

ORIGINAL ARTICLE

# Migraine attack related to shift work in emergency residents at Riyadh, Saudi Arabia hospitals; a cross-sectional study

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## ABSTRACT

**Objective:** This study aimed to assess migraine prevalence and shift work-related factors among emergency residents in Riyadh, Saudi Arabia.

**Methods:** A cross-sectional study enrolled 376 emergency residents. A validated questionnaire and Migraine Disability Assessment Test (MIDAS) were used to collect the data from the emergency residents.

**Results:** Out of 376 emergency medicine residents surveyed across Riyadh hospitals, 34.3% were diagnosed with migraines, and 44.1% reported a family history. Frequent headache episodes (3-6/month) were experienced by 43.4% of participants, with 34.0% reporting headaches lasting from 5 to 10 minutes. Throbbing or pulsating headaches (56.4%) and one-sided headache locations (50.5%) were the predominant clinical features. Photophobia, phonophobia, nausea, and vomiting were reported by 43.4%, 47.3%, 46.0%, and 38.0%, respectively. Common triggers included sleep disturbances (53.5%), strong smells (33.8%), and lights (33.8%). The median MIDAS score was 7 (IQR: 8), with only 17.3% experiencing severe migraine-related disability. Disability was significantly higher among females, those ≥35 years old, non-Saudi residents, those divorced/widowed, and residents with ≥3 years of experience.

**Conclusion:** Over one-third of emergency medicine residents suffered from migraines, with a considerable proportion experiencing moderate to severe disability. Headache frequency, associated symptoms, and insufficient medical evaluation highlighted the need for targeted awareness, early diagnosis, and intervention strategies to reduce disability and improve residents' well-being and productivity.

**Keywords:** Migraine, shift work, MIDAS, migraine disability, residents, Saudi Arabia.

## Introduction

Migraine is a neurological condition that affects a significant number of individuals around the world [1]. Presently, it is estimated that around 14%-15% of the global population suffers from migraines, which accounts for approximately 4.9% of those who report being ill [2]. A hallmark of migraines is recurrent headaches that can lead to intense, throbbing pain or a pulsating feeling, typically on one side of the head. The Global Burden of Disease study indicates that from the year 1990 to 2019, the worldwide prevalence of migraines rose from 721.9 million to 1.1 billion cases [3].

Various elements can trigger chronic migraine episodes. Conditions such as obesity, depression, frequent use of medication, certain anti-infective drugs, and stress can all contribute to the onset of migraines. Additionally, sleep disorders might interfere with sleep patterns, turning episodic migraines into chronic ones [4].

Sudden migraines can often strike individuals without any identifiable external causes. To help reduce the frequency, severity, and length of these episodes, various preventive measures can be recommended. These might include medical interventions, such as medications or procedures, as well as non-medical approaches, like the use of devices [5]. Migraines can be initiated by several factors, including extended periods of fasting, 50

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**Received:** 04 October 2025 | **Accepted:** 06 November 2024



55 low blood sugar levels, disruptions in sleep, emotional  
56 stress, hormonal fluctuations linked to contraceptive use,  
57 menstruation, and ovulation. Certain medications, like  
58 nitroglycerin, reserpine, and estrogen, can also act as  
59 triggers [6].

60 A systematic review and meta-analysis conducted in Saudi  
61 Arabia indicated that migraine accounted for 25% of all  
62 headache types [7]. Additionally, research conducted in  
63 Jeddah revealed that the occurrence of migraines within  
64 the general population reached 37.2% [8]. Various  
65 research findings indicated a connection between shift  
66 work and migraines, particularly in relation to headaches  
67 that result in disability. A combination of case studies  
68 and narrative reviews revealed that individuals working  
69 shifts tend to experience chronic migraine episodes and  
70 a greater occurrence of disability related to headaches.  
71 Furthermore, research consistently showed that shift  
72 workers face a higher risk of undiagnosed headaches  
73 and migraines compared to those with regular daytime  
74 schedules. The stress and irregular hours inherent in shift  
75 work appear to be a major trigger for these episodes [9].

