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PREVALENCE OF MULTIPLE SCLEROSIS IN THE NORTHERN REGIONS OF THE REPUBLIC OF AZERBAIJAN

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Abstract

Introduction. Multiple sclerosis (MS) is a chronic immune-mediated inflammatory disease of the central nervous system characterized by demyelination and neuroinflammation.

Aim. This study investigates the prevalence and demographics of MS in the northern regions of Azerbaijan, providing insights for targeted healthcare strategies.

Materials and Methods. This was a prospective, single-center, registry-based observational study involving patients referred from regional clinics or those presenting directly. The study was conducted at the Neurology Center of the Ministry of Health of Azerbaijan, from 01.01.2013, to 31.12.2022. Newly diagnosed or follow-up MS cases were included, with referrals from neurologists across the republic or self-referral to the center. Diagnostic protocols followed the Ministry of Health's "Clinical Protocol for the Diagnosis and Treatment of MS". Prevalence rates per 100,000 population were calculated and standardized using international and local demographic benchmarks. Statistical analysis included Pearson's chi-square, Student's t-tests, and Mann-Whitney U-tests, with significance set at $p<0.05$.

Results. In 2022, MS prevalence in the northern region of Azerbaijan was 18.25±1.25/100,000 (95% CI: 15.80–20.70), higher in urban (28.27±2.80/100,000, 95% CI: 22.78–33.75) than in rural areas (13.76±1.31/100,000, 95% CI: 11.20–16.32) ($p<0.0001$). The mean diagnosis age was 35.39±8.65 years (95% CI: 34.23–36.54), disease onset at 29.89±8.57 years (95% CI: 28.74–31.03), and the diagnostic delay was 5.50±4.24 years (95% CI: 4.93–6.07). Among living registered patients included in the point–prevalence analysis, women accounted for 63.4% of cases (135/213). The prevalence was significantly higher among women than men (23.10±1.99 vs. 13.38±1.51 per 100,000; $p<0.001$).

Conclusion. MS prevalence in northern region Azerbaijan is lower than in most European regions but comparable to neighboring countries. Findings highlight the need for better diagnostics in rural areas and establish a baseline for studying environmental and other risk factors.

Key words: Azerbaijan, delayed diagnosis, epidemiology, multiple sclerosis, prevalence.

Introduction. Multiple sclerosis (MS) is the most common demyelinating disease of the central nervous system. Its prevalence varies significantly across geographic regions, being notably higher in North America and Europe and lower in East Asia and sub-Saharan Africa [1]. Studies exploring the geographic and ethnic distribution of MS, along with its epidemiological characteristics in various regions, have greatly advanced the understanding of the respective roles of endogenous and exogenous factors in the development of the disease [1,2].

Recent studies have reported an increase in the prevalence of multiple sclerosis (MS), accompanied by a rising socio-economic burden [3]. MS typically manifests during individuals' reproductive and working years, significantly affecting not only patients and their families but

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also the healthcare system and government resources. The disease leads to higher healthcare costs, a reduced active workforce, and increased expenditures for compensating permanent or temporary disabilities [4].

MS is particularly relevant in Azerbaijan, where its significance is underscored by the "State Program on Treatment, Prevention, and Control Measures for Multiple Sclerosis", approved by Presidential Decree No. 2542 on November 13, 2012.

This article aims to investigate the prevalence and demographic characteristics of MS in the northern regions of the Republic of Azerbaijan to provide insights for targeted healthcare strategies.

Materials and methods.

Ethical issues

The data were collected after the approval of the Institutional Review Board of the Neurology Centre of the Ministry of Health of The Republic of Azerbaijan (Dated: 24.12.2012, Approval Reference: 11/2012).

Study area

Azerbaijan is divided into 14 economic regions. Among these, the Shaki-Zagatala and Guba-Khachmaz economic regions are classified as northern regions. The Shaki-Zagatala economic region spans 8.84 thousand km^2, accounting for 10.2% of the country's total territory. This region is situated in the northwestern part of Azerbaijan, along the southern slopes of the Greater Caucasus mountain range. According to the State Statistics Committee of the Republic of Azerbaijan, the population is 623.6 thousand, with a population density of 71 people per km^2 [5].

The Guba-Khachmaz economic region is located in northeastern Azerbaijan, covering an area of 6.96 thousand km^2 (8.0% of the country's territory). The region's population totals 543.8 thousand, with a population density of 78 people per km^2 [5].

Case ascertainment and referral pathway

As part of the State Program, an expert commission was established at the Neurology Center of the Ministry of Health. This commission facilitated the inclusion of MS patients from all regions of the country, ensuring referrals to the Neurology Center. Patients newly diagnosed with MS or requiring follow-up treatments could either visit the Neurology Center independently or be referred by neurologists working in clinics or hospitals across the republic. All examinations were conducted in accordance with the "Clinical Protocol for the Diagnosis and Treatment of Multiple Sclerosis", issued by the Ministry of Health of the Republic of Azerbaijan.

