Factors associated with chronic headache among adults: results from a Ravansar noncommunicable disease cohort study

Shahab Rezaeian[1], Behrooz Hamzeh[2], Mitra Darbandi,[2,3] Farid Najafi[2,4], Ebrahim Shakiba[5] and Yahya Pasdar[2]

[1]Infectious Diseases Research Center; [2]Research Center for Environmental Determinants of Health; [3]Student Research Committee, Health Institute; [4]Cardiovascular Research Center; [5]Behavioral Disease Research Center, Kermanshah University of Medical Sciences, Kermanshah, Islamic Republic of Iran (Correspondence to Mitra Darbandi: m.darbandi@kums.ac.ir).

Abstract

Background: Headache is the most common disorder of the central nervous system, and one of the most prevalent noncommunicable diseases.

Aims: We aimed to determine factors associated with chronic headache among adults in the Islamic Republic of Iran.

Methods: This was a cross-sectional study that recruited 10 063 participants from the baseline data of the Ravansar non-communicable disease cohort study in western Islamic Republic of Iran in 2021. Participants who had headaches for ≥ 15 days per month for ≥ 3 months were considered as having chronic headache. Logistic regression was used to examine the associations.

Results: The prevalence of chronic headache was 10.49% (n = 1054), and was significantly higher among females (14.55%, n = 769) than males (5.98%, n = 285) (P < 0.001). The risk of chronic headache among married females was 73% higher than among single females. Among male smokers, the risk of chronic headache was 1.47 times higher than among non-smokers [95% confidence interval (CI): 1.05, 2.06]. The risk of chronic headache among depressed males was 2.59 times higher than among non-depressed males (95% CI: 1.28, 5.22); and among depressed females the risk was 2.38 times higher than among non-depressed females (95% CI: 1.76, 3.23). Among males who lived in rural areas, the risk of chronic headache was 84% lower than among those who lived in urban areas; and among females who lived in rural areas it was 81% lower than those who lived in urban areas. Being menopausal and having normal sleep were significantly associated with lower risk, while comorbidity was associated with higher risk, of developing chronic headache.

Conclusions: Depression, urban residence, smoking, comorbidity, and being married were associated with an increase in the risk of developing chronic headache, while higher education level, menopause and normal sleep were associated with a decrease in the risk of developing chronic headache.

Keywords: chronic headache, prevalence, risk factors, adults, Iran

Citation: Rezaeian S, Hamzeh B, Darbandi M, Najafi F, Shakiba E, Pasdar Y. Factors associated with chronic headache among adults: results from a Ravansar noncommunicable disease cohort study. East Mediterr Health J. 2023;29(8):620–629. https://doi.org/10.26719/emhj.23.093

Received: 28/06/22; Accepted: 15/12/22

Introduction

Headache is the most common central nervous system disorder and one of the most prevalent noncommunicable diseases worldwide (*1*). Chronic headache is defined as a headache that lasts for 15 days or more in a month over a period of more than 3 months (*2*). The global prevalence of chronic headache is 2–3% (*3*), and it is recognized as the third most common cause of years of life lost to disability (*4*). Years lived with disability due to chronic headache increased from 4.8% globally in 1990 to 9.0% in 2013 (*5*).

The estimated prevalence of headache may be affected by age, sex, race, geography and socioeconomic status, and varies according to the population being evaluated (*6,7*). Female sex, low income, divorce and death of spouse are recognized as nonmodifiable risk factors for chronic headache (*8*). Stressful life events, anxiety, depression, obesity, inactivity and drug overdose can be seen as modifiable risk factors (*9,10*). Previous studies have reported the prevalence of chronic headache and noted that symptoms and duration differ among males and females (*11,12*). Research has shown greater pain and tolerance among males with chronic headache than among females. Unruh has reported more frequent, more severe, and longer lasting headaches among females than among males (*13*). Clinical studies have shown that females often have more acute and more severe pain, and use analgesics more than males. Severe and frequent headaches limit daily activities, reduce quality of life, and can lead to loss of professional activity. They also lay a great burden on individuals, families and society (*1*).

Notably, chronic and severe headaches account for a significant share of headache-related productive time lost: approximately one-third of chronic headache attacks occur on workdays and two-thirds of these result in substantial loss of productivity (*14*). Stewart et al. found that, among common pain conditions, headache was the most commonly reported condition resulting in lost productivity time in the workforce in the United States of America (*15*). Individuals suffering from this health

problem had 4 times more productive time lost than those who had less-frequent attacks (*14*).

Various studies have reported the increasing burden of headache-related disorders throughout the world (*3,4*), and considering the fact that this is a preventable condition, it is important to conduct studies in this field. Therefore, we conducted this study to determine the factors associated with chronic headache among adults participating in the Ravansar non-communicable disease cohort study.

Methods

Study design and participants

This cross-sectional study was conducted using baseline data from the Ravansar non-communicable disease cohort study, in the western region of the Islamic Republic of Iran in 2021. This was a part of the Prospective Epidemiological Research Studies in IrAN (PERSIAN), conducted on different ethnicities in coordination with the Ministry of Health and Medical Education. Ravansar is a city in Kermanshah Province, the largest province in western Islamic Republic of Iran. The population of the Ravansar District is about 50 000, mainly of Iranian Kurdish ethnicity. Details and profiles of the Ravansar non-communicable disease cohort study have already been published (*16*). Eligibility criteria for the cohort study were: age 35–65 years, a permanent inhabitant of the Ravansar region (Ravansar town and all villages in its vicinity) and Iranian nationality. All participants in the Ravansar cohort study were included in the present study (n = 10 063).

