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ORIGINAL ARTICLES

Coping with migraine: an exploratory study to understand and to relieve migraine in a sample of Egyptian middle-aged working women

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ABSTRACT

Background: Migraine is a painful disabling work-related condition. However, managing migraine at work can be challenging. Objectives: To investigate the prevalence and triggers of migraine among a sample of middle-aged employed women and to assess the impact of a tailored migraine coping program. Methods: Participants of the cross-sectional phase were 135 and 140 mid-aged employed women and housewives. A structured questionnaire was used to determine the prevalence of migraine and migraine triggering and alleviating factors. Pre and post intervention questionnaires were used to study the impact of a tailored migraine coping program on employed migraine sufferers (n=53). Results: Migraine was significantly prevalent among employed women (47.4%) compared to housewives (35.0%). Prolonged sitting in front of computer screens, job stress and long working hours were the commonest work-related triggers, along with other general triggers such as sensory and physical stimuli, lifestyle and hormonal changes. Medications (100%) and sleeping (93.8%) were the commonest pain reliving methods. After applying the migraine coping program, significant improvement in the studied migraine coping measures was detected, with no changes in job performance. Conclusion: Migraine is prevalent in this sample of working mid-aged women. The designed migraine coping program had a positive effect on pain severity, attacks' frequency and duration, disability score, and the effectiveness of different treatments. These findings are impetus for further research on employed women at different occupations that should evaluate the effects of this migraine coping program and other management strategies in randomized controlled trials.

Key words: Work; Migraine headache; Migraine coping; Migraine management; Mid-aged women.

Introduction

Migraine is a common debilitating disease worldwide with significant morbidity and economic impact (Stovner and Hagen, 2006; Hawkins *et al.* 2007*)*. It is a painful disabling condition that is three times more prevalent amongst women, especially between ages 25 and 55 years which equates to their peak working years (Stovner and Hagen, 2006; Samaan *et al.* 2010*)*. Therefore, its impact on the labour force is likely to increase during the upcoming years as increasing numbers of women are entering the workforce (Burton *et al.* 2009).

Migraine headaches can be triggered by a wide variety of internal and external stimuli. Evidence suggests that migraine may be influenced by hormones; particularly estrogen levels, as well as having genetic links (Lipton *et al.* 2001; Schmitz *et al.* 2008). Because a considerable number of migraine sufferers are working, and some of migraine triggers occur in workplaces, migraine can be considered as a work-related condition (Von Korff *et al.* 1998).

Migraine is characterized by recurrent episodes of severe headache that may be associated with symptoms (aura/prodrome) (Breslau and Rasmussen, 2001). The attacks are initially episodic with increasing frequency of headaches over months or years in some patients, leading to chronic migraine, in which headaches occur at least 15 days per month (Bigal and Lipton, 2006). However, most migraineurs do not seek medical care (Talaat *et al*. 2004; Lucas *et al*. 2006).

Migraine has serious deleterious effects on patients' quality of life even when they are not experiencing an attack, for example affecting the educational and employment choices. Moreover, employed migraineurs often miss work (absenteeism) or have reduced productivity at work (presenteeism) (Von Korff *et al.* 1998; Burton *et al.* 2009; Friedman and Dye, 2009).

It is estimated that trigger factors are implicated in about 40% of patients' attacks. Consequently, trigger-management strategies, relaxation training, thermal biofeedback, and cognitive-behavioral stress management

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can be very powerful tools in managing migraine (Rains *et al.* 2005; Migraine Association of Ireland, 2011). However, migraines continue to occur in some people, even after serious attempts of identifying and avoiding triggers and lifestyle changes (Holroyd *et al*. 2010). Thus, managing migraine can be challenging, needing a combination of medical treatments as well as changes in patients' behavior (Adelman and Adelman, 2001; Migraine Association of Ireland, 2011). This combination can help in avoiding "rebound" or "medication-overuse headaches" as well as medications adverse effects (Aukerman *et al*. 2002). However, until now there is lack of research evaluating the effect of some migraine management interventions on workers' productivity (Burton *et al.* 2009). Consequently, this study aims to; (i) estimate the one-year prevalence of migraine among a sample of middle-aged female Egyptian employees, compared with a sample of middle-aged housewives, (ii) determine the commonest migraine triggering factors particularly those related to work, and (iii) assess the impact of a brief migraine coping program upon pain severity, frequency and duration of the attacks, effectiveness of treatments, disability caused by migraine, and job performance.

