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# Health after the pandemic: investigating risk factors for poorly controlled arterial hypertension and type 2 diabetes among elderly patients in primary care in Slovenia

MATIC MIHEVC[1, 2, A–G], TINA VIRTIČ POTOČNIK[1, 3, A, B, E], ČRT ZAVRNIK[1, 2, A, B, E],
ORCID ID: 0000-0003-4041-8682 ORCID ID: 0000-0003-4925-3706 ORCID ID: 0000-0003-0654-452X
MARIJA PETEK ŠTER[2, A, E], ZALIKA KLEMENC-KETIŠ[1, 3, A, E, G], ANTONIJA POPLAS SUSIČ[1, 2, A, E, G]
ORCID ID: 0000-0003-1736-2377 ORCID ID: 0000-0002-0270-1754 ORCID ID: 0000-0002-4328-3333

[1] Primary Healthcare Research and Development Institute, Health Centre Ljubljana, Ljubljana, Slovenia
[2] Department of Family Medicine, Medical Faculty, University of Ljubljana, Ljubljana, Slovenia
[3] Department of Family Medicine, Medical Faculty, University of Maribor, Maribor, Slovenia

**A** – Study Design, **B** – Data Collection, **C** – Statistical Analysis, **D** – Data Interpretation, **E** – Manuscript Preparation, **F** – Literature Search, **G** – Funds Collection

**Summary** **Background.** Recently, arterial hypertension (AH) and type 2 diabetes (T2D) populations have shifted in occurrence, age patterns and healthcare strategies. However, poorly controlled AH and T2D persist, emphasising the importance of monitoring and predicting control rates.

**Objectives.** To assess the prevalence of poorly controlled AH and T2D in elderly Slovenian population and identify risk factors associated with poor control.

**Material and methods.** A multi-centre cross-sectional survey among elderly individuals with AH and T2D, treated in Slovenian primary care, was conducted. Socio-demographic, clinical and laboratory data were collected. Poorly controlled AH and T2D were defined as blood pressure (BP) ≥ 140/90 mm Hg and $HbA_{1c}$ ≥ 7.5%, respectively. Statistical analysis encompassed univariate tests and multivariate binary logistic regression.

**Results.** A total of 137 participants, averaging 71.2 ± 4.5 years of age, with mean systolic BP of 137.2 ± 14.4 mm Hg and mean $HbA_{1c}$ of 7.2 ± 1.0%, were studied. Prevalence rates for poorly controlled AH and T2D stood at 41.6% and 36.5%, respectively. Multivariate logistic regression models, adjusted for relevant factors, revealed that living in an urban area (OR = 2.72, 95% CI: 1.15–6.47, $p$ = 0.023) and AH duration (OR = 1.05, 95% CI: 1.01–1.10, $p$ = 0.022) were significantly associated with poorly controlled AH. Conversely, female gender (OR = 2.47, 95% CI: 1.07–5.73, $p$ = 0.035) and daily T2D pill count (OR = 1.96, 95% CI: 1.32–2.91, $p$ = 0.001) were significantly associated with poorly controlled T2D.

**Conclusions.** To improve AH and T2D control, integrated care models should incorporate risk-aware screening methods along with approaches such as increasing awareness, improving education and self-management support, increasing combination therapy usage and personalised treatment plans.

**Key words:** aged, multimorbidity, disease management, women, urban population, polypharmacy.

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## Background

Global healthcare systems face increasing challenges in managing chronic diseases, with arterial hypertension (AH) and type 2 diabetes (T2D) emerging as two of the most prevalent chronic conditions worldwide [1, 2]. This trend is expected to intensify, particularly among the elderly population [1, 3].

To address this issue, healthcare providers are advocating for an integrated care approach that prioritises patient-centred care [4, 5]. The integrated care package (ICP) for individuals dealing with AH and T2D comprises six components: (a) early identification, (b) primary care-based treatment, (c) health education, (d) self-management support, (e) structured collaboration and (f) organisation of care [4, 6]. At the core of this comprehensive strategy lies primary care, which manages nearly 80% of AH and T2D cases [6]. However, despite concerted efforts to enhance chronic care, the prevalence of poorly controlled AH and T2D remains high [7–11].