Data collection

Sociodemographic and economic characteristics such as age, sex, education, marital status, wealth index and medical information were collected using digital questionnaires, which were completed by trained experts. Individual habits such as cigarette smoking, alcohol use and physical activity were surveyed.

The standard physical activity questionnaire from the PERSIAN Cohort Study was used to assess the participants. The questionnaire had 22 items about sport, work and leisure-related activities on an average weekday. Physical activity levels were classified as low [24–36.5 metabolic equivalent (MET) hours per day], moderate (36.6–44.4 MET hours per day) and heavy (≥ 44.5 MET hours per day) (*16,17*). Wealth index was defined based on selected assets: home ownership, area per capita, rooms per capita, washing machine, motorcycle, car (based on price) for personal use, dish washer, freezer, personal computer, vacuum cleaner and TV in the household and having a cell phone, laptop and access to the Internet. Principal component analysis was used to create the wealth index (*18*). Participants were classified into 5 quintiles: poorest, second poorest, middle, second richest and richest. Sleep duration was measured over 24 hours and was applied quantitatively (*19,20*). Normal sleep was defined as sleeping 7 or more hours per night in adults (*21*). Body composition, including weight and body mass index (BMI), was measured using Inbody 770 (Inbody Co., Seoul, Korea) with a precision of 0.5 kg for body weight. Depression was defined based on the use of antidepressants, self-reported depression and verbal confirmation from a physician. Hypertension was defined as a having systolic/diastolic blood pressure ≥ 140/90 mmHg and/or use of antihypertensive drugs. Comorbidity was defined as the co-occurrence of more than one disorder in the same individual, which in this study included stroke, myocardial infarction, cardiac ischemia and cancers (14 types). Among females, menopause was defined as having had no menstrual period for the previous 12 months, based on self-report.

Definition of chronic headache

The main outcome of this study was chronic headache, which was defined as having headache for 15 days or more per month for a duration of ≥ 3 months (*2*). The probable medication overuse headache is a chronic daily headache and a secondary disorder in which acute medications used excessively cause headache in a headache-prone patient (*22*).

Statistical analysis

Data were presented as mean and standard deviation (SD) for continuous variables and frequency (percentage) for categorical variables. The *t*-test was used to compare the continuous variables between males and females and the chi-squared test for categorical variables. Bivariate and multivariate logistic regression analyses were performed for reporting crude and adjusted odds ratios (ORs) with 95% confidence interval (CI). Analysis was carried out using *STATA*, version 14.2. The significance level was set at 0.05.

Ethics approval and consent

The research and technology deputy and the ethical committee of Kermanshah University of Medical Sciences approved the study protocol (Number: KUMS.REC.1398.1038). Participants provided oral and written informed consent.

Results

Overall, 10 063 participants were examined. Mean age was 48.10 [standard deviation (SD) 8.25] years; 4773 (47.43%) participants were male. The prevalence of chronic headache in the whole study population was 10.49% (95% CI: 9.90, 11.09), and was significantly higher among females (14.55%, n = 769) than among males (5.98%, n = 285) (P < 0.001). The overall prevalence of medication overuse headache was 4.10%, 6.03% among females and 1.90% among males. About 41% of females and 33% of males with chronic headache reported excessive drug use (P = 0.011). There was no significant difference in the age of onset of chronic headache between females (37.03, SD 10.6 1 years) and males (36.16, SD 11.49 years) (P = 0.250). The average sleep time over 24 hours was longer among

females than among males ($P < 0.001$). The prevalence of depression was statistically significantly higher among females than among males ($P < 0.001$). In total, 76.86% ($n = 4061$) of all females were using oral contraceptive pills and 31.30% ($n = 1656$) were in menopause (Table 1).

Sleep duration, depression, hypertension, comorbidity and use of oral contraceptive pills were statistically significantly more prevalent in the chronic headache group than in the non-chronic headache group ($P < 0.05$) (Table 2). More than 85% of those with chronic headache lived in urban areas whereas for the non-chronic headache group the distribution was more evenly split ($P < 0.001$) (Table 2).

In the univariate logistic regression model, the risk of chronic headache in the age group 46–55 years among females was 27% higher than the age group 35–45 years (OR = 1.27, 95% CI: 1.10, 1.52) (Table 3). The risk of chronic headache was 38% lower (OR 0.62; 95% CI: 0.36, 0.99) among employed males than unemployed males, and 26% higher (OR = 1.26, 95% CI: 0.64, 2.46) among retired males than unemployed males. The risk of chronic headache among depressed males was 2.43 times higher (95% CI: 1.23, 4.87) and among depressed females was 2.45 times higher (95% CI: 1.84, 3.26) than among non-depressed males and females. Among male former smokers, the risk of chronic headache was 1.49 times greater than among non-smokers. The risk of chronic headache was 3.29 times higher among married and 2.88 times higher among divorced/widowed females than among single females (Table 3). In contrast, among married males the risk of chronic headache was lower than among single males. Women who used oral contraceptive pills had a 45% higher risk of developing chronic headache than those who did not.

