



Migraine-Related Disability, Work Productivity, and Daily Functioning Among Employed Adults: A Prospective Mixed-Methods Study

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Abstract

Background

Migraine is a common neurological disorder that can substantially affect occupational productivity, daily functioning, and health-related quality of life. This study assessed migraine-related disability and work productivity among employed adults and explored their coping strategies, workplace experiences, and perceived workplace accommodations.

Methodology

A prospective mixed-methods observational study was conducted among 150 employed adults aged 18-55 years with a clinical diagnosis of migraine according to the International Classification of Headache Disorders, 3rd Edition (ICHD-3). Migraine-related disability and work productivity were assessed at baseline and at the four-month follow-up using the Migraine Disability Assessment Scale (MIDAS) and Work Productivity and Activity Impairment Questionnaire (WPAI). Semi-structured interviews were conducted with 30 purposively selected participants to explore coping strategies and workplace experiences.

Results

Among 150 participants, most were women (68.0%), with a mean age of 34.8 ± 7.2 years. At four-month follow-up, migraine frequency, attack duration, pain severity, migraine-related disability, and work and daily activity impairment were reduced compared with baseline. Higher migraine burden was associated with greater productivity and activity impairment. Qualitative interviews with 30 participants identified coping strategies, trigger management, workplace accommodations, psychological impact, and social support as major themes.

Conclusion

Migraine was associated with substantial occupational and functional impairment among employed adults. Reductions in migraine frequency, attack duration, and pain severity over four months were accompanied by lower levels of severe disability and productivity-related impairment. The qualitative findings further highlighted the relevance of individualized coping strategies and supportive workplace accommodations in managing migraine-related challenges in the workplace.

Categories: Neurology, Medical Education, Medical Simulation

Keywords: daily functioning, midas, migraine, mixed-methods study, presenteeism, workplace accommodations, work productivity, wpai

Introduction

Migraine is a very common, clinically heterogeneous neurological condition, and a significant source of disability in young and middle-aged adults [1,2]. Migraine attacks are usually episodic and often involve moderate-to-severe headaches, light sensitivity (photophobia), and sound sensitivity (phonophobia). Abdominal migraine is characterized by episodic abdominal pain commonly in the periumbilical or midline region along with gastrointestinal symptoms like nausea and vomiting [3]. These manifestations can substantially affect daily functioning, emotional well-being, and occupational productivity [4]. The clinical significance of migraine may extend beyond symptomatic burden, as it has been associated with serious cerebrovascular conditions such as cervical artery dissection, which may have potentially severe neurological consequences [5].

The Global Burden of Disease study shows that migraine contributes significantly to the burden of years

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lived with disability, especially for people of economically productive age [1,6]. Beyond pain, migraine can substantially affect work performance, routine functioning, emotional well-being, and quality of life and can be accompanied by psychological distress and inflammatory changes [7]. Absenteeism and presenteeism are important aspects of lost productivity due to migraine, resulting in diminished productivity and work performance [8]. Absenteeism refers to time missed from work because of migraine, whereas presenteeism refers to reduced productivity or impaired functioning while remaining at work despite migraine symptoms. Both forms of productivity loss contribute to the occupational burden of migraine, with presenteeism potentially accounting for a substantial proportion of the overall productivity impact, as many people work during periods when they would benefit from taking a day off due to migraine symptoms [8,9]. Increased attack frequency, attack length, and severity of pain correlate with higher levels of concentration, work performance, and quality of life impairment [9].

Although previous research has established an association between migraine burden and impaired work performance and quality of life, the occupational impact of migraine is not fully captured by quantitative productivity measures alone. In particular, limited attention has been given to how productivity impairment is experienced in everyday working life and how coping strategies, workplace support, and accommodations may influence these experiences. The present mixed-methods study therefore combines standardized measures of migraine-related disability and work productivity with qualitative interviews to provide a more comprehensive assessment of migraine-related occupational and functional burden.