76 Previous studies have also explored how workplace  
77 demands, such as high-pressure environments, long hours,  
78 and disrupted sleep, contribute to migraine frequency  
79 and severity. Nonetheless, there is a lack of current  
80 data regarding the link between headache occurrences  
81 and shift work among emergency residents in Saudi  
82 Arabian hospitals. Consequently, the findings from this  
83 study would aid in identifying migraine incidents among  
84 emergency residents and contribute to the formulation  
85 of national strategies aimed at alleviating migraine  
86 symptoms among workers in Saudi Arabia. Hence, this  
87 study aimed to evaluate the relationship between shift  
88 work and migraine attacks among emergency residents  
89 at hospitals in Riyadh, Saudi Arabia.

## 90 **Subjects and Methods**

91 The cross-sectional, observational, survey-based study  
92 was conducted at the primary health care centers (PHCCs)  
93 of the Ministry of Health, Saudi Arabia from June 2024  
94 to March 2025. Data were collected from emergency  
95 residents at a selected hospital in Saudi Arabia.

96 The sample size was determined using the Raosoft  
97 statistical program, which established a 95% confidence  
98 level, a 5% margin of error, and a 50% response  
99 distribution. As a result, approximately 377 participants  
100 were identified as necessary for the study, with a target of  
101 400 participants to consider potential dropouts. A simple  
102 random sampling technique was used.

103 A self-administered, previously validated questionnaire  
104 adopted from a prior study was distributed to participants  
105 [10]. To gather data, a list of emergency residents' names  
106 and contact numbers was obtained from each sector,  
107 and a random sampling technique was applied until  
108 all questionnaires were retrieved. The study included  
109 emergency residents working in Primary Health Care  
110 Centers (PHCs) under the Ministry of Health in Saudi  
111 Arabia who were present at the time of data collection  
112 and agreed to participate by completing the full  
113 questionnaire. Physicians were excluded if they were not

114 affiliated with MOH PHCs, were on leave or unavailable  
115 during data collection, or belonged to other professional  
116 categories such as interns, nurses, or administrative staff.  
117 Questionnaires that were incomplete or blank were also  
118 excluded from the analysis.

119 The questionnaire consisted of three main parts. The  
120 first part included socio-demographic and personal  
121 characteristics, including age, gender, nationality,  
122 marital status, and years of experience. The second part  
123 consisted of questions about the diagnostic criteria of  
124 episodic migraine headache and the associated factors.  
125 The third part was the Migraine Disability Assessment  
126 Test (MIDAS) [10].

127 The MIDAS questionnaire was composed of five scored  
128 questions and two additional questions. Questions should  
129 be answered over the last three months to measure the  
130 impact of migraine headaches on participants' lives. The  
131 participant's performance was evaluated on working  
132 days, household days, and social activities. The total  
133 score was divided into four grades to suggest treatments  
134 for the participant according to the participants' grade  
135 level. The grades had been categorized as follows: Grade  
136 I indicated little or no disability, with scores ranging from  
137 0 to 5, suggesting a low medical need. Grade II reflected  
138 a mild disability, with scores between 6 and 10. Grade  
139 III represented a moderate disability, with scores from  
140 11 to 20. Lastly, Grade IV signified a severe disability,  
141 with scores of 21 or higher, which required a high level  
142 of medical attention, particularly in the cases of Grades  
143 III and IV [11].

144 Dependent variables for this study were the prevalence of  
145 migraine headache and its degree, while the independent  
146 variables were demographic characteristics of the  
147 participants and the questions assessing the diagnostic  
148 criteria of episodic migraine headache and the associated  
149 factors.

150 Statistical analysis was conducted using the IBM  
151 Statistical Package for Social Sciences (SPSS) software  
152 (version 26.0, Armonk, NY, USA). Categorical variables  
153 were expressed in percentages and numbers, while  
154 numerical data were expressed as mean and standard  
155 deviation (SD) for normally distributed data and as a  
156 median and interquartile range (IQR) for non-normally  
157 distributed data. Group comparisons between categorical  
158 and continuous variables were conducted using the  
159 Mann-Whitney U test for two groups and the Kruskal-  
160 Wallis H test for more than two groups. The statistical  
161 significance was considered when  $p$ -values were below  
162 0.05. A valid percentage was calculated for missing data.

## 163 **Results**

164 A total of 376 emergency residents completed the  
165 questionnaire. The majority of residents were males  
166 (62.0%) and aged 25–34 years (74.97%). Most, 60.6%,  
167 were single, and 89.6% were Saudi nationals. Regarding  
168 residency year, second-year residents were the majority  
169 group (37.2%). The majority had 1–2 years of experience  
170 (37.2%) (Table 1).