Materials and Methods

Study design and setting:

The study was conducted during the period from February to November 2012 in Sharqia Governorate branch of the Telecom Egypt Company in Zagazig City. A cross-sectional survey and a before and after intervention study were carried out. Proposal acceptance was obtained from the Research Ethics Committee (REC) in Zagazig Faculty of Medicine. Moreover, informed consent was taken from all participants during interviews, where confidentiality was assured.

Study population:

The total number of middle-aged female telecommunication employees, aged 40–60 years at the time of study was 172; 27 were excluded from the main study (exclusion criteria): participation in pilot study; pregnancy; past history of head/neck trauma, sinusitis, deviated septum, and nasal allergy; headache of secondary neurological or systemic disorders; and mixed headaches as tension-chronic daily-cluster headache. Thus, 145 women were invited to participate in the cross-sectional phase of the study and 135 agreed to participate. A control group of 140 housewives attending the Gynecology and Obstetrics' outpatient clinic in Zagazig University Hospitals was recruited in the study. Both groups were comparable regarding age, residence, marital status, parity, educational level, methods of contraception, hormonal therapy, and family history of migraine. Moreover, the same exclusion criteria were applied for the control group. The before and after intervention study was conducted with employed women who were identified as migraine sufferers.

Data collection and measures:

I) Survey questionnaire: This consisted of four main domains. The first domain included socio-demographic and occupational data along with relevant medical and family history. The second included the International Headache Society (IHS) diagnostic criteria for migraine without aura (MO) and migraine with aura (MA) (Headache Classification Committee of the IHS, 1988). The third domain included a list of common migraine triggers whether general or work-related (Friedman and Dye, 2009; Migraine Association of Ireland, 2011; Zomig, 2012). The fourth domain included a list of common migraine relieving factors (Migraine Association of Ireland, 2011). Respondents of the cross-sectional phase of the study [employed women (n=135) and housewives (n = 140)] were recruited, consented and interviewed by the investigators and asked to complete the first two sections of the questionnaire. Migraine sufferers of employed women according to the IHS diagnostic criteria and the neurological assessment (n=64) were then asked to complete sections 3 and 4 of the questionnaire. This step took part in a 30 minutes interview per participant using a semi-structured interview schedule in a scheduled room at the site of work of the employees to ensure privacy.

II) Before and after intervention study: Respondents among employed migraine sufferers who agreed to participate in this phase (n=53) were interviewed and asked to complete a structured pre-test questionnaire that included four main domains (Zomig, 2012). The first domain assessed migraine headache pain intensity, frequency, and duration throughout the past three months. Pain intensity of migraines was scored using 1-5 pain severity scale (discomfort=1 and very severe=5). The second assessed the amount of pain relief medications and the effectiveness of medications as well as non-medical treatments using the effectiveness scale 1-5 (not effective=1 and most effective=5). The third domain is the migraine disability assessment test. It is a five-item questionnaire developed to quantify headache-related disability in a 3-month period (Stewart *et al*. 2001; Gedikoglu *et al*. 2005). The fourth domain measured respondents' overall job performance throughout the past

three months using a scale from 0 to 10 (0=the worst job performance anyone could have at job and 10=the top performance) (WHO, 2002).

Migraine coping program:

A specifically designed, structured, manually guided, behavioral migraine management program, that maximizes clinical relevance and employees' compliance, was developed, with elements based on previous work and translated into Arabic (Rains *et al.* 2005; Holroyd *et al*. 2010; Maurer, 2010; Migraine Association of Ireland, 2011). The aim of this program was to equip employed migraineurs with the tools needed to reduce the impact of migraine on their work as well as on their lives in general. It was implemented by teaching and training migraineurs about several migraine management skills, particularly self-help approaches. This was done in two sessions:

The first session was conducted as a power point presentation for one hour and an open discussion was allowed for half an hour. It provided an overview of the pathophysiology, types, early warning signs, and important triggering factors of migraine. A migraine tracking diary was distributed to all participants at the end of the session (Zomig, 2012).