There are several standardized questionnaires available to measure migraine disability and loss of productivity, including the Migraine Disability Assessment Scale (MIDAS) and the Work Productivity and Activity Impairment Questionnaire (WPAI) [10,11]. These tools measure objectively how much migraine impacts work functioning and daily life. But a purely quantitative evaluation may not reflect an individual's experience of working with migraine. The burden of migraine may also be affected by factors like psychosocial distress, coping strategies, adaptation to migraine triggers, work ergonomics, and other work-specific factors.

This mixed-methods study aimed to quantitatively assess migraine-related disability and work productivity and qualitatively explore coping strategies and workplace accommodations among employed adults with migraine.

Materials And Methods

Study design and setting

This four-month prospective observational study was conducted from February 2026 to May 2026 using a mixed-methods approach to assess the impact of migraine on work productivity and daily functioning. The study was conducted in the neurology outpatient department of a tertiary care teaching hospital and in the associated employee wellness program. Eligible participants were identified and recruited by the study investigators/research team. The quantitative component assessed migraine-related disability and work productivity using standardized instruments, while the qualitative component explored participants' coping strategies, workplace experiences, and workplace accommodations. Ethical approval was obtained from the Ethics Committee of N.K.P. Salve Institute of Medical Sciences and Research Centre and Lata Mangeshkar Hospital (Ref. No.: NKPSIMS & RC and LMH/IEC/19/2026) on January 29, 2026. Written informed consent was obtained from all participants, and confidentiality of participant information was maintained.

Potential participants were screened as per the predefined inclusion and exclusion criteria and recruited consecutively from eligible adults attending the neurology outpatient departments of the participating tertiary-care teaching hospitals and associated employee wellness programs during the study period.

Selection Criteria

Adults aged 18-55 years with an established clinical diagnosis of migraine according to the International Classification of Headache Disorders, 3rd Edition (ICHD-3) [12], made by a treating neurologist/qualified physician, were eligible for inclusion. Participants were not required to be drug-naïve; both participants receiving migraine medications and those not receiving preventive medication at baseline were eligible for inclusion. Participants were required to be employed either full-time or part-time and to have experienced at least two migraine episodes per month during the three months preceding enrollment. Participants were required to consent to completion of the disability and productivity questionnaires and, if selected for the qualitative component, to participate in a semi-structured interview.

Individuals with secondary headache disorders, chronic neurological diseases other than migraine, severe psychiatric disorders that interfered with effective communication, pregnancy, a history of substance abuse within the preceding six months, or participation in a structured migraine intervention program during the previous six months were excluded.

Sample Size

For the quantitative component, the sample size was calculated a priori using a paired-mean difference approach for comparison of repeated measurements within the same participants. Work productivity and activity impairment were assessed using the WPAI questionnaire [11]. Assuming a two-sided significance level of 5%, 80% statistical power, and a conservative standardized within-participant effect size of 0.256, the required sample size was calculated using the following formula:

$$n = [(Z_{1-\alpha/2} + Z_{1-\beta})^2] / d^2$$

Where n is the required sample size, $Z_{1-\alpha/2} = 1.96$ for a two-sided α of 0.05, $Z_{1-\beta} = 0.84$ for 80% power, and $d = 0.256$ represents the assumed standardized within-participant effect size.

$$n = [(1.96 + 0.84)^2] / (0.256)^2$$

$$n = (2.80)^2 / 0.065536$$

$$n = 7.84 / 0.065536 = 119.63$$

Thus, the minimum required sample size was rounded to 120 participants. To account for potential incomplete responses, loss to follow-up, and participant withdrawal during the four-month follow-up period, the recruitment target was increased to 150 participants. For the qualitative component, 30 participants were purposively selected from the quantitative cohort for semi-structured interviews. Interview transcripts were reviewed iteratively during data collection, with codes and emerging themes examined after each set of interviews. After 30 interviews, no new codes emerged in the final (5) interviews, and the research team judged that thematic saturation had been reached.