Study design

The study was a prospective, single-center, registry-based observational study conducted over a 10-year case-ascertainment period (from 01.01.2013, to 31.12.2022). During this time, 245 patients from the northern regions were referred to the Neurology Center: 103 from the Guba-Khachmaz economic region and 142 from the Shaki-Zagatala economic region. All patient data were recorded in a digital database.

Study population

Patients were included if they met the following criteria: residence in one of the northern economic regions of Azerbaijan, namely Guba-Khachmaz or Shaki-Zagatala; referral to or direct presentation at the Neurology Center between 01.01.2013 and 31.12.2022; and confirmed or reconfirmed diagnosis of MS according to the national Clinical Protocol for the Diagnosis and Treatment of Multiple Sclerosis. Both newly diagnosed patients and patients diagnosed before 2013 whose diagnosis was reconfirmed during the study period were included in the registry. For the point–prevalence analysis, only living registered patients as of 31.12.2022 were included in the numerator.

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Patients were excluded if the diagnosis of MS was not confirmed after clinical and diagnostic review, if an alternative diagnosis was established, or if their residence was outside the Guba-Khachmaz and Shaki-Zagatala economic regions.

Statistical analysis

Statistical analysis was conducted using IBM SPSS Statistics 27 and Microsoft Excel 2016. Distributional characteristics and homogeneity of variances were assessed to select the appropriate statistical tests. For categorical variables, Pearson's chi-square test was used. To compare means in normally distributed data with homogeneous variances, Student's t-test was employed, whereas the Mann-Whitney U-test was applied for non-parametric comparisons. Prevalence rates were calculated per 100,000 population, and 95% confidence intervals (CI) were estimated using Poisson standard errors [8]. For comparisons between sex- and residence-specific prevalence rates, z statistics were calculated using the difference between two independent rates and their standard errors. A significance level of $p<0.05$ was considered statistically significant.

Prevalence rates per 100,000 individuals were calculated. To facilitate comparisons with other studies, age–standardized prevalence rates were computed using direct standardization, referencing the WHO world population data (2000–2025) and the European population data (2011–2030) [6,7]. For regional comparisons, standardized prevalence rates were also calculated based on the age structure of Azerbaijan's population as of January 1, 2023 [5].

Results. Of the 245 individuals referred to the Neurology Center, 218 were diagnosed with MS, including 90 patients from the Guba-Khachmaz economic region and 128 from the Shaki-Zagatala economic region. As of the prevalence date (31.12.2022), five patients had passed away, leaving a total of 213 patients on record (88 from Guba-Khachmaz and 125 from Shaki-Zagatala). During the study period, 181 new cases of MS were registered. Additionally, 37 patients had been diagnosed prior to 2013. These previously diagnosed patients were incorporated into the registry under the State Program, and their diagnostic and treatment records were reviewed. Demographic and clinical characteristics were analyzed for all confirmed/reconfirmed MS cases (n=218), whereas point prevalence was calculated using living registered cases on 31.12.2022 as the numerator (n=213). The flow of patient inclusion in the registry and point–prevalence analysis is shown in Figure 1.

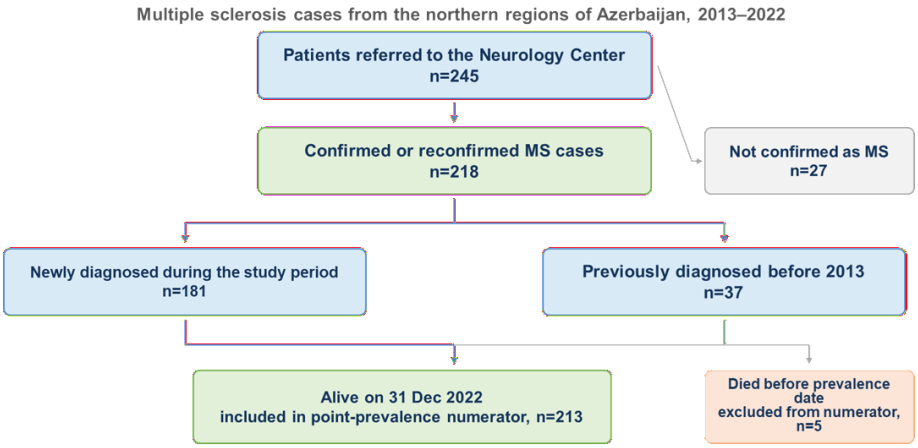

Figure 1. Flow diagram of patient inclusion in the MS registry and point–prevalence analysis (MS – multiple sclerosis. The point–prevalence numerator included only patients who were alive on 31.12.2022).