Month 1 homework assignments focused on identifying triggers and early warning signs of migraine through monitoring their headaches.

The second session was conducted as power point presentation and video demonstration for two hours (Savoia, 2007; Cure 4migraine, 2009). It focused on the development of strategies for managing migraine using a combination of medical treatments (pain relief medications that were used by the participants before this study) and self-help techniques that included: avoiding triggers, preparedness, some stress management and relaxation training techniques (rhythmic, deep, and visualized breathing, progressive muscle relaxation, music relaxation, and mental imagery relaxation), and using early warning signs as a cue to use these self-help approaches for reducing the frequency and severity of anticipated attacks. Open discussion for one hour was allowed then important tips about coping with migraine at work were distributed to all participants in the form of printed colored booklets.

Month 2 homework assignments focused on the integration of self-help techniques in managing migraine into the participants' daily routine.

Post-test questionnaire:

Three months later, participants of the before and after intervention study were interviewed and were asked to complete the post-test questionnaire that was the same as the pre-test one. A pilot study was conducted on 6 employed women, who were excluded from the main study, to test the measures and then modifications were carried out to improve clarity and convenience.

Data management:

Data was coded and statistically analyzed using SPSS version 19 (IBM, 2010). Comparison between group means was done using *Student's t* test; comparison between categorical variables was done by $\chi 2$ test and Paired *t* test was used for paired quantitative data. A p-value < 0.05 was considered statistically significant.

Results:

Characteristics of the participants:

One hundred and thirty five employed women agreed to participate in the cross-sectional phase of the study out of 145 women who met the inclusion criteria, with a response rate of 93.1%. Respondents had an age range of 40-59 years with a mean of (44.9 ± 5.1 years). The majority of them were married (85.2%), live in urban areas (68.9%), and were not involved in sift work (77.8%). The majority of married, divorced and widowed women had ≤ 3 children (76.3%). Those used intrauterine contraceptive device were 40 women out of 61 women (65.6%).Those with school education constituted 66 women (48.9%) and those graduated from college/technical institutes constituted 69 women (51.1%). Those with positive family history of migraine constituted 29 employed women (21.5%). There were 76 (56.3%) technicians and 59 (43.7%) non-technical administrators. The average length of service was (16.6 ± 9.8 years) (range 9-35). All respondents reported working for 40 hours per week. None of the participants of both groups reported taking hormonal therapy (Table 1).

Prevalence of migraine:

Diagnosis of migraine among participants of the cross-sectional phase based on the International Headache Society (IHS) diagnostic criteria for migraine and clinical assessment demonstrated that (47.4%) of employed women had migraine compared to (35.0%) of housewives with a statistically significant difference ($P < 0.05$), among them (25.2% of employed women and 21.4% of housewives) had migraine without aura and (22.2% of employed women and 13.6% of housewives) had migraine with aura (Figure 1).

Table 1: Characteristics of participants of the cross-sectional phase of the study.

The studied variables	*Employed women (N = 135)*	*Housewives (N = 140)*	*Test of significance (P-value)*
	N (%)	*N (%)*	
Age (years) ($\overline{X} \pm SD$)	(44.9 ± 5.1) *Range* (40 – 59)	(43.9 ± 4.9) *Range* (40 – 58)	t-test (1.7) P-value (0.09)
Residence Urban Rural	 93 (68.9%) 42 (31.1%)	 95 (67.9%) 45 (32.1%)	χ^2 (0.03) P-value (0.85)
Marital status Single Married Divorced/widowed	 4 (2.9%) 115 (85.2%) 16 (11.9%)	 6 (4.3%) 117 (83.6%) 17 (12.1%)	χ^2 (0.36) P-value (0.84)
Parity * 0 ≤ 3 > 3	 9 (6.9%) 100 (76.3%) 22 (16.8%)	 10 (7.5%) 108 (80.6%) 16 (11.9%)	χ^2 (1.27) P-value (0.53)
Methods of contraception ** Intrauterine device Hormonal	 40 (65.6%) 21 (34.4%)	 47 (70.1%) 20 (29.9%)	χ^2 (0.31) P-value (0.58)
Education School College/technical diploma	 66 (48.9%) 69 (51.1%)	 72 (51.4%) 68 (48.6%)	χ^2 (0.18) P-value (0.67)
Family history of migraine Positive Negative	 29 (21.5%) 106 (78.5%)	 31 (22.1%) 109 (77.9%)	χ^2 (0.02) P-value (0.89)

* Married, divorced and widowed employed women (n = 131) and housewives (n = 134).
** Employed women using contraceptive methods (n = 61) and housewives (n = 67).