Data sources and variables

Baseline demographic and clinical characteristics included age, sex, duration of migraine history, monthly migraine frequency, mean attack duration, and employment status. Preventive medication use at baseline and initiation, discontinuation, or modification of preventive or acute migraine treatment during the four-month follow-up were documented. Pain severity was assessed using the Visual Analog Scale (VAS). Migraine-related disability was assessed using the MIDAS questionnaire [10,13], while work productivity and activity impairment were assessed using the WPAI questionnaire [11]. Data were collected at baseline and again at four-month follow-up. All 150 enrolled participants completed the four-month follow-up, with no withdrawals or loss to follow-up. Complete outcome data were available at both assessment points, and no imputation for missing outcome data was required.

The primary outcome measures were absenteeism, presenteeism, overall work impairment, and daily activity impairment as assessed using WPAI measures. Secondary quantitative outcomes included MIDAS disability, monthly migraine frequency, attack duration, and pain severity. Qualitative outcomes included coping strategies, migraine triggers, workplace experiences, psychological impact, social support, and workplace accommodations.

For the qualitative component, 30 participants were purposively selected from the quantitative cohort based on predefined criteria intended to capture variation in migraine-related disability and work-related impairment. Selection also considered participants' willingness and availability to participate in a semi-structured interview. The purposive approach was intended to capture a range of workplace experiences and coping strategies rather than to provide a statistically representative subsample. Interviews were audio-recorded and transcribed verbatim. Identifying information was excluded from the transcripts, and the data were handled confidentially.

The flow of participants through the quantitative and qualitative components is presented in Figure 1.

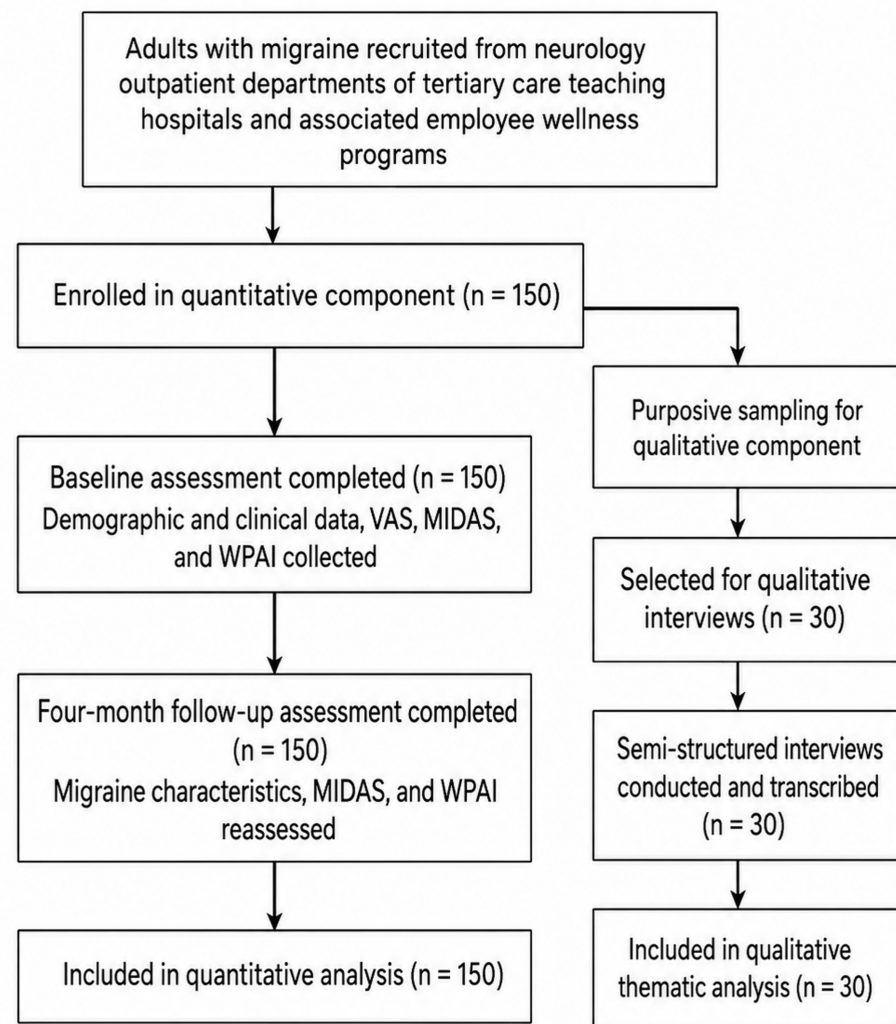


FIGURE 1: Participant flow diagram showing screening and eligibility assessment, enrollment into the quantitative component, baseline assessment, four-month follow-up, and purposive selection of participants for semi-structured qualitative interviews.

