Usual care and management of fall risk increasing drugs in older dizzy patients in Dutch general practice

Hanneke Stam, Thomas Harting, Marjolijn van der Sluijs, Rob van Marum, Henriëtte van der Horst, Johannes C. van der Woud, and Otto R. Maarsingh

Department of General Practice and Elderly Care Medicine and EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, The Netherlands

ABSTRACT

Objective: For general practitioners (GPs) dizziness is a challenging condition to deal with. Data on the management of dizziness in older patients are mostly lacking. Furthermore, it is unknown whether GPs attempt to decrease Fall Risk Increasing Drugs (FRIDs) use in the management of dizziness in older patients. The aim of this study is to gain more insight into GP’s management of dizziness in older patients, including FRID evaluation and adjustment. Design: Data were derived from electronic medical records, obtained over a 12-month period in 2013. Setting: Forty-six Dutch general practices. Patients: The study sample comprised of 2812 older dizzy patients of 65 years and over. Patients were identified using International Classification of Primary Care codes and free text. Main outcome measures: Usual care was categorized into wait-and-see strategy (no treatment initiated); education and advice; additional testing; medication adjustment; and referral. Results: Frequently applied treatments included a wait-and-see strategy (28.4%) and education and advice (28.0%). Additional testing was performed in 26.8%; 19.0% of the patients were referred. Of the patients 87.2% had at least one FRID prescription. During the observation period, GPs adjusted the use of one or more FRIDs for 11.7% of the patients. Conclusion: This study revealed a wide variety in management strategies for dizziness in older adults. The referral rate for dizziness was high compared to prior research. Although many older dizzy patients use at least one FRID, FRID evaluation and adjustment is scarce. We expect that more FRID adjustments may reduce dizziness and dizziness-related impairment.

KEY POINTS
- It is important to know how general practitioners manage dizziness in older patients in order to assess potential cues for improvement.
- This study revealed a wide variety in management strategies for dizziness in older patients.
- There was a scarcity in Fall Risk Increasing Drug (FRID) evaluation and adjustment.
- The referral rate for dizziness was high compared with previous research.

Introduction

For general practitioners (GPs) dizziness is a challenging condition to deal with: dizziness may refer to a variety of sensations and the complaint dizziness may accompany harmless but also very serious conditions. Dizziness can refer to several sensations including a giddy or rotational sensation, a loss of balance, a faint feeling, light-headedness, instability or unsteadiness, a tendency to fall, or a feeling of everything turning black.[1] There is a broad etiologic spectrum of peripheral, central (neurological), and general medical causes for dizziness. Furthermore, several authors suggest that dizziness in older people might be a multifactorial geriatric syndrome.[2–6] A geriatric syndrome is defined as a specific symptom that is caused by multiple underlying factors, involving multiple organ systems that tend to contribute to the geriatric syndrome.[7]

It is important to know how GPs manage dizziness in older patients, in order to assess potential cues for improvement. Only few studies focused on the management of dizziness in primary care but these studies did not focus on older patients.[8–12]
A medication review should be part of the assessment of older patients with dizziness because it is assumed that medication is a contributory factor to dizziness in as much as 25% of these patients. However, it is unknown whether GPs consider if medication might contribute to the dizziness when they evaluate an older patient. Drugs that contribute to dizziness demonstrate a striking similarity with the list of Fall Risk Increasing Drugs (FRIDs). This similarity might be explained by the fact that dizziness increases the risk of falling and FRIDs are known to affect postural control. Therefore, the list of FRIDs might be a useful proxy for potential dizziness inducing medication. Recently, Harun and Agrawal recommended to reconsider the use of FRIDs when evaluating and treating dizzy patients.

The aim of this study is to gain more insight into the management of dizziness in older adults in general practice, with a focus on FRID evaluation and adjustment.

**Material and methods**

We used anonymized data from the database of the Academic Network of General Practice of VU University Medical Center (ANH-VUmc). The ANH-VUmc is a collaboration between VU University Medical Center and general practices located in an urban area of the Netherlands. The ANH-VUmc database contains anonymized routine health care data. Observational studies based on the ANH-VUmc database are carried out according to Dutch privacy legislation and are exempted from informed consent of patients.

**Identification of patients**

An electronic search strategy was applied to identify our target population: all patients aged 65 years and above who visited their GP because of dizziness in 2013. The database was searched for International Classification of Primary Care (ICPC) codes N17 “vertigo/dizziness” and H82 “vertiginous syndrome”. Additionally, we searched for dizziness in the full text records by searching for the Dutch equivalents of “dizz*” and “vertigo”.