The average age at diagnosis was 35.39±8.65 years, while the average age at the probable first attack was 29.89±8.57 years (Table 1). Patients from the Guba-Khachmaz economic region

had significantly lower mean ages at diagnosis and at the probable first attack compared to patients from the Shaki-Zagatala economic region ($p<0.01$ and $p<0.05$). The diagnostic delay (time between the first attack and diagnosis) was 5.50±4.24 years. The mean disease duration (time from the first attack to the prevalence date) was 11.88±5.95 years. There were no significant differences in diagnostic delay or disease duration when comparing regions. Among deceased patients, the average age at death was 58.80±7.86 years, and the average life span (time from the diagnosis to death) was 19.60±12.34 years.

Table 1. Demographic indicators of Multiple Sclerosis Patients (Prevalence day 31.12.2022).

Guba-Khachmaz economic region						
Indicator	**N**	**Min.**	**Max.**	**Median**	**Mean±SD (95% CI)**	**SE**
Age at diagnosis	90	17	51	33.0	33.50±8.45** (31.73–35.27)	0.89
Age on the prevalence date	88	22	64	38.5	39.55±9.47* (37.54–41.55)	1.01
Age at the probable first attack	90	14	47	27.0	28.21±8.74* (26.38–30.04)	0.92
Diagnostic delay (years)	90	0	20	4	5.29±4.21 (4.41–6.17)	0.44
Disease Duration (years)	90	2	40	10	11.87±6.69 (10.46–13.27)	0.71
Shaki-Zagatala economic region						
Indicator	**N**	**Min.**	**Max.**	**Median**	**Mean±SD (95% CI)**	**SE**
Age at diagnosis	128	16	58	36.5	36.71±8.58 (35.21–38.21)	0.76
Age on the prevalence date	125	21	63	41.0	42.65±9.79 (40.91–44.38)	0.88
Age at the probable first attack	128	15	51	31.0	31.06±8.28 (29.61–32.51)	0.73
Diagnostic delay (years)	128	0	20	5.0	5.65±4.27 (4.90–6.40)	0.38
Disease Duration (years)	128	3	29	11.0	11.89±5.39 (10.95–12.83)	0.48
Northern Region (Total)						
Indicator	**N**	**Min.**	**Max.**	**Median**	**Mean±SD (95% CI)**	**SE**
Age at diagnosis	218	16	58	35.5	35.39±8.65 (34.23–36.54)	0.59
Age on the prevalence date	213	21	64	41.0	41.37±9.8 (40.05–42.68)	0.67
Age at the probable first attack	218	14	51	29.0	29.89±8.57 (28.74–31.03)	0.58
Diagnostic delay (years)	218	0	20	4.5	5.50±4.24 (4.93–6.07)	0.29
Disease Duration (years)	218	2	40	11.0	11.88±5.95 (11.09–12.67)	0.4

Age at death	5	48	69	58.0	58.80±7.86 (49.05–65.55)	3.51
Life span (years)	5	7	40	18.0	19.60±12.34 (4.28–34.92)	5.52

Footnote: N – number of patients, Min. – minimum value, Max. – maximum value, Mean – average value, SD – standard deviation, CI – confidence interval, SE – standard error. P<0.05 (*); P<0.01 (**). P – statistical significance of differences determined by Student's t–test (comparison by economic regions).

Patients from the Guba-Khachmaz economic region had significantly lower mean ages at the prevalence date compared to patients from the Shaki–Zagatala economic region (p<0.05; Table 1).

Among all confirmed/reconfirmed MS cases (n=218), the most common clinical type was relapsing–remitting MS, observed in 173 patients (79.36%). Secondary progressive MS was recorded in 28 patients (12.84%), clinically isolated syndrome in 9 patients (4.13%), primary progressive MS in 5 patients (2.29%), and progressive-relapsing MS in 3 patients (1.38%).

The distribution by residence and gender was analysed for all confirmed/reconfirmed MS cases (n=218). Overall, 52.3% of patients lived in rural areas, while 47.7% were urban residents. Among male patients, rural residents predominated, accounting for 63.3% (p<0.05). In contrast, urban residency was more common among female patients, with 54.0% living in urban areas (Table 2).

Table 2. Characteristics of all confirmed/reconfirmed multiple sclerosis cases by residence and gender (n=218).

Indicator	**Region**				**Total**
	Urban		**Rural**		
	N	**%**	**N**	**%**	**N**
Male	29	36.7	50	63.3	79
Female	75	54.0	64	46.0	139
Total	104	47.7	114	52.3	218
$P_{\chi 2}$	0.014				
Fisher exact $P_{\chi 2}$	0.017				

Footnote: N – number of patients; Statistical significance of differences (comparison by sex): Pχ2 – by Pearson's chi–square test and Fisher's exact test.