MIDAS: Migraine Disability Assessment Scale; WPAI: Work Productivity and Activity Impairment Questionnaire; VAS: Visual Analog Scale.

Statistical analysis

Quantitative data were analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY). Continuous variables were summarized as mean $\pm$ standard deviation (SD), while categorical variables were presented as frequencies and percentages. Baseline and four-month follow-up measurements of monthly migraine frequency, attack duration, and pain severity were compared using paired t-tests.

Pearson correlation analysis was performed using baseline measurements to assess unadjusted associations between migraine severity or disability measures and work productivity or activity impairment. Correlations were based on baseline values only and did not use change scores or pooled baseline and follow-up measurements. Because these were unadjusted analyses, potential confounding by demographic, clinical, or treatment-related factors was not accounted for. Because multiple correlations were examined, these analyses were considered exploratory, and the findings were interpreted cautiously with emphasis on the magnitude and precision of the correlation coefficients rather than statistical significance alone. A two-sided p-value <0.05 was considered statistically significant.

Qualitative interview data were analyzed using an inductive thematic-analysis approach. The interview transcripts were systematically reviewed to identify recurring patterns and themes related to coping strategies, migraine triggers, workplace experiences, psychological impact, social support, and workplace

accommodations and coded by the researcher, with an initial codebook developed from recurring concepts and iteratively refined during analysis. Related codes were grouped into categories and broader themes, with regular discussion among the research team to review interpretations and resolve discrepancies. The coded data were organized manually. The researchers maintained reflexive awareness of their clinical and research perspectives throughout the analytic process.

Quantitative and qualitative findings were integrated during interpretation by examining the qualitative themes alongside the corresponding quantitative findings. Areas of convergence and complementarity were identified, with qualitative findings used to provide contextual explanations for the observed patterns in work productivity, daily functioning, and migraine-related burden. For example, quantitative evidence of work and activity impairment was considered alongside participants’ reported experiences of coping with migraine, workplace accommodations, psychological impact, and social support. This integration was used to develop an overall interpretation of the occupational and functional burden of migraine (Table 1).

Quantitative finding	Related qualitative theme	Integrated interpretation
Work productivity impairment	Workplace accommodations	Participants described flexible schedules, reduced screen exposure, and quiet areas as strategies for managing migraine during work.
Daily activity impairment	Coping strategies	Rest, hydration, meditation, and early medication use were commonly reported approaches to managing symptoms.
Migraine burden and productivity impairment were positively correlated	Psychological impact/social support	Participants described stress, fear of workplace judgment, and the perceived benefit of supportive colleagues and supervisors.

TABLE 1: Joint display integrating quantitative findings with qualitative themes.

Results

A total of 150 employed adults with migraine were included in the quantitative component of the study, and 30 participants were purposively selected from this cohort for qualitative interviews. All enrolled participants completed the four-month follow-up. There were no withdrawals or losses to follow-up, and no participants were excluded from the final quantitative analysis because of missing outcome data. The mean age of the participants was 34.8 ± 7.2 years, with 102 (68.0%) females and 48 (32.0%) males. The mean duration of migraine history was 6.4 ± 3.1 years. Participants reported a mean of 5.2 ± 2.4 migraine attacks per month, with a mean attack duration of 10.6 ± 4.3 hours and a mean baseline VAS pain score of 7.8 ± 1.4. Preventive medication was used by 64 (42.6%) participants, while 112 (74.6%) were employed full-time (Table 2).

