Chapter 1

General introduction

Otto R. Maarsingh
Defining dizziness

Although the word “dizzy” may sound modern and even has a slangy air, it goes back to the Old English “dysig” (9th century), meaning foolish or stupid. In The Pricke of Conscience (Stimulus Conscientiae), a religious poem written in the 14th century, the word “dysy”, was used for the first time to describe a whirling sensation in the head:

\[\text{The properties of old age [Book 1]}
\]

\[
(...) \\
\text{Than chaunges his complexcion} \\
\text{And his maners and his condicion;} \\
\text{Than waxes his hert hard and hevy,} \\
\text{And his heved feble and dysy;} \\
\text{Than waxes gaste seke and sare,} \\
\text{And his face rouncles, ay mare and mare;} \\
\text{His mynde es short when he oght thynkes,} \\
\text{His nese ofte droppes, his hand styntes,} \\
\]

\[
(...) \\
\text{[Then his complexion changes,} \\
\text{And his manners and his condition;} \\
\text{Then his heart becomes hard and heavy,} \\
\text{And his head feeble and dizzy;} \\
\text{Then his mental abilities become weak and ailing,} \\
\text{His face wrinkles, more and more,} \\
\text{His mind fails when he thinks of anything,} \\
\text{His nose often drips, his hands smell]}
\]

From a scientific perspective, dizziness is an imprecise term, referring to many different bodily sensations. Investigators in previous research used a variety of (combinations of) descriptions to define dizziness, including abnormal sensation of swaying, about to fall or veer to one side, environmental moving or rotating, falling
sensation, feeling about to faint or lose consciousness, feeling of unreality, impending black-out, loss of equilibrium, room spinning, sensation of motion, spinning sensation, swimmy-headedness, unsteadiness, vertigo, or wooziness. Other investigators did not define dizziness at all.

In a classic paper [1972], Drachman and Hart identified four dizziness subtypes. Vertigo is a false sensation that the body or the environment is moving (usually spinning). Presyncope is a feeling of light-headedness that is often described as a sensation of impending faint. Disequilibrium is a sense of unsteadiness that is primarily felt in the lower extremities, most prominent when standing or walking, and relieved by sitting or lying down. Other dizziness is a feeling not covered by the above definitions. It may include swimming or floating sensations, vague light-headedness, or feelings of dissociation. Although Drachman’s typology has stood the test of time, being widely accepted and frequently used, it has several drawbacks. First, the typology is authority-based and lacks empirical evidence. Second, many patients, especially older ones, report more than one dizziness subtype, reducing the discriminative value of this typology. Finally, the typology does not differentiate between acute and chronic dizziness. This differentiation may be important, because dizziness duration is an important risk factor for functional impairment.

The definition of dizziness used in this thesis includes the following – regularly used – terms by Dutch dizzy patients in general practice: dizzy (dizzy), duizeligheid (dizziness), draaierig (giddy or rotational sensation), evenwichtsstoornis (loss of equilibrium), flauwe (faint feeling), licht in het hoofd (light-headedness), onvast ter been (instability), onwelwording (becoming unwell), valneiging (tendency to fall), wankel ter been (unsteadiness), and zweverig (giddy).

Epidemiology of dizziness
Many researchers have reported on the epidemiology of dizziness (Appendix 1), both in community-based populations and in primary care populations. Studying these results, several conclusions can be made. First, dizziness is a common symptom among all adult age groups. Second, the prevalence of dizziness in the community is much higher than in primary care (15-50% vs. 1-5%), indicating that many people experience some form of dizziness, but only some visit a physician because of this symptom. Third, the prevalence of dizziness increases with age, both in the community and in primary care. Finally, among all adult age groups dizziness
is more common in women than in men, both in the community and in primary care. The results, however, give also food for thought. In the first place, definitions of dizziness used in previous research are often imprecise or absent; moreover, none of these studies used the same definition of dizziness. Furthermore, although a majority of dizzy patients are seen in general practice,7,32 most prevalence studies on dizziness are community-based and include a spectrum of patients not representative of general practice. Therefore, more detailed information about the epidemiology of dizziness in general practice is warranted.