Among living registered patients included in the point–prevalence analysis (n=213), 135 were women (63.4%) and 78 were men (36.6%). By the end of 2022, the prevalence of MS in the northern region was 18.25±1.25 per 100,000 people. The prevalence among women was significantly higher than among men (23.10±1.99 vs. 13.38±1.51 per 100,000, respectively; p<0.0001). Similarly, MS prevalence was higher in the urban population (28.27±2.80 per 100,000) compared to the rural population – 13.76±1.31 per 100,000 (p<0.05). However, no statistically significant difference in MS prevalence was found between rural and urban populations within the Guba-Khachmaz economic region (Table 3).

While the prevalence in the Shaki-Zagatala economic region – 20.05±1.79 per 100,000 was higher than in the Guba-Khachmaz economic region – 16.18±1.72 per 100,000, this difference was not statistically significant, even after standardization using the Azerbaijan Standard.

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Table 3. Prevalence of Multiple Sclerosis in the Northern Region of Azerbaijan by the End of 2022.

Guba-Khachmaz economic region						
Indicator	**Population**	**Cases**	**Prevalence±SE, crude (95% CI)**	**Prevalence±SE, WSt (95% CI)**	**Prevalence±SE, EuSt (95% CI)**	**Prevalence±SE, AzSt (95% CI)**
Male	273,591	35	12.79±2.16 (8.55–17.03)	12.21±2.11 (8.07–16.35)	12.10±2.10 (7.97–16.22)	13.27±2.20 (8.95–17.58)
Female	270,197	53	19.62±2.69 (14.33–24.90)	18.48±2.61 (13.35–23.60)	19.42±2.68 (14.16–24.67)	20.23±2.74 (14.87–25.60)
p–value, male vs female	–	–	p<0.05	p>0.05	p<0.05	p<0.05
Rural	360,255	52	14.43±2.00 (10.51–18.36)	13.90±1.96 (10.05–17.75)	14.17±1.98 (10.28–18.05)	15.14±2.05 (11.12–19.16)
Urban	183,533	36	19.62±3.27 (13.21–26.02)	18.38±3.16 (12.17–24.58)	19.12±3.23 (12.80–25.45)	20.12±3.31 (13.63–26.61)
p–value, rural vs urban	–	–	p>0.05	p>0.05	p>0.05	p>0.05
Total	543,788	88	16.18±1.73 (12.80–19.56)	15.36±1.68 (12.07–18.66)	15.82±1.71 (12.48–19.16)	16.77±1.76 (13.33–20.22)
Shaki-Zagatala economic region						
Indicator	**Population**	**Cases**	**Prevalence±SE, crude (95% CI)**	**Prevalence±SE, WSt (95% CI)**	**Prevalence±SE, EuSt (95% CI)**	**Prevalence±SE, AzSt (95% CI)**
Male	309,345	43	13.90±2.12 (9.75–18.06)	12.42±2.00 (8.50–16.35)	13.42±2.08 (9.34–17.51)	13.80±2.11 (9.66–17.94)
Female	314,251	82	26.09±2.88 (20.45–31.74)	23.11±2.71 (17.80–28.43)	24.89±2.81 (19.38–30.41)	25.86±2.87 (20.23–31.48)
p–value, male vs female	–	–	p<0.05	p<0.05	p<0.05	p<0.05
Rural	446,266	59	13.22±1.72 (9.85–16.59)	12.17±1.65 (8.93–15.41)	13.33±1.73 (9.94–16.72)	13.46±1.74 (10.05–16.86)

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Urban	177,330	66	37.22±4.58 (28.24–46.20)	32.06±4.25 (23.72–40.39)	34.03±4.38 (25.44–42.61)	35.97±4.50 (27.14–44.80)
p–value, rural vs urban	–	–	p<0.05	p<0.05	p<0.05	p<0.05
Total	623,596	125	20.05±1.79 (16.53–23.56)	17.82±1.69 (14.51–21.13)	19.24±1.76 (15.79–22.68)	19.90±1.79 (16.40–23.40)

Northern region (total)