In the multivariate regression models, the risk of chronic headache among males (OR = 2.73, 95% CI: 1.34, 5.52) and females (OR = 2.38, 95% CI: 1.76, 3.23) with depression was higher than among non-depressed participants (Table 3). In males, BMI was not a risk factor for chronic headache. For females, however, for each unit of increase in BMI, the risk of chronic headache increased by 2% in the univariate model, although this was not statistically significant in the multivariate model. Adequate sleep time was a protective factor for chronic headache (OR = 0.88, 95% CI: 0.82, 0.94) among females. In the multivariate model, the risk of chronic headache for rural males (OR = 0.16, 95% CI: 0.10, 0.24) and rural females (OR = 0.19, 95% CI: 0.15, 0.24) was much lower than that of urban residents (Table 3). Among male former smokers, the risk of chronic headache was 1.47 times greater than among male non-smokers (95% CI: 1.05, 2.06). The multivariate model showed that the risk of chronic headache was 73% (OR = 1.73, 95% CI: 1.03, 2.91) higher among married and 61% (OR = 1.61, 95% CI: 0.91, 2.87) higher among divorced/widowed than among single females.

Discussion

Our findings showed that prevalence of chronic headache was significantly higher among females than males (14.5% vs 6%). The prevalence of medication overuse headache was 6.03% among females and 1.90% among males with chronic headache. Depression, urban residence, smoking, comorbidity and marriage were also associated with an increased risk, and high education level, menopause and normal sleep with a decreased risk, of developing chronic headache.

The prevalence of chronic headache is 2–3% worldwide (*3*), and in a systematic review covering 27 population-based studies, the prevalence of medication overuse headache varied from 0.5% to 7.2% among adults (*23*), which is consistent with our findings. However, the prevalence of chronic headache in our study was higher than in the countries of the Middle East region, which may be due to differences in the study design, sample size, sampling methods and characteristics of the study population. The middle-aged population in this study included people who were involved in the 8 years of the Iran–Iraq war, and the horrific consequences of war can contribute to this complication.

We found that the risk of having chronic headache among depressed males and females was significantly higher than among non-depressed participants, confirming reports in other studies; clinical studies have also documented the causes, including lesions related to white matter and long-term use of antidepressant drugs (*24,25*). Generally, depression, smoking, urban residence and use of oral contraceptive pills among females have been identified as the most commonly identified risk factors for predicting chronic headache. In our study, over two-thirds of females (76.9%) used oral contraceptive pills and headache has been identified as one of the side-effects of hormonal treatments (*26*). For example, tamoxifen, which is used to treat menstrual migraine, can cause headaches (*27*). In a review from 2012, chronic headache due to the use of oral contraceptive pills was observed in about one-third of females of reproductive age (*28*).

In other studies, and consistent with our own findings, there was a correlation between smoking and both chronic headache and medication overuse headache (*29–31*), indicating that smokers are more likely to have chronic headache. Among former smokers, the risk was greater than among those who currently smoked, which may be due to cigarette dependence and the consequences of quitting. The cause needs to be further examined.

Our results showed a nonsignificant relationship between BMI and chronic headache among males. However, for females, the risk of chronic headache increased with BMI in the univariate model, but this was not observed in the multivariate model. Another research in this area has also shown contradictory results (*32*). It is likely that there is interaction between a number of variables, and that a person who is obese or dissatisfied with their body composition will engage in

Table 1 Characteristics of study participants based on baseline data from the Ravansar non-communicable disease cohort study, 2021

Characteristic	Total (*n* = 10 063)	Males (*n* = 4 773)	Females (*n* = 5 290)	*P*-value[a]
	Mean (SD)	Mean (SD)	Mean (SD)	
Age (years)	48.10 (8.25)	47.82 (8.05)	48.36 (8.41)	< 0.001
Sleep duration (hours)	7.04 (1.25)	6.94 (1.24)	7.13 (1.26)	< 0.001
Body mass index (kg/m²)	27.51 (4.63)	26.34 (4.06)	28.56 (4.86)	< 0.001
Age at start of chronic headache (years)	36.79 (10.85)	36.16 (11.49)	37.03 (10.61)	0.250
	No. (%)	No. (%)	No. (%)	
Chronic headache	1054 (10.49)	285 (5.98)	769 (14.55)	< 0.001
Treatment of chronic headache	413 (39.11)	94 (32.87)	319 (41.43)	< 0.001
Medication overuse headache	413 (4.10)	94 (1.90)	319 (6.03)	< 0.001
Use alcohol	635 (6.31)	631 (13.22)	4 (0.08)	< 0.001
Depression	327 (3.25)	88 (1.99)	230 (5.14)	< 0.001
Hypertension	1575 (15.69)	611 (12.83)	964 (18.27)	< 0.001
Comorbidity	650 (6.46)	258 (5.41)	392 (7.41)	< 0.001
Menopause status	–	–	1656 (31.30)	–
Use oral contraceptive pill	–	–	4061 (76.77)	–
Physical activity (MET hours/day)				
Low	2773 (27.58)	1585 (33.24)	1188 (22.47)	< 0.001
Moderate	5166 (51.37)	1595 (33.45)	3571 (67.54)	
High	2117 (21.05)	1589 (33.32)	528 (9.99)	
Residence				
Rural	4101 (40.75)	1840 (38.55)	2261 (42.74)	< 0.001
Urban	5962 (59.25)	2933 (61.45)	3029 (57.26)	
Education level				
Illiterate	2492 (24.76)	619 (12.97)	1873 (35.41)	< 0.001
Primary	3843 (38.19)	1378 (28.87)	2465 (46.60)	
Secondary	2944 (29.36)	2141 (44.86)	803 (15.18)	
Tertiary	784 (7.79)	635 (13.30)	149 (2.82)	
Employment				
No	186 (1.82)	178 (3.69)	9 (0.13)	< 0.001
Yes	4790 (47.65)	4376 (91.79)	416 (7.84)	
Retired	228 (2.20)	217 (4.49)	9 (0.13)	
Housewife/husband	4859 (48.33)	2 (0.02)	4856 (91.90)	
Marital status				
Single	422 (4.19)	96 (2.01)	326 (6.16)	< 0.001
Married	9074 (90.17)	4636 (97.13)	438 (8389)	
Divorced/widowed	567 (5.63)	41 (0.86)	526 (9.94)	
Wealth index				
Poorest	2247 (22.33)	758 (15.88)	1489 (28.15)	< 0.001
Second poor	1891 (18.79)	877 (18.38)	1014 (19.17)	
Middle	1978 (19.66)	1116 (23.39)	862 (16.29)	
Second rich	2115 (21.02)	1004 (21.04)	1111 (21.00)	
Richest	1831 (18.20)	1017 (21.31)	814 (15.39)	
Smoking status				
None	8026 (80.00)	3026 (63.61)	5000 (94.77)	< 0.001
Current	1178 (11.74)	1071 (22.51)	107 (2.03)	
Former	829 (8.26)	660 (13.87)	169 (3.20)	

