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Trends in the incidence cases of diabetes mellitus in Elbasan, Albania, 2020–2024: A retrospective registry-based study

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Abstract

Background: Diabetes mellitus is an increasing public health concern in Albania; however, long-term regional epidemiological data remain limited. This study aimed to evaluate temporal trends in newly diagnosed diabetes mellitus cases in Elbasan, Albania, from 2020 to 2024 and to describe the demographic and clinical characteristics of affected patients.

Methods: A retrospective cross-sectional study was conducted using data from the Elbasan Regional Directorate of the Health Care Services Operator (OSHKSH) and the regional diabetes registry for 2020–2024. A total of 1,917 newly diagnosed diabetes cases were included. Data on sex, age, residence, educational level, body mass index (BMI), hypertension, family history of diabetes, and hypolipidemic medication use were analyzed. Descriptive statistics and Pearson's Chi-square test were applied to assess associations between categorical variables, while temporal trends were evaluated using annual case counts and percentage changes.

Results: Newly diagnosed diabetes cases increased from 223 in 2020 to 599 in 2023, followed by a decline to 390 cases in 2024 (–34.9%). Most patients were aged 55–64 years (38.1%), resided in urban areas (56.1%), and had low educational attainment (45.3%). More than 85% were overweight or obese, whereas 70–80% reported no family history of diabetes. No significant sex differences were found in age distribution, BMI, hypertension, or family history. Significant temporal variations were observed in hypertension prevalence and hypolipidemic medication use, although interpretation should consider missing data for 2022–2023.

Conclusions: The findings indicate a substantial increase in newly diagnosed diabetes cases between 2020 and 2023, followed by a decline in 2024. The high prevalence of modifiable risk factors, particularly overweight, obesity, and urban residence, underscores the need for targeted prevention strategies. Strengthening registry-based surveillance is essential to monitor disease trends and support evidence-based public health interventions in Albania.

Keywords: Diabetes Mellitus; Incidence; Temporal Trends; Epidemiology; Registry-Based Study; Albania.

1. Introduction

Diabetes mellitus represents one of the most significant public health challenges of the 21st century, placing a substantial burden on individuals, healthcare systems, and national economies worldwide (2,6,14). According to the International Diabetes Federation (IDF) Diabetes Atlas, approximately 537 million adults aged 20–79 years were living with diabetes in 2021, a figure projected to rise to 783 million by 2045 (2,14). Type 2 diabetes mellitus (T2DM) accounts

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for nearly 90% of all cases and is strongly associated with population ageing, urbanization, obesity, physical inactivity, and unhealthy dietary patterns (2,6,14).

A major public health concern is the high proportion of undiagnosed diabetes. Globally, nearly one in two adults with diabetes remains unaware of their condition, with the majority of undiagnosed cases occurring in low- and middle-income countries (2,14). Early detection and timely lifestyle interventions have been shown to significantly reduce the incidence of T2DM and related complications (22,23).

Epidemiological evidence indicates considerable variation in diabetes incidence trends across countries. While the global prevalence continues to rise, several European countries, including Germany, Denmark, and the Netherlands, have reported stabilization or even declining incidence rates over the past two decades (1,3–6,21). Similar patterns have been observed in the United States and Portugal, suggesting that preventive strategies, improved screening programmes, and enhanced management of high-risk populations may be influencing disease dynamics (15–18). Nevertheless, disruptions in healthcare services during the COVID-19 pandemic may have affected diagnosis rates and reporting accuracy, leading to temporary fluctuations in observed incidence (24).

Obesity remains one of the most important modifiable risk factors for T2DM. Consistent evidence shows that overweight and obesity significantly increase diabetes risk, whereas structured lifestyle intervention programmes can reduce incidence by up to 58% among high-risk individuals (22,23,25). In addition, socioeconomic determinants, including educational attainment and urbanization, have been linked to higher diabetes prevalence and poorer health outcomes (2,6,14).

In Albania, data on long-term trends in newly diagnosed diabetes remain limited, particularly at the regional level. Available national and regional reports suggest a continuing increase in diabetes burden over the past decade (7,26). However, detailed analyses describing the demographic and clinical characteristics of newly diagnosed patients are still scarce.

