10. ALZHEIMER'S DISEASE AND RELATED DISORDERS – AN IMPORTANT PUBLIC HEALTH PROBLEM IN POLAND

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Introduction to the problem of Alzheimer's disease in Poland

Alzheimer's disease is the most common neurodegenerative disease associated with dementia; it is estimated to account for 60–70% of dementia cases.[1] It involves progressive memory loss and other cognitive problems. After several years, it leads to a complete loss of cognitive and physical independence. Alzheimer's disease is treated with symptomatic pro-cognitive drugs and various forms of supportive therapy for patients and carers.[2]

Alzheimer's disease has been studied for many years, but its causes are not fully understood. Its development is influenced by many factors, including genetics, demographics (age is one of the most important factors in the development of Alzheimer's disease and related disorders), health status (cerebrovascular dysfunction resulting from coexisting vascular risk factors such as high blood pressure, hyperlipidaemia, ischaemic heart disease or type 2 diabetes),

[1] https://www.who.int/news-room/fact-sheets/detail/dementia
[2] NFZ o zdrowiu. Choroba Alzheimera i choroby pokrewne [National Health Fund on health. Alzheimer's disease and related disorders], commentary on the report by Prof. Agnieszka Słowik, National Consultant for Neurology, https://ezdrowie.gov.pl/portal/home/badania-i-dane/zdrowe-dane/raporty/nfz-o-zdrowiu-choroba-alzheimera-i-choroby-pokrewne.

psychological and social factors (living alone, lack of social and family relationships promotes the development of dementia).[3]

This chapter presents the epidemiological situation concerning Alzheimer's disease and related disorders, estimated using data on health services reported to the National Health Fund. The analyses presented here expand the data contained in the *National Health Fund on health. Alzheimer's disease and related disorders.*[3]

Data reported to the National Health Fund via SWIAD (data on outpatient and inpatient services) was used. This means that the analysis does not include data concerning health resort treatment or certain preventive programmes.

The **recorded prevalence** of Alzheimer's disease and related disorders in year *t* was defined as the number of persons who were alive at the end of year *t* and who, in the years from *t–3* to *t* (inclusive), received at least one health service with a primary or secondary diagnosis classified under ICD-10 codes F00–F01 (all diagnoses, including those without specified expanded codes), F02.1–F02.3, G30 (all diagnoses, including 3-digit ones) and diagnoses G31.0, G31.1, G31.8, G31.9. The patient population was restricted to individuals aged 55 and over (based on year of birth). Information on the recorded prevalence from 2014 to 2023 is presented, which can be interpreted as the number of diagnosed cases in those years. The second indicator used to describe the recorded epidemiology is the recorded incidence. As in the case of recorded prevalence, this indicator was estimated based on health services reported to the National Health Fund.

Recorded incidence was defined as the number of patients who, in a given year (*t*), received a health service with a primary or secondary diagnosis of F00–F01 (all diagnoses, including those without reported expanded code), F02.1–F02.3, G30 (all diagnoses, those without reported expanded code) and diagnoses G31.0, G31.1, G31.8, G31.9 according to ICD-10 and did not receive such a service in the years from *t–3* to *t–1*. As with recorded prevalence, this information refers to persons aged 55 or over in year *t*.

It should be noted that the information presented has been estimated based on the National Health Fund reporting data and does not include information on persons who received services financed exclusively from sources other than the National Health Fund or who did not use services in connection with Alzheimer's disease and related disorders.

[3] https://ezdrowie.gov.pl/portal/home/badania-i-dane/zdrowe-dane/raporty/nfz-o-zdrowiu-choroba-alzheimera-i-choroby-pokrewne

Scale of the health problem and characteristics of the patient population

This section provides information on the epidemiological situation concerning Alzheimer's disease and related disorders. Information on the recorded prevalence from 2014 to 2023 is presented, which can be interpreted as the number of diagnosed cases in those years. This subsection also contains information on the recorded incidence of new cases of Alzheimer's disease and related disorders in the state-funded healthcare system.

The prevalence of Alzheimer's disease and related disorders per 1,000 persons, for both males and females, was stable between 2014 and 2023 (Fig. *10.1*). For men, it was approximately 20 cases per 1,000 of the population aged 55 and over, while for women, it ranged from approximately 37 to 39 cases.