SD = standard deviation.
[a]*P-value obtained by t-test and Chi squared test.*

Table 2 Distribution of characteristics of the participants (*n* = 10 063) according to chronic headache status based on the baseline data from the Ravansar non-communicable disease cohort study, 2021

Characteristic	Chronic headache (*n* = 1054)	Non-chronic headache (*n* = 8998)	*P*-value[a]
	Mean (SD)	Mean (SD)	
Sleep duration (hours)	6.97 (1.27)	7.05 (1.25)	0.050
Body mass index (kg/m²)	28.40 (4.65)	27.41 (4.62)	< 0.001
	No. (%)	No. (%)	
Use alcohol	43 (4.08)	592 (6.58)	0.002
Depression	81 (7.69)	246 (2.73)	< 0.001
Hypertension	193 (18.35)	1382 (15.39)	0.013
Comorbidity	110 (10.44)	540 (6.00)	< 0.001
Menopause status	210 (27.34)	1445 (31.95)	0.009
Use oral contraceptive pill	630 (82.14)	3429 (75.98)	< 0.001
Age (years)			
35–45	430 (9.72)	3992 (90.28)	0.028
46–55	388 (11.60)	2958 (88.40)	
56–65	236 (10.33)	2048 (89.67)	
Employment			
No	12 (1.56)	170 (1.85)	< 0.001
Yes	306 (29.33)	4470 (49.88)	
Retired	21 (2.57)	195 (2.16)	
Housewife/husband	715 (66.54)	4132 (46.11)	
Physical activity (MET hours/day)			
Low	258 (24.48)	2511 (27.92)	< 0.001
Moderate	644 (61.10)	4519 (50.25)	
High	152 (14.42)	1963 (21.83)	
Residence			
Rural	146 (13.85)	3951 (43.91)	< 0.001
Urban	908 (86.15)	5047 (56.09)	
Education level			
Illiterate	271 (25.71)	2218 (24.65)	< 0.001
Primary	489 (46.39)	3350 (37.23)	
Secondary	238 (22.58)	2702 (30.03)	
Tertiary	56 (5.31)	728 (8.09)	
Marital status			
Single	23 (2.18)	399 (4.43)	0.001
Married	958 (90.89)	8106 (90.09)	
Divorced/widowed	73 (6.93)	493 (5.48)	
Wealth index			
Poorest	213 (20.21)	2030 (22.56)	< 0.001
Second poor	196 (18.60)	1691 (18.80)	
Middle	165 (15.65)	1811 (20.13)	
Second rich	261 (24.76)	1853 (20.60)	
Richest	219 (20.78)	1612 (17.92)	
Smoking status			
None	892 (84.87)	7132 (79.42)	< 0.001
Current	80 (7.61)	1098 (12.23)	
Former	79 (7.52)	750 (8.35)	

SD = standard deviation.
[a]*P-value obtained by t-test and Chi squared test.*

Table 3 Logistic regression showing association between chronic headache and sociodemographic and clinical variables using baseline data from the Ravansar non-communicable disease cohort study, 2021

