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Letter to the Editor

Patterns of cardiovascular drugs prescribed for an elderly Swedish population

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To the Editor,

Cardiovascular diseases (CVDs), such as coronary heart disease, atrial fibrillation, heart failure and stroke, are increasingly common as people age. Therefore, cardiovascular drugs are the most frequently prescribed medications for preventive and therapeutic purposes among older adults [1]. However, several factors make cardiovascular drug treatment in elderly people complicated. Age-related pathophysiological changes in the cardiovascular system, liver and kidney can affect the pharmacokinetics and pharmacodynamics of commonly used drugs, which makes older persons more vulnerable to adverse drug events [2]. Additionally, most clinical trials have been conducted in younger and healthier patient populations, leaving limited evidence on the benefits and harms of prescribing cardiovascular drugs to frail older patients. Indeed, cardiovascular drugs are responsible for a large proportion of adverse drug reactions (ADRs) among older people. Therefore, monitoring cardiovascular drug therapy among older population is crucial to help reduce ADRs. A few observational studies have described the use of specific cardiovascular drugs (i.e., beta-blockers, diuretics) among the oldest-old [3,4], but there is a lack of large population-based studies that provide an assessment of a broad range of prescribed cardiovascular drugs within older people from a general population. In this study, we aim to investigate the patterns of use of cardiovascular drugs with respect to age, sex and CVDs among older people (≥60 years) in a Swedish cohort.

Data were from the baseline survey of the Swedish National study on Aging and Care in Kungsholmen (SNAC-K) (www.snac-k.se). The SNAC-K was approved by the Regional Ethical Review Board in Stockholm, and informed consent was obtained from all participants. The SNAC-K participants included elderly people aged ≥60 years, living either in institutions or in their own homes in the Kungsholmen district in central Stockholm, Sweden [5]. The sampling was stratified into different age cohorts and years of interval for assessment, i.e., a six-year interval for the younger-age cohorts (60, 66, 72, and 78 years) and a three-year interval for the older-age cohorts (81, 84, 87, 90, 93, 96, and 99+ years). Of the 5111 persons who were initially invited for participation, 4590 were alive and eligible, and 3363 (73.3%) eventually participated in the baseline examination (March 2001–June 2004). Data on age, sex, education, lifestyle factors, medical conditions (e.g., diabetes, high cholesterol, hypertension, CVDs), and current use of medications (e.g., antihypertensive agents, lipid-lowering agents) were collected through interviews by nurses and clinical examinations by physicians [5]. Information on the use of medications was further verified by inspecting drug prescriptions and containers. Heart failure, coronary heart disease (CHD), atrial fibrillation, and stroke were considered the main CVDs. Information on history of CVDs was taken from either self-reports or the computerized inpatient register system that covers all hospitals in Sweden since 1969. Medications were classified according to the Anatomical Therapeutic Chemical (ATC) classification system [6]. The classes of cardiovascular drugs included antithrombotic agents (ATC code B01), cardiac therapy (C01), diuretics (C03), beta-blockers (C07), calcium channel blockers (C08), renin–angiotensin system (RAS)-acting agents (C09), and lipid-lowering drugs (C10). The crude prevalence of drug use was standardized using the local age- and sex-specific census data of the Kungsholmen community. Descriptive statistics were performed by using IBM SPSS Statistics 22 for Windows (IBM SPSS Inc., Chicago, Illinois, USA).

Of all the participants, 15 had missing information on drug use, leaving 3348 people for this analysis. The mean age of participants was 74.3 (SD, 11.2) years, and 64.8% were women.

Overall, antithrombotic agents were most commonly prescribed (26.4%), followed by diuretics (21.7%) and beta-blockers (19.2%). The prevalence of the use of other classes of cardiovascular drugs was

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Table 1
Crude and age- and sex- standardized prevalence (per 100 population) of cardiovascular drug class use by sex (N = 3348). Abbreviations: ATC, Anatomical Therapeutic Chemical; CI, Confidence interval; RAS, renin-angiotensin system.