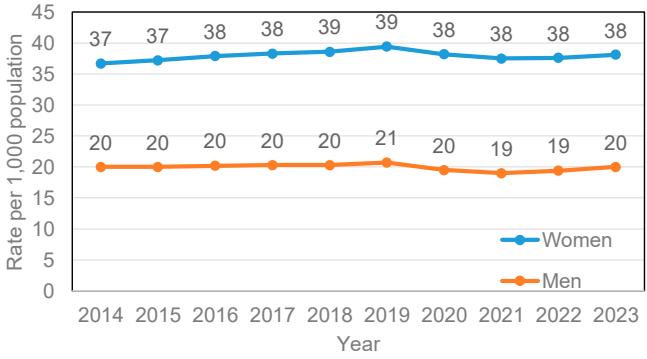

Fig. 10.1. Estimated prevalence of Alzheimer's disease and related disorders in Poland per 1,000 people aged 55 and over (Statistics Poland and National Health Fund data)

Between 2014 and 2023, more women than men had Alzheimer's disease and related disorders in Poland (approximately 250.0 thousand women annually, reaching 261.3 thousand in 2023) (Fig. 10.2). In the analysed period, the highest number of female patients, 270.8 thousand, was recorded in 2019. The number of male patients fluctuated around 100.0 thousands. In 2023, there were 104.2 thousand male patients aged 55 and over.

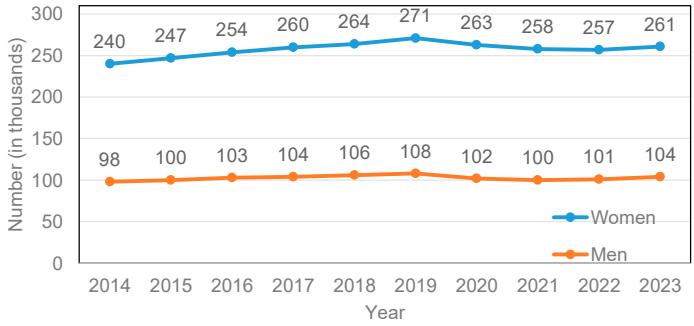

Fig. 10.2. Estimated number of patients with Alzheimer's disease and related disorders in Poland (2014–2023) aged 55 and over as an absolute value (National Health Fund data)

Between 2014 and 2023, the recorded incidence rate (per 1,000 population aged 55 and over) of Alzheimer's disease or related disorders was approximately 7 among men (Fig. 10.3). In women, the incidence rate was 11. There was a noticeable decrease in the incidence rate for both sexes in 2020, which is most likely due to the reduced number of services provided during the COVID-19 pandemic.

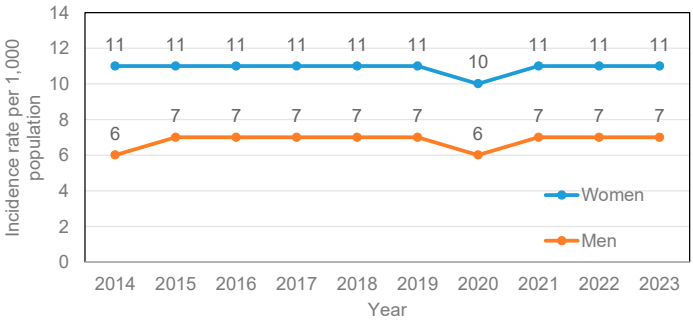

Fig. 10.3. Estimated incidence rate of Alzheimer's disease and related disorders in Poland per 1,000 population aged 55 and over (2014–2023) (Statistics Poland and National Health Fund data)

Fig. 10.4 shows the recorded incidence of Alzheimer's disease and related disorders in the population aged 55 and over. Between 2014 and 2023, approximately 35.0 thousand new male cases were reported annually. The figures for women fluctuated between 71.1 thousand and 76.8 thousand new cases per year during this period.