Variable	Males		Females	
	Univariate model	Multivariate model	Univariate model	Multivariate model
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age (years)				
35–45	Ref	Ref	Ref	Ref
46–55	1.17 (0.89, 1.54)	1.03 (0.77, 1.38)	1.27 (1.10, 1.52)	1.08 (1.01, 1.32)
56–65	1.16 (0.84, 1.60)	1.06 (0.73, 1.54)	0.98 (0.81, 1.20)	0.85 (0.66, 1.11)
Residence				
Urban	Ref	Ref	Ref	Ref
Rural	0.17 (0.11, 0.25)	0.16 (0.10, 0.24)	0.19 (0.16, 0.24)	0.19 (0.15, 0.24)
Education level				
Illiterate	Ref	Ref	Ref	Ref
Primary	1.16 (0.87, 1.55)	1.14 (0.82, 1.60)	1.21 (1.03, 1.42)	1.03 (0.84, 1.26)
Secondary	0.80 (0.53, 1.21)	0.68 (0.42, 1.11)	1.20 (0.83, 1.74)	0.87 (0.56, 1.35)
Tertiary	1.04 (0.69, 1.56)	0.78 (0.46, 1.31)	0.81 (0.48, 1.35)	0.44 (0.23, 0.83)
Employment				
No	Ref	Ref	Ref	Ref
Yes	0.62 (0.36, 0.99)	0.57 (0.32, 1.01)	1.11 (0.13, 9.43)	0.84 (0.10, 7.47)
Retired	1.26 (0.64, 2.46)	1.01 (0.50, 2.02)	7.98 (0.60, 10.93)	6.83 (0.48, 10.35)
Housewife/ husband	–	–	1.05 (0.13, 8.78)	0.96 (0.12, 8.41)
Depression				
No	Ref	Ref	Ref	Ref
Yes	2.43 (1.23, 4.87)	2.73 (1.34, 5.52)	2.45 (1.84, 3.26)	2.38 (1.76, 3.23)
Marital status				
Single	Ref	Ref	Ref	Ref
Married	0.95 (0.41, 2.20)	0.73 (0.28, 1.90)	3.29 (2.05, 5.39)	1.73 (1.03, 2.91)
Divorced/ widowed	0.37 (0.04, 3.21)	0.32 (0.03, 2.95)	2.88 (1.67, 4.99)	1.61 (0.91, 2.87)
Smoking status				
Non-smoker	Ref	Ref	Ref	Ref
Current	1.10 (0.82, 1.48)	1.18 (0.87, 1.61)	0.96 (0.55, 1.66)	1.19 (0.65, 2.18)
Former	1.49 (1.08, 2.05)	1.47 (1.05, 2.06)	1.07 (0.70, 1.64)	1.18 (0.75, 1.86)
Use alcohol				
No	Ref	Ref	No data	No data
Yes	1.17 (0.84, 1.64)	1.17 (0.82, 1.68)	No data	No data
Use oral contraceptive pill				
No	Ref	Ref	Ref	Ref
Yes	–	–	1.45 (1.19, 1.77)	1.11 (0.88, 1.38)
Menopause				
No	Ref	Ref	Ref	Ref
Yes	–	–	0.80 (0.67, 0.94)	0.75 (0.61, 0.93)
Comorbidity				
No	Ref	Ref	Ref	Ref
Yes	1.83 (1.20, 2.80)	1.64 (1.04, 2.59)	1.67 (1.29, 2.16)	1.45 (1.10, 1.91)
Sleep duration (hours)	1.01 (0.91, 1.11)	1.02 (0.92, 1.13)	0.89 (0.84, 0.94)	0.88 (0.82, 0.94)
Body mass index (kg/m^2)	0.99 (0.97, 1.03)	0.95 (0.88, 1.03)	1.02 (1.01, 1.04)	1.02 (0.97, 1.07)

OR = odds ratio.
Cl = confidence interval.
Ref = reference category.

harmful health behaviours or experience mental distress, which may exacerbate chronic or migraine headaches (*33*), however, obesity and overweight alone cannot lead to headache. Further studies are needed to confirm this finding.

We found no association between physical activity and chronic headache although previous studies have reported that lack of physical activity can be a risk factor for chronic headache and medication overuse headache (*34,35*). The reason for this difference may be related to demographic characteristics such as occupation: most of the participants were working in agricultural and livestock areas, and as a result, had appropriate levels of physical activity.

Marital status and wealth index showed different effects on chronic headache. Among females, marital status was a risk factor, and among males a protective factor. Risk of chronic headache was directly related to wealth index among females and inversely related among males. This may be due to an interaction that strengthens the occurrence of disease in females and weakens that in males. Differences in lifestyle and level of physical activity related to type of occupation for both females and males are factors which may support these findings. Westergaard et al. reported that socioeconomic status was an effective factor in the occurrence of chronic headache, with a strong correlation between prevalence of both chronic headache and medication overuse headache and low levels of education, income and social welfare status (*36*). The association between chronic headache and medication overuse headache and low socioeconomic status has also been reported in studies in Norway and Sweden (*34,37*). It should be noted that these countries have low levels of socioeconomic inequality. It is, therefore, likely that the link between chronic headache and low socioeconomic status is stronger in countries with greater socioeconomic disparity since they have poorer access to health care for lower-income groups.

Sufficient sleep was identified as a protective factor in the prevalence of chronic headache in this study. The role of insomnia in chronic headache has already been shown, and appropriate sleep has been observed as a protective factor (*38,39*). The simultaneous effects of stress and insomnia have been identified as major contributors to chronic headache and the synergistic effects of these 2 factors have caused chronic headache (*40,41*). Another protective factor for chronic headache in both crude and adjusted regression analysis was residence in a village. The occurrence of chronic headache among rural females and males was lower than among urban females and males, which could be related to the lifestyle of villagers, perhaps because of lower stress, greater physical activity and better sleep.

One of the strengths of this study was the large sample size and surveying urban and rural populations simultaneously. This was the first study in the Islamic Republic of Iran conducted on the Kurdish population. It could be used as an appropriate reference for future studies on other ethnicities since it provides the possibility of comparing ethnicities with their different lifestyles.

One of the limitations of this study was its cross-sectional nature, meaning there was no possibility of a causal interpretation of the relationships, in particular whether it is excessive consumption of medication that causes headache, or whether chronic headache leads to overuse. However, it is believed that the use of symptomatic treatment for repeated headaches is not appropriate and may be a possible cause of chronic headache (*42*). Other factors, such as stress and specific living conditions, may also play a role in chronic headache that could not be determined in this study.

Other limitations were the lack of young and older age groups in our study population as we only had the opportunity to review middle-aged people. Data on different types of headaches such as migraine, tension headache and cluster headache were not available separately.

Conclusion

The prevalence of chronic headache among females was almost 3 times as high as among males, and medication overuse headache was more prevalent among females than males. Depression, urban residence, comorbidity and marriage were associated with increased risk and higher education level, menopause and normal sleep with decreased risk of developing chronic headache.

