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Prevalence of Migraine and Associated Disability Among Auto-Rickshaw Drivers in Lahore During Summer

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ABSTRACT

Background: Migraine is a prevalent, disabling neurological disorder characterized by recurrent episodes of moderate to severe headache, often accompanied by sensory disturbances such as photophobia, phonophobia, nausea, and vomiting. Occupational stress and environmental triggers significantly contribute to migraine prevalence, particularly in high-risk populations like auto-rickshaw drivers who are exposed to extreme environmental conditions during summers.

Objective: To assess the prevalence of migraine and the extent of migraine-related disability among auto-rickshaw drivers in Lahore during the summer season.

Methods: A descriptive, cross-sectional study was conducted among 169 male auto-rickshaw drivers aged 18 years and above in Lahore. Participants were recruited using a non-probability convenient sampling technique. Data were collected through face-to-face interviews using a structured questionnaire, which included the ID Migraine™ screening tool, Visual Analogue Scale (VAS) for pain intensity, and Migraine Disability Assessment Scale (MIDAS) for disability evaluation. Ethical approval was obtained, and informed consent was secured from all participants. Data were analyzed using IBM SPSS Version 25.0 with descriptive statistics and chi-square tests, considering $p < 0.05$ as statistically significant.

Results: The prevalence of migraine was 18.9% (n=32). Among migraineurs, 59.4% experienced severe pain, 28.1% reported very severe pain, and 12.5% had moderate pain. Migraine-related disability was categorized as severe in 34.4%, moderate in 28.1%, mild in 15.6%, and little or no disability in 21.9% of cases. A positive family history of migraine was reported by 28.12% of migraineurs.

Conclusion: Migraine is highly prevalent among auto-rickshaw drivers in Lahore during summers, with a significant proportion experiencing severe pain and disability. Occupational exposure to environmental stressors may exacerbate migraine prevalence and severity in this population.

Keywords: Automobile Driving, Disability Evaluation, Migraine Disorders, Migraine Disability Assessment, Migraine Disability Assessment Scale (MIDAS), Occupational Health, Prevalence, Pain Measurement

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Introduction

Migraine, derived from the Greek term "hemicrania," signifies unilateral head pain—a hallmark symptom of this complex neurological disorder (1). As one of the most prevalent forms of primary headaches, migraine is characterized by recurrent episodes of moderate to severe intensity, often accompanied by sensory disturbances such as photophobia, phonophobia, nausea, and vomiting (2). The Global Burden of Disease Study of 2016 highlighted migraine as the second most prevalent neurological condition, significantly contributing to global disability rates (2).

Migraine attacks are often precipitated by diverse endogenous and exogenous stimuli, including bright lights, specific odors, extreme temperature fluctuations, and high-altitude exposure (3). Additionally, it manifests in episodic and chronic forms, differentiated by attack frequency, with chronic migraine defined by 15 or more headache days per month (4,5). Gender disparities are notable, with a higher prevalence among females, potentially linked to hormonal fluctuations, as reflected in Pakistan's demographic data indicating a prevalence of 27% in females compared to 18% in males (6). Globally, migraine affects approximately 14–15% of the population, though prevalence rates vary across different regions and populations (7).

Its etiology is multifactorial, encompassing genetic predispositions, neurovascular dysregulation, and environmental triggers. While once predominantly considered a vascular disorder due to the throbbing nature of its pain, contemporary research underscores its neurovascular basis, implicating the brainstem and trigeminovascular system in its pathophysiology (8). The pathophysiology of migraine involves four distinct phases: the prodromal phase, aura phase, headache (ictal) phase, and postdromal phase (9). This progression underscores the disorder's complexity, intertwining metabolic, neurological, and vascular changes. While extensively studied in diverse populations such as healthcare professionals, students, and the general public, there remains a paucity of data on occupational groups exposed to specific environmental stressors. Auto-rickshaw drivers in Lahore, particularly during the intense summer months, represent a unique cohort subjected to numerous migraine triggers, including prolonged heat exposure, noise pollution, physical exertion, and socio-economic stress. These occupational hazards may amplify the risk and severity of migraine attacks, compounded by potential genetic predispositions and increased serotonin activity associated with seasonal changes.

This study aims to bridge the existing knowledge gap by assessing the prevalence of migraine and the extent of migraine-related disability among auto-rickshaw drivers in Lahore during summer. Through this focused investigation, the research seeks to elucidate the occupational and environmental factors contributing to migraine in this vulnerable population, offering insights that could inform targeted interventions and public health strategies.