Dizziness in older persons

In a sample of community-dwelling people aged 65 years or older, 30% reported episodes of dizziness during the last 6 months, increasing to 40% in persons between 80-90 years of age, and 55% in persons aged 90 years and older.11 In Dutch general practice, the prevalence of an episode of dizziness in patients above 65 is 2-5%.31,32 Commonly performed interventions by the general practitioner among older dizzy patients include a drug prescription (40%), information and advice (30%), additional diagnostic testing (10%), and a referral to a specialist (3%).32

In previous research, associations have been reported between complaints of dizziness and polypharmacy,10,11,17,33 multiple neurosensory deficits,23,25 impaired hearing,10,19, impaired vision11,19 locomotor disease,34-36 anxiety,6,10,37 depression,6,10,17,19,23,37,38 somatization,6,37 and cardiovascular disease.10,11,13,17,19,23 Because of the association between multiple characteristics and dizziness, coupled with the variability in frequency and duration and the multiplicity of sensations and triggering activities, Tinetti et al. suggested that dizziness may be a geriatric syndrome, similar to falling and delirium.10 According to Drachman, calling dizziness a “geriatric syndrome” carries a certain risk, as it suggests dizziness to be due to old age (i.e. not diagnosable nor treatable), whereas it is usually possible to identify one or more underlying disorders.39

Although dizziness is most prevalent among older persons, no single (national and international) guideline on dizziness provides specific information about the diagnostic approach of older dizzy patients.
Impact of dizziness

Although most disorders related to dizziness are not life-threatening, and dizziness does not seem to be associated with an increased risk of institutionalization or death (follow-up period of 12 months), dizziness can be very troublesome and lead to persistent limitations in daily functioning. Previous studies have described associations of dizziness with functional disability, an increased risk of falling, and worsening of depressive symptoms, self-rated health, falls efficacy/confidence, and social activities. Especially in older patients, impaired balance and complaints of dizziness are risk factors for serious falls and fractures. Many studies provided follow-up information on dizzy patients. In two studies performed in a primary care setting, 40-45% of dizzy patients were still symptomatic after 12-18 months. Researchers have described several predictors of persisting or handicapping dizziness, like dizziness duration longer than one year, daily dizziness, activity limitation due to dizziness, avoidance of situations that provoke dizziness, dizziness due to psychiatric causes, and the presence of three or more chronic conditions.

Several questionnaires have been developed for assessing the severity and effect of dizziness on patients’ quality of life, like the Dizziness Handicap Inventory (DHI), a screening version of the DHI (DHI-S), a short form of the DHI (DHIsf), the Vestibular Disorders Activities of Daily Living (VADL), the Activities-specific Balance Confidence (ABC) scale, the Vertigo Handicap Questionnaire (VHQ), the Vertigo, Dizziness, or Imbalance (VDI) questionnaire, the UCLA Dizziness Questionnaire (UCLA-DQ), and the Dizziness Factor Inventory (DFI). Until now, none of these questionnaires have been validated in a primary care setting.

Diagnosing dizziness

For clinicians, dizziness often represents a diagnostic challenge: it is a subjective sensation that depends on self-report, it may refer to several different and overlapping sensations, and it can be caused by a wide range of benign or serious conditions. Previous reported diagnoses in patients presenting with dizziness include peripheral vestibular conditions (e.g. vestibular neuronitis or benign paroxysmal positional vertigo), cardiovascular conditions (e.g. orthostatic hypotension or arrhythmia), cerebrovascular conditions (e.g. migraine or cerebral ischemia), neurological conditions (e.g. head injury or multiple sensory deficits), musculoskeletal conditions (e.g. physical deconditioning), psychiatric conditions (e.g. anxiety or
depressive disorder), metabolic conditions (e.g. anaemia or diabetes mellitus), and pharmacologic conditions (e.g. adverse drug effect).\textsuperscript{26, 67} Often, dizziness has more than one cause, especially in older patients.\textsuperscript{3, 14, 68} In previous studies, 10-40\% of dizzy patients remained undiagnosed, as well in primary care,\textsuperscript{32, 68-70} as in secondary/tertiary care.\textsuperscript{3, 25, 27, 48, 49, 71-74}

