarized

[2] In this study, we unfortunately were unable to perform a dynamic platform posturography because the necessary apparatus was not available at the time of the study. At present, we are implementing this investigative method in a new study (see also Section 4).

with the classification criteria of the International Classification of Disorders (ICD-10) (Dilling, Mombour, Schmidt, & Schulte-Markwort, 1994) as well as those of the DSM-IV. Diagnostic encoding was performed according to both classification systems, but only the DSM-IV categories are used here.[3]

2.1.3. Psychometric assessment, questionnaires, and interview measures

The *psychometric assessment* consisted of the following measures: the Symptom Check List (SCL-90-R) (Derogatis, 1986; Franke, 1995), STAI (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), a systematic evaluation of handicap (inability to work in weeks, self-rating of handicap in occupational activities), the number of different specialized physicians contacted, and a Visual Analogue Scale (VAS) on the intensity of the complaints whose values ranged from 0 to 100.

The revised version of the *Symptom Check List-90 (SCL-90R)* (Derogatis, 1986) is a 90-item, self-reported inventory widely used to measure current psychopathological symptoms. In addition to a global rating (Global Severity Index/GSI), nine syndrome scales can be calculated (somatization, obsessive–compulsive, anxiety, phobic anxiety, interpersonal sensitivity, hostility, paranoid ideations, psychoticism). Evidence supporting the reliability and validity of the German version of the SCL-90R is similar to evidence supporting the original version (Derogatis, 1986). The reliability (inner consistence) of the nine scales lies between .80 and .90 (Franke, 1995). Various studies have proven the validity of the scales (Geiser, Imbierowicz, Schilling, Conrad, & Liedtke, 2000; Rief, Greitemyer, & Fichter, 1991). The *State-Trait Anxiety Inventory (STAI)* (Laux, Glanzmann, Schaffner, & Spielberger, 1981) is the German adaptation of the STAI developed by Spielberger et al. (1983). The two parts of the STAI serve to assess anxiety as a personality trait (trait-anxiety/STAI-G X2) and anxiety as a situation-dependent state (state-anxiety/STAI-G X1). Within the framework of this investigation, only the trait-anxiety (X2) was assessed. The STAI (X2) comprises 20 items that are compiled into a sum score. The sex-specific norm values (t values) were included in the analysis. The reliability of this widely implemented procedure is very high (retest-reliability $> .84$, Cronbach's alpha $< .90$, Spielberger et al., 1983), and its validity is also regarded as well-established. The main criticism of the instrument is that it does not clearly differentiate between anxiety and depression (Beck, Epstein, Brown, & Steer, 1988).

2.2. Psycho-organic classification

Dizziness patients were classified into one of four groups depending on the (non)existence of somatic abnormalities judged to be relevant and the

[3] The reliability of the judgments in this context was not examined, but the quality of assessment by the same person is being controlled in an ongoing study, and preliminary analysis showed high reliability of the classifications against SCID-I results (Structured Clinical Interview for DSM-IV Disorders, First, Gibbon, Spitzer, & Williams, 1996) made by another well-trained examiner.

(non)existence of psychiatric abnormalities that seemed to be of importance. Criteria for classification into the following groups was defined in advance based on the results of the literature and the results of a small pilot study (see also Furman & Jacob, 1997; Jacob, Furman, Clark, & Durrant, 1992; Jacob, Furman, Durrant, & Turner, 1996; Sullivan et al., 1993).

Organic group (O)	vestibular or organic disorder—no psychiatric disorder
Mixed group (M)	vestibular or organic disorder—psychiatric disorder
Psychiatric group (P)	no vestibular or organic disorder—psychiatric disorder
Ideopathic group (I)	no vestibular or somatic disorder—no psychiatric disorder

The assignment of the patients to one of these groups was done during a monthly *interdisciplinary case discussion* attended by the neurologists involved and the investigator/psychiatrist. In a first step, the psychiatric investigator proposed an assignment *with no* knowledge of the neurological or psychometric findings. This estimation was based on the clinical diagnostic interviews (see above). The neurologists added their assignment, likewise *with no* knowledge of the psychometric findings, basing their decision on the neurological examination and the vestibular and radiologic examinations. This resulted in an immediate 80% correspondence of assignments. The remaining 20% of the patients were assigned after interdisciplinary discussion and agreement.