Materials and Methods

This descriptive, observational, cross-sectional study was conducted to assess the prevalence of migraine and associated disability among auto-rickshaw drivers in Lahore during the summer season. The study spanned over a period of four months, targeting male auto-rickshaw drivers aged 18 years and above, who had experienced at least two headache episodes in the preceding three months. The sample size of 169 participants was determined using OpenEpi Version 3.0, based on statistical parameters appropriate for prevalence studies. A non-probability convenient sampling technique was employed to recruit participants from various localities within Lahore, ensuring a diverse representation of the population at risk.

Eligibility criteria included male drivers with no history of significant head trauma, cognitive impairments, or any medical conditions that could interfere with effective communication during interviews. Participants with a history of neurological disorders other than migraine were also excluded to maintain diagnostic specificity. Prior to data collection, informed consent was obtained from all participants after providing a comprehensive explanation of the study's objectives, procedures, and potential risks. Ethical approval for the study was secured from the relevant institutional review board, ensuring compliance with the principles outlined in the Declaration of Helsinki for ethical research involving human subjects (1).

Data collection was conducted through face-to-face interviews using a structured questionnaire designed to capture demographic details, headache characteristics, and migraine-related disability. The questionnaire comprised multiple components, including the ID Migraine™ screening tool, a set of eight self-administered questions, the Visual Analogue Scale (VAS) for assessing pain intensity, and the Migraine Disability Assessment Scale (MIDAS) for evaluating the degree of disability associated with migraine attacks. The ID Migraine™ tool, with validated sensitivity and specificity, facilitated the initial identification of probable migraine cases (2). Participants who responded affirmatively to two or more items on the ID Migraine™ tool were further assessed using the VAS and MIDAS to quantify pain severity and functional impairment, respectively. (10-13)

Interviews were conducted in Urdu and Punjabi to ensure clarity and comprehension, considering the linguistic preferences of the target population. Data were collected verbally to accommodate participants with limited literacy. The VAS was employed to assess the intensity of migraine pain, ranging from moderate to very severe, while the MIDAS questionnaire provided a standardized

measure of migraine-related disability across work, household, and social domains.

All collected data were systematically entered and analyzed using IBM SPSS Statistics Version 25.0. Descriptive statistics were utilized to summarize demographic variables, prevalence rates, and disability scores. The study maintained strict confidentiality of all participant information, with data anonymized during the analysis to protect personal identities. The research adhered to high ethical standards, ensuring voluntary participation, the right to withdraw at any stage without consequences, and the provision of appropriate referrals for participants requiring medical attention for severe migraine symptoms.

Results

Total of 169 auto-rickshaw drivers from Lahore participated in this study, with a mean age of 36.36 years (SD ±11.52). The study aimed to assess the prevalence of migraine, its severity, and the extent of migraine-related disability during the summer season. The key findings are presented below, supported by tables for clarity. The prevalence of migraine among the participants was found to be 18.9% (n=32), while 81.1% (n=137) were diagnosed as non-migraineurs based on the ID Migraine tool.

Table 1: Prevalence of Migraine Among Auto-Rickshaw Drivers

Migraine Status	Frequency (n)	Percentage (%)
Migraine Positive	32	18.9
Migraine Negative	137	81.1
Total	169	100.0

Table 2: Responses to ID Migraine Questionnaire

ID Migraine Questions	Yes (n, %)	No (n, %)
Severe headache with nausea	40 (23.7%)	129 (76.3%)
Severe headache with sensitivity to light and sound	55 (32.5%)	114 (67.5%)
Headache causing dysfunction in daily activities	66 (39.1%)	103 (60.9%)

Among the 32 identified migraineurs in the study, the presence of a family history of migraine was assessed to determine potential genetic predisposition. Out of these participants, 9 individuals (28.12%) reported a positive family history of migraine, suggesting a notable hereditary influence in nearly one-third of the cases. Conversely, 19 individuals (59.38%) indicated no known family history of migraine, highlighting the multifactorial nature of the condition, where environmental and occupational factors may play significant roles. Additionally, 4 participants (12.50%) were uncertain about their family history, which may reflect limited awareness or lack of detailed medical history within families. These findings emphasize that while genetic predisposition is an important risk factor, migraines can also occur in individuals without a clear familial background, underscoring the role of non-genetic triggers such as occupational stress and environmental exposures.

Table 3: Visual Analogue Scale (VAS) for Pain Intensity Level Among Migraineurs

Pain Intensity Level	Frequency (n)	Percent (%)
Moderate	4	2.4
Severe	19	11.2
Very Severe	9	5.3
Total (Migraineurs)	32	18.9
Non-Migraineurs	137	81.1

Migraine-related disability was evaluated using the MIDAS questionnaire, categorizing disability into four levels: little or no disability, mild, moderate, and severe. A significant proportion of participants experienced moderate to severe disability due to migraine. The study revealed that 18.9% of the participants were migraineurs, with 59.4% of them experiencing severe pain and 34.4% reporting severe disability due to migraine. Additionally, 28.12% had a positive family history of migraine. These findings highlight the substantial burden of migraine and related disability among auto-rickshaw drivers in Lahore, particularly during the summer months.