171 Only 38.6% of participants had been evaluated by  
172 a neurologist, and 34.3% had been diagnosed with

Factor	Category	Number (n)	Percentage (%)
Gender	Male	233	62.0
	Female	143	38.0
Age (years) (n = 560)	18-24	55	14.6
	25-34	281	74.7
	35-44	38	10.1
	>44	2	0.5
Years of experience (years)	<1	106	28.2
	1-2	140	37.2
	3-5	116	30.9
	>6	14	3.7
Marital status	Single	228	60.6
	Married	112	29.8
	Divorced	32	8.5
	Widowed	4	1.1
Nationality	Saudi	337	89.6
	Non-Saudi	39	10.4
Year of residency	1 <sup>st</sup> year	113	30.1
	2 <sup>nd</sup> year	140	37.2
	3 <sup>rd</sup> year	70	18.6
	4 <sup>th</sup> year	53	14.1

174 migraines. Only 33.2% experienced a head or neck injury  
 175 requiring medical attention, and 26.9% had a chronic  
 176 health disorder. About half of the participants (44.1%)  
 177 had a family history of migraines. The frequency of  
 178 headaches varied, with 33.5% experiencing 1 to 3  
 179 episodes per month. Headache duration was mostly  
 180 between 5 and 10 minutes (34.0%). The most reported  
 181 first onset of headaches was before age 15 years (44.1%).  
 182 In the past year, 65.2% of residents reported experiencing  
 183 headaches. Regarding headache clinical characteristics,  
 184 throbbing or pulsating was the most reported (56.4%).  
 185 Headaches were exacerbated in 53.7% of participants by  
 186 physical activity. In 46.0% and 38.0% of participants,  
 187 headaches were associated with nausea and vomiting,  
 188 respectively. Sensitivity to light and noise was observed  
 189 in less than half of the cases (43.4% and 47.3%,  
 190 respectively) (Table 2).

191 The median (IQR) total MIDAS score was 7 (8), with  
 192 most individuals having little to no disability (Grade I)  
 193 (38.8%), followed by those with mild disability (Grade  
 194 II) (32.7%) (Table 3).

195 The highest impact on headaches was missed household  
 196 work, followed by missing social or leisure activities,  
 197 with a median (IQR) of 1 (3) and 1 (2) days, respectively.  
 198 Participants reported a median (IQR) of 1 (3) day of  
 199 having headaches in the last 3 months, with a median  
 200 (IQR) headache pain score of 6 (3) out of 10 (Table 4).

201 Female residents had significantly higher disability  
 202 scores compared to males (median (IQR) 8 (29) vs. 6  
 203 (8),  $p < 0.001$ ). Participants aged 35 years or older had  
 204 significantly higher MIDAS scores compared to younger  
 205 individuals (39.5 (67),  $p < 0.001$ ). Additionally, the  
 206 experience level also impacted disability score. Those

207 having three or more years of experience reported higher  
 208 scores than those with two or fewer years (9 (14),  $p$ -value  
 209 = 0.009). Those who were divorced or widowed had  
 210 higher disability than married and single participants  
 211 (60.5 (47),  $p < 0.001$ ). Non-Saudi residents showed a  
 212 greater disability score than Saudi residents (8 (16),  
 213  $p$ -value = 0.001). Finally, third to fourth-year residents  
 214 reported higher disability scores compared to earlier-year  
 215 residents (15 (21) vs. 7 (8),  $p < 0.001$ ) (Table 5).

216 A significant association was found between the MIDAS  
 217 score and being evaluated by a neurologist, type of  
 218 headache diagnosis, history of head or neck injury,  
 219 number of headache episodes per month, duration of  
 220 headache, and age at first onset ( $p < 0.05$ ). Participants  
 221 evaluated by a neurologist had higher disability scores  
 222 than those who were not (8 (8) vs. 6 (9),  $p$ -value =  
 223 0.004). Those diagnosed with migraine had higher scores  
 224 compared to those diagnosed with other headache types  
 225 (8 (6) vs. 7.5 (32) vs. 5 (9),  $p$ -value = 0.001). Similarly,  
 226 individuals with a history of head or neck injury reported  
 227 greater disability (8 (7) vs. 6 (9),  $p$ -value = 0.023).  
 228 Participants experiencing more than six headache  
 229 episodes per month had significantly higher disability  
 230 scores compared to those with fewer episodes (15 (56) vs.  
 231 7 (6) vs. 4 (8),  $p < 0.001$ ). In terms of duration, residents  
 232 whose headaches lasted between 5–10 minutes had  
 233 higher MIDAS scores than those with episodes lasting  
 234 more than 10 minutes than shorter episodes (8 (12) vs.  
 235 8 (12) vs. 6 (6),  $p < 0.001$ ). Furthermore, the age of first  
 236 headache significantly impacted disability levels, with  
 237 higher scores among those with onset after age 20 years  
 238 compared to earlier onset at 15–20 years or < 15 years (25  
 239 (64) vs. 7 (8) vs. 6 (6),  $p < 0.001$ ). Associated symptoms  
 240 before or during headache such as vision loss (8.6 (6)