2.3. Statistical analysis

The raw scale scores obtained on the SCL-90R and the STAI (X2) were transformed according to the manuals into t values. For the SCL-90R, sex-specific t values were calculated and for the STAI (X2) the sex- and age-specific norm values were used. The VAS Scales were used as they were (values 0–100).

Analysis of differences between the psycho-organic groups started with a multivariate analysis of variance (MANOVA) that also generated a univariate analysis of variance (ANOVA), followed by pair-wise post hoc tests (Scheffè tests) to reveal specific group differences. A more exploratory analysis for differences between psychiatric subgroups was done using exactly the same procedure and dependent variables for the diagnostic groups. The control variable "gender" was examined using the χ^2 test. Some subjects did not complete all the scales. The O, P, M, and I group percentages refer to the groups' proportions in the total sample of $N = 189$ patients. The statistical evaluation of the psychometric data only includes $N = 177$ persons due to missing data (see Tables 3 and 4). All of the patients from the P and M groups form the basis for the evaluation of the differences between the psychiatric subgroups. (see Tables 5 and 6)). Due to the explorative character of our study, there was no correction for multiple testing (alpha-inflation). Computations were carried out using SPSS for Windows, version 10. Alpha error was set to 5%.

3. Results

3.1. Control variables

The four subgroups (O, M, I, P) did not differ significantly in terms of sex distribution ($\chi^2 = 6.079$, $df = 3$, $P = .11$) or age (ANOVA, $F = 2.436$, $df = 3$, $P = .66$).

3.2. Psycho-organic groups: proportions and differences

Assignment of the 189 patients based on the groups described above resulted in the following proportions: Organic group: 50 patients (26.6%), Mixed group: 30 patients (16%), Psychiatric group: 99 patients (52.1%), Ideopathic group: 10 patients (5.3%). Neurologic diagnoses that describe the somatic diagnoses of the sample, or to be more precise, the Organic and Mixed groups, and the psychiatric diagnoses are shown in Tables 1 and 2.

The most frequent organic causes of dizziness were peripheral vestibular lesions and benign paroxysmal positional dizziness. This concurs with results of other authors (e.g., Brandt, 1999). The most frequent psychiatric disorders were anxiety and phobic disorders at 43.41% ($N = 56$), followed by the somatoform ones at 41.09% ($N = 53$) and depressive disorders at 15.5% ($N = 20$).

Table 1
Neurologic diagnoses

Diagnosis	Mixed group ($N = 30$)	Organic group ($N = 50$)
Peripheral vestibular lesion	13	20
Benign paroxysmal positioning vertigo	2	7
Menière's disease	4	
Central lesion	3	2
Basilar artery migraine		4
Inflammated CNS-disease	1	2
Commotio labyrinthii		5
Neurinoma lumbar spine		1
Brainstem contusion		1
Arachnoidal intracerebral cyst	2	
Megalodolichobasilaris	1	
Alport syndrome	1	
Cholesteatoma	1	
Cervical syndrome	1	
Parkinson's disease		1
Transient ischemic attack	2	6
Acusticus neurinoma		1

CNS: Central Nervous System.

Table 2
Psychiatric (DSM-IV) diagnoses

DSM-IV diagnosis	Psychiatric group ($N = 99$)	Mixed group ($N = 30$)
Depressive disorders		
296.2 Major depression, single episode	10	4
296.3 Major depression, recurrent episode		1
311 Depressive disorder, NOS	2	1
309.0 Adjustment disorder with depressed mood	1	1
Anxiety disorders		
300.01 Panic disorder without agoraphobia	7	1
300.21 Panic disorder with agoraphobia	11	3
300.22 Agoraphobia	3	
33.02 Generalized anxiety disorder	11	3
300.00 Anxiety disorder NOS	13	4
Somatoform disorders		
300.81 Somatization disorder	2	2
300.81 Undifferentiated somatoform disorder	1	
300.81 Somatoform disorder, NOS	13	2
300.11 Conversion disorder	25	8

NOS: Not otherwise specified.

3.3. Differences between the four diagnostic (Organic, Mixed, Psychiatric, Ideopathic) subgroups

Table 3 shows the differences between the groups on the SCL-90 R scales, on the anxiety scale of the STAI (X2), and the handicaps in work and daily activity.