We extracted the following data from anonymized patient records: patient characteristics (gender, age), characteristics of consultation for dizziness (type of consultation, date, ICPC diagnosis given by the GPs), characteristics of prescribed drugs (Anatomical Therapeutic Chemical (ATC) classification, prescription date) and information on symptoms, physical examination, diagnostic evaluation, and treatment.

**Data analysis**

We used descriptive analyses to describe the study population and to categorize treatment modalities. Practice list sizes were available and prevalence rates were calculated using the mid-time population. Age groups were compared with Chi-square tests and logistic regression analysis.

**Results**

Figure 1 presents a flowchart of the study selection process. A total of 2812 older dizzy patients were included in the sample.
Table 1 presents the clinical features of the total study population of 2812 older dizzy patients. The median age of the population was 76 years (range: 65–101). The majority of the patients was female (67.3%). The 12-month prevalence of dizziness was 11.8%. The prevalence of dizziness significantly increased with age ($\chi^2$ (linear-by-linear) = 354, df = 1, $p < 0.001$). The median consultation frequency for dizziness was 1 (range: 1–23), 444 patients (15.8%) had more than 3 consultations in the dizziness episode. The mean follow-up time after the first consultation was 199 days (range: 1–365), 94.7% of the sample could be followed up more than one month. The most frequently recorded diagnoses for dizziness were symptom diagnoses (32.0%), cardiovascular conditions (18.2%), and peripheral vestibular diseases (10.5%).

Table 2 provides an overview of treatment modalities. Frequently applied treatments by GPs were a strategy of wait-and-see ($n = 799$, 28.4%) and providing education and advice ($n = 786$, 28.0%). Additional tests were performed to 755 patients (26.8%), of which blood analyses ($n = 622$, 22.1%) were most often carried out. Medication was prescribed and adjusted in 526 patients (18.7%). Finally, 533 patients (19.0%) were referred to a medical specialist. Patients were most often referred to a neurologist ($n = 136$, 4.8%), cardiologist ($n = 110$, 3.9%), and physiotherapist ($n = 65$, 2.3%).

The use of FRIDs and the frequencies of all FRID medication adjustments are displayed in Table 3. The patients were prescribed a mean of 3.1 FRIDs (SD 2.1). As many as 87.2% of the patients had at least one FRID prescription. FRID’s were adjusted in 330 patients (11.7%). GPs reduced a FRID dose for 111 patients (3.9%) and discontinued FRID for 199 patients (7.1%). For 20 patients GPs both reduced the FRID dose and discontinued a FRID. Dose reductions of FRIDs...
significantly increased with age (10 year odds ratio 1.36; 95% confidence interval 1.10–1.69).

Discussion

Principal findings

We performed this study to gain more insight into the management of dizziness in older adults in general practice. Frequent treatments included a wait-and-see strategy (28.4%) and education and advice (28.0%). Additional tests were carried out for 26.8% of the sample. For 11.7% of the patients GPs adjusted FRID prescription. The frequency of dose reductions of FRIDs significantly increased with age. GPs referred 19.0% of the older dizzy patients to specialized care.

The prevalence of dizziness was 11.8%. Cardiovascular conditions and peripheral vestibular disease were most often recorded as cause of dizziness. The GP recorded a symptom diagnosis in 32% of the patients. In 3.9% of the patients the GP did not record a diagnosis at all.

Strengths and weaknesses

Prior to this study, few studies have investigated the management of dizziness in older patients in general practice.[8–10] To our knowledge, this is the first study that investigates adjustments of FRIDs for older dizzy patients.

In the Netherlands, all patients are registered with a GP. The GP provides care and acts as a gatekeeper to specialized care. As a consequence, data presented in this study are a proper reflection of the prevalence and management of older dizzy people in general practice.

By using a dataset derived from electronic medical records (EMRs) we were able to identify a large sample of older patients with dizziness. However, we note that the quality of data depends on the accuracy of registration by GPs. Yet, GPs who participate in the general practice-based registration network where data for this study is derived from, are annually trained on registering and coding of medical data.

Findings in relation to other studies

Only a small number of studies investigated the management of dizziness in general practice.[8–11] A wait-and-see strategy was also frequently seen in a previous study with dizzy patients of both younger and older age.[9] Observation, reassurance, and advice to change behavior tended to be used in older dizzy patients in this study of Sloane et al. [9] In three studies with younger and older adults, drugs were prescribed to 60–90% of the patients,[8–10] which is much more frequent than in our sample. The high rate of referral to specialized care (19.0%) in this study is remarkable; international studies reported 4–16% referrals [8–10] and Dutch studies reported referral rates of 3.2–4.5%.[20,21] Several studies demonstrate that GPs’ referral decisions are influenced by a complex mix of patient, physician, and health care system structural characteristics.[22–24] As the Dutch health care system did not change, changes in patient’s expectations, doctor’s perceptions of patients expectations reassurance for the patient) might have influenced the referral rate. It is unknown whether the referrals were effective in achieving their objectives and whether they were cost-effective.