Variable	Mean $\pm$ SD/n (%)
Age (years)	34.8 $\pm$ 7.2
Female	102 (68%)
Male	48 (32%)
Duration of migraine (years)	6.4 $\pm$ 3.1
Monthly migraine episodes	5.2 $\pm$ 2.4
Mean attack duration (hours)	10.6 $\pm$ 4.3
VAS pain score	7.8 $\pm$ 1.4
Preventive medication use	64 (42.6%)
Full-time employed	112 (74.6%)

TABLE 2: Baseline demographic and clinical characteristics of the participants (n = 150).

Data are presented as mean $\pm$ standard deviation (SD) for continuous variables and frequency with percentage, n (%), for categorical variables. No inferential statistical tests were performed for this descriptive table.

VAS: Visual Analog Scale; SD: standard deviation.

At four-month follow-up, a reduction in mean monthly migraine frequency was observed from 5.2 $\pm$ 2.4 to 3.8 $\pm$ 2.0 attacks, representing a statistically significant reduction (paired t-test, $p < 0.001$). Mean attack duration decreased from 10.6 $\pm$ 4.3 to 8.7 $\pm$ 3.5 hours ($p = 0.003$), while mean VAS pain score decreased from 7.8 $\pm$ 1.4 to 6.4 $\pm$ 1.1 ($p < 0.001$). These findings are presented in Table 3. These findings represent observed temporal changes over the follow-up period and should not be interpreted as treatment effects.

Parameter	Baseline	Four-month follow-up	p-value
Monthly migraine attacks	5.2 $\pm$ 2.4	3.8 $\pm$ 2.0	<0.001
Mean attack duration (hours)	10.6 $\pm$ 4.3	8.7 $\pm$ 3.5	0.003
VAS pain score	7.8 $\pm$ 1.4	6.4 $\pm$ 1.1	<0.001

TABLE 3: Change in migraine characteristics between baseline and four-month follow-up.

Data are presented as mean $\pm$ standard deviation (SD). Baseline and four-month follow-up values were compared using the paired t-test. A two-sided p-value < 0.05 was considered statistically significant.

VAS: Visual Analog Scale; SD: standard deviation.

Changes in migraine-related disability and work productivity are summarized below (Table 4). The proportion of participants classified as having severe migraine-related disability (MIDAS grade IV) decreased from 68 (45.3%) at baseline to 20 (13.3%) at four-month follow-up, corresponding to a reported improvement of 70.5%.

Outcome measure	Baseline	Four-month follow-up	Improvement (%)
MIDAS grade IV (severe disability)	68 (45.3%)	20 (13.3%)	70.5%
Absenteeism	18.4%	9.8%	46.7%
Presenteeism	42.6%	26.1%	38.7%
Overall work impairment	52.3%	32.4%	38.1%
Daily activity impairment	58.7%	35.6%	39.4%

TABLE 4: Migraine disability and work productivity outcomes.

Data are presented as n (%) for MIDAS grade IV (severe disability) and as percentages for WPAI outcomes.

MIDAS: Migraine Disability Assessment Scale; WPAI: Work Productivity and Activity Impairment Questionnaire.

The reported mean absenteeism decreased from 18.4% at baseline to 9.8% at four months, while presenteeism decreased from 42.6% to 26.1%. Overall work impairment decreased from 52.3% to 32.4%, and daily activity impairment decreased from 58.7% to 35.6%. The corresponding percentage improvements were 46.7%, 38.7%, 38.1%, and 39.4%, respectively.

At baseline, exploratory Pearson correlation analysis demonstrated significant positive unadjusted associations between migraine severity or disability measures and productivity-related impairment. VAS pain score was positively correlated with overall work impairment ($r = 0.62$, 95% CI: 0.51-0.71, $df = 148$, $p < 0.001$), monthly migraine attack frequency was positively correlated with absenteeism ($r = 0.57$, 95% CI: 0.45-0.67, $df = 148$, $p < 0.001$), and MIDAS score was positively correlated with daily activity impairment ($r = 0.71$, 95% CI: 0.62-0.78, $df = 148$, $p < 0.001$) (Table 5).