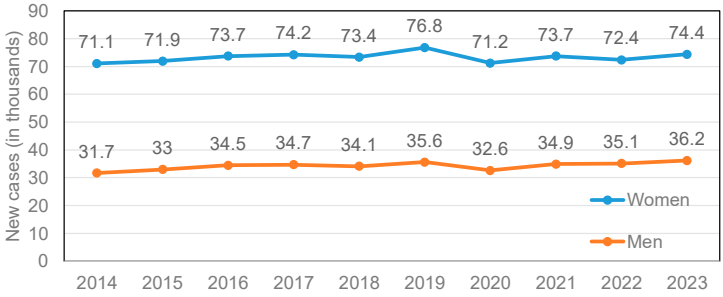

Fig. 10.4. Estimated number of new cases of Alzheimer's disease and related disorders in Poland (2014–2023) (National Health Fund data)

Fig. 10.5 presents information on the number of patients with Alzheimer's disease or related disorders in 2023 by age group. In the youngest group analysed, patients aged 55–64, there were 8.3 thousand male and 8.0 thousand female patients. The older the age group, the more female patients. In 2023, the highest number of patients was aged 85 and over (approximately 117.9 thousand). In men, the highest number of cases, 40.5 thousand, was observed in the group aged 75–84.

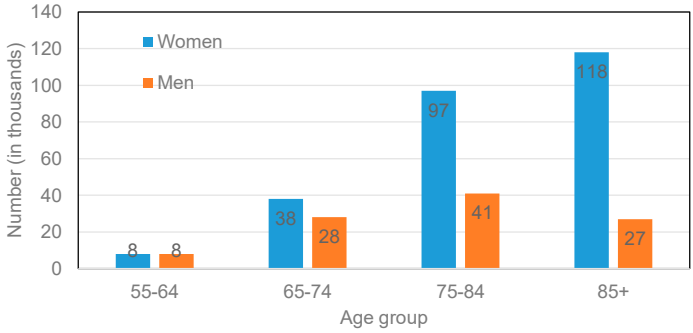

Fig. 10.5. Number of people with Alzheimer's disease or related disorders by gender and age group in 2023 (National Health Fund data)

Data from 2023 indicate that the percentage of patients with Alzheimer's disease and related disorders increases with age (Fig. 10.6). In the 55–64 age group, approximately 0.3% of women were affected, which translates to approximately

7.99 thousand patients. In turn, in the group aged 85 and over, the percentage of women affected by Alzheimer's disease or related disorders was 20% in 2023.

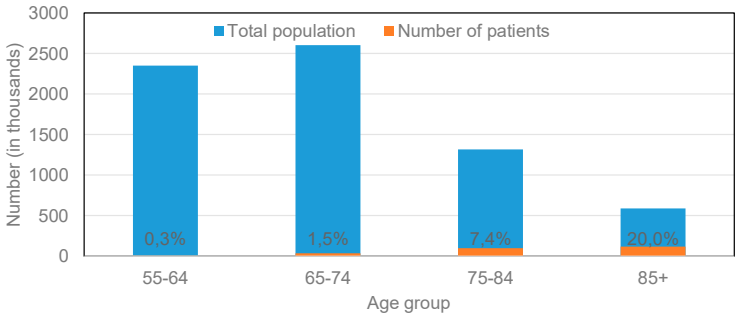

Fig. 10.6. Number and percentage of the population with Alzheimer's disease or related disorders by age group – women, 2023 (Statistics Poland and National Health Fund data)

The data presented in Figure 10.7 indicate that in 2023, the highest percentage of men with Alzheimer's disease and related disorders was found in the oldest age groups. Among individuals aged 55–64, approximately 0.4% of men (approximately 8.3 thousand) had this disease. The highest number of male patients was in the 75–84 age group, with 40.5 thousand cases, representing 5.1% of men in this age group. In turn, the percentage of male patients aged 85 and over was 12%, but the absolute number of patients was lower than in the 75–84 age group, standing at 27.4 thousand men.

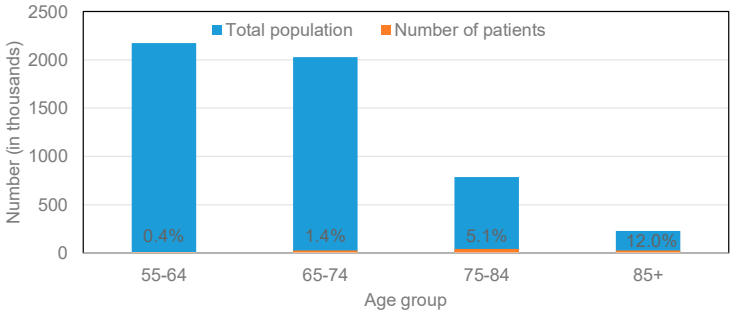

Fig. 10.7. Number and percentage of the population with Alzheimer's disease or related disorders by age group – men, 2023 (Statistics Poland and National Health Fund data)