Acknowledgement

The authors thank the Student Research Committee, Kermanshah University of Medical Sciences and the PERSIAN Cohort Study collaborators for their support for this study.

Funding: This study was supported by Kermanshah University of Medical Sciences (Grant number 980953). The Iranian Ministry of Health and Medical Education contributed to the funding for the PERSIAN Cohort Study through Grant No. 700/534.

Competing interests: None declared.

Facteurs associés aux céphalées chroniques chez l'adulte : résultats d'une étude de cohorte sur les maladies non transmissibles à Ravansar

Résumé

Contexte : Les céphalées constituent l'affection la plus courante du système nerveux central et comptent parmi les maladies non transmissibles les plus répandues.

Objectif : Déterminer les facteurs associés aux céphalées chroniques chez les adultes.

Méthodes : Il s'agissait d'une étude transversale dans laquelle 10 063 participants ont été recrutés à partir des données de référence de l'étude de cohorte Ravansar sur les maladies non transmissibles dans l'ouest de la République islamique d'Iran, menée en 2021. Les participants qui avaient des maux de tête pendant 15 jours ou plus par mois durant trois mois ou plus étaient considérés comme des personnes souffrant de céphalées chroniques. La régression logistique a été utilisée pour examiner les associations.

Résultats : La prévalence des céphalées chroniques était de 10,49 % (n = 1054) et était significativement plus élevée chez les femmes (14,55 %, n = 769) que chez les hommes (5,98 %, n = 285) (p < 0,001). Le risque de céphalées chroniques était 73 % plus élevé chez les femmes mariées que chez les femmes célibataires. Chez les hommes fumeurs, le risque de céphalées chroniques était 1,47 fois plus élevé que chez les non-fumeurs [intervalle de confiance (IC) à 95 % : 1,05, 2,06]. Le risque de céphalées chroniques était 2,59 fois plus élevé chez les hommes dépressifs que chez les hommes non dépressifs (IC à 95 % : 1,28, 5,22) ; et chez les femmes dépressives, le risque était 2,38 fois plus élevé que chez les femmes non dépressives (IC à 95 % : 1,76, 3,23). Le risque de céphalées chroniques était inférieur de 84 % chez les hommes vivant en zone rurale par rapport à ceux vivant en zone urbaine, et de 81 % chez les femmes vivant en zone rurale par rapport à celles vivant en zone urbaine. La ménopause et le fait d'avoir un sommeil normal étaient significativement associés à un risque plus faible de céphalées chroniques, tandis que la comorbidité était liée à un risque plus élevé de développer cette affection.

Conclusion : La dépression, la résidence urbaine, le tabagisme, la comorbidité et le fait d'être marié étaient associés à une augmentation du risque de développer des céphalées chroniques, tandis que le niveau d'éducation supérieur, la ménopause et le sommeil normal étaient liés à une diminution de ce risque.

العوامل المرتبطة بالصداع المزمن لدى البالغين: نتائج دراسة أترابية أُجريَت في مدينة روانسر عن الأمراض غير السارية

شهاب رضيان، بهروز حمزة، ميترا داربانديي، فريد نجفي، إبراهيم شكيبة، يحيى باسدار

الخلاصة

الخلفية: الصداع هو أكثر اضطرابات الجهاز العصبي المركزي شيوعًا، وأحد الأمراض غير السارية الأوسع انتشارًا.

الأهداف: هدفت هذه الدراسة إلى تحديد العوامل المرتبطة بالصداع المزمن لدى البالغين.

طرق البحث: شملت هذه الدراسة المقطعية 10063 مشاركًا مختارًا من البيانات المرجعية لدراسة رافانسار الأترابية الخاصة بالأمراض غير السارية في غرب جمهورية إيران الإسلامية في عام 2021. واعتُبر المشاركون، الذين أصيبوا بالصداع 15 يومًا أو أكثر في الشهر على مدى 3 أشهر أو أكثر، مصابين بالصداع المزمن. واستُخدم الانحدار اللوجستي لدراسة الروابط.

النتائج: بلغ معدل انتشار الصداع المزمن 10.49٪ (العدد = 1054)، وكان المعدل لدى الإناث أعلى كثيرًا (14.55٪، العدد = 769) من الذكور (5.98٪، العدد = 285) (القيمة الاحتمالية < 0.001). وكان خطر الإصابة بالصداع المزمن لدى الإناث المتزوجات أعلى بنسبة 73٪ منه لدى الإناث غير المتزوجات. وفي أوساط المدخنين الذكور، كان خطر الإصابة بالصداع المزمن أعلى 1.47 مرة من غير المدخنين [فاصل الثقة 95٪: 1.05، 2.06]. وكان خطر الإصابة بالصداع المزمن في أوساط الذكور المكتئبين أعلى 2.59 مرة من الذكور غير المكتئبين (فاصل الثقة 95٪: 1.28، 5.22)؛ وكان الخطر في أوساط الإناث المكتئبات أعلى 2.38 مرة من الإناث غير المكتئبات (فاصل الثقة 95٪: 1.76، 3.23). وفي أوساط الذكور الذين يعيشون في المناطق الريفية، كان خطر الإصابة بالصداع المزمن أقل بنسبة 84٪ من أولئك الذين يعيشون في المناطق الحضرية؛ وفي أوساط الإناث اللاتي يعشن في المناطق الريفية كان أقل بنسبة 81٪ من اللاتي يعشن في المناطق الحضرية. وكان انقطاع الطمث والنوم الطبيعي مرتبطين ارتباطًا كبيرًا بانخفاض مخاطر الإصابة بالصداع المزمن، في حين كانت حالات المِراضة المصاحبة مرتبطة بارتفاع مخاطر الإصابة به.