Both the overall multivariate test ($F = 2.52$, $df1 = 45$, $df2 = 473$, $P < .001$) and all but one of the univariate tests (14 variables, details see Table 4) revealed significant group differences. Regarding the post hoc pair-wise group differences, some remarkable results emerged: across all comparisons, patients of the Mixed group are more similar to patients of the Psychiatric group than to those of the Organic group. This is demonstrated with particular clarity by the following variables: the SCL-90 R scales anxiety, phobic anxiety, depression, obsessive–compulsive and somatization as well as by the GSI of SCL-90R; and moreover on the anxiety scale of the STAI (X2); this means that the patients of the P and Mixed groups suffer much greater emotional distress than patients of the Organic group. With regard to their impairment at work and in daily activities, patients of the P and Mixed groups are also significantly more heavily strained than the patients of the O group. In contrast, the patients of the I group showed themselves to be quite similar to the patients of the O group for most variables, yet they differed from the patients of the P and Mixed groups.

Table 3
Means, standard deviations and sample sizes for the dependent variables split by diagnostic groups

	Diagnostic group									
	O (Organic) ($N = 49$)		P (Psychiatric) ($N = 90$)		M (Mixed) ($N = 28$)		I (Ideopathic) ($N = 10$)		All ($N = 177$)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
SCL90-R obsessive–compulsive	50.34	10.96	59.72	12.75	61.35	14.06	50.95	15.11	56.89	13.34
SCL90-R interpersonal sensitivity	49.58	11.17	53.67	12.56	55.45	13.29	48.62	12.54	52.54	12.42
SCL90-R depression	49.84	10.47	59.96	13.37	59.97	12.56	47.82	11.35	56.47	13.26
SCL90-R anxiety	51.74	12.88	64.92	13.08	62.92	14.79	56.24	15.94	60.46	14.55
SCL90-R hostility	49.48	11.99	55.57	13.07	55.51	11.53	49.71	12.55	53.54	12.74
SCL90-R phobic anxiety	51.69	12.53	64.74	14.83	62.20	14.07	54.85	12.91	60.17	15.03
SCL90-R paranoid ideation	48.63	10.69	51.82	12.66	58.05	13.92	51.98	14.74	51.93	12.73
SCL90-R psychoticism	54.72	11.31	59.85	11.28	61.07	12.98	52.41	10.72	58.20	11.79
SCL90-R Global Severity Index	52.22	12.87	64.46	12.87	64.13	12.43	52.78	15.40	60.36	14.05
SCL90-R somatization	58.95	12.48	69.84	10.92	70.24	12.38	60.09	12.24	66.34	12.65
STAI-X2 trait	50.39	8.86	57.48	9.91	58.82	10.34	45.40	13.67	55.05	10.66
VAS current suffering	18.47	23.55	37.63	26.25	32.39	23.32	9.10	15.53	29.89	26.23
VAS total suffering	52.08	26.44	62.66	21.02	67.82	21.79	43.00	31.63	59.44	24.19
Weeks off work	4.12	12.74	10.81	17.42	11.75	21.16	.30	.67	8.51	16.73
Length of disease in month	7.35	15.5	22.49	28.44	18.11	26.19	29.60	40.24	18.01	26.68

Organic group (O): vestibular or organic disorder—no psychiatric disorder; Mixed group (M): vestibular or organic disorder—psychiatric disorder; Psychiatric group (P): no vestibular or organic disorder—psychiatric disorder; Ideopathic group (I): no vestibular or organic disorder—no psychiatric disorder; VAS: Visual Analogue Scale/intensitiy of dizziness; SCL-90 R: Symptom Check List; and STAI-X2: State-Trait Anxiety Inventory X2.