Dynamics – changes in prevalence and incidence over time

Table 10.1 presents the recorded prevalence of Alzheimer's disease and related disorders in Poland in 2014–2023. The table shows data for the population aged 55 and over. The number of patients during this period increased by approximately 7.9%, from 338.7 thousand to 365.5 thousand. This represented an increase of 8.7% for women and 6.0% for men. The recorded prevalence per 1,000 persons aged 55 and over increased slightly over time, from 29.5 in 2014 to 30.3 in 2023, while the age-standardised rate fell slightly. In 2023, the incidence rate was higher in women by 90.2% than in men. This difference is mostly related to the older age structure of women – the age-standardised prevalence rate for women was 40.2% higher than for men.

Table 10.2 presents the recorded incidence of Alzheimer's disease and related disorders in Poland in 2014–2023 among persons aged 55 and over. The number of new cases increased between 2014 and 2023, from 102.8 thousand in 2014 to 110.7 thousand in 2023 (an increase of 7.7%). The number of new cases for women increased by 4.6% in 2023 compared to 2014, while this figure rose by 14.2% for men. The incidence rate per 1,000 persons aged 55 and over increased from 9.0 in 2014 to 9.2 in 2023 (an increase of 2%). The age-standardised incidence rate per 1,000 persons aged 55 and over decreased in the analysed years from 11.2 to 10.5 for women and remained stable for men (approximately 9.5). The excess of the standardised incidence rate for women compared to men remains at approximately 10%, reaching 11.7% in 2023.

Prevalence differences and changes over time by voivodship of residence

Table 10.3 shows information on the European age-standardised prevalence rate of Alzheimer's disease and related disorders in 2023 by the patients' voivodship of residence. The figures ranged from 25.1 to 36.3, with the lowest value recorded in Podlaskie voivodship and the highest in Podkarpackie voivodship.

Table 10.1 Recorded prevalence and recorded prevalence rate of Alzheimer's disease and related disorders in Poland, 2014–2023 (Statistics Poland and National Health Fund data)

Year	Total number of patients (in thousands)	Number of female patients (in thousands)	Number of male patients (in thousands)	Total prevalence rate per 1,000 persons aged 55 and over	Female prevalence rate per 1,000 persons aged 55 and over	Male prevalence rate per 1000 persons aged 55 and over	Age-standardised prevalence rate per 1,000 persons aged 55 and over (total)	Age-standardised prevalence rate per 1000 persons aged 55 and over (women)	Age-standardised prevalence rate per 1,000 persons aged 55 and over (men)
2014	338.7	240.4	98.3	29.5	36.7	20.0	32.8	37.9	27.6
2015	346.6	246.6	100.1	29.8	37.2	20.0	32.9	38.1	27.6
2016	357.1	254.3	102.8	30.3	37.9	20.2	33.0	38.2	27.8
2017	364.1	259.7	104.3	30.6	38.3	20.3	33.0	38.3	27.7
2018	369.0	263.5	105.5	30.7	38.6	20.3	33.0	38.3	27.7
2019	379.0	270.8	108.2	31.3	39.4	20.7	33.3	38.8	27.8
2020	365.3	263.0	102.3	30.1	38.2	19.5	31.9	37.5	26.3
2021	357.2	257.8	99.5	29.5	37.5	19.0	31.1	36.6	25.6
2022	357.1	256.5	100.6	29.7	37.6	19.4	31.2	36.6	25.9
2023	365.5	261.3	104.2	30.3	38.1	20.0	31.4	36.6	26.1

Table 10.2 Recorded incidence and incidence rate of Alzheimer's disease and related disorders in Poland, 2014–2023 (Statistics Poland and National Health Fund data)

