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Stroke Prevalence and Stroke-Related Risk Factors from a Gender and Temporal Perspective: What Do Turkish Health Data Tell Us?

İnme Sıklığı ve İnme İlişkili Risk Faktörlerinin Cinsiyet ve Zaman Perspektifinden Değerlendirilmesi; Türkiye Sağlık Verileri Bize Ne Söylüyor?

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ABSTRACT

Background: Stroke is one of the most prevalent neurological disorders and remains a leading cause of mortality and long-term disability. This study aimed to evaluate the self-reported prevalence of stroke in the population, the clinical characteristics of individuals with a history of stroke, as well as their access to healthcare services and functional status, using data from the Turkish Health Survey (THS) conducted by the Turkish Statistical Institute (TSI).

Methods: Data from individuals aged 15 years and older were extracted from the THS conducted in 2014, 2016, 2019, and 2022. Information on stroke prevalence, stroke-related risk factors, post-stroke functional outcomes, and healthcare utilization was compared across survey years, age groups (15–50, 51–65, 66–80, and ≥81 years), and between sexes.

Results: A total of 76,197 participants were included, with a mean age of 43.1 (±17.6) years; 53% were female. Across the four survey years, the self-reported prevalence of stroke in the population ranged between 0.8% and 1%. The median age of individuals reporting stroke was 63 years (interquartile range, 48–73). Notably, 28% of stroke cases occurred before age 50, and 57% before age 65. Comorbidities such as diabetes (37%), hypertension (65%), kidney disease (26%), and depression (29%) were significantly more common among women (P=.009, P<.001, P=.004, and P=.02, respectively). Half of the individuals younger than 50 years reported not using prescribed medications in the preceding two weeks.

Conclusion: Over time, no substantial decline has been observed in the prevalence of stroke. The persistently high prevalence of modifiable risk factors in the community is striking. Further epidemiological studies are warranted in this field, and the development of new and inclusive strategies for both primary and secondary stroke prevention is urgently needed.

Key words: stroke, stroke-related risk factors, self-reported prevalence of stroke, health statistics.

ÖZ

Amaç: En yaygın nörolojik hastalıklardan biri olan inme, ölüm ve uzun dönem engelliliğin uzun dönem önde gelen nedenlerinden biri olmaya devam etmektedir. Bu çalışmada Türkiye İstatistik Kurumu (TÜİK) tarafından gerçekleştirilen Türkiye Sağlık Araştırması (TSA) verileri kullanılarak toplumdaki beyan edilen inme sıklığı, inme geçiren bireylerin klinik özellikleri ile sağlık hizmetlerine erişimleri ve işlevsellik durumlarının değerlendirilmesi amaçlanmıştır.

Yöntemler: Çalışmamıza 2014, 2016, 2019, ve 2022 yıllarında yapılmış olan TSA'lardan on beş yaş ve üstündeki bireylerin verileri dahil edilmiştir. İnme sıklığı, inme ilişkili risk faktörleri, inme sonrası işlevsellik ve sağlık hizmeti kullanımına dair veriler, farklı yıllar, farklı yaş grupları (15-50 yaş arası, 51-65 arası, 66-80 arası ve 81 yaş üzeri) ve her iki cinsiyet arasında kıyaslanmıştır.

Bulgular: Çalışmaya dahil edilen toplam 76197 katılımcının yaş ortalaması 43,1 (±17,6) yıldı ve katılımcıların %53'ü kadındı. Son dört TSA'ya göre toplumdaki beyan edilen inme sıklığı %0,8 ve %1 arasındaydı. İnme geçirdiğini beyan eden bireylerin yaş ortancası 63 (çeyreklikler 48-73) idi ve inme olgularının %28'i elli yaş; %57'si ise altmış beş yaş altındaydı. Diyabet (%37), hipertansiyon (%65), böbrek hastalığı (%26) ve depresyon (%29) kadınlarda daha sıktı (sırasıyla P=,009 P<,001; P=,004; ve P=,02) Elli yaş altındaki bireylerin yarısı son iki haftada reçeteli ilaç kullanmadığını beyan etmekteydi.