A recent study revealed that only 23% of women and 18% of men worldwide manage to maintain their blood pressure (BP) below the recommended threshold of 140/90 mm Hg [1]. A parallel pattern emerges when examining Central and Eastern European populations, where merely 10–15% of individuals with AH achieve BP levels < 140/90 mm Hg, and a mere 5–30% of people with T2D maintain their fasting blood glucose (BG) < 7.0 mmol/l [7]. In contrast, when analysing the American population, control rates for AH and diabetes are notably higher, reaching 43.7% and 50.5%, respectively [8, 9]. Similarly, in Slovenia, control rates for AH and T2D stand at 63.3% and 66.7%, respectively [10, 11].

While prior findings demonstrate varying control rates across diverse healthcare settings, the factors contributing to these disparities are intricate and multifaceted. Earlier research has illuminated several factors that contribute to poor AH and T2D control, including advanced age, socio-economic disparities, gender differences, extended disease duration, obesity, unhealthy lifestyle habits, difficulties with treatment adherence, disparity between knowledge and actions and mental health issues [12–17].

In recent years, the AH and T2D populations have shifted in occurrence, age patterns and healthcare strategies, including remote care approaches [1–5, 18]. These shifts underscore the need to actively monitor control rates and identify factors influencing disease control. Furthermore, in primary healthcare settings where ICP implementation is high, such as in Slovenia [4], there is a need to reassess shifts in disease control and identify predictive factors necessitating additional healthcare interventions.

To bridge this knowledge gap and gain a deeper understanding of how various factors impact AH and T2D control, we conducted a multicentre cross-sectional survey. Our study aimed to assess the prevalence of poorly controlled AH and T2D in the elderly Slovenian population and identify risk factors associated with poor control.

## Material and methods

### Study design

We conducted a multi-centre cross-sectional survey on Slovenian individuals with both AH and T2D, approved by the Medical Ethics Committee of Slovenia (reference number 0120-219/2019/4) and compliant with the Declaration of Helsinki.

### Study setting

Our research was conducted in three primary healthcare centres (PHCs) in Slovenia, each representing different development regions and backgrounds in our study.

PHC Ljubljana, the largest in Slovenia, provides health services to approximately 300,000 residents. According to 2021 Eurostat data [19], the gross domestic product (GDP) of the Western Slovenia region, which includes Ljubljana, was 108% of the EU average, confirming its urban nature.

In contrast, we selected PHC Trebnje and PHC Slovenj Gradec, both located in the Eastern Slovenia region. These centres serve around 50,000 residents. Eurostat data for 2021 [19] showed that the GDP of the Eastern Slovenia region was 74% of the EU average, indicating its rural character.

### Study population and patient recruitment

Between March and September 2022, eligible individuals, 65 years of age or older, with confirmed diagnoses of AH and T2D for at least one year, managing T2D with oral medication, and receiving primary care for both conditions, were invited by their general practitioners to participate. The sampling strategy was convenient until the planned sample was reached.

### Healthcare context

In Slovenia, ICP implementation for AH and T2D patients is high, but there is still needed improvement in self-management and structured collaboration sections [4, 5]. Patients receive care by a family physician-nurse team. Yearly check-ups include physical exams, laboratory tests and treatment adjustments overseen by the physician. The nurse screens for complications, provides non-pharmacological education and refers patients to health education centres.

### Data collection

**Socio-demographic profile**

Socio-demographic information was obtained from the participants using a questionnaire that included information about their age, gender, education level, physical exercise and smoking.

**Clinical data**

Clinical data was obtained from the medical records and included systolic blood pressure (SBP), diastolic blood pressure (DBP), $HbA_{1c}$, lipid profile, body mass index (BMI), glomerular filtration rate, type of treatment, combination therapy usage and daily AH and T2D pill count.