Table 4: Migraine Disability Assessment (MIDAS)

Disability Level (MIDAS)	Frequency (n)	Percentage (%)
Little or No Disability	7	21.9
Mild Disability	5	15.6
Moderate Disability	9	28.1
Severe Disability	11	34.4
Total	32	100.0

Discussion

This study assessed the prevalence of migraine and its associated disability among auto-rickshaw drivers in Lahore during the summer season, revealing a migraine prevalence rate of 18.9%. This figure aligns closely with global prevalence estimates, which range from 14% to 15% in the general population (7), and with regional studies reporting prevalence rates of 18% among Pakistani males (6). The findings underscore the significant burden of migraine within this occupational group, particularly considering their exposure to multiple environmental triggers such as heat, noise pollution, and physical stress—factors commonly identified as migraine precipitants (3,13).

The observed prevalence is consistent with studies conducted in other occupational settings. For example, research among Saudi residents reported a migraine prevalence of 26.3%, highlighting genetic predisposition and photophobia as common triggers (14,15). Similarly, Brazilian studies reported prevalence rates as high as 40.2% among specific populations, with stress identified as a predominant trigger (16). In the current study, stress and fatigue emerged as the most frequently reported triggers, reflecting the occupational demands faced by auto-rickshaw drivers, such as long working hours, poor ergonomics, and exposure to extreme environmental conditions. This finding is in line with previous studies where occupational stress significantly contributed to migraine prevalence (17,18).

Pain intensity, as measured by the Visual Analogue Scale (VAS), showed that 59.4% of migraineurs experienced severe pain, while 28.1% reported very severe pain. This distribution is comparable to findings from studies conducted in Iran and South Asia, where the majority of migraineurs reported pain intensities between 8–10 on the VAS (19). The severity of pain may be attributed to prolonged exposure to heat and environmental stressors, which are known to exacerbate migraine symptoms (20,21). The role of seasonal variation in migraine prevalence has also been documented, with studies indicating a higher incidence during warmer months due to increased serotonin levels and dehydration-related triggers (20).

Migraine-related disability, as assessed using the MIDAS questionnaire, indicated that 34.4% of participants experienced severe disability, significantly impairing their daily functioning. This aligns with global data suggesting that migraine is one of the leading causes of disability worldwide (2,12). The high rate of severe disability observed in this study is concerning, as it directly affects the productivity and quality of life of affected individuals, particularly in low-income, physically demanding occupations. The association between migraine and disability has been consistently reported in other studies, where severe disability was linked to both the frequency of attacks and the intensity of pain (22).

The study's strengths include its focus on a unique and underrepresented population—auto-rickshaw drivers—who are exposed to specific occupational risk factors that may not be prevalent in the general population. Additionally, the use of validated assessment tools such as the ID Migraine™, VAS, and MIDAS questionnaires enhances the reliability of the findings (10,11). However, certain limitations should be acknowledged. The cross-sectional design limits causal inferences regarding the relationship between occupational exposures and migraine prevalence. Moreover, the reliance on self-reported data may introduce recall bias, and the absence of neuroimaging or clinical confirmation may affect diagnostic accuracy. The study also excluded female participants, limiting the generalizability of the findings to the broader population.

Future research should consider longitudinal designs to explore causal relationships and include more diverse occupational groups and female participants to provide a comprehensive understanding of migraine epidemiology. Interventions aimed at mitigating occupational stress, improving ergonomic conditions, and promoting awareness about migraine management among auto-rickshaw drivers are recommended. Public health strategies should also focus on early detection and targeted interventions to reduce migraine-related disability, particularly in vulnerable populations exposed to high-risk environmental and occupational factors.

Conclusion

Migraine is a prevalent and disabling neurological condition among auto-rickshaw drivers in Lahore,

particularly during the summer months, with the majority of affected individuals experiencing severe pain and significant functional impairment. These findings highlight the urgent need for occupational health interventions, stress management programs, and public health strategies aimed at early detection and effective management of migraine to improve the quality of life and productivity in this vulnerable population

Authors' Contributions

ICMJE authorship criteria	Detailed contributions	Authors
Substantial Contributions	Conception or Design of the work	1,2,3
	Data acquisition	2,3
	Data analysis or interpretation	1,3
Drafting or Reviewing	Draft the work	1
	Review critically	2
Final approval	Final approval of the version to be published.	1,2,3
Accountable	Agreement to be accountable for all aspects of the work.	1,2,3

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