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Original Study

Treatment of Cardiovascular Diseases Among Elderly Residents of Long-term Care Facilities

Anna Kańtoch MD [a,*], Barbara Gryglewska MD, PhD [a], Jadwiga Wójkowska-Mach MS, PhD [b], Piotr Heczko MD, PhD [b], Tomasz Grodzicki MD, PhD [a]

[a] *Department of Internal Medicine and Gerontology, Faculty of Medicine, Jagiellonian University Medical College, University Hospital in Kraków, Kraków, Poland*
[b] *Department of Microbiology, Faculty of Medicine, Jagiellonian University Medical College, Kraków, Poland*

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A B S T R A C T

Background: The prevalence of cardiovascular diseases among nursing home residents is high but little is known whether pharmacologic therapy recommended by actual medication guidelines is followed by facility's staff.
Aim: To evaluate the adherence to actual guidelines for treatment of cardiovascular diseases among older adult residents of long-term care (LTC) facilities.
Material and methods: The cross-sectional study was performed from December 2009 to November 2010 among 189 elderly residents aged ≥60 years in 3 LTC facilities in Poland: 1 long-term care hospital (LTCH) and 2 nursing homes (NHs). The initial evaluation included analysis of medical documentation (all diagnosed diseases and used drugs), blood pressure (BP) measurements and performance of Mini Nutritional Assessment Short-Form (MNA-SF), Abbreviated Mental Test Score (AMTS), Activities of Daily Living (ADL) score, and Barthel Index. Prescribed medication for hypertension (HT), heart failure (HF), and coronary heart disease (CHD) were compared to current European Cardiology Society (ESC), and European Society of Hypertension (ESH) medication guidelines. Residents were divided into 3 subgroups: with HT, HF, and CHD. Results were presented as means and standard deviation. Groups were compared using Mann-Whitney *U* test for nonparametric data and chi-square test to assess differences in distribution of categorical variables. *P* values <.05 were considered statistically significant.
Results: CHD was diagnosed among 114 residents (60.3%) but only 60.5% of them were treated with aspirin (ASA), 45.6% with beta-blockers (BBs), 60.5% with angiotensin-converting enzyme inhibitor (ACEI), and 24.6% with statins. HF observed in 75% of cases was treated by using ACEI (54.7%), BBs (45.3%), loop diuretics (LDs, 36%), mineralocorticoid-receptor antagonists (MRAs, 21.3%). HT was diagnosed among 98 study participants (51.9%) and in the majority of cases (76.6%) was well controlled (mean BP: 133.7 ± 17.6/73.8 ± 10.2 mmHg). The most popular antihypertensive drugs were ACEIs (77.6%), BBs (40.8%) and calcium channel blockers (CCBs, 26.5%) whereas thiazides, alpha-blockers (ABs), and angiotensin receptor blockers (ARBs) were used less frequently.
Conclusion: In summary, the study showed that insufficient treatment of cardiovascular diseases among elderly residents of LTC facilities could be a potential risk factor of poor prognosis.

Cardiovascular diseases (CVDs) are the leading major cause of morbidity, disability, hospitalization, and mortality among older adults not only in Europe but also in other continents.[1] WHO indicated that more people die annually from CVD than from any other cause.[2] According to European Cardiovascular Disease Statistics (2017), each year CVD causes about 3.9 million deaths in Europe (45% of all deaths).[3] These facts could be motivation for experts to create and provide the guidelines for how cardiovascular diseases should be treated among different age groups, including nursing home

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* Address correspondence to Anna Kańtoch, MD, Department of Internal Medicine and Gerontology, Jagiellonian University Medical College, University Hospital in Kraków, 10 Śniadeckich Street, Kraków 31-531, Poland.
E-mail address: anna.kantoch@gmail.com (A. Kańtoch).

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residents. In fact, the elderly population seems to be the most difficult group to manage because of their multimorbidity and polypharmacy. A retrospective cross-sectional study of 2707 elderly home care patients revealed that inappropriate medication prescription based on Beers Criteria oscillated from 5.8% in Western Europe to 41.1% in Eastern Europe.[4] The similar situation was noted in United States among elderly patients receiving home health care—the prevalence of potentially inappropriate medications (PIMs) was also high (38%) and polypharmacy was associated with an increased risk of PIM use.[5] The worst statistics concerning PIM phenomenon came from nursing homes: 10.5% to 54.7%.[6]

The recent expert opinion of the European Society of Hypertension–European Union Geriatric Medicine Society (ESH-EUGMS) Working Group suggested that antihypertensive treatment among frail, very old patients should be individualized and that the frailty and clinical status should be monitored on a frequent basis.[7] It was the first official document to present the management of hypertension (HT) in very old, frail subjects. Unfortunately, there is still a lot of controversy and missing data on how institutionalized geriatric population should be treated. There are no available guidelines or algorithms for management of cardiovascular diseases in institutionalized settings. Residents of long-term care (LTC) facilities are the specific target group often disabled, frail, with cognitive impairment, chronic disabling diseases, malnourished and with impairments in activities of daily living so there are difficulties in recruiting study participants from this kind of population.[8] These factors could make cardiovascular treatment difficult to choose for doctors and to adopt by their patients. A systematic review of observational studies performed by Welsh et al characterized these populations as follows: the majority of nursing home residents are female (71%) and in the mean age of 82 years with a high prevalence of comorbidity: coronary heart disease (CHD, 25%), HT (16%-71%), cerebrovascular disease (28%), diabetes mellitus (23%), dementia (39%), and experiencing falls (32%).[9] However, there was a gap in the literature concerning the appropriate treatment of cardiovascular diseases among elderly residents of LTC facilities. The main aim of this article was to estimate the adherence to actual guidelines for treatment of cardiovascular diseases among elderly residents of LTC facilities.