Therefore, this study aimed to assess five-year trends in newly diagnosed diabetes mellitus cases in Elbasan, Albania, between 2020 and 2024. Using data from the Elbasan Regional Directorate of the Health Care Services Operator (OSHKSH) and the regional diabetes registry, 1,917 newly diagnosed cases were analyzed. The study further examined demographic and clinical characteristics, including age distribution, educational level, place of residence, body mass index, family history of diabetes, hypertension, and hypolipidemic treatment. By situating the local findings within the broader context of European surveillance systems and international epidemiological evidence (1,3,4,21), this study aims to contribute to a better understanding of diabetes trends in Albania and to inform evidence-based public health planning and prevention strategies.

2. Methods

2.1. Study Design and Setting

A retrospective registry-based observational study was conducted to assess temporal trends in newly diagnosed diabetes mellitus cases in the Elbasan region of Albania between January 2020 and December 2024. The study aimed to describe annual changes in the number of newly diagnosed diabetes cases and to examine their demographic and clinical characteristics over the five-year study period.

2.2. Data Source and Study Population

Data were obtained from the Elbasan Regional Directorate of the Health Care Services Operator (OSHKSH) and the regional diabetes registry, which routinely records information on individuals newly diagnosed with diabetes mellitus within the region.

All newly diagnosed diabetes cases registered between 1 January 2020 and 31 December 2024 were eligible for inclusion. A total of 1,917 cases met the inclusion criteria and were included in the final analysis. Since the study relied on routinely collected registry data, some variables contained missing observations. Cases with missing information were excluded only from the specific analyses involving those variables, while all available data were retained for the remaining analyses.

2.3. Study Variables

The following variables were extracted from the registry database:

- Sociodemographic variables
- Year of diagnosis (2020–2024)
- Sex (female or male)
- Age at diagnosis
- Age group (<45, 45–54, 55–64, 65–74, and ≥75 years)
- Place of residence (urban or rural)
- Educational level (low, secondary, or higher)

2.4. Clinical variables

- Body mass index (BMI)
- Hypertension status (yes/no)
- Family history of diabetes (yes/no)
- Use of hypolipidemic medication (yes/no)

Body mass index was categorized according to the World Health Organization (WHO) classification as underweight (<18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), and obese (≥30.0 kg/m^2).

2.5. Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics version 27 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. Categorical variables are presented as frequencies and percentages, whereas continuous variables are presented as means and standard deviations (SD).

Comparisons of categorical variables across study years and between sexes were performed using Pearson's Chi-square test. All statistical tests were two-sided, and a p-value of <0.05 was considered statistically significant.

Temporal trends in newly diagnosed diabetes cases were assessed by calculating annual frequencies and annual percentage changes (APC) using the following formula:

$$\text{Annual Percentage Change} = \frac{(N_t - N_{t-1})}{N_{t-1}} \times 100$$

Where N_t represents the number of cases in the current year and N_{t-1} represents the number of cases in the previous year.

Trend figures were prepared to illustrate annual changes in the number of newly diagnosed cases as well as selected demographic and clinical characteristics across the study period.

Ethical Considerations

This study was conducted as part of a doctoral research project at the University of Elbasan. The analysis was based exclusively on anonymized secondary data obtained from the official diabetes registry maintained by the Elbasan Regional Directorate of the Health Care Services Operator (OSHKSH). Access to the registry data was granted through institutional agreements for research purposes. No personal identifiers were available to the investigators, and all data were analyzed and reported in aggregate form to ensure participant confidentiality and privacy.

3. Results

Table 1 presents the sociodemographic characteristics of the 1,917 newly diagnosed diabetes mellitus cases recorded in the Elbasan region between 2020 and 2024. The annual number of newly diagnosed cases increased from 223 in 2020 to a peak of 599 in 2023, before declining to 390 cases in 2024.

Overall, females accounted for 50.9% (n = 975) of all registered cases, while males represented 49.1% (n = 942). The distribution by sex remained relatively balanced throughout the study period, with only minor year-to-year variation.

The majority of newly diagnosed patients belonged to the 55–64-year age group, comprising 38.1% (n = 729) of all cases, followed by those aged 65–74 years (28.3%, n = 541). Patients younger than 45 years accounted for the smallest proportion of diagnoses (8.0%, n = 153).

Regarding place of residence, 56.1% (n = 1,075) of patients lived in urban areas, whereas 43.9% (n = 842) resided in rural areas. The distribution of cases according to place of residence remained relatively stable across the five-year study period.