In the Netherlands, patients with dizziness are managed largely in primary care. From 1985 to 1995, Dutch general practitioners referred only 3\% of all dizzy patients to a medical specialist.\textsuperscript{32} However, most studies evaluating causes of dizziness have been performed among patients seen in emergency departments,\textsuperscript{48, 49, 74} or referred to secondary or tertiary care.\textsuperscript{3, 25, 27, 71-73, 75} Because of selective referral, the distribution of diagnoses in secondary/tertiary care patients is probably different from primary care patients. This hampers the application of findings established in secondary/tertiary care settings to patients in primary care. However, understanding the clinical epidemiology of dizziness in its corresponding population is an essential first step when evaluating dizziness.\textsuperscript{76} Therefore, more detailed information about the prevalence of causes of dizziness in general practice is necessary.

Practice guidelines on dizziness recommend the use of many diagnostic tests, like the measurement of pulse and blood pressure, the Dix-Hallpike manoeuvre, or the Romberg test (Appendix 2).\textsuperscript{77-87} However, these (often contradictory) recommendations are mainly expert-based and lack empirical evidence. Many authors have reported on diagnostic tests for the evaluation of dizziness, but only few investigated the diagnostic accuracy of these tests (i.e. how the results of the test under evaluation agree with the outcome of the reference standard).\textsuperscript{88} Furthermore, most of these diagnostic accuracy studies poorly represent daily clinical practice, on the level of study setting (mostly secondary/tertiary care, although most dizzy patients are managed at primary care level), study population (almost no older patients, although dizziness is most common among this subgroup; mostly a selection of patients with one specific diagnosis [e.g., vestibular disease] instead of patients visiting their physician because of the symptom dizziness), and study method (single test evaluations, although most diagnoses are grounded by a series of diagnostic tests; tests only suitable for use in secondary/tertiary care, although dizzy patients are first evaluated in primary care).

All together, it is necessary to carry out more diagnostic research on dizziness in a primary care setting.
Chapter 1

Study Dizziness in Elderly Patients (DIEP)

Most data reported on in this thesis have been collected as part of the study Dizziness In Elderly Patients (DIEP). DIEP was initiated by researchers from the Department of General Practice of the Academic Medical Center (AMC), University of Amsterdam, and the Department of General Practice and EMGO Institute for Health and Care Research, VU University Medical Center (VUmc), and it was financially supported by the Netherlands Organisation for Health Research and Development (ZonMW, No. 4200.0018). One of the reasons for initiating DIEP was the appearance of the guideline “Dizziness” of the Dutch College of General Practitioners [2002].87 The guideline pays much attention to the dizziness subtype vertigo and less attention to the subtypes presyncope and disequilibrium. Furthermore, in spite of the etiologic differences between younger and older patients, the guideline does not provide specific information about the diagnostic approach of older dizzy patients in general practice.

Objectives and outline of this thesis

The principle aim of this thesis is to obtain more insight into the epidemiology of dizziness in older patients, and to provide clinical guidance in the diagnostic approach of older dizzy patients in general practice.

In Chapter 2 we present the analysis of data obtained from the Second Dutch National Survey of General Practice. Aim of this analysis was to investigate the prevalence and incidence of dizziness reported by older patients in general practice, to describe their final diagnoses as recorded by the general practitioner, and to compare the clinical characteristics of dizzy patients with those of non-dizzy patients.

In Chapter 3 we report on the results of literature searches performed in MEDLINE, EMBASE, PsycINFO, CINAHL, and Gerolit. Aim of this systematic review was to assess and summarize the existing evidence about the accuracy of diagnostic tests for evaluating dizziness in primary care. In Chapter 3 we searched the databases of MEDLINE, EMBASE, PsycINFO, CINAHL, and Gerolit in order to assess and summarize the existing evidence about the accuracy of diagnostic tests for evaluating dizziness in primary care.
The results presented in Chapter 3 laid the foundation of the Delphi procedure, which we describe in Chapter 4. During this consensus procedure, an international expert panel used the collected evidence to determine which set of diagnostic tests should be part of a diagnostic protocol for evaluating dizziness in older patients in general practice.