Material and Methods

Study Design

The cross-sectional study was performed from December 2009 to November 2010 among elderly residents aged 60 years and older in 3 LTC facilities in Poland: 1 long-term care hospital (LTCH) and 2 nursing homes (NHs). The inclusion criteria was written informed consent. Subjects cognitively disabled were excluded from the analysis. The study protocol included the initial health assessment of the study participant: socio-demographic, medical and functional status. The study protocol was approved by the local ethics committee at the Jagiellonian University and conformed to the guidelines set forth by the Declaration of Helsinki and by managements of chosen institutions. Medical documentation was used to extract information about all diagnosed diseases (presence of HT, CHD, heart failure [HF], other comorbidities) and all applied medicines (beta-blockers [BBs], alpha-blockers, angiotensin-converting enzyme inhibitor [ACEI], angiotensin receptor blocker, calcium channel blocker [CCB], loop diuretics, thiazides, mineralocorticoid-receptor antagonists, aspirin [ASA], digoxin, statins, other). Prescribed medication for HT, HF, and CHD were compared to current European Cardiology Society (ESC) and European Society of Hypertension (ESH) medication guidelines.[10,11] The initial clinical evaluation and all study measurements included blood pressure (BP), weight and height, and malnutrition risk; functional and cognitive assessments were performed by the trained qualified nursing staff of each setting. Two measurements of blood pressure were conducted at the upper arm in a sitting position using oscillometric devices, and HT was defined as HT history, taking antihypertensive treatment, or when BP values obtained were ≥140 and/or 90 mmHg during study examination. Malnutrition risk was estimated using a validated nutrition screening tool, that is, the Mini Nutritional Assessment Short-Form (MNA-SF scores: 0-14).[12] According to this scale, malnutrition was diagnosed at 0 to 7 points, risk of malnutrition at 8 to 11 points, and the normal nutritional status at 12 to 14 points. The possibility of dementia among study participants[13] was estimated using the Abbreviated Mental Test Score (AMTS scores: 0-10). Severe cognitive impairment was diagnosed at 0 to 3 points, moderate cognitive impairment at 4 to 6 points, and normal mental status at >6 points. Katz Index of Independence in Activities of Daily Living (ADL score: 0-6) was used to assess performance in the 6 functions of bathing, dressing, toileting, transferring, continence, and feeding.[14] The Barthel Index (scores: 0-100) was used to evaluate disability/dependence in activities of daily living including presence or absence of fecal and urinary incontinence, help needed with grooming, toilet use, feeding, transfers, walking, dressing, climbing stairs, and bathing.[15] Results obtained from residents of LTCH and NH were compared.

Statistical Analysis

Descriptive statistics was based on the mean and standard deviation. Comparative statistics in groups was performed using the Mann-Whitney *U* test for nonparametric data and chi-square test to assess differences in distribution of categorical variables between groups. *P* values of <.05 were considered statistically significant. Statistical analysis was performed using Statistica 10.

Results

The analyzed sample consisted of 189 elderly residents (103 of LTCH and 86 of NHs), white race, majority women (61.4%), and average age 76.3 ± 11.2 years, with mean MNA-SF scores of 10.4 ± 2.5 and AMTS scores of 6.5 ± 3.1 points. The mean value of the Activities of Daily Living score was 2.9 ± 2.7, and the Barthel Index score was 45.3 ± 38.5 whereas the average values of systolic and diastolic BPs were 127.4 ± 18.7 mmHg and 71.8 ± 10.9 mmHg, respectively. Study participants had 4 or more diagnosed diseases and took 6 or more prescribed medicines. The general characteristics and the comparison between long-term care hospital and nursing home residents are presented in the Table 1.

The prevalence of cardiovascular diseases was analyzed among all study participants (Figure 1) and the frequency distribution of HT,

Table 1
Demographic and Clinical Characterisitics of LTCH and NH Residents

Variable	LTCH + NH (n = 189)	LTCH (n = 103)	NH (n = 86)
Age, years	76.3 ± 11.2	76.5 ± 11.8	76.2 ± 10.5
Men, %	38.6	34.0	44.2
MNA, score	10.4 ± 2.5	9.8 ± 2.9	11.1 ± 2.9***
AMTS, score	6.5 ± 3.1	6.5 ± 3.4	6.6 ± 2.7
ADL, score	2.9 ± 2.7	1.4 ± 1.9	4.7 ± 2.0***
Barthel Index, score	45.3 ± 38.5	19.3 ± 17.3	76.5 ± 33.5***
Systolic BP, mmHg	127.4 ± 18.7	120.2 ± 13.9	135.9 ± 20.0***
Diastolic BP, mmHg	71.8 ± 10.9	69.4 ± 10.7	74.6 ± 10.7**
Number of drugs	6.6 ± 3.5	7.0 ± 3.3	6.1 ± 3.6*
Number of chronic diseases	4.1 ± 1.8	4.0 ± 1.8	4.2 ± 1.8

ADL, Activities of Daily Living score.
Data are presented as means ± standard deviations or numbers (percentages).
*$P < .05$; **$P < .01$; ***$P < .001$.