Indicator	**Population**	**Cases**	**Prevalence±SE, crude (95% CI)**	**Prevalence±SE, WSt (95% CI)**	**Prevalence±SE, EuSt (95% CI)**	**Prevalence±SE, AzSt (95% CI)**
Male	582,936	78	13.38±1.52 (10.41–16.35)	12.36±1.46 (9.51–15.21)	12.86±1.49 (9.95–15.78)	13.60±1.53 (10.60–16.59)
Female	584,448	135	23.10±1.99 (19.20–27.00)	21.05±1.90 (17.33–24.77)	22.46±1.96 (18.62–26.30)	23.35±2.00 (19.43–27.27)
p–value, male vs female	–	–	p<0.05	p<0.05	p<0.05	p<0.05
Rural	806,521	111	13.76±1.31 (11.20–16.32)	12.97±1.27 (10.48–15.45)	13.74±1.30 (11.18–16.29)	14.23±1.33 (11.63–16.84)
Urban	360,863	102	28.27±2.80 (22.78–33.75)	25.30±2.65 (20.11–30.49)	26.71±2.72 (21.37–32.04)	28.17±2.79 (22.69–33.64)
p–value, rural vs urban	–	–	p<0.05	p<0.05	p<0.05	p<0.05
Total	1,167,384	213	18.25±1.25 (15.80–20.70)	16.73±1.20 (14.39–19.08)	17.73±1.23 (15.31–20.14)	18.51±1.26 (16.05–20.98)

Footnote: Prevalence – crude prevalence per 100,000 population; SE – standard error; CI – confidence interval; WSt – World Standard (using the world population as the standard); EuSt – European Standard (using the European population as the standard); AzSt – Azerbaijan Standard. Statistical significance of differences: The p–values indicate comparisons between the corresponding sex- or residence-specific prevalence rates using their standard errors.

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Discussion. In this manuscript, we compared our findings with data from other countries. In our study, the mean age at diagnosis was 35.39±8.65 years, which is higher than the global average age of MS diagnosis (32 years) [4]. The mean age at the first MS attack in Azerbaijan's northern region (29.89±8.57 years) was lower than reported in Karachi, Pakistan (32.92 years) [9]; Rome, Italy (31.7±10.3 years) [10]; Møre and Romsdal County, Norway (34 years) [11]; and Lorraine, France (34.3±11.3 years) [12]. However, studies conducted in Türkiye (Geyve and Kandira – 26.7±8.4 years) and Iran (Mazandaran – 28.7±8.6 years) showed lower mean ages at first attack [13,14].

The average diagnostic delay in Northern Region of Azerbaijan was 5.50±4.24 years, which is longer than the delays reported in Iran (18.01 months) [15], Colombia (3.07 years) [16], Norway (1.5 years, 1995–2017) [11], and Italy (33.8 months) [17]. A limited level of public health awareness and insufficient diagnostic resources might contribute to prolonged diagnostic delays in the region.

Several epidemiological studies have reported a high prevalence of MS in Türkiye and Iran in comparison with our reports [13,14,18–20]. For example, the Central Black Sea region of Türkiye reported a prevalence of 43.2 per 100,000, while Karabük and Ereğli reported prevalence rates of 95.9 and 96.1 per 100,000, respectively [18–20]. A descriptive cross–sectional study conducted in Mazandaran Province (Iran) reported a standardized prevalence of 72.5 per 100,000 in 2018, with rates of 108.5 per 100,000 for women and 37.1 for men [14]. But the lowest MS prevalence in Iran was recorded in the northeast, with rates of 12.9 per 100,000 in Razavi Khorasan, 8.7 in North Khorasan, and 5.3 in South Khorasan, all lower than the prevalence in Azerbaijan's northern region [21]. These differences may be related, on the one hand, to the variability of the research methods used, and on the other hand, to the differences in risk factors.

MS prevalence in Russia varies widely by regions and ethnic groups, ranging from 10 to 80 cases per 100,000 people. The highest rates are observed in the European part of the country [22]. MS prevalence among ethnic groups from the Caucasus (8,0–15.2/100,000) living near Azerbaijan is somewhat similar to our findings [22]. The reason can be similar epigenetic and lifestyle factors.

In Moldova, the standardized MS prevalence (using the European standard) was 20.2 per 100,000 in 2012, with rates of 24.3 per 100,000 for women and 15.5 for men – slightly higher than the rates reported in Azerbaijan [23]. In European countries, MS prevalence is generally much higher than in Azerbaijan. For example, the age-standardized prevalence in Hungary (2015) was 127.2 per 100,000 [24], while in Denmark, it reached 284 per 100,000 [25], and in Møre and Romsdal County, Norway, it was 335.8 per 100,000 [11]. This can be explained by geographical latitude, sun exposure, and other risk factors [2].

Study limitations. There are several limitations of the study. This study is limited to the northern region of Azerbaijan, which may not fully represent the epidemiological characteristics of MS across the entire country. Consequently, the findings may not be generalizable to other regions with differing demographics, healthcare access, or environmental factors. As a single-center study, the data may be influenced by referral patterns or the specific practices of the Neurology Center, potentially introducing bias.

Conclusion. The prevalence of MS in the northern region of Azerbaijan is lower than in most European countries but is comparable to some of the lowest rates observed in Russia and higher than the lowest rates reported in Iran. Long–term studies from various countries indicate that MS prevalence tends to increase over time, highlighting the need for ongoing research. Our findings emphasize the importance of continued monitoring and prevention efforts in the region, particularly in the context of improving healthcare quality and enabling early disease diagnosis.