Sonuç: Yıllar içinde inme sıklığında kayda değer bir azalma görülmemiştir ve kontrol edilebilen risk faktörlerinin toplumdaki yüksek sıklığı çarpıcıdır. Bu alanda yapılacak yeni epidemiyolojik çalışmaklara ihtiyaç vardır. İnmenin birincil ve ikincil korunmasında yeni ve kapsayıcı stratejilerin geliştirilmesi gerekmektedir.

Anahtar sözcükler: İnme, beyan edilen inme, inme ilişkili risk faktörleri, sağlık istatistikleri.

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INTRODUCTION

Stroke is the second most common cause of death worldwide among all non-communicable diseases.[1] 15% of all strokes occur in individuals aged 15-49, and 12 million people are diagnosed with stroke each year. One in three stroke-related deaths occurs in individuals under the age of 70, and 53% of strokes occur in men.[2] The same research indicates that four out of five strokes are due to preventable causes. Evidence-based medical practices yield new and promising results in the treatment of acute stroke every year. With outstanding contributions from intravenous thrombolytic therapies and mechanical thrombectomy applications, an increase in survival and rates of recovery without sequelae is observed in patients with ischemic stroke, which accounts for about 80% of all strokes.[3,4] Given that stroke is a preventable and treatable disease, obtaining community-based data on strokes is critical for the planning, provision, and implementation of healthcare services.

The Turkish Statistical Institute (TSI) is the official statistics institution of the Republic of Turkey, tasked with collecting, evaluating, analyzing, publishing statistics in the fields of economy, health, social issues, demography, culture, environment, science, and technology, and other areas deemed necessary. It reports official statistics in the health field, including deaths and diseases, at regular intervals.

According to the Death and Cause of Death Statistics 2023 conducted by TSI, diseases of the circulatory system constitute the primary cause of death at 33%. Stroke is the cause of 6% of all deaths. According to TSI's death statistics, in 2023, the age-standardized early death rate due to cerebrovascular diseases per 100,000 people is 22.4 for men and 13.7 for women. According to 2024 data, stroke ranks fifth among preventable causes of death, with a rate of 5%. Similarly, among treatable causes of death, stroke ranks fifth at 7.6%.[5] Due to its high morbidity and mortality, stroke is a significant public health issue in our country, as it is worldwide.

This study aims to evaluate the reported frequency of stroke, the demographic and clinical characteristics of all individuals who have experienced a stroke, their utilization of healthcare services, and their functional status using data from four different Turkey Health Surveys conducted over the last 11 years. Within this framework, changes between (I) different years, (II) genders, and (III) different age groups were examined.

MAIN POINTS

- The prevalence of self-reported stroke in Türkiye over past decade has ranged between 0.8% and 1%, with no evidence of decline.
- This stable prevalence underscores the need for stricker stroke prevention strategies.
- Hypertension, diabetes, renal disease and depression were more common among females reporting stroke compared to males. Moreover, these women had low level of education and higher body mass index than their male counterparts.
- These disparities highlight the need for sex specific approaches in stroke prevention.
- Stroke continues to be a major public health concern in Türkiye, largely driven by the high prevalence of modifiable risk factors.

MATERIAL AND METHODS

The Turkey Health Survey (THS) is a study conducted by the Turkish Statistical Institute (TSI), aiming to obtain data on health indicators, usually carried out at designated time intervals every two years. First implemented in 2008, the THS covers the entire population within the geographical boundaries of Turkey, excluding institutional populations such as the military, prisons, and nursing homes. Survey participants were identified through the Address-Based Population Registration System, later named the National Address Database. A two-stage stratified sampling method was employed, and sample size was calculated specifically for each survey year, taking into account the population size.

Samples drawn for each THS are independent of one another. For questions related to acute events such as stroke, the reference period was the one year preceding the survey. Definitions, categories of the survey questions, and sample size details were provided alongside each year's dataset. Summary tables of the collected data are published online by TSI, and further methodological details, including survey questions and raw data are made available to researchers upon justified request.