Variables correlated	r	95% CI for r	df	p-value
VAS pain score vs. overall work impairment	0.62	0.51–0.71	148	<0.001
Monthly attack frequency vs. absenteeism	0.57	0.45–0.67	148	<0.001
MIDAS score vs. daily activity impairment	0.71	0.62–0.78	148	<0.001

TABLE 5: Correlation between migraine severity and productivity impairment.

Pearson correlation analysis was used to assess the relationships between migraine severity or disability measures and productivity impairment outcomes. Data are presented as Pearson correlation coefficient (r), 95% confidence interval (CI), degrees of freedom (df), and p -value. A two-sided p -value < 0.05 was considered statistically significant.

VAS: Visual Analog Scale; MIDAS: Migraine Disability Assessment Scale; r : Pearson correlation coefficient; CI: confidence interval; df : degrees of freedom.

The qualitative component included 30 participants purposively selected from the quantitative cohort. Their demographic, occupational, migraine-related, and work-related characteristics are summarized (Table 6).

Characteristic	Category	n (%) / Mean $\pm$ SD
Age (years)	Mean $\pm$ SD	35.2 $\pm$ 7.1
Sex	Female	20 (66.7%)
	Male	10 (33.3%)
Occupation	Healthcare professionals	8 (26.7%)
	Teachers/academicians	6 (20.0%)
	Administrative/office employees	9 (30.0%)
	Other occupations	7 (23.3%)
Work arrangement	Full-time	24 (80.0%)
	Part-time	6 (20.0%)
Primary work setting	On-site	20 (66.7%)
	Hybrid/remote	10 (33.3%)
Duration of migraine (years)	Mean $\pm$ SD	6.7 $\pm$ 3.2
Monthly migraine frequency	Mean $\pm$ SD, attacks/month	5.4 $\pm$ 2.3
MIDAS score	Mean $\pm$ SD	24.6 $\pm$ 12.1
MIDAS disability grade	Grade I	3 (10.0%)
	Grade II	6 (20.0%)
	Grade III	9 (30.0%)
	Grade IV	12 (40.0%)
Preventive medication at baseline	Yes	13 (43.3%)
	No	17 (56.7%)
Overall work impairment (WPAI)	Mean $\pm$ SD	50.2 $\pm$ 18.4

TABLE 6: Characteristics of the participants included in the qualitative component (n = 30).

MIDAS: Migraine Disability Assessment Scale; WPAI: Work Productivity and Activity Impairment Questionnaire; SD: standard deviation.

The qualitative analysis of interviews with 30 participants identified five major themes: coping strategies, trigger management, workplace accommodations, psychological impact, and social support (Table 7).

Theme	Representative findings
Coping strategies	Resting in dark rooms, hydration, meditation, and early medication use
Trigger management	Avoidance of bright light, strong odors, and skipped meals
Workplace accommodations	Flexible schedules, reduced screen exposure, and quiet resting areas
Psychological impact	Fear of workplace judgement, stress, and anxiety during attacks
Social support	Supportive colleagues improved coping experiences

TABLE 7: Qualitative themes identified from semi-structured interviews (n = 30).

Themes were identified using thematic analysis of semi-structured interview transcripts.

The themes reflected participants' experiences of managing migraine symptoms while maintaining work responsibilities and navigating workplace expectations. Some representative anonymized quotations are presented below to illustrate the range of experiences within each theme. Participant identifiers were reported using non-identifying codes (e.g., P01 and P02) to maintain confidentiality.

Coping strategies

Participants described several approaches to managing migraine during work, including hydration, resting in low-light environments, meditation, and early medication use. One participant explained, "When the pain starts at work, I usually stop for a few minutes, drink some water, and sit somewhere quiet. If I take my medication early, I can often continue working." (P07).

Trigger management

Participants reported avoiding perceived triggers such as bright light, strong odors, and skipped meals. As one participant noted, "If I skip breakfast or delay my meals, I almost always notice that my headache becomes worse." (P21).