Year	Total number of new cases (in thousands)	Number of new female cases (in thousands)	Number of new male cases (in thousands)	Total incidence rate per 1,000 persons aged 55 and over	Female incidence rate per 1,000 persons aged 55 and over	Male incidence rate ratio per 1,000 persons aged 55 and over	Age-standardised incidence rate per 1,000 persons aged 55 and over (total)	Age-standardised incidence rate per 1,000 persons aged 55 and over (women)	Age-standardised incidence rate per 1,000 persons aged 55 and over (men)
2014	102.8	71.1	31.7	9.0	10.9	6.5	10.3	11.2	9.5
2015	104.9	71.9	33.0	9.0	10.8	6.6	10.3	11.1	9.6
2016	108.2	73.7	34.5	9.2	11.0	6.8	10.4	11.0	9.8
2017	108.9	74.2	34.7	9.1	11.0	6.8	10.3	10.9	9.7
2018	107.5	73.4	34.1	8.9	10.7	6.6	10.0	10.7	9.3
2019	112.4	76.8	35.6	9.3	11.2	6.8	10.2	11.0	9.5
2020	103.8	71.2	32.6	8.6	10.3	6.2	9.5	10.2	8.8
2021	108.7	73.7	34.9	9.0	10.7	6.7	10.0	10.5	9.5
2022	107.5	72.4	35.1	9.0	10.6	6.8	9.8	10.4	9.3
2023	110.7	74.4	36.2	9.2	10.9	6.9	9.9	10.5	9.4

Table 10.3. European age-standardised prevalence rate of Alzheimer's disease and related disorders per 1,000 population by the patients' voivodship of residence, 2023. (National Health Fund data)

Voivodship	European age-standardised prevalence rate
Dolnośląskie	31.21
Kujawsko-Pomorskie	29.40
Lubelskie	32.34
Lubuskie	32.66
Łódzkie	34.52
Małopolskie	35.43
Mazowieckie	31.51
Opolskie	29.19
Podkarpackie	36.27
Podlaskie	25.11
Pomorskie	27.60
Śląskie	29.71
Świętokrzyskie	35.43
Warmińsko-Mazurskie	30.35
Wielkopolskie	31.59
Zachodniopomorskie	29.71

In each voivodship, both in 2018 and in 2023, the prevalence of Alzheimer's disease and related disorders was higher in women than in men (Fig. 10.8, Fig. 10.9).

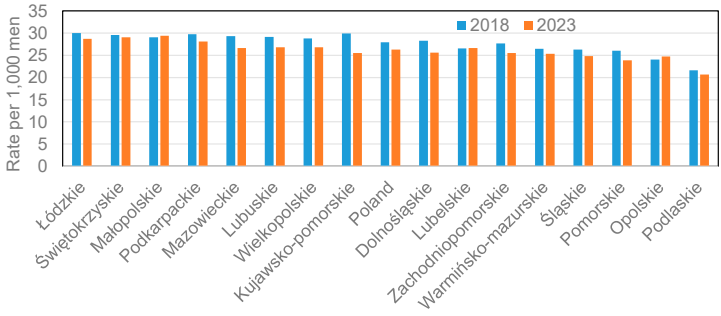

Fig. 10.8. Standardised prevalence of Alzheimer's disease and related disorders among men aged 55 and over per 1,000 men by voivodship of residence in 2018 and 2023 (National Health Fund data)

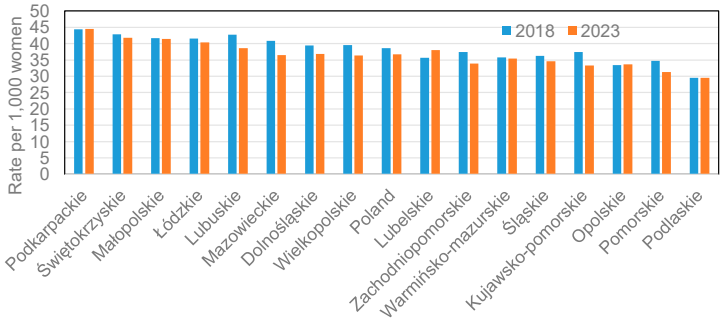

Fig. 10.9. Standardised prevalence of Alzheimer's disease and related disorders among women aged 55 and over per 1,000 women by voivodship of residence in 2018 and 2023 (National Health Fund data)

In 2023, the highest rate for men was observed in Małopolskie voivodship (29.4), and for women in Podkarpackie voivodship (44.47). The lowest rates in 2023 for both men and women were recorded in Podlaskie voivodship (20.65 for men and 29.58 for women). In most voivodships, prevalence was lower in 2023 than in 2018. In 2023, higher rates for men were observed in three voivodships: Małopolskie, Lubelskie and Opolskie, and for women in four voivodships: Podkarpackie, Lubelskie, Opolskie and Podlaskie.