For this study, we included THS data from 2014, 2016, 2019, and 2022, limited to individuals aged 15 years and older. The primary focus was on self-reported stroke status. In the survey, stroke history was determined by asking participants: 'In the past 12 months, have you experienced stroke/paralysis (brain hemorrhage, cerebral thrombosis)?' Variables related to stroke risk factors, functional status, and utilization of healthcare services were also analyzed. Stroke cases were stratified into four age groups: 15–50 years, 51–65 years, 66–80 years, and over 81 years. The prevalence of chronic diseases was recalculated for each age group. In addition to comparisons by sex and survey year, analyses were also conducted across the defined age groups.

Statistical Analysis

IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY, USA) was used for all analyses. Descriptive statistics were presented as percentages, means, medians, and interquartile ranges. Chi-square tests were applied for comparative analyses of categorical variables. For continuous variables, assumptions of normal distribution were checked, and depending on whether these assumptions were met, either multivariate ANOVA or the Kruskal–Wallis test was performed. A logistic regression analysis was performed with stroke defined as the dependent variable.

RESULTS

A total of 76,197 individuals aged 15 years and older were included in the study: 19,129 in 2014; 17,242 in 2016; 17,084 in 2019; and 22,742 in 2022. Overall, 53% of participants were women, and the mean age was 43.1 (±17.6) years. The proportion of individuals with 14 or more years of education was 16%, while illiterate participants with no formal education accounted for 13% of the sample. The mean body mass index was 26.3 (±5.1) (Figure-1). The reported prevalence of stroke was 0.9% in 2014; 1.0% in 2016; 0.8% in 2019; and 1.0% in 2022. The prevalence of stroke and vascular risk factors changed over time as shown in Figure 2. The prevalence of chronic diseases and stroke, stratified by survey period and sex, is presented in Table 1.

Table 1. Prevalence of stroke and chronic diseases across survey periods in all participants

	2014		2016		2019		2022	
	Male	Female	Male	Female	Male	Female	Male	Female
Coronary artery disease	681 (7.8)	1048 (10.1)	518 (6.8)	776 (8.1)	568 (7.3)	770 (8.3)	680 (6.2)	814 (6.9)
Stroke	80 (0.9)	85 (0.8)	75 (1)	92 (1)	60 (0.8)	81 (0.9)	109 (1)	110 (0.9)
Hypertension	1139 (13.1)	2396 (23.0)	1051 (13.7)	2218 (23.2)	1076 (13.8)	2091 (22.5)	1371 (12.5)	2460 (20.9)
Diabetes	714 (8.2)	1282 (12.3)	664 (8.7)	1214 (12.7)	729 (9.4)	1232 (13.2)	1066 (9.7)	1677 (14.2)
Hyperlipidemia	-	-	-	-	691 (8.9)	1273 (13.7)	844 (7.7)	1428 (12.1)
Depression	621 (7.1)	1621 (15.6)	391 (5.1)	1021 (10.7)	477 (6.1)	1224 (13.2)	507 (4.6)	1130 (9.6)

Data are presented as n (%).

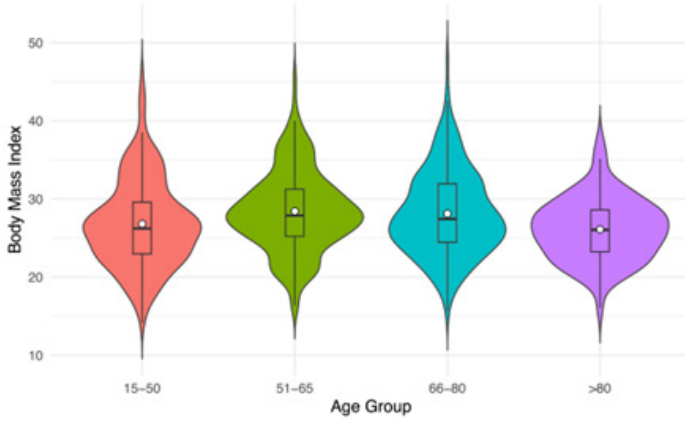

Figure 1. Distribution of body mass index across age groups (pooled data)