241 **Table 2.** *Migraine and headache characteristics and the associated factors among emergency residents (n = 376).*

Factor	Category	Number (n)	Percentage (%)
Evaluated by a neurologist	Yes	145	38.6
	No	231	61.4
Diagnosis	Migraine	129	34.3
	Tension-type	128	34.0
	Clusters	26	6.9
	None of the above	93	24.7
Have a head or neck injury requiring medical treatment	Yes	125	33.2
	No	251	66.8
Family history of migraine headaches	Yes	166	44.1
	No	210	55.9
Diagnosed with any chronic health disorder	Yes	144	38.3
	No	232	61.7
Clinical characteristics of headache			
Headache episode per month (episode)	1-3	126	33.5
	3-6	163	43.4
	6-9	67	17.8
	≥10	20	5.3
Duration of the headache (minutes)	<5	114	30.3
	5-10	128	34.0
	10-15	60	16.0
	>15	74	19.7
Age of the first headache (year)	<15	166	44.1
	15-20	133	35.4
	20-25	57	15.2
	25-30	15	4.0
	>30	5	1.3
Having a headache over the last year	Yes	245	65.2
	No	131	34.8
Having a headache not related to any other illness	Yes	245	65.2
	No	131	34.8
Headache description	Throbbing or pulsating	212	56.4
	Pressing, squeezing, or tightening	164	43.6
Type of headache pain	One side of the head	190	50.5
	Both sides	186	49.5
Physical activity worsens the headache	Yes	202	53.7
	No	174	46.3
Feeling nauseous with this headache	Yes	173	46.0
	No	203	54.0
Vomiting with this headache	Yes	143	38.0
	No	233	62.0
Bothered by daylight or other lighting	Yes	163	43.4
	No	213	56.6
Bothered by noise	Yes	178	47.3
	No	198	52.7
Before or during your headache symptoms	Zigzag lines appear	161	42.8
	Loss of vision	94	25.0
	Blurred/double vision	92	24.5
	Numbness or tingling	50	13.3
	One-sided body weakness and speech	24	6.4
	None	122	32.4

Factor	Category	Number (n)	Percentage (%)
Having headaches or worsening by	Sleep disturbance	201	53.5
	Certain smells or perfumes	127	33.8
	Lights	127	33.8
	Weather change	126	33.5
	Missed meals	115	30.6
	Smoking	113	30.1
	Certain foods	73	19.4
	Stress	76	20.2
	Exercises	62	16.5
	Hormones in women	54	14.4
	Sexual activity	20	5.3
	Rest	15	4.0
	Quiet and darkness	10	2.7
	None	27	7.2

362 **Table 3.** MIDAS severity Grades among emergency residents (n = 376).

Factor	Category	Number (n)	Percentage (%)
Total MIDAS Score	Grade I (0-5)	146	38.8
	Grade II (6-10)	123	32.7
	Grade III (11-20)	42	11.2
	Grade IV (>21)	65	17.3

363 **Table 4.** MIDAS among emergency residents (n = 374).

Factor	Mean ± SD	Median (IQR)	Min-Max
How many days in the last 3 months, because of your headaches, have you			
1. Missed work or school	2.73 ± 5.702	1 (2)	0-59
2. Reduced productivity at work or school by half or more	3.10 ± 5.430	1 (3)	0-50
3. Missed household work	3.56 ± 6.394	1 (3)	0-52
4. Reduced household work productivity by half or more	3.20 ± 5.987	1 (2)	0-53
5. Missed family, social, or leisure activities	3.29 ± 7.071	1 (2)	0-72
Total Score	15.88 ± 25.240	7 (8)	0-138
6. Having a headache	4.24 ± 9.720	1 (3)	0-90
7. Headache pain scale of 0-10	5.56 ± 1.826	6 (3)	0-10