Table 4
Statistical tests for diagnostic groups

	MANOVA/ANOVA (*F*-tests)				Post hoc Scheffè tests for group differences (*P*)					
	F	*df*1	*df*2	*P*	O–P	O–M	O–I	P–M	P–I	M–I
Multivariate	2.52	45	473	.001						
SCL90-R obsessive–compulsive	7.80	3	173	.001	.001	.004	.999	.949	.231	.176
SCL90-R interpersonal sensitivity	2.06	3	173	.108	.323	.260	.997	.931	.680	.521
SCL90-R depression	9.42	3	173	.001	.001	.009	.974	.999	.037	.073
SCL90-R anxiety	10.78	3	173	.001	.001	.008	.818	.925	.295	.614
SCL90-R hostility	3.05	3	173	.030	.061	.250	.999	.999	.580	.664
SCL90-R phobic anxiety	9.85	3	173	.001	.001	.021	.935	.872	.218	.569
SCL90-R paranoid ideation	3.39	3	173	.019	.558	.019	.896	.153	.999	.628
SCL90-R psychoticism	3.52	3	173	.016	.103	.149	.953	.971	.294	.249
SCL90-R Global Severity Index	11.41	3	173	.001	.001	.002	.999	.999	.066	.133
SCL90-R somatization	11.24	3	173	.001	.001	.001	.994	.999	.103	.139
STAI	9.88	3	173	.001	.001	.006	.555	.942	.005	.005
VAS current suffering	8.96	3	173	.001	.001	.131	.752	.809	.008	.090
VAS total suffering	5.03	3	173	.002	.095	.048	.741	.791	.100	.044
Weeks off work	2.94	3	173	.035	.159	.284	.930	.995	.303	.316
Length of disease in month	4.31	3	173	.006	.159	.284	.930	.995	.303	.316

Univariate *F*-tests and post hoc tests for the significance of specific group differences for the four diagnostic groups. Organic group (O), Mixed group (M), Psychiatric group (P), Ideopathic group (I). See text for further information.

Table 5
Means, standard deviations and sample sizes for the dependent variables split by Psychiatric group

	Psychiatric subgroup							
	Anxiety ($N = 54$)		Depressives ($N = 17$)		Somatoform disorder ($N = 47$)		All ($N = 118$)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
SCL90-R obsessive–compulsive	61.58	12.33	65.85	12.80	56.35	13.01	60.11	13.01
SCL90-R interpersonal sensitivity	56.50	12.99	57.22	11.95	50.20	11.85	54.10	12.70
SCL90-R depression	63.26	12.72	64.94	10.95	54.39	12.51	59.97	13.13
SCL90-R anxiety	70.37	11.88	59.87	12.90	59.30	12.84	64.45	13.47
SCL90-R hostility	57.80	13.21	57.09	13.59	52.42	11.26	55.56	12.68
SCL90-R phobic anxiety	70.22	13.58	60.72	13.54	58.39	13.68	64.14	14.64
SCL90-R paranoid ideation	54.61	13.33	55.77	15.24	50.90	12.09	53.30	13.18
SCL90-R psychoticism	62.20	12.04	61.86	10.51	57.16	11.18	60.14	11.66
SCL90-R Global Severity Index	68.64	11.53	66.08	10.77	58.88	12.82	64.38	12.71
SCL90-R somatization	72.05	9.47	71.38	11.41	66.99	12.54	69.94	11.23
STAI-X2 trait	59.13	10.63	62.77	9.01	54.47	8.52	57.80	9.98
VAS current suffering	39.15	25.31	48.88	25.42	28.70	23.97	36.39	25.58
VAS total suffering	67.18	20.26	64.47	21.62	59.87	21.93	63.88	21.23
Weeks off work	15.46	22.36	5.71	9.09	7.87	14.20	11.03	18.29
Length of disease in month	26.07	27.02	20.59	29.02	16.45	28.12	21.45	27.87

Table 6
Statistical tests and post hoc group comparison for Psychiatric groups

	MANOVA/ANOVA (*F*-tests)				Post hoc Scheffè tests for group differences (*P*)		
	F	*df*1	*df*2	*P*	A–D	A–S	D–S
Multivariate	2.34	30	200	.001			
SCL90-R obsessive–compulsive	4.18	2	115	.018	.481	.122	.033
SCL90-R interpersonal sensitivity	3.87	2	115	.024	.989	.043	.140
SCL90-R depression	8.02	2	115	.001	.889	.002	.013
SCL90-R anxiety	11.33	2	115	.001	.012	.001	.987
SCL90-R hostility	2.47	2	115	.089	.979	.103	.423
SCL90-R phobic anxiety	10.10	2	115	.001	.047	.001	.834
SCL90-R paranoid ideation	1.35	2	115	.264	.950	.372	.427
SCL90-R psychoticism	2.63	2	115	.076	.995	.094	.356
SCL90-R Global Severity Index	8.55	2	115	.001	.746	.001	.109
SCL90-R somatization	2.79	2	115	.065	.977	.077	.378
STAI	5.61	2	115	.005	.400	.056	.011
VAS current suffering	4.75	2	115	.010	.373	.112	.018
VAS total suffering	1.51	2	115	.225	.899	.227	.745
Weeks off work	3.12	2	115	.048	.153	.111	.913
Length of disease in month	1.52	2	115	.223	.777	.225	.870