The resulting set of diagnostic tests - as determined by the expert panel - was the starting point of a cross-sectional diagnostic study performed among 417 older dizzy patients seen by 45 general practitioners in 24 Dutch general practices, which we describe in Chapters 5, 6, and 7.

In Chapter 5 we present the results of the application of our diagnostic evaluation. For each dizzy patient, the results were independently reviewed by a panel consisting of a general practitioner, a geriatrician, and a nursing home physician, in order to describe subtypes of dizziness and to assess contributory causes of dizziness.

In Chapter 6 we describe how the test results were analysed using principal component analysis (PCA). This statistical technique can be used to summarize a large number of variables by identifying a small number of components, in which associated variables form a distinct pattern of profile. Aim of this analysis was to establish an empirical classification of diagnostic subtypes/profiles of dizziness in older patients in general practice.

In 15-40% of dizzy patients in primary care, psychiatric disorders may play a causative or contributory role. Compared to those without psychiatric disorders, dizzy patients with psychiatric disorders tend to have higher levels of self-perceived disability and are more likely to remain symptomatic and disabled. In Chapter 7 we focus on psychiatric disorders among older dizzy patients. Aim of the analysis presented in this chapter was to develop a prediction model for the presence of anxiety and/or depression in older dizzy patients in general practice.

In the general discussion (Chapter 8) the results of this thesis are linked together and put in a wider perspective, concluding with implications for future research and clinical practice.

The thesis concludes with a summary in both English and Dutch.


### Appendix 1. Reported prevalence rates of dizziness

#### I. Study population: community-based population

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Sample size</th>
<th>Definition of dizziness</th>
<th>Reported prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggarwal et al. (2000)</td>
<td>Age ≥65, recruited from participants in health and aging project (US, longitudinal study)</td>
<td>6,158</td>
<td>Not specified</td>
<td>65-74 years: 7% 75-84 years: 12% 76-85 years: 18% Men ≥65 years: 6% Women ≥65 years: 12%</td>
</tr>
<tr>
<td>Agrawal et al. (2009)</td>
<td>Age ≥40, recruited from survey among noninstitutionalized population (US, cross-sectional study)</td>
<td>5,086</td>
<td>Vestibular dysfunction, as measured by balance testing</td>
<td>40-49 years: 19% 50-59 years: 33% 60-69 years: 49% 70-79 years: 69% ≥80 years: 85% Men ≥40 years: 34% Women ≥40 years: 36%</td>
</tr>
<tr>
<td>Colledge et al. (1994)</td>
<td>Age ≥65, recruited from age/sex register of five general practices (UK, cross-sectional study)</td>
<td>893</td>
<td>Light-headedness, unsteadiness, vertigo, or no description</td>
<td>Men 65-69 years: 22% Women 65-69 years: 28% Men 70-74 years: 28% Women 70-74 years: 36% Men 75-79 years: 28% Women 75-79 years: 30% Men ≥80 years: 30% Women ≥80 years: 35%</td>
</tr>
<tr>
<td>Gassmann and Rupprecht (2009)</td>
<td>Age ≥65, recruited from registration office in two Germany cities, longitudinal study</td>
<td>620</td>
<td>Loss of balance, vertigo, near faint, or other</td>
<td>65-79 years: 27% 80-89 years: 38% ≥90 years: 54%</td>
</tr>
<tr>
<td>Jönssen et al. (2004)</td>
<td>Age ≥70, recruited from gerontological and geriatric population study (Sweden, longitudinal study)</td>
<td>2,011</td>
<td>Poor balance/general unsteadiness, rotation inside the head, rotatory vertigo, feeling of light-headedness, impending black-out, or feeling of unreality</td>
<td>Men 70 years: 29% Women 70 years: 36% Men 75 years: 28% Women 75 years: 32% Men 85 years: 46% Women 85 years: 51% Men 90 years: 44% Women 90 years: 54%</td>
</tr>
<tr>
<td>Kroenke and Price (1993)</td>
<td>Age ≥18, representative sample drawn from five US communities (longitudinal study)</td>
<td>13,538</td>
<td>Not specified</td>
<td>≥18 years: 23%</td>
</tr>
<tr>
<td>Neuhauser (2008)</td>
<td>Age ≥18, representative sample drawn from noninstitutionalized population (Germany, cross-sectional study)</td>
<td>4,869</td>
<td>Moderate or severe dizziness or vertigo</td>
<td>Men ≥18 years: 17% Women ≥18 years: 29%</td>
</tr>
<tr>
<td>Sloane et al. (1989)</td>
<td>Age ≥60, representative sample drawn from five US communities (longitudinal study)</td>
<td>1,622</td>
<td>Not specified</td>
<td>≥60 years: 34%</td>
</tr>
<tr>
<td>Stevens et al. (2008)</td>
<td>Age ≥65, recruited from the English Longitudinal Study of Ageing</td>
<td>2,925</td>
<td>Dizziness: not specified; impaired balance: as measured by balance testing</td>
<td>Dizziness: ≥65 years: 11% Impaired balance: ≥65 years: 22%</td>
</tr>
</tbody>
</table>
### Appendix 1 Continued