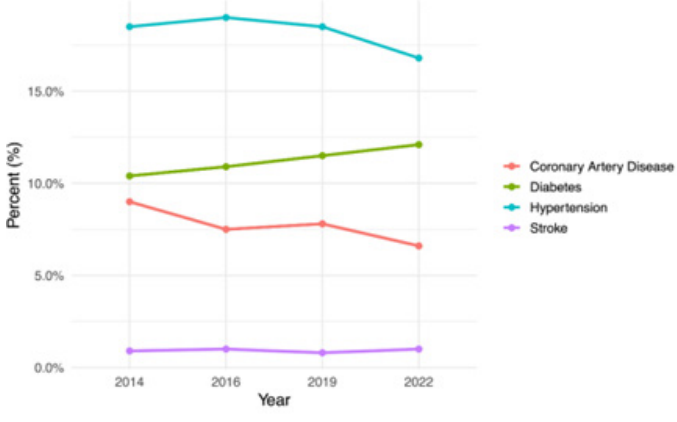

Figure 2. Trends in the prevalence of stroke and vascular risk factors

Stroke in Turkish Health Survey Data

When all individuals who reported having experienced a stroke across the four THS surveys were included, the mean age of stroke cases was 59.78 (±17.6) years, with a median of 63 years (interquartile range: 48–73). In 2014, the mean age of 165 stroke cases was 60.8 (±17.3) years; in 2016, 61.3 (±18.1) years; in 2019, 60.4 (±16.6) years; and in 2022, the mean age of 219 stroke cases was 57.3 (±17.6) years; and it remained same throughout the years (P=.051). No statistically significant difference was found in sex distribution among stroke cases across distinct survey years (P=.52).

When other chronic diseases were compared between sexes, diabetes (37%), hypertension (65%), kidney disease (26%), and depression (29%) were reported more frequently by women (P=.009, P<.001, P=.004, and P=.02, respectively). Among individuals with stroke, 28% had a body mass index (BMI) of 30 or higher, compared with 21% among those without stroke. Prevalence of tobacco product use among stroke patients was 14% in 2014; 20% in 2016; 23% in both 2019 and 2022. Although, tobacco product use varied across years, this difference was not statistically significant (P=.131). Additional characteristics of stroke cases, stratified by sex, are summarized in Table 2. Moreover, these sex-related differences persisted when analyses were expanded to include all participants (n=76,197) (Supplementary Table 1).

Differences Between Age Groups

When all stroke cases included in the study were pooled into a single sample and risk factor distributions were re-evaluated, it was observed that 28% of stroke cases were under 50 years of age and 57% were under 65 years of age. Only 11% of cases were older than 80 years. Sex differences by age category are presented in Table 2. The prevalence of coronary artery disease was 19.6% in the 15–50 age group, 32.4% in the 51–65 group, 38.8% in the 66–80 group, and 43.6% in those older than 80 years (P<.001). The prevalence of hypertension was 30.2%, 64.3%, 74.4%, and 74.4%, respectively (P< .001). Diabetes prevalence was 15.6% in the 15–50 age group, 37.8% in 51–65, 43.4% in 66–80, and 37.2% in those over 80 years. The prevalence of hyperlipidemia was 19.5%, 39%, 32.7%, and 45.7% across the same age groups (P=.003). (Figure 3)

The proportion of stroke patients reporting prescription drug use in the previous two weeks was 50% in the 15–50 age group, 74% in

Table 2. Sex-specific distribution of clinical features in individuals reporting stroke