Among participants with available educational data, low educational attainment was the most frequently reported category, accounting for 45.3% (n = 868) of cases, followed by secondary education (35.7%, n = 685). Higher education was reported in 6.3% (n = 120) of patients.

Table 1 Sociodemographic characteristics of newly diagnosed diabetes mellitus cases by year of diagnosis, Elbasan, Albania (2020–2024).

Variable	**Category**	**2020 n (%)**	**2021 n (%)**	**2022 n (%)**	**2023 n (%)**	**2024 n (%)**	**Total n (%)**
Number of cases		223	300	405	599	390	1,917
Sex	Female	116 (52.0)	157 (52.3)	206 (50.9)	293 (48.9)	203 (52.1)	975 (50.9)
	Male	107 (48.0)	143 (47.7)	199 (49.1)	306 (51.1)	187 (47.9)	942 (49.1)
Age group (years)	<45	19 (8.5)	23 (7.7)	24 (5.9)	69 (11.6)	18 (4.6)	153 (8.0)
	45–54	27 (12.1)	46 (15.4)	41 (10.1)	155 (25.9)	46 (11.8)	315 (16.5)
	55–64	84 (37.7)	95 (31.8)	166 (41.0)	249 (41.6)	137 (35.1)	729 (38.1)
	65–74	66 (29.6)	104 (34.8)	141 (34.8)	99 (16.5)	131 (33.6)	541 (28.3)
	≥75	27 (12.1)	31 (10.4)	33 (8.1)	25 (4.2)	58 (14.9)	174 (9.1)
Place of residence	Urban	129 (57.8)	157 (52.3)	244 (60.2)	326 (54.4)	219 (56.2)	1,075 (56.1)
	Rural	94 (42.2)	143 (47.7)	161 (39.8)	273 (45.6)	171 (43.8)	842 (43.9)
Educational level*	Low	106 (47.5)	126 (42.0)	142 (35.1)	294 (49.1)	200 (51.3)	868 (45.3)
	Secondary	105 (47.1)	91 (30.3)	136 (33.6)	193 (32.2)	160 (41.0)	685 (35.7)
	Higher	10 (4.5)	12 (4.0)	22 (5.4)	46 (7.7)	30 (7.7)	120 (6.3)

Note: Missing data for educational level were recorded in 2 cases in 2020, 71 cases in 2021, 105 cases in 2022, and 66 cases in 2023, resulting in a total of 244 missing observations

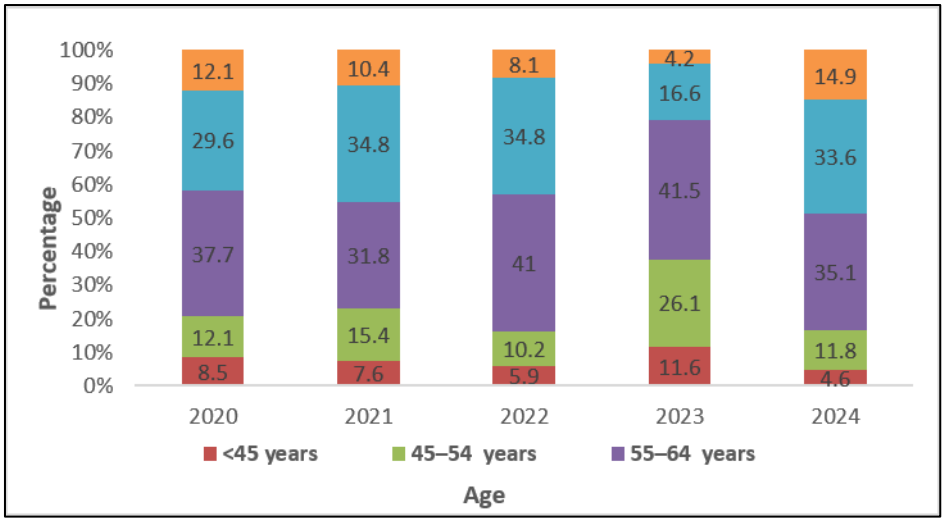

Figure 1 Age distribution of newly diagnosed cases by year.

Table 2 summarizes the clinical characteristics of newly diagnosed diabetes mellitus cases across the study period.