**Definition of poorly controlled AH and T2D**

Building upon previous findings and guidelines [5, 20–22], we defined poorly controlled AH in those with BP ≥ 140/90 mm Hg, and poorly controlled T2D in those with $HbA_{1c}$ ≥ 7.5%, considering the elderly population.

**Appraisal of diabetes**

The Appraisal of Diabetes Scale is a concise seven-item questionnaire designed to gain insights into individuals' perceptions and coping mechanisms regarding their diabetes [23]. The total score ranges from 7 to 35, with higher scores indicating more negative appraisal. ADS has been validated independently of this study [5].

**Depressive and anxiety symptoms**

We used the nine-item Patient Health Questionnaire-9 (PHQ-9) to screen for depressive symptoms. Each item is ranked on a 4-point Likert scale, with a total score range of 0 to 27. The PHQ-9 has been previously used in the Slovenian population [24].

For anxiety symptoms, we used the seven-item Generalized Anxiety Disorder-7 (GAD-7) questionnaire. Each GAD-7 item is ranked on a 4-point Likert scale, yielding a total score range of 0 to 21. The GAD-7 has been previously used in the Slovenian population [24].

### Sample size calculation

Our sample size determination was based on prior research, which reported a 35% prevalence of poorly controlled AH or T2D in the Slovenian population [10, 11]. Using the formula $N = [z(1 - \alpha/2)^2\, p(1 - p)]/d^2$, with a presumed prevalence ($p$) of 0.35, a margin of error ($d$) of 0.05 and a 95% confidence level, our calculations yielded a maximum sample size of 349 patients.

### Statistical analysis

We used IBM SPSS Statistics (Version 25.0) for our analysis. To assess the data's distribution characteristics, we employed the Shapiro-Wilks test. Group differences were evaluated using the unpaired samples $t$-Test for normally distributed variables, the Mann-Whitney U test for non-normally distributed variables and the chi-square test for categorical variables. We then applied multivariate binary logistic regression to estimate the relationships between multiple independent variables and poorly controlled AH and T2D. Variables with $p$-values < 0.05 in univariate analyses were considered for the multivariable model, but the final selection of variables was guided by previous studies [12–17] and expert knowledge.

## Results

### Baseline characteristics

The baseline data from of 137 elderly individuals with AH and T2D is presented in Table 1. Poorly controlled AH and T2D were found in 41.6% and 36.5%, respectively. Those with poorly controlled AH were significantly more likely to live in urban areas, while those with poorly controlled T2D were significantly more likely to be female compared to controlled cases.

### Clinical characteristics

Table 2 provides an overview of the clinical and laboratory characteristics, while Table 3 provides an overview of the treatment regimens across groups. Individuals with poorly controlled AH had a significantly longer duration of AH and were prescribed

| Table 1. Overview of socio-demographic characteristics across groups | | | | | |
|---|---|---|---|---|---|
| Variable | Total (*n* = 137) | Poorly controlled AH (*n* = 57) | | Poorly controlled T2D (*n* = 50) | |
| | *n* (%) | *n* (%) | *p* | *n* (%) | *p* |
| Age, years, mean (SD) | 71.2 (4.5) | 71.7 (5.3) | 0.260 | 71.7 (5.2) | 0.318 |
| Gender | | | | | |
| female | 58 (42.3) | 25 (43.9) | 0.761 | 27 (54.0) | 0.036 |
| male | 79 (57.7) | 32 (56.1) | | 23 (46.0) | |
| Education level | | | | | |
| primary/high school | 97 (70.8) | 39 (68.4) | 0.605 | 37 (74.0) | 0.533 |
| college/university | 40 (29.2) | 18 (31.6) | | 13 (26.0) | |
| Marital status | | | | | |
| single/widowed | 32 (23.4) | 16 (28.1) | 0.271 | 13 (26.0) | 0.579 |
| married | 105 (76.6) | 41 (71.9) | | 37 (74.0) | |
| Region | | | | | |
| urban | 68 (49.6) | 34 (59.6) | 0.048 | 23 (46.0) | 0.519 |
| rural | 69 (50.4) | 23 (40.4) | | 27 (54.0) | |
| Regular physical exercise | 29 (21.1) | 18 (31.5) | 0.408 | 14 (28.0) | 0.231 |
| Smoking | 16 (11.7) | 8 (14.0) | 0.542 | 5 (10.0) | 0.648 |