	Male	Female	P value
Age	Mean 58.8 (±17) median 61 IQR 47-83)	Mean 60 (±17) Median 64 (50-73)	.200*
Age categorized			
15-50	105 (52.8)	94 (47)	.227
51-65	85 (43.3)	111 (56)	
66-80	97 (44)	122 (55)	
>80	37 (44)	41 (52)	
Education level			
Illiterate	70 (21)	166 (45)	<.001
Less than 5 years	172 (53)	137 (37)	
Eight years	31 (9)	21 (6)	
Twelve years	26 (8)	28 (8)	
More than fourteen years	25 (7)	16 (4)	
Body Mass Index	26.5 (±4.4) Median 26.2 (23-28)	28.7 (±5.6) Median 27.9 (24-32)	<.001*
Coronary artery disease	100 (31)	125 (34)	.380
Hypertension	167 (51.5)	240 (65)	<.001
Diabetes	91 (28)	138 (37)	.009
Renal Disease	56 (17)	97 (26)	.004
Depression	71 (21)	108 (29)	.026
Hyperlipidemia	50 (29)	64 (33)	.425

* Mann-Whitney U test
Data are mean (SD), median (interquartile range) or n (%).

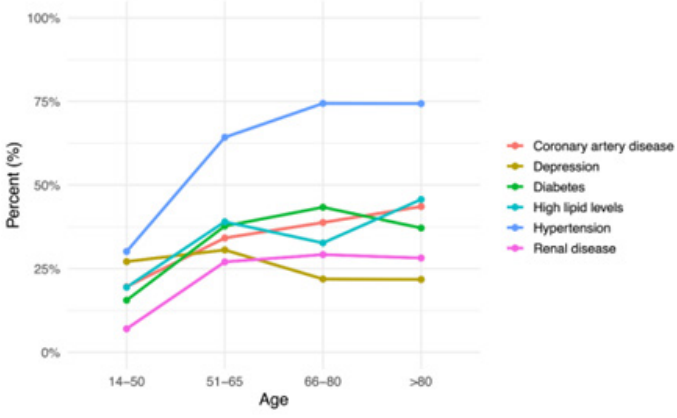

Figure 3. Age-group distribution of chronic diseases in stroke cases (pooled data)

51–65, 82% in 66–80, and 83% in those older than 80 years (P<.001). Regarding self-rated general health assessment, 51% of stroke patients described their health as poor or very poor. This rate was lowest in the 15–50 age group (32%). In terms of health monitoring and behaviors, 38% of patients under 50 reported not having had a blood pressure measurement in the past year, while this proportion decreased to 20% among those over 80. The proportion of patients reporting cholesterol measurement in the past 12 months was 53% in the 15–50 age group, 68% in 51–65, 76% in 66–80, and 79% in those over 80 (P <.001). Similarly, blood glucose measurement within the past year was reported by 52%, 69%, 79%, and 74% of the respective age groups (P<.001).

In functional and mobility assessments, 14% of all stroke patients reported being unable to walk 500 meters without support. Only 30% reported being able to climb stairs without difficulty, whereas 15% reported being unable to climb stairs at all. These difficulties differed significantly by sex: among women, 19% could not walk 500 meters without support and 10% could not climb stairs, compared with 19% and 9% of men, respectively (P=.002 and P=.004).

Since the number of individuals with and without stroke differed substantially (692 vs. 75,502), univariate group comparisons were not statistically correct. Therefore, the variables included in the logistic regression model were selected as demographic characteristics and chronic conditions commonly observed among stroke cases. Hyperlipidemia was excluded from the regression analysis due to a high proportion of missing data (46% missing data). The final model included age, sex, level of low education (<5 years), coronary artery disease, hypertension, diabetes, kidney disease, depression, obesity, and use of prescribed medication within the last two weeks. The results of this model are presented in Table 3.

Table 3. Logistic regression analysis of demographic and clinical risk factors for stroke*

	Odds ratio (95% confidence intervals)	P value
Age	1.02 (1.02-1.03)	<.001
Male	1.51 (1.29-1.77)	<.001
Low level of education (<5 years)	1.62 (1.32-1.98)	<.001
Hypertension	2.27 (1.88-2.74)	<.001
Coronary artery disease	2.07 (1.73-2.47)	<.001
Depression	2.19 (1.82-2.63)	<.001
Renal disease	1.55 (1.27-1.88)	<.001
Diabetes mellitus	1.34 (1.12-1.59)	.001
Obesity	1.26 (1.06-1.50)	.008
Use of prescribed medication within the last two weeks	1.51 (1.25-1.82)	<.001

Nagelkerke R2: .139, Chi square of Hosmer and Lemeshow test: 7.7,1 P=.46
*Enter method was used for logistic regression analysis.