The distribution of BMI categories remained relatively stable between 2020 and 2024, with no statistically significant differences observed across study years ($p = 0.068$). Overweight was the most common BMI category throughout the study period, accounting for 44.2% of cases in 2020, 51.5% in 2021, 46.4% in 2022, 48.0% in 2023, and 45.3% in 2024. Obesity was the second most frequent category, ranging from 34.5% to 41.6%, whereas normal-weight individuals represented 11.9%–19.9% of cases. Underweight patients accounted for less than 2% of newly diagnosed cases in every study year.

The proportion of patients with hypertension varied significantly across the study period ($p < 0.001$). Hypertension was reported in 40.8% of patients in 2020, 30.7% in 2021, 48.1% in 2022, 75.9% in 2023, and 30.3% in 2024. The proportion of patients without hypertension ranged from 24.1% to 69.7%.

Family history of diabetes also differed significantly across study years ($p < 0.001$). The percentage of patients reporting a positive family history ranged from 19.7% in 2020 to 30.3% in 2022, while the majority of patients in each year reported no family history, with proportions ranging from 69.7% to 80.3%.

The use of hypolipidemic medication showed statistically significant variation over time ($p < 0.001$). The proportion of patients receiving hypolipidemic treatment ranged from 17.2% in 2024 to 47.9% in 2023, whereas patients not receiving hypolipidemic medication represented the majority in most study years.

Table 2 Clinical characteristics of newly diagnosed diabetes mellitus cases by year of diagnosis, Elbasan, Albania (2020–2024).

Variable	Category	2020 n (%)	2021 n (%)	2022 n (%)†	2023 n (%)†	2024 n (%)	*p*-value
Body mass index (BMI)	Underweight	3 (1.5)	0 (0.0)	0 (0.0)	1 (0.2)	2 (0.6)	0.068
	Normal weight	41 (19.9)	27 (11.9)	43 (14.6)	57 (12.2)	40 (12.5)	
	Overweight	91 (44.2)	117 (51.5)	137 (46.4)	224 (48.0)	145 (45.3)	
	Obese	71 (34.5)	83 (36.6)	115 (39.0)	185 (39.6)	133 (41.6)	

Hypertension	Yes	91 (40.8)	92 (30.7)	148 (48.1)	148 (75.9)	118 (30.3)	<0.001
	No	132 (59.2)	208 (69.3)	160 (51.9)	47 (24.1)	271 (69.7)	
Family history of diabetes	Yes	44 (19.7)	80 (26.7)	111 (30.3)	131 (22.0)	88 (22.6)	<0.001
	No	179 (80.3)	220 (73.3)	256 (69.7)	465 (78.0)	301 (77.4)	
Hypolipidemic treatment	Yes	45 (20.2)	57 (19.0)	90 (29.4)	104 (47.9)	67 (17.2)	<0.001
	No	178 (79.8)	243 (81.0)	216 (70.6)	113 (52.1)	322 (82.8)	

Note: †Hypertension and hypolipidemic treatment data were incomplete, particularly during 2022–2023. Percentages are based on available data, and year-to-year comparisons for these variables should be interpreted with caution.

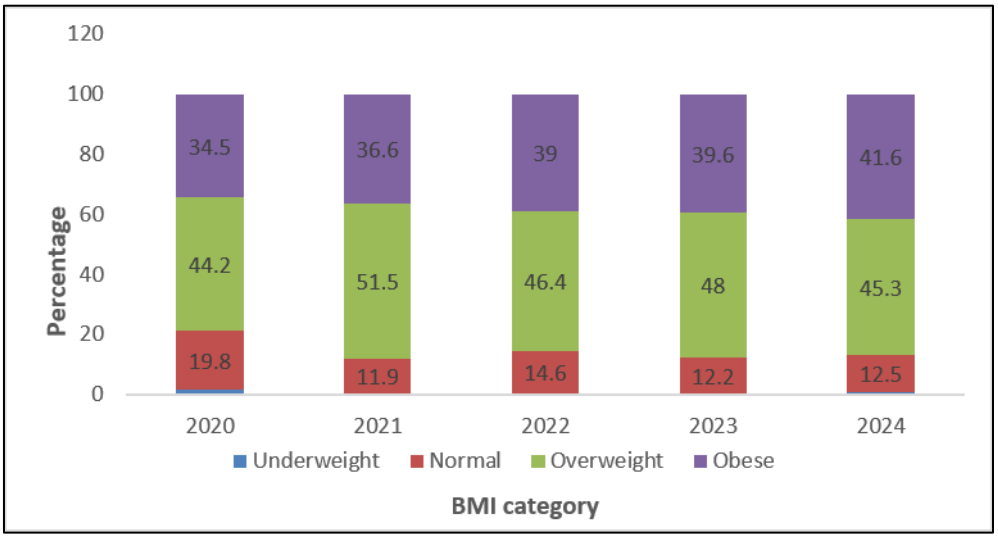

Figure 2 BMI categories among newly diagnosed patients.