Conflict of interest. The authors declare no conflict of interest.

Authors' contribution. RA was solely responsible for the concept and design of the study, methodology, software, validation, formal analysis, investigation, resources, data management, writing and preparation of the original manuscript, review and editing, visualization, supervision, and project administration. The author has read and approved the final version of the manuscript. The author declares that this material has not been previously published and is not under consideration by another publisher.

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Data availability statement. The datasets generated and analyzed during the current study are not publicly available because they contain clinical patient data. De–identified data may be made available from the corresponding author upon reasonable request and subject to applicable ethical and institutional approvals.

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LIST OF REFERENCES

1. Leray E, Moreau T, Fromont A, Edan G. Epidemiology of multiple sclerosis. Rev Neurol (Paris). 2016;172(1):3–13. https://doi.org/10.1016/j.neurol.2015.10.006
2. Hittle M, Culpepper WJ, Langer–Gould A, Marrie RA, Cutter GR, Kaye WE, et al. Population–based estimates for the prevalence of multiple sclerosis in the United States by race, ethnicity, age, sex, and geographic region. JAMA Neurol. 2023;80(7):693–701. https://doi.org/10.1001/jamaneurol.2023.1135
3. Moghaddam VK, Dickerson AS, Bazrafshan E, Seyedhasani SN, Najafi F, Hadei M, et al. Socioeconomic determinants of global distribution of multiple sclerosis: an ecological investigation based on Global Burden of Disease data. BMC Neurol. 2021;21(1):145. https://doi.org/10.1186/s12883–021–02170–3
4. Walton C, King R, Rechtman L, Kaye W, Leray E, Marrie RA, et al. Rising prevalence of multiple sclerosis worldwide: insights from the Atlas of MS, third edition. Mult Scler. 2020;26(14):1816–21. https://doi.org/10.1177/1352458520970841
5. State Statistical Committee of the Republic of Azerbaijan. Demographic indicators of Azerbaijan: statistical publication 2023. Baku: Chashioglu EI–MMC; 2023. 590 p.
6. Ahmad OB, Boschi–Pinto C, Lopez AD, Murray CJL, Lozano R, Inoue M. Age standardization of rates: a new WHO standard. GPE Discussion Paper Series. 2001;(31):10–2.
7. Pace M, Cayotte E, Agafitei L, Zupanic T, Wojtyniak B, Gissler M, et al. Revision of the European standard population: report of Eurostat's task force. Luxembourg: Publications Office of the European Union; 2013. 121 p.
8. Rossi RJ. Applied biostatistics for the health sciences. 2nd ed. Hoboken (NJ): Wiley; 2022. 688 p.
9. Butt MA, Arman A, Ansari T. Frequency of 25–hydroxy vitamin D deficiency in patients with multiple sclerosis. Khyber Med Univ J. 2022;14(1):42–6. https://doi.org/10.35845/kmuj.2022.22039
10. Prosperini L, Lucchini M, Ruggieri S, Tortorella C, Haggiag S, Mirabella M, et al. Shift of multiple sclerosis onset towards older age. J Neurol Neurosurg Psychiatry. 2022;93(10):1137–1139. https://doi.org/10.1136/jnnp–2022–329049
11. Willumsen JS, Aarseth JH, Myhr KM, Midgard R. High incidence and prevalence of MS in Møre and Romsdal County, Norway, 1950–2018. Neurol Neuroimmunol Neuroinflamm. 2020;7(3):e713. https://doi.org/10.1212/NXI.0000000000000713
12. Gbaguidi B, Guillemin F, Soudant M, Debouverie M, Mathey G, Epstein J. Age–period–cohort analysis of the incidence of multiple sclerosis over twenty years in Lorraine, France. Sci Rep. 2022;12(1):1001. https://doi.org/10.1038/s41598–022–04836–5
13. Bölük C, Türk Börü U, Taşdemir M, Gezer T. Epidemiology of multiple sclerosis in Turkey: a ten–year trend in rural cities. Turk J Neurol. 2021;27(1):41–5. https://doi.org/10.4274/tnd.2020.36418