	Total			Men			Women		
Classes of cardiovascular drugs (ATC code)	n	Crude (95% CI) (%)	Standardized[a] (95% CI) (%)	n	Crude (95% CI) (%)	Standardized[a] (95% CI) (%)	n	Crude (95% CI) (%)	Standardized[a] (95% CI) (%)
Antithrombotic agents (B01)	883	26.4 (24.9–27.9)	28.0 (27.0–28.9)	296	25.1 (22.6–27.6)	26.1 (24.4–27.7)	587	27.1 (25.2–29.0)	29.0 (27.7–30.1)
Cardiac therapy (C01)	449	13.4 (12.2–14.6)	14.7 (14.0–15.5)	139	11.8 (10.0–13.6)	12.9 (11.7–14.2)	310	14.3 (12.9–15.8)	15.7 (14.7–16.7)
Diuretics (C03)	726	21.7 (20.3–23.1)	23.3 (22.3–24.2)	220	18.6 (16.4–20.9)	19.5 (18.0–21.0)	506	23.3 (21.6–25.1)	25.3 (24.1–26.4)
Beta-blockers (C07)	643	19.2 (17.9–20.5)	20.0 (19.1–20.8)	217	18.4 (16.2–20.6)	19.1 (17.7–20.6)	426	19.6 (18.0–21.3)	20.4 (19.3–21.5)
Calcium channel blockers (C08)	331	9.9 (8.9–10.9)	10.0 (9.4–10.7)	110	9.3 (7.7–11.0)	9.5 (8.4–10.5)	221	10.2 (8.9–11.5)	10.3 (9.5–11.2)
RAS-acting agents (C09)	414	12.4 (11.3–13.5)	12.6 (11.8–13.3)	149	12.6 (10.7–14.5)	13.0 (11.7–14.2)	265	12.2 (10.8–13.6)	12.4 (11.5–13.2)
Lipid-lowering agents (C10)	397	11.9 (10.8–13.0)	11.6 (10.9–12.3)	154	13.1 (11.1–15.0)	13.1 (11.8–14.3)	243	11.2 (9.9–12.5)	10.9 (10.0–11.7)

[a] The prevalence was standardized using the age- and sex- specific census data in the Kungsholmen district.

13.4% for cardiac therapy, 9.9% for calcium channel blockers, 12.4% for RAS-acting agents, and 11.9% for lipid-lowering agents. The prevalence for use of prescribed cardiovascular drug class was higher in women than in men for cardiac therapy (14.3% vs. 11.8%, $P < 0.05$) and diuretics (23.3% vs. 18.6%, $P < 0.05$) (Table 1). The gender difference in use of these classes of cardiovascular drugs is in line with a previous report from Sweden [4]. After standardization by age and sex, the overall rates were only slightly changed.

The prevalence of use of antithrombotic agents, cardiac therapy, and diuretics increased with higher age ($P_{trend} < 0.001$). The prevalence of use of beta-blockers increased gradually until the age of 81 years and declined thereafter (Fig. 1). This decline could reflect a higher predisposition for side effects among the oldest old, such as hypotension and bradycardic effects, due to impaired cardiac function [7].

The prevalence of various classes of cardiovascular drugs by major CVDs is presented in Table 2. Use of RAS-acting agents, such as ACE inhibitors, has been considered to be cost-effective that significantly reduces mortality and hospitalization in older patients with heart failure [8]. However, in our study only 13.8% of patients with heart failure used this class of drugs, which is below the optimal level [9]. Antithrombotic agents were used by only 29.2% of people with a history of atrial fibrillation, which is also an inadequate level compared to the reports from a previous study [10]. While our study suggests that pharmaceutical management of community-dwelling patients with certain CVDs could be improved, it may also indicate frequent contraindications to antithrombotics and a high risk of potential bleeding among elderly patients.

In conclusion, cardiovascular drugs are used extensively among older people. We also detected a possible insufficient treatment with RAS-acting agents in patients with heart failure and antithrombotic agents in those with atrial fibrillation. Further epidemiological research is needed to help improve cardiovascular drug therapy in older people.

Conflict of interest

The authors have no conflict of interest to disclose.

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