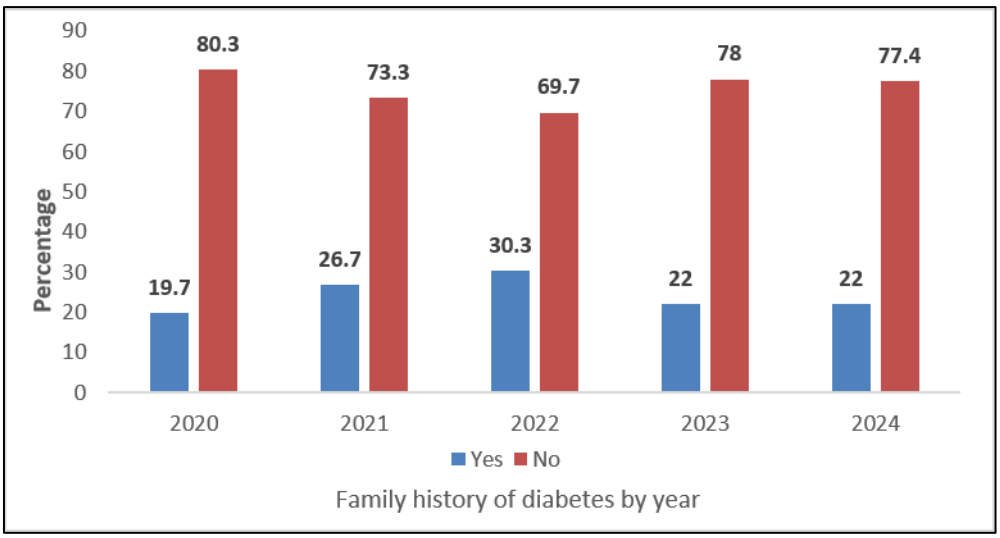

Figure 3 Family history of diabetes by years.

Table 3 presents the annual trend in newly diagnosed diabetes mellitus cases during the study period.

The number of newly diagnosed diabetes cases increased from 223 in 2020 to 300 in 2021, corresponding to an annual increase of 34.5%. A further increase was observed in 2022, when 405 new cases were recorded, representing a 35.0% increase compared with the previous year. The highest number of newly diagnosed cases was recorded in 2023 (n = 599), corresponding to an annual increase of 47.9%.

In 2024, the number of newly diagnosed diabetes cases declined to 390, representing a 34.9% decrease compared with 2023.

Table 3 Annual trend in the number of newly diagnosed diabetes mellitus cases in Elbasan, Albania (2020–2024).

Year	Newly diagnosed cases, *n*	Annual percentage change (%)	Trend
2020	223	—	Baseline
2021	300	34.5	Increasing ↑
2022	405	35	Increasing ↑
2023	599	47.9	Peak ↑
2024	390	−34.9	Decreasing ↓