Univariate *F*-tests and post hoc tests for the significance of specific group differences for the three psychiatric subgroups. A: anxiety patients, D: depressives, S: somatoform disorder patients. See text for further information.

3.4. Psychiatric subgroups: proportions and differences

One hundred and twenty-nine (68.3%) of the total sample of patients ($N = 189$) suffered from an acute psychiatric disorder. The highest percentage (30% of the total sample) comprised the anxiety and phobic disorders ($N = 56 = 43\%$ of the P and M groups), followed by the depressive (28% of the total sample) ($N = 53 = 41\%$ of the P and M groups) and the somatoform disorders (25% of the total sample) ($N = 47 = 36.4\%$ of the P and M groups).

The multivariate overall test for group differences was highly significant ($F = 2.34$; $df = 30, 200$; $P < .001$). As can be seen in Table 6, univariate group differences became significant for 8 of the 15 dependent variables.

A total of five significant post hoc tests could be found between the anxiety and the somatoform disorder group. These are all SCL-90R scales: interpersonal sensitivity ($P = .04$), depression ($P = .001$), anxiety ($P = .001$), phobic anxiety ($P = .001$), Global Severity Index ($P = .001$). The patients with anxiety and phobic disorders demonstrated the highest anxiety values (SCL-90R and STAI) compared to the depressive (SCL-90R scales anxiety, $P = .01$ and phobic anxiety, $P = .04$, pair-wise post hoc group comparisons [Scheffè tests]) and the somatoform disorders (SCL-90R scales anxiety, $P = .001$ and phobic anxiety, $P = .001$), and they show a higher interpersonal sensitivity (SCL-90R interpersonal sensitivity $P = .04$) and

greater psychic overall stress (SCL-90R GSI, $P = .001$) than patients with somatoform disorders. The patients with depressive disorders are more compulsive (SCL90 R scales: compulsiveness, $P = .033$), more depressive (SCL-90 R scale depression, $P = .01$) and more anxious (STAI, $P = .01$) than patients with somatoform disorders. The depressive patients feel most heavily burdened by the dizziness symptoms; the differences were only significant in comparison with the somatoform disorders (VAS scale strength of current suffering, $P = .02$).

4. Discussion

Among the patients we investigated, all of whom had the chief symptom of dizziness, we found four major subgroups: (1) patients with organic dizziness states who showed no psychiatric disorder, (2) patients with dizziness states who showed an acute psychiatric disorder but no organic lesion, (3) patients who showed both an organic lesion as well as an acute psychiatric disorder, and (4) an idiopathic group in whom neither organic nor psychopathological abnormalities could be detected. We were able to detect an acute psychiatric disorder in a total of 129 (=68.25%) of the patients. This proportion of psychiatric disorders is higher than percentages previously reported by other authors (Clark, Leslie, & Jacob, 1992; Clark et al., 1993, 1994a, 1994b; Eagger et al., 1992; Jacob et al., 1996; Kroenke et al., 1992; Kroenke, Hoffmann, & Einstadter, 2000).