**Table 5.** Demographics impact on Disability Assessment Test (MIDAS) total score.

Factor	Category	Total MIDAS Score Median (IQR)	p-value
Gender	Male	6 (8)	<0.001
	Female	8 (29)	
Age (years) (n = 560)	18-24	7 (7)	<0.001
	25-34	6 (8)	
	≥35	39.5 (67)	
Years of experience (years)	<1	7 (6)	0.009
	1-2	7 (9)	
	≥3	9 (14)	
Marital status	Single	6 (7)	<0.001
	Married	8 (14)	
	Divorced/Widowed	60.5 (47)	
Nationality	Saudi	7 (8)	<0.001
	Non-Saudi	25 (55)	
Year of residency	1 <sup>st</sup>	6 (6)	0.001
	2 <sup>nd</sup>	8 (12)	
	3 <sup>rd</sup> - 4 <sup>th</sup>	8 (16)	

425 **Table 6.** Headache diagnosis, frequency, and features impact on disability assessment test (MIDAS) total score.

Factor	Category	Total MIDAS Score Median (IQR)	p-value
Evaluated by a neurologist	Yes	8 (8)	<b>0.004</b>
	No	6 (9)	
Diagnosis	Migraine	8 (6)	<b>0.001</b>
	Tension-type/Cluster	7.5 (32)	
	None of the above	5 (9)	
Have a head or neck injury requiring medical treatment	Yes	8 (7)	<b>0.023</b>
	No	6 (9)	
Family history of migraine headaches	Yes	8 (6)	0.051
	No	6 (9)	
Diagnosed with any chronic health disorder	Yes	8 (7)	0.121
	No	6.5 (9)	
Headache episode per month (episode)	1-3	4 (8)	<b>&lt;0.001</b>
	3-6	7 (6)	
	>6	15 (56)	
Duration of the headache (minutes)	<5	6 (6)	<b>&lt;0.001</b>
	5-10	8 (12)	
	>10	8 (12)	
Age of the first headache (year)	<15	6 (6)	<b>&lt;0.001</b>
	15-20	7 (8)	
	>20	25 (64)	
Having a headache over the last year	Yes	6 (7)	<b>&lt;0.001</b>
	No	9 (43)	
Having a headache not related to any other illness	Yes	7 (8)	0.142
	No	8 (16)	
Headache description	Throbbing or pulsating	7 (7)	0.547
	Pressing, squeezing, or tightening	7 (16)	
Type of headache pain	Both sides	7 (6)	0.544
	One side of the head	8 (16)	
Physical activity worsens the headache	Yes	7 (7)	0.418
	No	7.5 (16)	
Feeling nauseous with this headache	Yes	8 (6)	0.204
	No	6 (9)	
Vomiting with this headache	Yes	7 (7)	0.055
	No	7 (10)	
Bothered by daylight or other lighting	Yes	7 (7)	0.294
	No	7 (10)	
Bothered by noise	Yes	8 (7)	0.063
	No	6 (9)	
Before or during your headache symptoms			
Loss of vision	Yes	8.6 (6)	<b>0.004</b>
	No	6.5 (9)	
Numbness or tingling	Yes	11 (54)	<b>&lt;0.001</b>
	No	7 (7)	
One-sided body weakness and speech	Yes	57 (78)	<b>&lt;0.001</b>
	No	7 (8)	
None	Yes	4.5 (9)	<b>&lt;0.001</b>
	No	8 (10)	
Having headaches or worsening by			
Sleep disturbance	Yes	6 (7)	<b>0.023</b>
	No	8 (22)	
Weather changes	Yes	8 (6)	0.056
	No	7 (10)	
Hormones (women)	Yes	8 (15)	<b>0.010</b>
	No	7 (9)	
None	Yes	3 (8)	<b>0.001</b>
	No	7 (9)	

386 vs. 6.5 (9),  $p$ -value = 0.004), numbness/tingling (11 (54)  
387 vs. 7 (7),  $p < 0.001$ ), and one-sided weakness or speech  
388 difficulty (57 (78) vs. 7 (8),  $p < 0.001$ ) were significantly  
389 associated with increased MIDAS scores. Among  
390 headache triggers, sleep disturbance was significantly  
391 associated with lower disability (6 (7) vs. 8 (22),  $p$ -value  
392 = 0.023). Hormonal changes in women were also linked  
393 with higher scores (8 (15),  $p$ -value = 0.010), while those  
394 who reported no known triggers had the lowest disability  
395 levels (3 (8),  $p$ -value = 0.001) (Table 6).