DISCUSSION

In our study, data obtained from different years of the THS were analyzed to investigate the clinical characteristics of individuals who reported having experienced a stroke across survey years and various age groups. In the second stage, stroke-related risk factors, health behaviors, and functional status were evaluated based on the THS data. According to these findings, the prevalence of self-reported stroke in Turkey over the past decade ranged between 0.8% and 1%. Male sex, age, low educational level, hypertension, diabetes, coronary artery disease, kidney disease, depression, and obesity were found to be significantly associated with stroke.

The reliability of patient self-reports for investigating stroke prevalence has been demonstrated in several studies.[6] In the study by Engstad et al., where participants were asked whether they had ever experienced a stroke and diagnoses were subsequently confirmed through detailed clinical assessment, self-reported stroke showed a sensitivity of 80% and a specificity of 99%.[7] In another study, participants were asked, "Has a doctor ever told you that you had a stroke or myocardial infarction?" Their responses were compared with medical records, revealing a sensitivity of 81.3% and a positive predictive value of 22.3% for stroke self-reporting.[8] Similarly, a study from New Zealand reported a sensitivity of 73% and specificity of 98% for self-reported stroke.[9] Furthermore, questionnaire-based stroke reporting has been associated with an increased risk of future stroke.[10] In a longitudinal study of 11,745 men (mean age 72 ±0.4 years), those who self-reported a prior stroke had a significantly higher risk of subsequent hospitalization for stroke compared with those who did not (hazard ratio 2.44, 95% CI 2.03–2.94).[11] Taken together, these findings support the validity of using self-reported stroke data in scientific research. The consistent prevalence rates observed across different survey years in our study further strengthen the reliability of the dataset.

There are, unfortunately, no recent nationwide studies in Turkey that have evaluated stroke incidence and prevalence using essential epidemiological methods. However, several regional prevalence studies exist. In Karabük province, the prevalence of stroke among individuals older than 44 years was reported as 4.1% (±2%), with 72% of these patients having hypertension.[12] Although these rates are higher than those found in our study, it should be noted that our analysis included individuals aged 15 years and older and represents a much larger population. In another study conducted in Denizli province between 2010 and 2011, which included 2,442 individuals aged over 44 years selected using cluster sampling, the prevalence of stroke was found to be 0.9%. In this study, stroke history was first assessed through a questionnaire and subsequently confirmed by a neurologist.[13] On the other hand, in a higher-risk cohort of 1,807 patients with non-valvular atrial fibrillation receiving oral anticoagulant therapy, 2.7% experienced stroke during a 12-month follow-up.[14]

According to the most comprehensive published review based on the 2019 Global Burden of Disease (GBD) data, the prevalence of stroke in Turkey is 1.3%, and the incidence is 145 per 100,000. Of those who experienced stroke, 56% were women, and approximately one in four cases occurred in individuals younger than 50 years.[15] These findings are consistent with the age, sex, and risk factor distributions observed in self-reported stroke cases in our study.

Even though certain vascular risk factors were found more prevalent in women, the prevalence of stroke was not statistically significant between sexes across years. It can be speculated that different mechanisms might be involved in stroke between males and females. It is also known that women's symptoms may differ from men's in conditions like ischemic heart disease.[16] A population-based study showed that women more commonly have non-focal symptoms of generalized weakness, fatigue, disorientation, and mental status changes.[17,18] Another possible explanation may be more frequent late presentation of women to the hospital.[19] Their symptoms may be less alarming for the emergency clinician, resulting in fewer diagnoses of stroke in women.

Another striking finding of our study was the low proportion of stroke survivors reporting prescription drug use. The fact that non-use of medication increased as age decreased implies a longer duration of risk exposure. It is known that younger individuals often demonstrate different patterns of medication behavior. Poor adherence to medication in chronic diseases has been associated with worse disease outcomes, more frequent emergency department visits, and higher mortality.[20,21] Conversely, high adherence after stroke and transient ischemic attack has been linked to improved survival.[22] Although there are more objective approaches for evaluating medication use and adherence—such as structured questionnaires combined with patient self-reports—it is important to underline that the findings in this study are based solely on self-reported data.