AH – arterial hypertension, T2D – type 2 diabetes, *n* – number, SD – standard deviation.

| Table 2. Overview of clinical characteristics across groups | | | | | |
|---|---|---|---|---|---|
| Variable | Total (*n* = 137) | Poorly controlled AH (*n* = 57) | | Poorly controlled T2D (*n* = 50) | |
| | *n* (%) or mean (SD) | *n* (%) or mean (SD) | *p* | *n* (%) or mean (SD) | *p* |
| Duration of AH (years) | 13.9 (10.2) | 16.3 (10.6) | 0.021 | 12.1 (8.1) | 0.106 |
| Duration of T2D (years) | 10.2 (8.3) | 10.5 (8.5) | 0.717 | 11.9 (8.6) | 0.060 |
| SBP (mm Hg) | 137.2 (14.4) | 150.1 (11.0) | – | 136.7 (13.6) | 0.756 |
| DBP (mm Hg) | 76.7 (8.1) | 80.6 (9.0) | – | 75.4 (6.9) | 0.165 |
| $HbA_{1c}$ (%) | 7.2 (1.0) | 7.2 (0.9) | 0.828 | 8.1 (0.9) | – |
| Total cholesterol (mmol/l) | 4.6 (1.0) | 4.7 (0.9) | 0.500 | 4.6 (1.1) | 0.493 |
| LDL (mmol/l) | 2.6 (0.7) | 2.7 (0.7) | 0.297 | 2.6 (0.7) | 0.606 |
| Triglycerides (mmol/l) | 1.6 (0.8) | 1.5 (0.6) | 0.472 | 1.6 (0.8) | 0.935 |
| BMI ($kg/m^2$) | 30.4 (4.8) | 30.4 (5.0) | 0.960 | 31.2 (5.7) | 0.137 |
| GFR ($ml/min/1.73\ m^2$) | 79 (13) | 78 (14) | 0.947 | 79 (14) | 0.540 |
| ADS score | 15.8 (3.4) | 15.8 (3.4) | 0.961 | 16.4 (3.3) | 0.105 |
| PHQ-9 score, median (min, max) | 2.0 (0.24) | 1.5 (0.7) | 0.142 | 1.0 (0.17) | 0.524 |
| GAD-7 score, median (min, max) | 1.0 (0.21) | 1.5 (0.13) | 0.274 | 3.0 (0.20) | 0.684 |

AH – arterial hypertension, T2D – type 2 diabetes, SBP – systolic blood pressure, DBP – diastolic blood pressure, $HbA_{1c}$ – glycated haemoglobin, LDL – low-density lipoprotein, BMI – body mass index, GFR – glomerular filtration rate, ADS – Appraisal of Diabetes Scale, PHQ-9 – Patient Health Questionnaire-9, GAD-7 – General Anxiety Disorder-7, *n* – number, SD – standard deviation.

| Table 3. Overview of treatment regimens across groups | | | | | |
|---|---|---|---|---|---|
| Variable | Total (*n* = 137) | Poorly controlled AH (*n* = 57) | | Poorly controlled T2D (*n* = 50) | |
| | *n* (%) or mean (SD) | *n* (%) or mean (SD) | *p* | *n* (%) or mean (SD) | *p* |
| Treatment of arterial hypertension | | | | | |
| ACE inhibitor | 79 (57.7) | 39 (68.4) | 0.031 | 28 (56.0) | 0.765 |
| Angiotensin II receptor blocker | 27 (19.7) | 14 (24.6) | 0.228 | 11 (22.0) | 0.609 |
| Diuretic | 61 (44.5) | 27 (47.4) | 0.572 | 21 (42.0) | 0.652 |
| Calcium channel blocker | 61 (44.5) | 31 (54.4) | 0.050 | 23 (46.0) | 0.792 |
| Beta blocker | 40 (29.5) | 11 (19.3) | 0.031 | 14 (28.0) | 0.815 |
| Alpha-1 antagonist | 7 (5.1) | 5 (8.8) | 0.100 | 1 (2.0) | 0.210 |
| Conservative | 17 (12.4) | 3 (5.3) | 0.032 | 6 (12.0) | 0.912 |
| Daily pill count | 1.5 ± 1.0 | 1.6 ± 0.9 | 0.111 | – | – |
| Combination therapy use | 66 (48.2) | 32 (56.1) | 0.115 | – | – |

