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PREDICTION OF EPIDEMIOLOGIC PARAMETERS OF STROKE IN NORTH-EASTERN REGION OF AZERBAIJAN

Prof. Shiraliyeva R.K, Aliyev R.R

Department of Neurologic Diseases, Azerbaijan State Doctors Advancement Institute
named after A. Aliyev, Baku

Introduction. Today cerebrovascular events account for majority of mortality cases in many countries, being 2nd or 3rd leading cause for mortality, as well as number one leading cause of disability. Implementation of effective treatment and prevention methods during last 15 years has allowed decreasing stroke-related mortality by over 50% in Western European countries, USA, Japan, and Australia.

Considering emerging nature of this problem, the **objective** of the study presented here is to predict epidemiologic parameters (incidence, prevalence, mortality, and lethality rates) of stroke for 2015 in north-eastern region of Azerbaijan.

Materials and Methods. To achieve identified objective of the study, epidemiologic parameters of stroke for 10 years (1998-2008) in selected region have been analysed. Data used in the analysis was obtained from Statistics Departments of Central Regional Hospitals, municipal, district, and village hospitals, Outpatient Physician Offices, and Physician Assistants' and Obstetricians' Offices.

Figures regarding number of population residing in selected study region were obtained from National Census Data of State Statistics Committee. Incidence, standardized, as well as prevalence rates were calculated per 1000 population using variation statistics. Stroke-related prevalence and incidence rates for 2015 were predicted for both the studied region and its individual towns using Exponential Distribution method. Calculations were conducted using Microsoft Office Excel.

Brief description of region. Guba-Khachmaz region is located in north-eastern part of Azerbaijan. The region incorporates Siyazan, Shabran, Gusar, and Khachmaz administrative regions in itself. Overall area of this economic region is 766 000 sq. kilometers, accounting for 8.8% of the total area of the country.

According to the results of the National Census, 2009, the population of the region comprises 5.48% of total population of Azerbaijan, being 488 741 persons.

49.84% of population (243 575 persons) is comprised of males and 50.16% (245 166 persons) of females.

Study results. During the period of 1999-2008, 10-years average of incidence for stroke in Guba-Khachmaz region was $1.2 \pm 0.05\%$. The lowest incidence rate was observed in Siyazan region in 2001, being $0.8 \pm 0.15\%$ and the highest incidence rate was registered in Guba region, being $1.8 \pm 0.1\%$ ($p < 0.0001$). The lowest number of new cases of stroke was reported in 1999 ($0.99 \pm 0.05\%$), whereas the highest one was reported in 2008 ($1.47 \pm 0.06\%$).

During 1999-2008, average prevalence rate for stroke among residents of Guba-Khachmaz economic region was $2.4 \pm 0.07\%$, with the minimum rate ($2.14 \pm 0.07\%$) being reported in 2001 and the maximum rate ($3.0 \pm 0.09\%$) being reported in 2008 ($p < 0.0001$).

While analysing death cases occurring due to stroke, it was identified that 10-years average Mortality Rate (MR) was $0.4 \pm 0.03\%$, whereas average Lethality Rate (LR) was $35.0 \pm 0.7\%$. MR and CFR were described for the period covered by the study. Figures related to MR and LR did not demonstrate statistically significant differences per year, when compared with the rates for previous year. The highest and lowest MRs were reported in 2008 and 1999,

respectively ($p < 0.01$). Also, the highest and lowest LRs were registered in 2008 and 2001, respectively ($p < 0.01$). However, stroke-related mortality rate remained dynamically stable.

Discussion. Overall, average prevalence of stroke for 10 years was $2.54 \pm 0.1\%$, being $2.67 \pm 0.19\%$ and $2.4 \pm 0.18\%$ among females and males, respectively.

The lowest average prevalence rate for 10 years was observed in Shabran region ($2.06 \pm 0.2\%$), whereas the highest average prevalence rate for 10 years was reported in Khachmaz ($2.54 \pm 0.1\%$) ($p < 0.05$). The lowest 10-years average prevalence of stroke among males was registered in Siyazan, being $1.87 \pm 0.3\%$ and the highest one was registered in Gusar, being $2.69 \pm 0.26\%$ ($p < 0.05$). The lowest average prevalence rate for 10 years among females was observed in Shabran region ($2.22 \pm 0.3\%$), whereas the highest average prevalence rate for 10 years was reported in Khachmaz ($2.67 \pm 0.19\%$) ($p < 0.05$).

The lowest average mortality rate for 10 years due to stroke was observed in Shabran, being $0.3 \pm 0.08\%$ and the highest one was reported in Khachmaz, being $0.44 \pm 0.05\%$. The lowest stroke-related mortality rate was reported in 1999 and 2005 in Shabran, being $0.26 \pm 0.08\%$ and $0.26 \pm 0.07\%$, respectively. In contrast, the highest average mortality rate for 10 years was reported in Guba in 2008, being $0.53 \pm 0.08\%$ ($p < 0.05$).

The lowest average of stroke-related LR for 10 years in the region was registered in Shabran ($29.7 \pm 2.1\%$), with highest average being registered in Guba ($36.27 \pm 1.19\%$). The lowest stroke-related LR was reported in Shabran in 2005, being $25.5 \pm 6.1\%$ and the highest one was reported in Guba in 2001, being $41.2 \pm 4.3\%$ ($p < 0.05$). LR associated with stroke varied chaotically in different residential areas of studied region.

The results demonstrate a weak positive trend in mortality rate for stroke in the region. Annual LR changed from year to year during 1999-2008, remaining within the range of 31.5 ± 1.7 and $37.2 \pm 2.2\%$.

Epidemiologic parameters of stroke were predicted for Guba-Khachmaz economic region and its administrative areas for 2015, using Exponential Distribution method applied to available data. It was predicted that incidence and prevalence of stroke will increase in the studied region in 2015, which is true for mortality rate, as well. However, estimated LR for 2015 is 34.1% , which does not differ from those pertaining to studied years.

In Siyazan, prediction is that the incidence of stroke will increase in 2015, in contrast, no change is expected for prevalence rate. It is noted that the epidemiologic situation in Shabran will remain stable compared to the previous years studied. An acute growth of both incidence and prevalence rates for stroke is predicted for Guba, provided that the relevant figures for 2008 are excluded. In Gusar, a slight increase is estimated for prevalence with the incidence rate remaining stable. In Khachmaz, both prevalence and incidence rates are estimated to increase.

Although, a growth in mortality rate for stroke is predicted in Siyazan, decrease might be observed in LR in comparison with several previous years. For Shabran, it is estimated that the epidemiologic situation will remain stable compared to other studied years. A sharp increase is predicted for Guba in 2015, given that respective figures for 2008 are not considered. In contrast, a decline is estimated for LR. It is estimated that the MR will remain stable in Gusar, whereas the LR will increase relatively. Finally, in Khachmaz, it is predicted that the MR will increase, with LR remaining stable.

Conclusion: According to published data, we may assume that incidence and prevalence rates of stroke in Azerbaijan, represented by Guba-Khachmaz region, occupy middle levels compared to other countries. Mortality rate is similar to those observed in developed countries, whereas LR is higher than those reported in developed countries.