Migraine triggering and relieving factors:

Employed migraineurs (n = 64) were asked to indicate common migraine triggering factors; sensory stimuli (81.3%), lifestyle changes (81.3%), physical stimuli (75.0%), and hormonal changes (59.4%) were the commonest general triggers. Others (e.g. weather/seasonal changes, high attitude, and dehydration) (21.9%) and eating certain food (9.4%) were less common general triggers. Prolonged sitting in front of computer screens (68.8%), job stress (59.4%), long working hours (53.1%) were the commonest work-related triggers. Rotating/bending head or neck (31.3%), sustained poor posture (18.8%), and irregular job schedule (18.8%) were less common work-related triggers (Table 2). Medications (100.0%), sleeping (93.8%), and resting in a dark quiet room (40.6%) were the major migraine relieving methods; while eating (15.6%), drinking coffee (15.6%), and improving posture (9.4%) were less common relieving methods. Muscle massage and cold packs were not reported as pain relieving techniques (Figure 2).

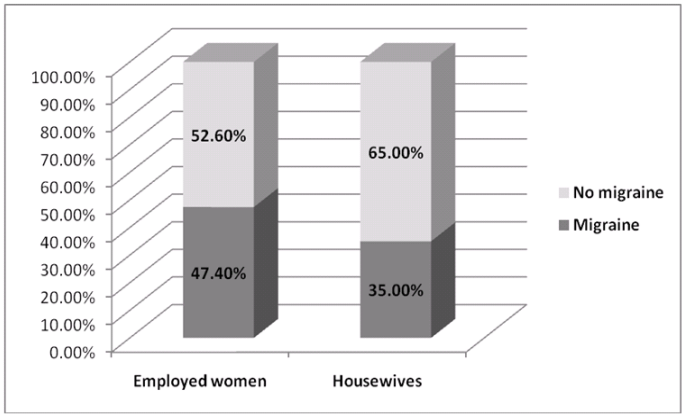

Fig. 1: Prevalence of migraine among participants of the cross-sectional phase.

Table 2: Frequency distribution of employed migraine sufferers according to triggering factors.

Triggering factors	*Employed migraineurs (N = 64)*
	N (%)
General	
Sensory stimuli	52 (81.3%)
Lifestyle changes	52 (81.3%)
Physical stimuli	48 (75.0%)
Hormonal	38 (59.4%)
Others	14 (21.9%)
Certain food	6 (9.4%)
Work-related	
Prolonged sitting in front of computer screens	44 (68.8%)
Job stress	38 (59.4%)
Long working hours	34 (53.1%)
Rotating/bending head or neck	20 (31.3%)
Sustained poor posture	12 (18.8%)
Irregular job schedule	12 (18.8%)

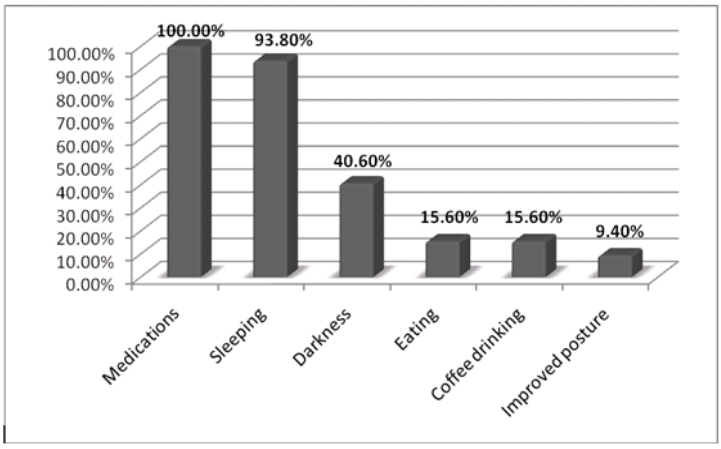

Fig. 2: Relieving methods as reported by employed migraine sufferers.