**Table 3. Overview of treatment regimens across groups**

| Variable | Total (*n* = 137) | Poorly controlled AH (*n* = 57) | | Poorly controlled T2D (*n* = 50) | |
|---|---|---|---|---|---|
| | *n* (%) or mean (SD) | *n* (%) or mean (SD) | *p* | *n* (%) or mean (SD) | *p* |
| Treatment of type 2 diabetes | | | | | |
| Metformin | 76 (55.5) | 35 (61.4) | 0.271 | 37 (74.0) | 0.001 |
| Sulphonyl urea | 38 (27.7) | 20 (35.1) | 0.115 | 24 (48.0) | < 0.001 |
| GLP-1 agonist | 3 (2.2) | 2 (3.5) | 0.380 | 3 (6.0) | 0.022 |
| SGLT-2 inhibitor | 21 (15.3) | 7 (12.3) | 0.386 | 16 (32.0) | < 0.001 |
| DPP-4 inhibitor | 8 (5.8) | 3 (5.3) | 0.794 | 3 (6.0) | 0.965 |
| Conservative | 37 (27.0) | 13 (22.8) | 0.328 | 4 (8.0) | < 0.001 |
| Daily pill count | 1.8 ± 1.3 | – | – | 2.4 ± 1.2 | < 0.001 |
| Combination therapy use | 19 (13.9) | – | – | 11 (22.0) | 0.037 |

ACE – angiotensin converting enzyme, GLP-1 – Glucagon-like peptide-1, DPP-4 – Dipeptidyl peptidase 4, *n* – number, SD – standard deviation.

**Table 4. Multivariate logistic regression model of risk factors of poorly controlled AH**

| Variable | MODEL 1: all variables | | MODEL 2: no gender | | MODEL 3: no age | | MODEL 4: no GAD-7 | |
|---|---|---|---|---|---|---|---|---|
| | OR (95% CI) | *p* | OR (95% CI) | *p* | OR (95% CI) | *p* | OR (95% CI) | *p* |
| Urban region | 2.72 (1.15–6.47) | 0.023 | 2.81 (1.19–6.62) | 0.018 | 2.60 (1.11–6.13) | 0.028 | 2.46 (1.18–5.14) | 0.017 |
| Age | 1.04 (0.95–1.14) | 0.401 | 1.03 (0.94–1.13) | 0.517 | – | – | 1.04 (0.96–1.13) | 0.350 |
| Male gender | 1.97 (0.79–4.90) | 0.144 | – | – | 1.87 (0.76–4.58) | 0.172 | 1.21 (0.58–2.53) | 0.621 |
| AH duration | 1.05 (1.01–1.10) | 0.022 | 1.05 (1.01–1.10) | 0.024 | 1.05 (1.01–1.10) | 0.014 | 1.04 (1.00–1.08) | 0.037 |
| GAD-7 score | 1.08 (0.97–1.21) | 0.165 | 1.07 (0.96–1.20) | 0.242 | 1.09 (0.97–1.22) | 0.137 | – | – |

AH – arterial hypertension, GAD-7 – General Anxiety Disorder-7, OR – odds ratio, 95% CI – 95% confidence interval.