الاستنتاجات: ارتبط الاكتئاب والعيش في المدن والتدخين والمراضة المصاحبة والزواج بزيادة خطر الإصابة بالصداع المزمن، في حين ارتبط ارتفاع مستوى التعليم وانقطاع الطمث والنوم الطبيعي بتراجع خطر الإصابة بالصداع المزمن.

References

1. D'Amico D, Grazzi L, Usai S, Raggi A, Leonardi M, Bussone G. Disability in chronic daily headache: state of the art and future directions. Neurol Sci. 2011 May;32(Suppl. 1):S71–6. doi:10.1007/s10072-011-0552-1
2. Headache Classification Committee of the International Headache Society (IHS). The international classification of headache disorders, (beta version). Cephalalgia. 2013;33(9):629–808. doi:10.1177/0333102417738202
3. Stovner L, Hagen K, Jensen R, Katsarava Z, Lipton R, Scher A, et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia. 2007 Mar;27(3):193–210. doi:10.1111/j.1468-2982.2007.01288.x
4. Steiner TJ, Birbeck GL, Jensen RH, Katsarava Z, Stovner LJ, Martelletti P. Headache disorders are third cause of disability worldwide. J Headache Pain. 2015;16:58. doi:10.1186/s10194-015-0544-2
5. Vos T, Barber RM, Bell B, Bertozzi-Villa A, Biryukov S, Bolliger I, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet. 2015 Aug 22;386(9995):743–800. doi:10.1016/S0140-6736(15)60692-4
6. Rastenytė D, Mickevičienė D, Stovner LJ, Thomas H, Andrée C, Steiner TJ. Prevalence and burden of headache disorders in Lithuania and their public-health and policy implications: a population-based study within the Eurolight Project. J Headache Pain. 2017 Dec;18(1):53. doi:10.1186/s10194-017-0759-5
7. Stewart WF, Lipton RB, Liberman J. Variation in migraine prevalence by race. Neurology. 1996;47(1):52–9. doi:10.1212/wnl.47.1.52
8. Scher A, Stewart W, Ricci J, Lipton R. Factors associated with the onset and remission of chronic daily headache in a population-based study. J Pain. 2003;106(1–2):81–9. doi:10.1016/s0304-3959(03)00293-8
9. Amin FM, Aristeidou S, Baraldi C, Czapinska-Ciepiela EK, Ariadni DD, Di Lenola D, et al. The association between migraine and physical exercise. J Headache Pain. 2018;19(1):83. doi:10.1186/s10194-018-0902-y
10. Lipton RB, Bigal ME. Migraine: epidemiology, impact, and risk factors for progression. Headache. 2005;45:S3–S13. doi:0.1111/j.526-4610.2005.4501001.x
11. Fillingim RB, Ness T. Sex-related hormonal influences on pain and analgesic responses. Neurosci Biobehav Rev. 2000;24(4):485–501. doi:10.1016/s0149-7634(00)00017-8
12 Hellström B, Lundberg U. Pain perception to the cold pressor test during the menstrual cycle in relation to estrogen levels and a comparison with men. Integr Physiol Behav Sci. 2000 Apr–Jun;35(2):132–41. doi:10.1007/BF02688772
13. Unruh AM. Gender variations in clinical pain experience. Pain. 1996;65(2–3):123–67. doi:10.1016/0304-3959(95)00214-6.
14. Stewart WF, Wood GC, Razzaghi H, Reed ML, Lipton RB. Work impact of migraine headaches. J Occup Environ Med. 2008 Jul 1;50(7):736–45. doi:10.1097/JOM.0b013e31818180cb
15. Stewart WF, Ricci JA, Chee E, Morganstein D, Lipton R. Lost productive time and cost due to common pain conditions in the US workforce. JAMA. 2003 Nov 12;290(18):2443–54. doi:10.1001/jama.290.18.2443
16. Pasdar Y, Najafi F, Moradinazar M, Shakiba E, Karim H, Hamzeh B, et al. Cohort profile: Ravansar Non-Communicable Disease Cohort Study: the first cohort study in a Kurdish population. Int J Epidemiol. 2019 Jun 1;48(3):682–3f. doi:10.1093/ije/dyy296
17. Moghaddam MB, Aghdam FB, Jafarabadi MA, Allahverdipour H, Nikookheslat SD, Safarpour S. The Iranian version of International Physical Activity Questionnaire (IPAQ) in Iran: content and construct validity, factor structure, internal consistency and stability. World Appl Sci J. 2012;18(8):1073–80. doi:10.5829/idosi.wasj.2012.18.08.754
18. Vyas S, Kumaranayake L. Constructing socio-economic status indices: how to use principal components analysis. Health Policy Plan. 2006 Nov 1;21(6):459–68. doi:10.1093/heapol/czl029
19. Farrahi Moghaddam J, Nakhaee N, Sheibani V, Garrusi B, Amirkafi A. Reliability and validity of the Persian version of the Pittsburgh Sleep Quality Index (PSQI-P). Sleep Breath. 2012 Mar;16(1):79–82. doi:10.1007/s11325-010-0478-5
20. Najafi A, Akbarpour S, Najafi F, Safari-Faramani R, Sadeghniiat-Haghighi K, Aghajani F, Asgari S, Aleebrahim F, Nakhostin-Ansari A. Prevalence of short and long sleep duration: Ravansar NonCommunicable Disease (RaNCD) cohort study. BMC Public Health. 2022 Dec;22(1):1–9. doi:10.1186/s12889-022-14061-4
21. Watson NF, Badr MS, Belenky G, Bliwise DL, Buxton OM, Buysse D, et al. Recommended amount of sleep for a healthy adult: a joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society. Sleep. 2015 Jun 1;38(6):843–4. doi:10.5665/sleep.4716
22. Lipton RB. Risk factors for and management of medication-overuse headache. Continuum. 2015;21(4):1118–31. doi:10.212/CON.0000000000000216
23. Westergaard ML, Hansen EH, Glümer C, Olesen J, Jensen RH. Definitions of medication-overuse headache in population-based studies and their implications on prevalence estimates: a systematic review. Cephalalgia. 2014;34(6):409–25. doi:10.1016/j.pain.2014.07.002
24. Colombo B, Dalla Libera D, Comi G. Brain white matter lesions in migraine: what's the meaning? Neurol Sci. 2011 May;32(Suppl. 1):S37–40. doi:10.1007/s10072-011-0530-7
25. Serafini G, Pompili M, Innamorati M, Negro A, Fiorillo M, Lamis DA, et al. White matter hyperintensities and self-reported depression in a sample of patients with chronic headache. J Headache Pain. 2012 Nov;13(8):661–7. doi:10.1007/s10194-012-0493-y