The patients of the P and Mixed groups showed higher emotional distress, intensity of the complaints (VAS), impairment at work, duration of inability to work than the patients of the O group; their demand for medical attention was significantly higher; they were altogether under much greater stress from the dizziness symptoms than the patients of the Organic group. The patients of the Mixed group differed significantly in terms of the relevant dimensions (emotional distress, the intensity of the complaints, impairment at work, duration of inability to work, demand for medical attention) from the patients of the Organic group, yet they did not differ from the patients of the P group. Just like the patients of the P group, those of the Mixed group are handicapped to a distinctly greater degree by the dizziness in their work and daily activities. They report a subjectively higher severity of symptoms (VAS), show a distinctly higher degree of emotional distress, have a chronic course of illness, and incur higher medical costs due to the great number of physicians consulted and longer absences from work, etc. The Mixed Group possibly also should include patients with latent vestibular disorders (e.g., Mal de debarquement Syndrome, space phobia, visual vertigo, etc.) or delayed vestibular compensation following vestibular lesions that show a chronic course with high subjective impairment. Various mechanisms for symptom formation could be postulated in these patients; we have described these mechanisms elsewhere (Eckhardt-Henn et al., 1996) and we refer the reader to the excellent, recently published article by Furman and Jacob (2001).

In our patient collective, we found all of the psychiatric subgroups mentioned in Section 1. The anxiety and phobic disorders represented the largest proportion of the psychiatric subgroups (Psychiatric and Mixed groups), which confirms the results of many previous investigations that show the anxiety disorders as being the most relevant in patients with psychiatric dizziness (Alvord, 1991; Asmundson et al., 1998; Clark et al., 1992, 1994a, 1994b; Eagger et al., 1992; Eckhardt et al., 1996; Frommberger et al., 1994; Kroenke et al., 1992; Simon et al., 1998; Stein et al., 1994; Yardley, Burgneay, Nazareth, & Luxon, 1998a; Yardley, Owen, Nazareth, & Luxon, 1998b; Yardley, Verschuur, Masson, Luxon, & Haacke, 1992).

Our 37% anxiety disorder patients in the Mixed group confirms results of Eagger et al. (1992) who reported 41% anxiety disorders in patients with vestibular dysfunction. We found that 45% of the patients in the Psychiatric group (i.e., patients without vestibular disorders) suffered from anxiety disorders and with this proportion fall between the previously reported percentages of 6% (Sullivan et al., 1993) and 76% (Simpson et al., 1988).

According to our results, however, other psychiatric disorders must also be taken into account when diagnosing long-term dizziness symptoms, namely somatoform and depressive disorders. Surprisingly, in our study the somatoform disorders turned out to occur nearly as frequently as anxiety disorders. This means that the relevance of these disorders has been underestimated in previous studies and that they have to be taken into account in the differential diagnosis of psychiatric dizziness patients.

The patients of the Psychiatric group, in particular those with anxiety disorders, feel subjectively significantly more heavily strained and impaired in their daily life and occupational activities than the patients of our Organic group. The subjective strain is connected with the psychiatric disorder diagnosed.

In the case of the P group, let us assume hypothetically that the acute psychiatric disorder is the actual relevant disorder in need of treatment, and that the dizziness in this instance possibly is a symptom of this illness, i.e., is to be understood as a somatoform/functional symptom. In the Mixed group, the psychiatric disorder appears to more relevant for the form of the handicap and the subjective severity of symptoms than the organic lesion (e.g., Jacob et al., 1996; Staab, 2000). If so, an interdisciplinary treatment that includes psychiatric treatment would be superior to an exclusively somatic one. This connection has previously been observed by many other authors, but they have failed to interpret it in terms of a psychiatric disorder significant for dizziness (Rigatelli, Casolari, Bergamini, & Guidetti, 1984; Yardley, 1994; Yardley et al., 1992; Yardley, Britton, Lear, Bird, & Luxon, 1995). Only more recent papers point out that dizziness can be an expression of an underlying psychiatric illness (Furman & Jacob, 2001; Staab, 2000; Yardley, 2000).

The extent of the subjective impairment is connected with increased depression values, a high rate of medical care (medical examinations, visits to the doctor), i.e., higher medical costs and longer periods of inability to work (Angst, 1996; Bailey, Sloane, Mitchell, & Preisser, 1993; Beitman, Kushner, & Basha, 1992; Candilis & Pollack, 1997; Chignon, Lepine, & Ades, 1993; Ettigi, Meyerhoff, Chirban, &

Jacobs, 1997; Katon, 1996; Walker, Katon, Jemelka, & Byrne, 1992; Wells et al., 1989). As the subjective impairment increases, so does the danger of early retirement.