**Table 5. Multivariate logistic regression model of risk factors of poorly controlled T2D**

| Variable | MODEL 1: all variables | | MODEL 2: no gender | | MODEL 3: no T2D duration | | MODEL 4: no BMI | |
|---|---|---|---|---|---|---|---|---|
| | OR (95% CI) | *p* | OR (95% CI) | *p* | OR (95% CI) | *p* | OR (95% CI) | *p* |
| Female gender | 2.47 (1.07–5.73) | 0.035 | – | – | 2.53 (1.10–5.84) | 0.029 | 1.83 (0.84–3.97) | 0.128 |
| T2D duration | 1.03 (0.98–1.08) | 0.265 | 1.03 (0.98–1.08) | 0.268 | – | – | 1.01 (0.96–1.06) | 0.732 |
| BMI | 1.09 (0.99–1.17) | 0.066 | 1.08 (0.99–1.17) | 0.097 | 1.08 (0.99–1.18) | 0.086 | – | – |
| Appraisal of diabetes | 1.06 (0.93–1.19) | 0.386 | 1.06 (0.94–1.20) | 0.334 | 1.05 (0.93–1.18) | 0.464 | 1.06 (0.94–1.18) | 0.379 |
| Daily T2D pill count | 1.96 (1.32–2.91) | 0.001 | 1.98 (1.34–2.92) | 0.001 | 2.07 (1.41–3.04) | < 0.001 | 2.04 (1.41–2.97) | < 0.001 |

T2D – type 2 diabetes, BMI – body mass index, OR – odds ratio, 95% CI – 95% confidence interval.

ACE inhibitors and beta blockers significantly more often. Individuals with poorly controlled T2D were significantly more likely to be prescribed metformin, sulphonyl urea, GLP-1 agonists and SGLT-2 inhibitors. They also required fixed-dose combinations of drugs significantly more often and had a significantly higher daily pill count.

In terms of ideal clinical benchmarks, 52.6% maintained their SBP between 120–139 mm Hg, 48.9% maintained their DBP between 70–79 mm Hg, 63.5% achieved an $HbA_{1c}$ value < 7.5%, and 10.9% maintained their LDL value < 1.8 mmol/l.

## Risk factors associated with poorly controlled AH and T2D

Table 4 summarises the outcomes of a multivariable binary logistic regression analysis for poorly controlled AH. Four distinct models were developed, adjusting for confounding variables including gender, age and GAD-7 score. In each of these models, urban residence and AH duration were significantly associated with poor AH control.

Table 5 summarises the outcomes of a multivariable binary logistic regression analysis for poorly controlled T2D. Four distinct models were developed, adjusting for confounding variables, including gender, T2D duration and BMI. Across all models, daily T2D pill count was significantly associated with T2D control. Furthermore, female gender was significantly associated with poor T2D control. In Model 4, where BMI was excluded, the significance of female gender reduced, suggesting a possible BMI-gender link influencing T2D control.

## Discussion

### Principal findings and comparison with the existing literature

Unlike previous studies that included the entire AH and T2D population, our research uniquely focused on older patients in an integrated primary care setting. This targeted approach allowed us to uncover specific predictors of poorly controlled AH and T2D in this population.

Our results reveal that 41.6% and 36.5% of patients had poorly controlled AH and T2D, respectively. These control rates are in line with previous studies in the Slovenian population [10, 11] and exceed control rates observed in other regions of Central and Eastern Europe [7]. While these control rates are below the target standard [20–23], they are in line with health systems at similar levels of development [8, 9], highlighting the need for continuous improvement.

In our study, poorly controlled AH was associated with urban living, longer AH duration and increased use of ACE inhibitors and beta-blockers. Poorly controlled T2D was associated with female gender, higher daily T2D pill count and more frequent prescriptions of metformin, sulfonylurea, GLP-1 agonists and SGLT-2 inhibitors. In multivariate models, adjusted for confounding variables, urban residence and AH duration were significantly associated with poorly controlled AH, while female gender and daily T2D pill count were significantly associated with poorly controlled T2D.