Prevalence differences and changes over time (comparison of 2023/2018) by size of place of residence

Table 10.4 presents the European age-standardised prevalence of recorded Alzheimer's disease and related disorders by size of place of residence in 2018 and 2023. Both in 2018 and 2023, the highest prevalence was observed in towns with a population of up to 10,000 and gradually decreased with increasing population size – the lowest prevalence rates were observed in cities with a population of 100,000–200,000, while in the largest cities, the rate increased slightly. In 2023, the prevalence rate among residents of rural areas and the smallest towns with fewer than 10,000 inhabitants increased compared to 2018, while it decreased among residents of other urban areas. The excess prevalence of women compared to men was highest among rural residents and lowest among residents of the largest cities.

Table 10.4. Standardised recorded prevalence rates of Alzheimer's disease and related disorders per 1,000 population in Poland by sex and size of place of residence of persons aged 55 and over in 2018 and 2023 (Statistics Poland and National Health Fund data)

Year	Sex	Rural area	Towns up to 10,000 inhabitants	Towns with 10,000 to 20,000 inhabitants	Towns/ cities with 20,000 to 50,000 inhabitants	Cities with 50,000 to 100,000 inhabitants	Cities with 100,000 to 200,000 inhabitants	Cities with 200,000 inhabitants
2018	Women	49.7	60.5	44.7	39.3	38.1	36.8	39.2
2018	Men	35.3	47.4	32.6	28.7	27.4	27.2	29.9
2018	Total	42.7	54.3	38.7	34.0	32.8	32.0	34.5
2023	Women	53.8	64.7	43.8	37.4	35.6	34.8	34.5
2023	Men	36.9	47.8	31.3	27.3	26.1	25.7	26.1
2023	Total	45.4	56.6	37.6	32.4	30.8	30.3	30.3

Table 10.5 shows the recorded incidence rates for Alzheimer's disease and related disorders in 2018 and 2023 by place of residence size and sex. Similarly to the recorded prevalence, the highest rates were observed in towns with up to 10,000 inhabitants – this applies to both 2018 and 2023. The lowest rates were recorded in cities with a population of 100,000–200,000 and over 200,000. Unlike the prevalence rate, the figures for women were not higher than those for men in all places of residence by size, with lower rates recorded in 2018 in rural areas, towns with up to 10,000 inhabitants and towns with 10,000–20,000 inhabitants. In 2023, lower rates for women were observed only in rural areas and towns with up to 10,000 inhabitants.

The differences in the prevalence of Alzheimer's disease and related disorders in Poland by the size of the place of residence may be due to a number of factors. These include limitations related to the data set used – in line with the methodology, the estimate does not take into account data on services financed from non-public sources. Therefore, it is likely that in larger cities, where a higher percentage of such services can be expected, the number of patients or newly diagnosed cases may be underestimated.

Table 10.5. European age-standardised incidence rate of recorded Alzheimer's disease and related disorders per 1,000 population in Poland by sex and size of place of residence for persons aged 55 and over, 2018 and 2023 (Statistics Poland and National Health Fund data)

Year	Sex	Rural area	Towns up to 10,000 inhabitants	Towns with 10,000 to 20,000 inhabitants	Towns/ cities with 20,000 to 50,000 inhabitants	Cities with 50,000 to 100,000 inhabitants	Cities with 100,000 to 200,000 inhabitants	Cities with 200,000 inhabitants
2018	Women	23.0	30.2	15.8	12.5	10.8	10.0	10.9
	Men	24.1	36.3	14.6	11.2	9.6	8.8	9.5
	Total	23.5	32.9	15.2	11.8	10.2	9.4	10.2
2023	Women	23.3	29.7	15.8	12.4	11.0	10.6	10.0
	Men	22.9	33.4	14.6	11.5	10.1	9.2	8.8
	Total	23.1	31.4	15.2	11.9	10.5	9.9	9.4

Other possible causes may lie in risk factors for Alzheimer's disease and related diseases. The literature indicates that the risk of dementia depends on the level of formal education – people with a lower education level have a higher risk of developing Alzheimer's disease.[4] Other risk factors that may explain the differences between individual categories of place of residence include other lifestyle-related diseases (such as type 2 diabetes, dyslipidaemia, hypertension, obesity and underweight).[5,6,7]

[4] Hersi, M., Irvine, B., Gupta, P., Gomes, J., Birkett, N., Krewski, D., 2017. Risk factors associated with the onset and progression of Alzheimer's disease: A systematic review of the evidence. Neurotoxicology 61, 43–187.