Our psychiatric subgroups show the usual differences to be expected, e.g., the patients with anxiety disorders have significantly higher values on the anxiety scales of the SCL-90R and the STAI than the patients with depressive and somatoform disorders; they show higher depression scores and a higher interpersonal sensitivity than the patients with somatoform disorders. Patients with depressive disorders show a higher rate of depression and compulsion than patients with somatoform disorders. This means that patients with psychiatric dizziness have ''typical'' psychiatric disorders and the symptom dizziness appears to be of subordinate meaning for the therapy; the psychiatric therapy is oriented towards the definitive therapies for anxiety, depressive and somatoform disorders. In contrast, dizziness patients with organic and comorbid psychiatric disorders (M group) should be administered interdisciplinary treatment; an anxiety-exposition therapy that specifically takes into account the symptom of dizziness might be useful (see Beidel & Horak, 2001; Clark & Swartz, 2001; Jacob, Whitney, Detweiler-Shostack, & Furman, 2001).

Our results underscore the importance of differentiated, psychiatric and psychometric diagnostics in patients with chronic dizziness. In patients with psychiatric dizziness illnesses or organic dizziness illnesses and comorbid psychiatric diseases such diagnostic measures could lead to an early differentiated and specifically psychiatric or interdisciplinary treatment. In doing so, we could reduce the great emotional distress and severe handicap of these patients, the strong tendency toward chronification and the high medical costs involved.

In this study we were able to show that patients in whom we diagnosed an underlying or comorbid psychiatric disorder by means of a clinical-structured interview also demonstrated correspondingly high scores in the results of the psychometric examination. As a consequence, we were able to substantiate our clinical diagnoses. At first glance this might appear obvious, but not if one considers that these patients first came to our outpatient clinic with the symptom dizziness and in most cases had already had a long course of illness behind them without any psychiatric disorder having been diagnosed. Our results show that the Symptom Check List (SCL-90 R) can be a useful instrument for screening psychiatric disorders in patients complaining of dizziness as the chief symptom.

This study has a number of important limitations. The study population may not be representative of a primary care population. The patients were referred to a special outpatient clinic by their primary physicians who were unable to identify the cause of the symptoms. Furthermore, patients older than 65 years were excluded from the study. The highest incidence of dizziness due to vascular or other organic causes has, however, been reported for this age group (see also Ettigi et al., 1997). This may be the reason for our high percentage of psychiatric diagnoses in 68.25% of our patients, which is significantly higher than the 30% rate cited in the literature. We did not implement the dynamic platform posturography

in our diagnostic measures; some studies exist that used this diagnostic method to demonstrate that some abnormalities could be detected in the posturography of a certain percentage of patients in whom all other electrophysiological findings (i.e., ENG) were normal (Furman, 1995; Girolamo et al., 1998; Goebel et al., 1997). Yet there are few posturographic studies on patients with non-organic (psychiatric) dizziness (Jacob, Furman, Durrant, & Turner, 1997a; Kantner, Rubin, Armstrong, & Cummings, 1991; Yardley, Luxon, Lear, Britton, & Bird, 1994). In a recent study, Krafczyk, Schlamp, Dieterich, Haberhauer, and Brandt (1999) analyzed postural sway in patients with phobic postural vertigo and a control group of healthy volunteers. They found an increase in higher frequency body sway in the PPV group, however, in their opinion this difference does not objectively impair postural stability; they favored a change in postural strategy due to anxious balance control rather than a sensorimotor dysfunction. Similar results were presented by Cevette, Puetz, Marion, Wertz, and Muenter (1995), Hoffmann, O'Leary, & Munjack (1994), Kantner et al. (1991), Robertson and Ireland (1995), and FitzGerald, Birchall, and Murray (1997). We found similar preliminary results in a new study in which we compared patients with organic dizziness (vestibular neuronitis) to patients with psychiatric dizziness (no pathologic results in the electrophysiologic tests but acute psychiatric disorder). These results are not yet published (Eckhardt-Henn, Schellmann, Maurer, & Thomalske, 2002). We would like to note that the methodological approach of our investigation is a field experiment (i.e., we were interested in forming preliminary hypotheses that are to be tested in subsequent studies). Further research is urgently required as to etiology and diagnosis of dizziness as well as how patients cope with the disorder and the effectiveness of psychotherapeutic and/or interdisciplinary therapy.

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