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Sample size</th>
<th>Definition of dizziness</th>
<th>Reported prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamber and Brussgaard (2009)</td>
<td>Age 30-76, sample from multi-purpose health survey in Norway (cross-sectional study)</td>
<td>17,638</td>
<td>Any trouble by faintness or dizziness</td>
<td>30 years: 26% 40/45 years: 27% 59/60 years: 28% 75/76 years: 36% Men 30-76 years: 23% Women 30-76 years: 34%</td>
</tr>
<tr>
<td>Tinetti et al. (2000)</td>
<td>Age ≥72, probability sample of community-living persons in New Haven (US, cross-sectional study)</td>
<td>1,087</td>
<td>Dizzy, unsteady, spinning or moving sensation, light-headed, or faint</td>
<td>≥72 years: 28%</td>
</tr>
<tr>
<td>Wiltink et al. (2008)</td>
<td>Age 14-90, representative sample of German population (cross-sectional study)</td>
<td>1,269</td>
<td>Not specified</td>
<td>14-90 years: 18%</td>
</tr>
<tr>
<td>Yardley et al. (1998)</td>
<td>Age 18-64, recruited from age/sex register of four general practices in the UK (cross-sectional study)</td>
<td>2,064</td>
<td>Vertigo, giddiness, light-headedness, wooziness, feeling faint, unsteadiness, or imbalance</td>
<td>Men 18-35 years: 17% Women 18-35 years: 29% Men 36-64 years: 19% Women 36-64 years: 25%</td>
</tr>
</tbody>
</table>
### Appendix 1 continued