## 396 Discussion

397 Migraine prevalence is rising globally, with shift work  
398 identified as a significant contributing factor. Emergency  
399 medicine residents, who often have demanding schedules,  
400 experience a substantial burden of migraine headaches.  
401 This cross-sectional study conducted among emergency  
402 medicine residents in Saudi hospitals found that 34.3%  
403 reported having a formal diagnosis of migraines, 34.0%  
404 reported tension-type headaches, and 33.3% reported  
405 experiencing 10 or more headache episodes per month.  
406 This result aligns with similar studies among healthcare  
407 workers in South China (25.9%) (12) and Brazil (28.2%)  
408 (13). Similarly, Kuo et al. [14] reported an increased  
409 migraine risk among physicians (adjusted odds ratio  
410 [AOR]: 1.67) and nurses (AOR: 1.62) compared to  
411 the general population, while Choudry et al. observed  
412 a 24.4% migraine prevalence among physicians and  
413 medical students in Pakistan [15]. In contrast, Bulman et  
414 al. reported a higher prevalence of 37.2% in the general  
415 population of Jeddah [8].

416 The burden of migraine on daily functioning was evident  
417 in the disability scores. The median (IQR) MIDAS total  
418 score was 7 [8]. Although most participants experienced  
419 mild to no disability (Grade I: 38.8%, Grade II: 32.7%),  
420 17.3% experienced severe disability (Grade IV), and  
421 11.2% had moderate disability (Grade III). These figures  
422 reflected a moderate impact on daily functioning among  
423 residents. Residents aged  $\geq 35$  and those with  $\geq 3$  years of  
424 experience reported significantly higher disability scores  
425 (median MIDAS 39.5 ( $p < 0.001$ ) and 9 ( $p$ -value = 0.009),  
426 respectively), suggesting cumulative effects of prolonged  
427 shift work and occupational stress. This aligns with Xie  
428 et al., who observed that more than 6-night shifts/month  
429 increased migraine risk (OR 2.72), whereas doctors  
430 showed a non-significant trend (OR 1.80). Notably,  
431 doctors had an increased tension-type headache risk (OR  
432 2.31), possibly related to prolonged sitting postures [12].

433 Likewise, Navarro-Pérez et al. found that 24-hour on-  
434 call shifts significantly increased migraine disability,  
435 with MIDAS scores doubling from 4.0 to 8.0 ( $p$ -value  
436 = 0.001) [16]. Silva Júnior et al. also found that working  
437 more than 60 hours per week was associated with  
438 increased migraine risk (OR 1.66) [13]. Another study by  
439 Magnavita reported that 48.8% of workers experienced  
440 headaches, with 38.7% suffering severe impact on  
441 productivity, using the Headache Impact Test-6 with a  
442 result of  $> 55$  (9).

443 The current study data further showed that missed  
444 household work and social/leisure activities, with median  
445 (IQR) of 1 (3) and 1 (2) days, respectively, were the most

486 affected domains, underscoring migraine's occupational  
487 burden.

488 Shift work was identified as a critical exacerbating factor,  
489 with 46.3% of current participants reporting worsened  
490 headaches, consistent with evidence from Taiwan showing  
491 increased migraine risk with long-term shift work among  
492 healthcare professionals. These findings align with  
493 Riccò et al.'s report that 61.2% of Italian occupational  
494 physicians perceived migraine as challenging to manage  
495 in workplace settings, and prolonged exposure to shift  
496 work exacerbated migraine severity [17]. Sandoe et al.  
497 similarly found that shift work contributes to migraine  
498 chronification, with patients reverting to episodic  
499 migraine only after discontinuing night shifts [4].

500 Night shifts are likely to disrupt circadian rhythms,  
501 leading to reduced sleep quality, a significant migraine  
502 trigger reported by 53.5% of participants. Stress, reported  
503 by 20.2% of participants, was also a common trigger.  
504 This finding aligns with the research by Navarro-Pérez  
505 et al., which showed that poor sleep quality, as measured  
506 by the Pittsburgh Sleep Quality Index (PSQI), worsened  
507 after night shifts, with scores increasing from 7.0 to 8.0  
508 ( $p$ -value = 0.003). Additionally, anxiety levels, assessed  
509 using the Hospital Anxiety and Depression Scale (HADS),  
510 rose from 5.0 to 8.0 ( $p < 0.001$ ) after night shifts [16].  
511 These findings support previous conclusions that work-  
512 related stress and disrupted sleep, both frequent in shift  
513 work, are major migraine triggers linked with anxiety  
514 and sleep disorders [18].