26. López-Picado A, Lapuente O, Lete I. Efficacy and side-effects profile of the ethinylestradiol and etonogestrel contraceptive vaginal ring: a systematic review and meta-analysis. Eur J Contracept Reprod Health Care. 2017;22(2):131–46. doi:10.1080/13625187.2017.1287351

27. Bousser MG. Estrogens, migraine, and stroke. Stroke. 2004 Nov;35(11 Suppl. 1):2652–6. doi:10.1161/01.STR.0000143223.25843.36

28. Calhoun A. Combined hormonal contraceptives: is it time to reassess their role in migraine? Headache. 2012;52(4):648–60. doi:10.1111/j.526-4610.2011.02051.x

29. Aamodt A, Stovner L, Hagen K, Bråthen G, Zwart J. Headache prevalence related to smoking and alcohol use. The Head-HUNT Study. Eur J Neurol. 2006;13(11):1233–8. doi:10.111/j.468–331.2006.01492.x

30. Molarius A, Tegelberg Å, Öhrvik J. Socio-economic factors, lifestyle, and headache disorders—a population-based study in Sweden. Headache. 2008;48(10):1426–37. doi:10.111/j.526-4610.2008.01178.x

31. Schramm SH, Obermann M, Katsarava Z, Diener H-C, Moebus S, Yoon M-S, et al. Epidemiological profiles of patients with chronic migraine and chronic tension-type headache. J Headache Pain. 2013;14(1):40. doi:10.1186/29-2377-14-40

32. Chai NC, Scher AI, Moghekar A, Bond DS, Peterlin BL. Obesity and headache: part I--a systematic review of the epidemiology of obesity and headache. Headache. 2014;54(2):219–34. PMID:24512574

33. Zhao G, Ford ES, Li C, Strine TW, Dhingra S, Berry JT, et al. Serious psychological distress and its associations with body mass index: findings from the 2007 Behavioral Risk Factor Surveillance System. Int J Public Health. 2009 Jun;54(Suppl. 1):30–6. doi:10.1007/s00038-009-0004-3

34. Hagen K, Linde M, Steiner TJ, Stovner LJ, Zwart J-A. Risk factors for medication-overuse headache: an 11-year follow-up study. The Nord-Trøndelag Health Studies. Pain. 2012;153(1):56–61. doi:10.1016/j.pain.2011.08.018

35. Varkey E, Hagen K, Zwart J, Linde M. Physical activity and headache: results from the Nord-Trøndelag Health Study (HUNT). Cephalalgia. 2008;28(12):1292–97. doi:10.111/j.468-2982.008.01678.x

36. Westergaard ML, Hansen EH, Glümer C, Olesen J, Jensen RH. Definitions of medication-overuse headache in population-based studies and their implications on prevalence estimates: a systematic review. Cephalalgia. 2013 2013/11/29;34(6):409–25. doi:10.1177/0333102413512033

37. Jonsson P, Hedenrud T, Linde M. Epidemiology of medication overuse headache in the general Swedish population. Cephalalgia. 2011;31(9):1015–22. doi:10.1177/0333102411410082

38. Houle TT, Butschek RA, Turner DP, Smitherman TA, Rains JC, Penzien DB. Stress and sleep duration predict headache severity in chronic headache sufferers. Pain. 2012 Dec;153(12):2432–40. doi:10.1016/j.pain.2012.08.014

39. Martin PR, MacLeod C. Behavioral management of headache triggers: avoidance of triggers is an inadequate strategy. J Clinical psychology review. 2009;29(6):483–95. doi:10.1016/j.cpr.2009.05.002.

40. Sadeh A, Keinan G, Daon K. Effects of stress on sleep: the moderating role of coping style. J Health Psychol. 2004;23(5):542. doi:10.1037/0278-6133.23.5.542.

41. Waters WF, Adams Jr SG, Binks P, Varnado P. Attention, stress and negative emotion in persistent sleep-onset and sleep-maintenance insomnia. J Sleep. 1993;16(2):128–36. doi:10.1093/sleep/16.2.128.

42. Taylor FR, Kaniecki RG. Symptomatic treatment of migraine: when to use NSAIDs, triptans, or opiates. Curr Treat Options Neurol. 2011 Feb;13(1):15–27. doi:10.1007/s11940-010-0107-4.