#### II. Study population: primary care population

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Sample size</th>
<th>Definition of dizziness</th>
<th>Reported prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kroenke et al. (1990)</td>
<td>Age 21-70, consecutive patients attending an internal medicine clinic in the US (cross-sectional study)</td>
<td>410</td>
<td>Dizziness reported to be a “major problem” on one-time survey; dizziness not specified</td>
<td>21-70 years: 17%</td>
</tr>
<tr>
<td>Kruschinski et al. (2008)</td>
<td>All ages, data from electronic patient records of 138 general practices in Germany (cross-sectional study)</td>
<td>317,042</td>
<td>ICD-10 diagnoses related to dizziness: vertiginous syndrome, Ménière’s disease, Benign Paroxysmal Positional Vertigo, vestibular neuronitis, dizziness of central origin, dizziness/vertigo not specified</td>
<td>All ages: 3.4%</td>
</tr>
<tr>
<td>Okkes et al. (1996)</td>
<td>All ages, data from electronic patient records of 23 general practices in the Netherlands (longitudinal study, study period 10 years)</td>
<td>93,297*</td>
<td>Vertigo, abnormal sensation in one's head, dizzy, light-headedness, floating sensation, feeling of numbness during walking, drunk feeling, seeing everything at a distance, tendency to fall</td>
<td>Men 0-4 years: 0% Women 0-4 years: 0% Men 5-14 years: 0.2% Men 15-24 years: 0.4% Women 15-24 years: 1.1% Men 25-44 years: 0.4% Women 25-44 years: 1.0% Men 45-64 years: 0.9% Women 45-64 years: 1.6% Men 65-74 years: 1.9% Women 65-74 years: 2.8% Men ≥75 years: 3.0% Women ≥75 years: 5.4%</td>
</tr>
<tr>
<td>Sloane (1989)</td>
<td>All ages, sample of patients seen by general practitioners, family practitioners, general internists, and general pediatricians (cross-sectional study)</td>
<td>17,498</td>
<td>Vertigo-dizziness, falling sensation, giddiness, light-headedness, loss of equilibrium, or room spinning</td>
<td>0-14 years: 0.2% 15-24 years: 0.7% 25-34 years: 1.8% 35-44 years: 1.8% 45-54 years: 2.4% 55-64 years: 2.0% 65-74 years: 3.4% 75-84 years: 4.0% ≥85 years: 6.7%</td>
</tr>
<tr>
<td>Van der Linden et al. (2004)</td>
<td>All ages, data from electronic patient records of 104 general practices in the Netherlands (longitudinal study, study period 1 year)</td>
<td>400,912</td>
<td>Giddiness, feeling faint, light-headedness, loss of balance, woozy</td>
<td>Men 1-4 years: 0% Women 1-4 years: 0% Men 5-14 years: 0.1% Women 5-14 years: 0.3% Men 15-24 years: 0.3% Women 15-24 years: 0.8% Men 25-44 years: 0.4% Women 25-44 years: 1.2% Men 45-64 years: 1.1% Women 45-64 years: 1.8% Men 65-74 years: 2.0% Women 65-74 years: 3.6% Men ≥75 years: 3.8% Women ≥75 years: 5.4%</td>
</tr>
</tbody>
</table>

*: Patient years
# Appendix 2. Guidelines on dizziness, (pre)syncope, or vertigo

<table>
<thead>
<tr>
<th>Diagnostic test</th>
<th>AAN (V)</th>
<th>ACEP (V)</th>
<th>CKS (V)</th>
<th>DC (D/S)</th>
<th>DDC (D)</th>
<th>DDC (S)</th>
<th>EBM (S)</th>
<th>EBM (V)</th>
<th>ESC (S)</th>
<th>NHG (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Audiometry</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>2. Auscultation of the carotid artery</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3. Auscultation of the heart</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>4. Testing of (motor) coordination</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>5. Carotid sinus massage</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6. Dix-Hallpike manoeuvre</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7. ECG</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>8. ECG monitoring</td>
<td>0</td>
<td>?/+</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>9. Examination of the neck</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10. Screening for heart failure</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>11. Hopping</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12. Laboratory testing</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>?</td>
<td>?</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>?</td>
</tr>
<tr>
<td>13. Screening neurological examination</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>14. Nystagmus examination</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>15. Orthopaedic screening of the lower extremities</td>
<td>0</td>
<td>+</td>
<td>0</td>
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</table>

**D:** dizziness; **S:** (pre)syncope; **V:** vertigo

*+:* recommended; *-:* discouraged; *0:* not described; *?: additional value questioned

AAN: American Academy of Neurology, 2000
CKS: Clinical Knowledge Summaries, 2010
DC: Diagnostic compass, 2005
DDC: Diagnostics of daily complaints, 2008
EBM: Evidence-Based Medicine Guidelines, 2007 (vertigo) and 2010 (syncope)
ESC: European Society of Cardiology, 2004
NHG: Guideline of the Dutch College of General Practitioners, 2002

*: In Dutch “koorddansersgang”
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(53) Kurre A, Bastiaenen CH, van Gool CJ, Gloor-Juzi T, de Bruin ED, Straumann D. Exploratory factor analysis of the Dizziness Handicap Inventory (German version). BMC Ear Nose Throat Disord 2010;10:3.