Previous studies have identified AH duration as a risk factor for poorly controlled AH [25, 26]. The latter could be due to progressive vascular remodelling, end-organ damage, shifts in neurohormonal balance, establishment of unfavourable lifestyle habits and perceived decreasing efficacy of treatments, ultimately leading to decreased patient adherence over time [25, 26].

Furthermore, residing in an urban environment was a risk factor for poorly controlled AH, even though rural regions often exhibit a higher prevalence of lifestyle-related risk factors [27, 28]. The urban environment affects the control of BP due to higher stress, unhealthy habits, limited exercise, poor air quality and noise, which affects sleep quality [29]. In contrast, in some cases, residing in rural areas predicted poor BP control due to limited access to health care, lower awareness of AH and difficulty adhering to medication [30]. The inclusiveness of the Slovenian healthcare system and the concept of integrated care could mitigate these factors and thus possibly explain our findings [4].

Gender emerged as a significant risk factor for poorly controlled T2D, with previous studies indicating that females with T2D face more difficulties in regulating BG levels, have higher all-cause mortality and are at increased risk for cardiovascular disease compared to men with T2D [31, 32]. Possible causes of poorer glycaemic control in females compared to males include differences in body composition, hormones and inflammation [33].

Moreover, daily T2D pill count has been established as a risk factor for poorly controlled T2D [34]. This association arises from the complexity of juggling multiple medications, which can lead to problems with treatment adherence, possible neglect of recommended lifestyle changes, psychological stress and progression of the underlying disease itself [34–36].

### Implications for practice

To improve AH and T2D management in primary care, integrated care models should start with comprehensive screening protocols to identify high-risk individuals, including those with obesity, depression/anxiety, complex treatment regimens and long disease duration [12–16]. In this way, timely interventions and tailored treatment plans can be created based on individual health needs and risk profiles.

Furthermore, despite current efforts by registered nurses and health education centres to provide non-pharmacological education, there is a need to expand educational approaches [4, 5, 17]. This is particularly crucial as evidence suggests that T2D knowledge among the elderly Slovenian population has stagnated or even declined over the past decade and that there is a disparity between knowledge and actual actions [17, 37]. Innovative educational methods may include peer support groups, gamification, behaviour change techniques, family involvement, telemonitoring and various digital health tools [4, 5, 18, 38]. These options empower patients to monitor their health data, ensure adherence and receive real-time feedback from healthcare providers, encouraging active engagement in their treatment [5, 18].

Finally, it is also important to improve adherence to guidelines that promote the use of combination therapies and switching to new antidiabetic medications [21, 22]. In addition, the ability to reduce daily pill intake promises better adherence and overall clinical outcomes [35].

### Strengths and limitations of the study

The strength of this study lies in its multi-faceted and multicentre approach, which contributes to a comprehensive exploration of the target population within the integrated care model. Nevertheless, it is essential to acknowledge the limitations associated with the study design. These include the cross-sectional nature of the study, reliance on convenience sampling and the limited sample size, all of which have the potential to introduce selection bias. Furthermore, the results may not be directly transferable to health systems whose structures differ from the integrated care model used in Slovenia. Finally, the definitions of poorly controlled AH and T2D are based on specific cut-offs, which may not apply to all people, as individual treatment goals may depend on individual factors.

## Conclusions

In conclusion, our study's focused approach on older patients in an integrated primary care setting has unearthed valuable insights into AH and T2D control. The findings highlight the high prevalence of poorly controlled AH and T2D, emphasising the need for targeted interventions. The intricate relationships between urban living, disease duration, gender, medication patterns and treatment complexity collectively contribute to management challenges. Tailored interventions and comprehensive strategies, including innovative education, self-management tools, adherence promotion and seamless transitions to advanced treatments, are crucial. By integrating these factors, we can usher in a new era of disease management that caters to individual patient needs while addressing the broader challenges of controlling AH and T2D.

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References: 38

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Address for correspondence:
Matic Mihevc, MD
Department of Family Medicine
Medical Faculty
University of Ljubljana
Slovenia
Tel.: +386 40520247
E-mail: mihevc.matic@zd-tr.si