This is the first study that focussed on the use and adjustments of FRIDs in older dizzy patients. FRID use was quite high in our study sample, with a mean of 3.1 FRID prescriptions per patient. This is similar to the mean of FRID prescriptions in a study of older patients.

Table 2. Overview of management of 2812 older dizzy patients.

| Management Type                                      | n (%)    |
|-----------------------------------------------------|----------|
| Wait-and-see (no treatment)                          | 799 (28.4) |
| Education and advice                                |          |
| Vestibular training exercises                        | 87 (3.10) |
| Breathing exercises                                  | 5 (0.20)  |
| Other education or advice                            | 709 (25.2) |
| Total*                                               | 786 (28.0) |
| Additional test                                      |          |
| Blood analysis                                       | 622 (22.1) |
| Urine analysis                                       | 89 (3.20)  |
| Electrocardiography                                  | 65 (2.30)  |
| 24-h blood pressure monitoring                       | 41 (1.50)  |
| Other                                                 | 34 (1.20)  |
| Total*                                               | 755 (26.8) |
| Medication prescription and medication adjustment    |          |
| Prescription of antiemetics                          | 83 (3.00)  |
| in dizziness caused by Mènière’s disease             | 7 (0.20)   |
| in other dizziness of vestibular origin              | 52 (1.80)  |
| in other types of dizziness                          | 84 (3.00)  |
| Adjustment of FRIDs                                  |          |
| dose reduction                                       | 131 (4.70) |
| discontinuation                                      | 219 (7.80) |
| Total*                                               | 526 (18.7) |
| Referral                                             |          |
| Neurologist                                          | 136 (4.80) |
| Cardiologist                                         | 110 (3.90) |
| Physical therapist                                   | 65 (2.30)  |
| Internist                                            | 58 (2.10)  |
| Otolaryngologist                                     | 37 (1.30)  |
| Geriatrician                                         | 25 (0.90)  |
| Ophthalmologist                                      | 19 (0.70)  |
| Psychotherapist                                      | 16 (0.60)  |
| Other                                                 | 112 (4.00) |
| Total*                                               | 533 (19.0) |

*Total number of patients. As some patients had multiple tests, adjustments or referrals, the sum of individual items does not add up to the total.

BPPV: benign paroxysmal positional vertigo; FRIDs: fall risk increasing drugs.

significantly increased with age (10 year odds ratio 1.36; 95% confidence interval 1.10–1.69).
plus a fall history and a study with frail aged patients (3.3 and 3.4, respectively).[16,25]

GPs discontinued a FRID or reduced the dose of a FRID for 11.7% of the patients. Other management strategies were carried out in 19.0–28.4% of our sample. Compared with other management strategies, FRID adjustment was carried out the least frequent. In a qualitative study on situations in which GPs associate FRIDs with falls, drug use was often not perceived as a prominent factor.[26] One situation leading to a consideration of the drug prescribed was if a patient had fallen or presented with a symptom such as dizziness. However, the paradox of not being able to predict the outcome of changes in drug treatment was perceived as challenging and uncomfortable; the GPs believed that it might be better not to change prescriptions instead.[26] In other research on de-prescribing of medication, four main themes of doctor-related barriers are described: lack of awareness on consequences of polypharmacy; inertia or devolving of responsibility; lack of skills and knowledge; and presumed lack of feasibility.[27] Evidently, adjustment of medication seems difficult. However, given the fact that 87.2% of the patients were having at least one prescribed FRID in this sample, there is ample room for improvement by adjusting more FRID medication. A medication review, and evaluation and adjustment of FRIDs in particular, may be a simple and effective management strategy to reduce dizziness and dizziness-related impairment in older patients. FRIDs can also be adjusted if the cause of dizziness has not yet been identified.

The prevalence of dizziness in older adults seems higher than previously reported. Maarsingh et al. reported a dizziness prevalence of 8.3%, whereas this study revealed a dizziness prevalence of 11.8% in a highly comparable sample.[28] Furthermore, Sloane et al. reported a dizziness prevalence of 7.0% in patients aged 85 years and above.[8] Drug prescription has increased,[29] with higher rates of adverse drug reactions as a result. This may have resulted in a higher prevalence of dizziness in older patients, as adverse drug reactions are thought to contribute to dizziness.[13] On the other hand, GPs who participate in the general practice-based registration network where data for the current study is derived from, are annually trained on registering and coding of medical data. This may have caused higher registration rates by GPs in this study. It is important to continue monitoring whether dizziness prevalence in older adults is rising, because this will increase the burden of dizziness on society, health care systems, and individuals.