[5] Li, X., Song, D., Leng, S.X., 2015. Link between type 2 diabetes and Alzheimer's disease: from epidemiology to mechanism and treatment. Clinical Interventions in Aging 10, 549

[6] Silva, M.V.F., Loures, C.d.M.G., Alves, L.C.V., de Souza, L.C., Borges, K.B.G., das Graças Carvalho, M., 2019. Alzheimer's disease: risk factors and potentially protective measures. Journal of biomedical science 26, 33

[7] Qu, Y., Hu, H.Y., Ou, Y.N., Shen, X.N., Xu, W., Wang, Z.T., Dong, Q., Tan, L., Yu, J.T., 2020. Association of body mass index with risk of cognitive impairment and dementia: a systematic review and meta-analysis of prospective studies. Neuroscience & Biobehavioral Reviews.

Prevalence differences and changes over time (comparison of 2014/2018/2023) by sex and age

According to the recorded prevalence data presented in Table 10.6, the number of patients in 2018 was higher than in 2014, and in 2023, it was higher than in 2018, regardless of age group. The differences are due to changes in the population – the prevalence rate per 1,000 people, regardless of sex or age group (with a few exceptions), showed an inverse relationship – the rate in 2018 was lower than in 2014, and the rate in 2018 was lower than in 2023. The exception to this trend is the group aged 85 and over – the total population and women.

Table 10.6. Recorded prevalence of Alzheimer's disease and related disorders in Poland by age group, 2014, 2018 and 2023 (Statistics Poland and National Health Fund data)

Age group	Year	Total number of patients (in thousands)	Number of female patients (in thousands)	Number of male patients (in thousands)	Total prevalence rate per 1,000 persons in a given age group	Female prevalence rate per 1,000 persons in a given age group	Male prevalence rate per 1,000 persons in a given age group
55–64	2014	34.0	17.3	16.8	6.1	5.9	6.3
	2018	26.4	13.5	12.9	5.0	4.9	5.1
	2023	16.3	8.0	8.3	3.6	3.4	3.8
65–74	2014	56.4	33.6	22.8	17.6	18.5	16.5
	2018	63.8	37.4	26.4	15.9	16.6	15.1
	2023	66.1	38.1	28.0	14.3	14.7	13.8
75–84	2014	138.7	100.2	38.4	68.9	77.4	53.7
	2018	139.5	100.0	39.5	72.1	80.9	56.6
	2023	137.8	97.3	40.5	65.5	73.9	51.4
85 and over	2014	109.6	89.3	20.3	164.9	183.8	113.6
	2018	139.2	112.5	26.7	176.4	197.8	121.0
	2023	145.3	117.9	27.4	177.8	200.1	120.2

For recorded incidence, both in absolute terms and per 1,000 population, considering age groups, there is no clear trend in 2014, 2018 and 2023, with incidence rates clearly decreasing in the youngest age group of 55–64 (Table 10.7).

Table 10.7. Recorded incidence of Alzheimer's disease and related disorders in Poland by age group, 2014, 2018 and 2023 (Statistics Poland and National Health Fund data)

Age group	Year	Total number of new cases (in thousands)	Number of new female cases (in thousands)	Number of new male cases (in thousands)	Total incidence rate per 1,000 persons in a given age group	Female incidence rate per 1,000 persons in a given age group	Male incidence rate per 1,000 persons in a given age group
55–64	2014	8.3	4.2	4.1	1.5	1.4	1.6
	2018	6.4	3.2	3.2	1.2	1.2	1.3
	2023	4.6	2.2	2.4	1.0	0.9	1.1
65–74	2014	15.9	9.3	6.6	5.0	5.1	4.8
	2018	18.0	10.3	7.7	4.5	4.6	4.4
	2023	21.3	11.9	9.4	4.6	4.6	4.7
75–84	2014	41.7	28.9	12.8	20.7	22.3	17.8
	2018	40.9	27.9	13.0	21.2	22.6	18.6
	2023	42.0	28.0	14.0	20.0	21.3	17.8
85 and over	2014	37.0	28.7	8.3	55.7	59.1	46.4
	2018	42.1	31.9	10.2	53.4	56.1	46.3
	2023	42.7	32.4	10.3	52.3	54.9	45.4