14. Baghbanian SM, Cheraghmakani H, HabibiSaravi R, Azar A, Ghasemihamedani F. Does the multiple sclerosis (MS) map need to change again? An update of MS prevalence in Mazandaran province of Iran in 2018. BMC Neurol. 2020;20(1):52. https://doi.org/10.1186/s12883–020–1618–6
15. Ghiasian M, Faryadras M, Mansour M, Khanlarzadeh E, Mazaheri S. Assessment of delayed diagnosis and treatment in multiple sclerosis patients during 1990–2016. Acta Neurol Belg. 2021;121(1):199–204. https://doi.org/10.1007/s13760–020–01528–7
16. Cárdenas–Robledo S, Lopez–Reyes L, Arenas–Vargas LE, Carvajal–Parra MS, Guío–Sánchez C. Delayed diagnosis of multiple sclerosis in a low–prevalence country. Neurol Res. 2021;43(7):521–7. https://doi.org/10.1080/01616412.2020.1866374
17. Patti F, Chisari CG, Arena S, Toscano S, Finocchiaro C, Fermo SL, et al. Factors driving delayed time to multiple sclerosis diagnosis: results from a population–based study. Mult Scler Relat Disord. 2022;57:103361. https://doi.org/10.1016/j.msard.2021.103361
18. Akdemir N, Terzi M, Arslan N, Onar M. Prevalence of multiple sclerosis in the Middle Black Sea Region of Turkey and demographic characteristics of patients. Noro Psikiyatr Ars. 2017;54(1):11–4. https://doi.org/10.5152/npa.2016.12451
19. Börü ÜT, Bilgiç AB, Köseoğlu Toksoy C, Yılmaz AY, Tasdemir M, Sensöz NP, et al. Prevalence of multiple sclerosis in a Turkish city bordering an iron and steel factory. J Clin Neurol. 2018;14(2):234–41. https://doi.org/10.3988/jcn.2018.14.2.234
20. Türk Börü Ü, Bölük C, Taşdemir M, Gezer T, Serim VA. Air pollution, a possible risk factor for multiple sclerosis. Acta Neurol Scand. 2020;141(5):431–7. https://doi.org/10.1111/ane.13223
21. Ghandehari K, Riasi HR, Nourian A, Boroumand AR. Prevalence of multiple sclerosis in north east of Iran. Mult Scler. 2010;16(12):1525–6. https://doi.org/10.1177/1352458510372150
22. Boyko A, Melnikov M. Prevalence and incidence of multiple sclerosis in Russian Federation: 30 years of studies. Brain Sci. 2020;10(5):305. https://doi.org/10.3390/brainsci10050305
23. Marcoci C, Lisnic V, Gavriliuc M, Odainic O, Sangheli M, Belenciuc A, et al. Prevalence of multiple sclerosis in the Republic of Moldova. Neuroepidemiology. 2016;46(3):166–72. https://doi.org/10.1159/000443931
24. Iljicsov A, Milanovich D, Ajtay A, Oberfrank F, Bálint M, Dobi B, et al. Incidence and prevalence of multiple sclerosis in Hungary based on record linkage of nationwide multiple healthcare administrative data. PLoS One. 2020;15(7):e0236432. https://doi.org/10.1371/journal.pone.0236432
25. Magyari M, Joensen H, Laursen B, Koch–Henriksen N. The Danish Multiple Sclerosis Registry. Brain Behav. 2021;11(1):e01921. https://doi.org/10.1002/brb3.1921

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ӘЗІРБАЙЖАН РЕСПУБЛИКАСЫНЫҢ СОЛТҮСТІК ӨҢІРЛЕРІНДЕ ШАШЫРАҢҚЫ СКЛЕРОЗДЫҢ ТАРАЛУЫ

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Түйіндеме

Кіріспе. Шашыраңқы склероз (ШС) – орталық жүйке жүйесінің демиелинизациямен және нейроқабынумен сипатталатын созылмалы иммундық механизмдер арқылы дамитын қабыну ауруы.

Мақсаты. Бұл зерттеу Әзірбайжанның солтүстік өңірлеріндегі ШС таралуын және демографиялық сипаттамаларын зерттеуге, сондай-ақ нысаналы денсаулық сақтау стратегияларын әзірлеу үшін мәліметтер ұсынуға бағытталған.

Материалдар мен әдістер. Аймақтық клиникалардан жолданған немесе тікелей өздері жүгінген пациенттер қатысқан проспективті, бір орталықты, тіркеу деректеріне негізделген обсервациялық зерттеу жүргізілді. Зерттеу Әзірбайжан Денсаулық сақтау министрлігінің Неврологиялық орталығында 01.01.2013 жылдан 31.12.2022 жылға дейін жүргізілді. Зерттеуге алғаш рет диагноз қойылған ШС жағдайлары, сондай–ақ республика бойынша неврологтар жолдаған немесе орталыққа өз бетінше жүгінген, бұрыннан бақылауда болған ШС пациенттері енгізілді. Диагностикалық шаралар Денсаулық сақтау министрлігінің «ШС диагностикасы мен емдеудің клиникалық протоколына» сәйкес жүргізілді. 100 000 тұрғынға шаққандағы таралу көрсеткіштері есептеліп, халықаралық және жергілікті демографиялық стандарттар бойынша стандартталды. Статистикалық талдауға Пирсонның $\chi 2$ критерийі, Стьюденттің t-критерийі және Манн-Уитнидің U-критерийі енгізілді; статистикалық маңыздылық деңгейі $p<0,05$ деп белгіленді.