Workplace accommodations

Flexible schedules, reduced screen exposure, and access to quiet spaces were described as helpful accommodations. One participant stated, "Having some flexibility in my working hours makes a big difference. If I can start a little later after a bad attack, I can still complete my work." (P11).

Psychological impact

Participants also described anxiety, stress, and concerns about workplace judgment. One participant reported, "I worry that my colleagues will think I am making excuses when I need to take a break." (P09).

Social support

Supportive colleagues and supervisors were perceived as facilitating continued participation at work. One participant explained, "My colleagues know about my migraine now, and when they see that I am struggling, they help me with urgent tasks." (P05).

Discussion

This mixed-methods study evaluated the impact of migraine on work productivity and daily functioning using standardized measures of migraine-related disability and productivity, together with qualitative exploration of coping strategies and workplace experiences. The findings demonstrate a substantial occupational and functional burden among employed adults with migraine. At four-month follow-up, significant reductions were observed in monthly migraine frequency, attack duration, and pain severity. Reductions were also observed in severe migraine-related disability and in measures of absenteeism, presenteeism, overall work impairment, and daily activity impairment. The qualitative findings provided additional context by highlighting commonly used coping strategies and workplace accommodations that participants perceived as helpful in managing migraine while maintaining work participation.

The demographic characteristics of the study population were broadly consistent with the established epidemiology of migraine, with a predominance of women and representation of individuals in the working-age population [1-4]. The mean age of the participants was 34.8 ± 7.2 years, and women constituted 68.0% of the study population. This is relevant because migraine frequently affects individuals during their economically productive years and may consequently have substantial effects on occupational functioning and social participation [1,7]. Previous literature has demonstrated that migraine is associated with considerable disability and productivity loss, particularly through absenteeism and presenteeism [8,9]. The present findings are consistent with this broader evidence, as participants demonstrated measurable impairment in work productivity and daily activities.

A significant reduction was observed in monthly migraine frequency, which decreased from 5.2 ± 2.4 attacks at baseline to 3.8 ± 2.0 attacks at four months ($p < 0.001$). Mean attack duration also decreased significantly from 10.6 ± 4.3 to 8.7 ± 3.5 hours ($p = 0.003$), while VAS pain scores decreased from 7.8 ± 1.4 to 6.4 ± 1.1 ($p < 0.001$). These changes were accompanied by a reduction in the proportion of participants with severe MIDAS disability, from 45.3% at baseline to 13.3% at four months. The observed reduction in migraine burden alongside improvement in disability is consistent with previous literature linking migraine severity and disability with functional outcomes [14]. However, given the observational design and absence of a control group, these temporal changes should not be interpreted as evidence that a specific treatment or intervention caused the observed improvements. Natural variability in migraine burden, regression to the mean, treatment adherence, and behavioral or contextual factors may also have contributed to these changes.

The WPAI findings further demonstrated reductions in absenteeism, presenteeism, overall work

impairment, and daily activity impairment over the four-month period. Absenteeism decreased from 18.4% to 9.8%, while presenteeism decreased from 42.6% to 26.1%. Overall work impairment decreased from 52.3% to 32.4%, and daily activity impairment decreased from 58.7% to 35.6%. These findings are clinically relevant because migraine-related productivity loss may occur not only through absence from work but also through reduced functioning while remaining at work. Previous occupational studies have similarly emphasized the contribution of presenteeism to productivity loss among individuals with migraine [8,15]. In the present study, the magnitude of the observed reductions suggests that changes in migraine burden may be accompanied by improvements in occupational and daily functioning; however, the current analysis does not establish a causal relationship.

The baseline exploratory correlation analysis further demonstrated positive unadjusted associations between migraine severity or disability and productivity impairment. These findings indicate that participants with greater migraine severity or disability also tended to report greater occupational and functional impairment. Although the observed associations were statistically significant, multiple comparisons may increase the possibility of type I error. Accordingly, these findings should be interpreted as exploratory associations, with greater emphasis placed on the magnitude and confidence intervals of the correlations rather than statistical significance alone.