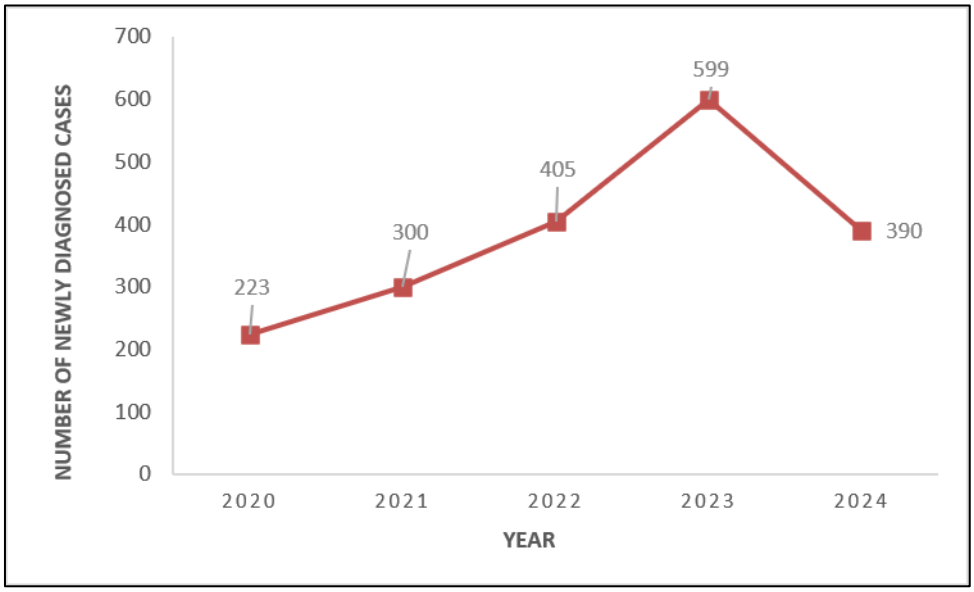

Figure 4 Annual trend in newly diagnosed diabetes cases (2020–2024).

Table 4 presents the comparison of clinical and demographic characteristics between female and male patients diagnosed with diabetes mellitus during the study period.

No statistically significant differences were observed between females and males in age distribution ($p = 0.508$). In both groups, the highest proportion of patients was observed in the 55–64-year age group, followed by the 65–74-year group, while the lowest proportion was found among individuals younger than 45 years.

The distribution of BMI categories did not differ significantly between sexes ($p = 0.051$). Overweight was the most frequent category among males (50.7%), whereas obesity was more prevalent among females (41.4%). Normal weight and underweight categories showed similar distributions between sexes.

No significant sex-based differences were found in the prevalence of hypertension ($p = 0.228$), family history of diabetes ($p = 0.129$), hypolipidemic treatment use ($p = 0.318$), or place of residence ($p = 0.945$). In both sexes, most patients resided in urban areas and the majority did not report a family history of diabetes or use of hypolipidemic treatment.

Table 4 Comparison of clinical and demographic characteristics by gender, Elbasan, Albania (2020–2024).

Variable	Category	Female n (%)	Male n (%)	*p*-value
Age group (years)	<45	79 (8.1)	74 (7.9)	0.508
	45–54	149 (15.3)	166 (17.7)	
	55–64	368 (37.8)	361 (38.5)	
	65–74	290 (29.8)	251 (26.8)	
	≥75	88 (9.0)	86 (9.2)	
BMI category	Underweight	4 (0.5)	2 (0.3)	0.051
	Normal weight	111 (14.3)	97 (13.1)	
	Overweight	339 (43.7)	375 (50.7)	
	Obese	321 (41.4)	266 (35.9)	
Hypertension	Yes	321 (44.3)	276 (40.0)	0.228
	No	404 (55.7)	414 (60.0)	
Family history of diabetes	Yes	214 (22.4)	240 (26.1)	0.129
	No	742 (77.6)	679 (73.9)	
Hypolipidemic treatment	Yes	193 (26.0)	170 (24.6)	0.318
	No	550 (74.0)	522 (75.4)	
Place of residence	Urban	546 (50.8)	529 (49.2)	0.945
	Rural	429 (51.0)	413 (49.0)	

4. Discussion

The present study provides one of the first regional assessments of newly diagnosed diabetes mellitus cases in Albania based on five years of registry data. A progressive increase in new diagnoses was observed between 2020 and 2023, followed by a marked decline of 34.9% in 2024. The upward trend observed in the first four years is consistent with the increasing global burden of diabetes reported by the International Diabetes Federation (2,14). However, the decline observed in 2024 should be interpreted with caution. One possible explanation is delayed diagnosis and reduced healthcare utilization during the COVID-19 pandemic period, followed by a rebound in case detection as health services resumed normal functioning (24). An alternative explanation may be an early stage of epidemiological stabilization, similar to patterns reported in several high-income countries, including Denmark, Germany, the Netherlands, Portugal, and the United States, where incidence has stabilized or shown a gradual decline despite continued increases in overall diabetes prevalence (1,3–6,12,13,15,16,18,21).