Supporting evidence for the low prescription drug use observed in our study can also be found in national statistics. According to the 2023 Annual Health Statistics Yearbook of the Turkish Ministry of Health, Turkey ranks third lowest among OECD countries in antihypertensive drug consumption per 1,000 population. The per capita consumption of cholesterol-lowering drugs is 43 per 1,000 in Turkey, compared with 140–211 in Western European countries. Although the per capita daily use of antidiabetic drugs in Turkey increased from 56 in 2012 to 97 in 2023, this rate still remains lower than in many other countries.5 The same report also indicated that,

based on the 2021 Global Burden of Disease data, stroke ranked third among causes of years of life lost (YLL) in Turkey.

The results of the logistic regression analysis in our study suggest that male sex increases the risk of stroke by approximately 1.5-fold, while hypertension and coronary artery disease increase the risk by nearly two-fold. Although the dataset included cross-sectional data obtained in four separate periods, the chronic nature of these conditions and the selected statistical approach permit such interpretation. Moreover, these observed risk increases are consistent with findings from previous population-based studies.[23] However, sex-specific risk factors vary with age among women.[24,25] In this context, considering periods such as pregnancy and the pre- and post-menopausal phases separately would allow a more accurate evaluation of stroke risk in women.[26] Since no such subgroup analysis was conducted in our study, the increased risk observed in men should be interpreted with caution. Furthermore, to better elucidate the relationship between depression and stroke, additional information such as confirmation of depression diagnosis through supplementary questions and data on depression duration would be required.

Secondary prevention of stroke is of critical importance in reducing the risk of recurrence. Beyond antiplatelet and anticoagulant therapies, the control of vascular risk factors such as hyperlipidemia, hyperglycemia, and hypertension represents key priorities in this context. Additionally, lifestyle interventions and cessation of smoking and other tobacco products should be incorporated into the primary and secondary prevention of stroke.[27] A multicenter study investigating the association between the control of four or more risk factors and stroke prevention demonstrated that nearly half of all strokes were attributable to modifiable factors, and that there was an inverse and significant relationship between patient age and the number of controllable risk factors.[28] The INTERSTROKE study, which also included data from Turkey, similarly highlighted the strong association between stroke risk and modifiable vascular risk factors, particularly hypertension.[29] In addition, hypertension, atrial fibrillation, and smoking have been suggested to be associated with more severe strokes.[30]

There are several limitations in this study. First, the information regarding stroke was not confirmed by a neurologist. Second, and importantly, smoking could not be examined due to inconsistent coding across years.

CONCLUSION

As observed worldwide, stroke remains a common condition in Turkey, with a strikingly high prevalence of modifiable risk factors contributing to its etiology. Over the years, there has been no significant reduction in the frequency of stroke and other chronic diseases, and the disadvantage observed among women persists. To strengthen secondary prevention—where risk factor modification plays a central role—there is a need to increase awareness and develop new strategies for monitoring and treatment, including among younger individuals. In this context, our findings may serve as a guide in the short term; however, in the long term, community-based studies with robust methodology are needed.

Ethics Committee Approval: As this study involved secondary analysis of an anonymized dataset made publicly available by the Turkish Statistical Institute (TÜİK), ethics committee approval was not required. Institutional permission to access and use the dataset was obtained from TÜİK. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.

Informed Consent: Not applicable, as the study used fully anonymized secondary data and did not involve direct contact with human participants.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – M.S.; Design – M.S., N.Y..; Supervision – N.Y., S.Ö.Y.; Resources – M.S.; Materials – M.S.; Data Collection and/or Processing – M.S., S.Ö.Y.; Analysis and/or Interpretation – M.S., S.Ö.Y.; N.Y.; Literature Search – M.S., N.Y.; Writing Manuscript –M.S., N.Y.; Critical Review – N.Y., S.Ö.Y.

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