VAS pain score was positively correlated with overall work impairment ($r = 0.62$, $p < 0.001$), monthly migraine frequency was positively correlated with absenteeism ($r = 0.57$, $p < 0.001$), and MIDAS score showed a strong positive correlation with daily activity impairment ($r = 0.71$, $p < 0.001$). These findings are consistent with previous evidence indicating that greater migraine burden is associated with greater occupational and functional impairment [9]. However, these correlations were based on baseline measurements and were not adjusted for potential confounding factors, including demographic characteristics, clinical factors, or treatment exposure. Therefore, they should be interpreted as descriptive associations rather than evidence of an independent relationship or causality.

The qualitative component complemented the quantitative findings by providing insight into how participants managed migraine in the workplace. Commonly reported coping strategies included resting in dark or low-light environments, maintaining hydration, meditation, early medication use, and avoidance of individual migraine triggers. These findings are broadly consistent with previous literature describing non-pharmacological and behavioral approaches to migraine self-management [16].

The observations regarding workplace accommodations should be interpreted as participants' perceived experiences rather than evidence of effectiveness. Although participants described flexible schedules, reduced screen exposure, and access to quiet areas as helpful, the study did not evaluate these accommodations using a causal or comparative design [17,18]. The qualitative findings also identified psychological and social dimensions of migraine in the workplace. Participants described stress, fear of workplace judgment, and anxiety during migraine attacks, while supportive colleagues and supervisors were perceived as helpful in coping with symptoms. Previous literature has similarly highlighted the psychosocial burden associated with migraine and the importance of workplace understanding and support [17]. These findings suggest that the occupational impact of migraine extends beyond measurable productivity loss and includes the individual's experience of managing symptoms, maintaining work responsibilities, and negotiating workplace expectations.

Overall, the quantitative and qualitative findings provide complementary perspectives on migraine-related occupational burden. The quantitative results demonstrate measurable impairment in disability, productivity, and daily activity, while the qualitative findings illustrate the coping mechanisms and workplace factors that shape participants' experiences. Together, these findings support the importance of considering both clinical symptom burden and workplace context when assessing the functional impact of migraine.

Strengths and limitations

This study has several strengths. Its mixed-methods design allowed quantitative assessment of migraine-related disability and productivity using standardized instruments while also capturing participants' experiences through qualitative interviews. The use of standardized self-report MIDAS and WPAI instruments provided structured measures of disability and work-related impairment, while the four-month follow-up permitted assessment of temporal changes in migraine characteristics and functional outcomes. The qualitative component further provided contextual information regarding coping strategies, workplace challenges, psychological experiences, and perceived workplace accommodations.

Several limitations should also be considered. The observational design and absence of a control group limit the ability to attribute the observed changes over four months to any specific intervention or factor. The study setting may also limit the generalizability of the findings to other populations and workplace environments. Many of the clinical and productivity measures were self-reported and may therefore be subject to recall or reporting bias. Workplace accommodations were not standardized across participants, which may have contributed to variability in productivity-related outcomes. The relatively short four-month follow-up also limits conclusions regarding the persistence of changes over the longer term. Finally, the

qualitative component included 30 purposively selected participants, and their experiences may not represent those of all employed individuals with migraine.

Conclusions

Among employed adults recruited from neurology outpatient departments and associated employee wellness programs, migraine was associated with substantial impairment in work productivity and daily functioning. Over the four-month follow-up, reductions were observed in migraine frequency, attack duration, pain severity, severe migraine-related disability, and productivity-related impairment. The qualitative findings further highlighted the importance of individualized coping strategies and supportive workplace accommodations in helping participants manage migraine while maintaining work participation. An integrated approach that combines appropriate clinical management with workplace support may help address the occupational and functional burden associated with migraine. Given the clinical and workplace-based recruitment, these findings may not be generalizable to all individuals with migraine.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. N.K.P. Salve Institute of Medical Sciences and Research Centre and Lata Mangeshkar Hospital issued approval NKPSIMS & RC and LMH/IEC/19/2026. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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