In 35.9% of this sample GPs recorded a symptom diagnosis or did not record a diagnosis at all. In a similar study, GPs recorded a symptom diagnosis in 40.0% of the patients.[28] This high rate of unknown cause of dizziness may be the result of difficulties for GPs to establish the origin of dizziness.

### Table 3. Use, adjustments, and new prescription of FRIDs of 2812 older dizzy patients.

| Drug group                  | Use of FRIDs n (%)<sup>a</sup> | Dose reductions n (%)<sup>b</sup> | Discontinuation n (%)<sup>b</sup> | Newly prescribed n (%)<sup>b</sup> |
|-----------------------------|--------------------------------|----------------------------------|----------------------------------|----------------------------------|
| **Cardiovascular FRIDs**    |                                |                                  |                                  |                                  |
| Diuretics                   | 1199 (42.6)                    | 27 (2.3)                         | 56 (4.7)                         |                                  |
| β-Blockers                  | 1144 (40.7)                    | 35 (3.1)                         | 24 (2.1)                         |                                  |
| Calcium channel blockers    | 654 (23.3)                     | 19 (2.9)                         | 33 (5.0)                         |                                  |
| Angiotensin converting enzyme inhibitors | 714 (25.4) | 17 (2.4)                         | 19 (2.7)                         |                                  |
| Angiotensin receptor blockers | 620 (22.0)                   | 13 (2.1)                         | 9 (1.5)                          |                                  |
| Nitrates                    | 343 (12.2)                     | 3 (0.9)                          | 4 (1.2)                          |                                  |
| Antiarrhythmic agents       | 61 (2.2)                       | 1 (0.6)                          | 0 (0)                            |                                  |
| Digoxin                     | 97 (3.4)                       | 0 (0)                            | 0 (0)                            |                                  |
| **Psychotropic FRIDs**      |                                |                                  |                                  |                                  |
| Antivertigo drugs           | 239 (8.52)                     | 0 (0)                            | 7 (2.9)                          | 143 (59.8)                      |
| Analgesics (opioids)        | 524 (18.6)                     | 13 (2.5)                         | 23 (4.4)                         |                                  |
| Anxiolytics and hypnotics   | 815 (29.0)                     | 5 (0.6)                          | 8 (1.0)                          |                                  |
| Antidepressants             | 389 (13.8)                     | 4 (1.0)                          | 8 (2.1)                          |                                  |
| Neuroleptics                | 91 (3.22)                      | 2 (0.6)                          | 3 (0.6)                          |                                  |
| α-blockers and anticholinergics | 330 (11.7) | 1 (0.3)                          | 14 (4.2)                         |                                  |
| Hypoglycaemics              | 508 (18.1)                     | 3 (0.6)                          | 3 (0.6)                          |                                  |
| Antihistamines              | 292 (10.4)                     | 1 (0.3)                          | 1 (0.3)                          |                                  |
| β-Blocker eye drops         | 98 (3.52)                      | 0 (0)                            | 0 (0)                            |                                  |
| Other FRIDs                 | 471 (16.7)                     | 3 (0.6)                          | 27 (0.6)                         |                                  |
| No FRID use                 | 359 (12.8)                     | na                               | na                               | na                               |
| **Total medication adjustments** | na                       | 131 (4.7)<sup>c</sup>          | 219 (7.8)<sup>d</sup>            | (140)<sup>e</sup>               |

<sup>a</sup>Percent of patients being prescribed at least one drug of the displayed fall risk increasing drug categories during 2013.
<sup>b</sup>Percent of patients with at least one FRID adjustment per FRID group.
<sup>c</sup>In 14 patients, two medications were reduced in dose, in one patient three medications were reduced in dose.
<sup>d</sup>In 20 patients two medications were stopped.
<sup>e</sup>In 3 patients two antivertigo drugs were prescribed.

FRID: Fall Risk Increasing Drug; na: not applicable.
Meaning of the study: implications for clinicians and research

Compared with other management strategies, FRID adjustments were carried out the least. We recommend to always evaluate the use of FRIDs for older dizzy patients and to consider adjustment. The use of FRIDs should be discontinued if no health risks are involved by discontinuation or the dose of FRIDs should be reduced when discontinuation is not an option.

The referral rate for dizziness was high compared with previous research. Therefore, it is important to investigate whether referrals for dizziness are effective in achieving their objectives and whether they are cost-effective.

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Ethical approval

The ANH-VUmc database contains anonymized routine health care data. Observational studies based on the ANH-VUmc database are carried out according to Dutch privacy legislation and are exempted from informed consent of patients.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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