515 Female residents in the current study reported significantly  
516 higher disability scores than males (median MIDAS  
517 8 vs. 6;  $p < 0.001$ ). This finding aligns with Choudry  
518 et al, where female physicians had a higher migraine  
519 prevalence (32.2%) than males (22.7%) [15]. Silva Júnior  
520 et al. also identified female gender as a strong predictor of  
521 both migraine (OR 3.10) and headache-related functional  
522 impairment (OR 1.39) [13]. Similarly, Xie et al. noted  
523 that women were more than twice as likely to experience  
524 migraine compared to men among Chinese doctors [12].

525 Interestingly, residents with a family history of migraines  
526 reported lower disability scores, although this did not  
527 reach statistical significance. The current study findings  
528 suggested that residents with prior migraine experience  
529 might recognize symptoms earlier and take proactive  
530 steps to manage them. This aligns with Choudry et al.,  
531 who suggest that greater awareness can help reduce  
532 migraine-related disability [15].

533 The current study highlighted a high prevalence of  
534 migraines among emergency medicine residents in  
535 Riyadh, significantly impacting their work performance,  
536 well-being, and overall quality of life. Key contributors  
537 include erratic shift schedules, poor sleep, and high stress  
538 levels, with notable differences based on gender and  
539 years of experience. These results call for institutional  
540 changes, such as better shift scheduling, mental health  
541 support, and educational programs on migraines.  
542 Addressing these modifiable risk factors could improve  
543 resident health, enhance patient care, and promote long-  
544 term workforce sustainability.

545 While this study offers important insights into migraine  
546 prevalence among emergency residents, several  
547 limitations should be considered. First, relying on self-  
548 reported data introduced the possibility of recall bias or  
549 inaccurate reporting of symptoms. Second, this cross-  
550 sectional design means did not determine whether shift  
551 work directly causes migraines; this would require  
552 longer-term tracking of residents. Additionally, since  
553 the collected data were from a single urban center, the  
554 current study findings might not reflect the experiences  
555 of residents working in rural areas or private hospitals.  
556 Moving forward, research should follow residents  
557 over time to better understand how shift patterns affect  
558 migraine development, investigate how cultural factors  
559 influence migraine experiences through in-depth  
560 interviews, and evaluate practical solutions like adjusted  
561 work schedules in actual hospital settings.

## 562 Conclusion

563 More than one-third of emergency department residents  
564 in this study had a diagnosed migraine, with many  
565 reporting frequent headache episodes, and 28.5%  
566 experiencing moderate to severe disability from their  
567 symptoms. Common migraine features, such as throbbing  
568 pain, nausea, light sensitivity, and work impairment,  
569 were widespread. However, only 38.6% of residents had  
570 seen a neurologist, and many struggled with frequent,  
571 debilitating headaches without a formal diagnosis.  
572 Female residents were disproportionately affected, with  
573 significantly higher disability scores. Given the intense  
574 demands of emergency medicine training, these findings  
575 highlighted an urgent need for routine migraine screening,  
576 easier access to neurology referrals, and targeted support  
577 programs. Moving forward, interventions should focus on  
578 education, stress reduction, and workplace adjustments  
579 to safeguard residents' health and optimize their clinical  
580 performance.

## 581 List of Abbreviations

582 HADS	Hospital Anxiety and Depression Scale
583 IQR	Interquartile Range
584 MIDAS	Migraine Disability Assessment Test
585 PHCCs	Primary Health Care Centers
586 PSQI	Pittsburgh Sleep Quality Index
587 SD	Standard Deviation
588 SPSS	Statistical Package for Social Sciences

## 589 Consent for Participation

590 Informed consent was obtained from the participants.

## 591 Conflict of Interest

592 The authors declare that there is no conflict of interest  
593 regarding the publication of this article.

## 594 Funding

595 None.

## 596 Ethical Approval

597 Ethical approval was granted by the Institutional Review  
598 Board (IRB) at King Faisal Specialist Hospital & Research  
599 Center, Riyadh, Saudi Arabia, via reference number 2241053,  
600 dated 26 February 2024.

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