Нәтижелер. 2022 жылы Әзірбайжанның солтүстік өңірінде ШС таралуы 100 000 тұрғынға шаққанда 18,25±1,25 құрады (95% СА: 15,80–20,70) және ауылдық аймақтарға қарағанда (13,76±1,31/100 000; 95% СА: 11,20–16,32) қалалық аймақтарда жоғары болды (28,27±2,80/100 000; 95% СА: 22,78–33,75) ($p<0,0001$). Диагноз қойылған орташа жас 35,39±8,65 жылды (95% СА: 34,23–36,54), аурудың басталу жасы 29,89±8,57 жылды (95% СА: 28,74–31,03), ал диагностикалық кідіріс 5,50±4,24 жылды (95% СА: 4,93–6,07) құрады. Нүктелік таралуды талдауға енгізілген тірі тіркелген пациенттердің ішінде әйелдер 63,4% жағдайды құрады (135/213). Таралу көрсеткіші әйелдер арасында ерлерге қарағанда едәуір жоғары болды (100 000 тұрғынға шаққанда 23,10±1,99 және 13,38±1,51; $p<0,001$).

Қорытынды. Әзірбайжанның солтүстік өңірінде ШС таралуы Еуропаның көптеген өңірлерімен салыстырғанда төмен, бірақ көршілес елдердің көрсеткіштерімен шамалас. Алынған нәтижелер ауылдық аймақтарда диагностиканы жақсарту қажеттілігін көрсетеді және экологиялық және басқа да қауіп факторларын зерттеу үшін бастапқы негіз қалыптастырады.

Түйінді сөздер: Әзірбайжан, диагностикалық кідіріс, эпидемиология, шашыраңқы склероз, таралу.

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РАСПРОСТРАНЁННОСТЬ РАССЕЯННОГО СКЛЕРОЗА В СЕВЕРНЫХ РЕГИОНАХ АЗЕРБАЙДЖАНСКОЙ РЕСПУБЛИКИ

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Аннотация

Введение. Рассеянный склероз (РС) является хроническим иммуноопосредованным воспалительным заболеванием центральной нервной системы, характеризующимся демиелинизацией и нейровоспалением.

Цель. Настоящее исследование изучает распространённость и демографические характеристики РС в северных регионах Азербайджана и предоставляет данные для разработки целевых стратегий здравоохранения.

Материалы и методы. Проведено проспективное, одноцентровое, регистровое обсервационное исследование с участием пациентов, направленных из региональных клиник или обратившихся самостоятельно. Исследование проводилось в Неврологическом центре Министерства здравоохранения Азербайджана с 01.01.2013 по 31.12.2022. В исследование включались впервые диагностированные случаи РС, а также пациенты с ранее установленным диагнозом, находившиеся под наблюдением, направленные неврологами из различных регионов республики или самостоятельно обратившиеся в центр. Диагностика проводилась в соответствии с «Клиническим протоколом диагностики и лечения РС» Министерства здравоохранения. Показатели распространённости на 100 000 населения рассчитывались и стандартизировались с использованием международных и локальных демографических стандартов. Статистический анализ включал критерий $\chi 2$ Пирсона, t-критерий Стьюдента и U-критерий Манна-Уитни; уровень статистической значимости был установлен при $p<0,05$.

Результаты. В 2022 году распространённость РС в северном регионе Азербайджана составила 18,25±1,25 на 100 000 населения (95% ДИ: 15,80–20,70) и была выше в городских районах (28,27±2,80 на 100 000; 95% ДИ: 22,78–33,75), чем в сельских районах (13,76±1,31 на 100 000; 95% ДИ: 11,20–16,32) ($p<0,0001$). Средний возраст постановки диагноза составил 35,39±8,65 года (95% ДИ: 34,23–36,54), возраст начала заболевания – 29,89±8,57 года (95% ДИ: 28,74–31,03), а диагностическая задержка – 5,50±4,24 года (95% ДИ: 4,93–6,07). Среди живых зарегистрированных пациентов, включённых в анализ точечной распространённости, женщины составили 63,4% случаев (135/213). Распространённость была значительно выше среди женщин, чем среди мужчин (23,10±1,99 против 13,38±1,51 на 100 000 населения; $p<0,001$).

Заключение. Распространённость РС в северном регионе Азербайджана ниже, чем в большинстве европейских регионов, но сопоставима с показателями соседних стран. Полученные данные подчёркивают необходимость улучшения диагностики в сельских районах и формируют исходную базу для изучения экологических и других факторов риска.

Ключевые слова: Азербайджан, диагностическая задержка, эпидемиология, рассеянный склероз, распространённость.