A key finding of this study was the high prevalence of overweight and obesity among newly diagnosed patients, with more than 80% classified in these categories. This is consistent with extensive epidemiological evidence identifying excess body weight as one of the strongest modifiable risk factors for type 2 diabetes and a major driver of the global diabetes burden (2,6,14,22,23,25). In addition, nearly three-quarters of patients reported no family history of diabetes, suggesting that non-genetic factors, particularly lifestyle and environmental exposures, may have played a more prominent role in disease occurrence in this population. These findings further support the importance of lifestyle-based prevention strategies, including dietary modification, increased physical activity, and weight control, in reducing diabetes risk (22,23).

The sociodemographic profile of patients also provides important insights. The majority of newly diagnosed cases occurred in individuals aged 55–64 years, more than half resided in urban areas, and a substantial proportion had low educational attainment. These patterns highlight the influence of demographic and socioeconomic determinants on diabetes risk and underscore the need for targeted prevention strategies. Similar findings have been reported in previous studies conducted in Albania; however, the present study adds a more detailed regional perspective by integrating both clinical and demographic characteristics of newly diagnosed cases (7,26).

The findings of this study have important implications for public health practice in Albania. Strengthening diabetes prevention programmes, promoting healthy lifestyle interventions, and improving early detection among high-risk groups should remain key priorities. Furthermore, enhancing regional diabetes registries and developing standardized surveillance systems, similar to the Danish Adult Diabetes Registry, could significantly improve monitoring capacity and support evidence-based public health planning (1,21). Experiences from countries with well-established diabetes registry systems demonstrate that continuous and standardized monitoring contributes to improved quality of care and more effective health policy decision-making (8,10,21).

Limitations

Several limitations should be considered when interpreting the findings of this study. First, the study was conducted in a single administrative region of Albania; therefore, the findings may not be fully generalizable to the entire Albanian population. Second, the retrospective design relied on routinely collected registry data, which may be subject to incomplete or inconsistent reporting. Third, population denominator data were not available, precluding the calculation of incidence rates and limiting the analysis to absolute numbers of newly diagnosed cases. Fourth, the registry did not distinguish between type 1 and type 2 diabetes; however, given the age distribution of the study population, most cases are likely to represent type 2 diabetes mellitus. In addition, the study period overlapped with the COVID-19 pandemic, which may have influenced healthcare utilization, diagnostic practices, and case reporting, potentially contributing to the marked increase observed in 2023 and the subsequent decline in 2024. Finally, missing data for hypertension and hypolipidemic treatment may have affected the interpretation of these variables. Despite these limitations, the study represents one of the first regional registry-based analyses of temporal trends in newly diagnosed diabetes mellitus in Albania, providing valuable epidemiological evidence from a large sample of 1,917 cases collected over a five-year period. The findings contribute to a better understanding of the regional burden of diabetes and may support future public health surveillance, prevention strategies, and health policy planning.

5. Conclusion

This study provides a five-year overview of newly diagnosed diabetes mellitus cases in Elbasan, Albania, highlighting important demographic and clinical patterns. A substantial increase in newly diagnosed cases was observed between 2020 and 2023, followed by a marked decline in 2024. Although the underlying reasons for this decline require further investigation, the overall pattern confirms a sustained burden of diabetes in the region.

The majority of newly diagnosed patients were aged 55–64 years, resided in urban areas, and had low educational attainment. In addition, most patients were overweight or obese, underscoring the central role of modifiable lifestyle-related risk factors in the development of diabetes. While a proportion of patients reported a family history of diabetes, the findings suggest that environmental and behavioral factors may have a more prominent role in the observed disease burden.

These findings highlight the need for strengthened diabetes prevention strategies, with particular emphasis on obesity prevention, promotion of healthy lifestyles, and early detection among high-risk populations. Strengthening continuous surveillance systems and improving regional diabetes registries are essential to monitor temporal trends and support evidence-based public health interventions in Albania.

Compliance with ethical standards

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The content of this publication is the sole responsibility of the authors and does not necessarily reflect the views of AKKSHI.

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

Statement of ethical approval

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Department of Nursing, Faculty of Technical Medical Sciences, Aleksander Xhuvani University, Elbasan, Albania (Protocol No. 31, March 31, 2025). Permission to access the regional diabetes registry was granted by the Elbasan Regional Directorate of the Health Care Services Operator (OSHKSH). The study used anonymized secondary data, and no personal identifiers were collected or analyzed. Therefore, the requirement for individual informed consent was waived by the approving institution.

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