Assessment of migraine coping program:

Among employed migraineurs (n = 64), 53 women agreed to participate in the before and after intervention study with a response rate of 82.8%. Significant reduction in migraine attacks frequency and duration, pain intensity, amount of pain relief medications, and migraine disability scores was evident after implementing the program. Significant improvement regarding the effectiveness of the migraine medications as well as non-medical treatments was also found. However, there was no detected significant improvement in the job performance score after application of the program (Table 3).

Table 3. Impact of migraine coping program comparing pre and three month follow up measures.

Migraine coping measures	*Participants of the before and after study (N = 53)*		*Paired t-test*	*P- value*
	Before $\overline{X} \pm SD$	*After* $\overline{X} \pm SD$		
Average number of migraine attacks/month	5.02 ± 1.3	4.8 ± 1.2	3.2	0.002
Average duration of the attacks (hours)	5.7 ± 1.1	5.1 ± 1.2	6.2	0.000
Pain severity score	4.1 ± 0.7	3.6 ± 0.7	5.7	0.000
Average number of pills/month	5.7 ± 1.6	4.8 ± 1.3	5.6	0.000
Effectiveness score of medications	3.9 ± 0.8	4.3 ± 0.5	- 4.6	0.000
Effectiveness score of non-medical treatments	3.1 ± 0.8	3.3 ± 0.7	- 4.2	0.000
Migraine disability score	23.3 ± 5.9	21.6 ± 6.2	7.3	0.000
Job performance score	8.3 ± 1.1	8.4 ± 0.9	- 1.9	0.058

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Discussion:

The present study is novel, in that assessed the prevalence of migraine among a working female population in a developing country. In the present study, the overall one-year prevalence of migraine among employed women (47.4%) was significantly higher than that among housewives (35.0%). Estimates of one-year prevalence of migraine among women reported by several studies ranged from (3.3% to 32.6%) (Lipton and Bigal, 2005). In one Egyptian study, the prevalence of migraine among secondary school students was (34.2%) (El-Tallawy *et al*. 2006). While, it has been reported that almost 15% of any workforce could be migraineurs (Migraine Association of Ireland, 2011). In a Turkish study, the prevalence of migraine among working women in the reproductive age was (12.6%) compared to (16.2%) among housewives with no significant difference (Boru *et al*. 2005). The discrepancy regarding the estimates of migraine prevalence among studies may be attributed to the differences in the methodology including, case definition, age distribution, race, and genetic characteristics of the study sample along with socio-cultural differences and working status and conditions (Breslau and Rasmussen, 2001; Lipton and Bigal, 2005).

The findings of the current study support those of other studies (El-Tallawy *et al*. 2006; Bigal *et al*. 2006) in that migraine without aura was more frequently reported than migraine with typical aura by the studied sample of Egyptian middle-aged women.

Until recently, there has been much debate about migraine triggering factors, as convincing data have been lacking for most of these factors. However, attention to trigger factors plays a prominent role in the management and prevention of migraine (Breslau and Rasmussen, 2001; Haque *et al*. 2012). In the present study, the commonest general triggering factors reported by employed migraineurs were sensory stimuli, including bright/flickering light, sunlight, noise, and odors. This finding was not surprising as sensory stimuli are transmitted directly to the central nervous system (CNS) by the senses; and cause direct excitation of the neural pathways (El-Tallawy *et al*. 2006). Moreover, lifestyle changes, physical stimuli, and hormonal changes were considered as important migraine general triggering factors. These findings may partly due to the fact that the majority of our participants were married women who typically have multiple duties both at work and at home, and therefore may be subjected to sleep and eating pattern disturbances along with emotional stress. In addition, women in mid life experience hormonal changes due to pregnancy, lactation, oral contraceptive pills, and the menstrual cycle. Most participants in several recent studies reported multiple migraine precipitating factors, including lifestyle changes, sensory stimuli, hormonal changes, and physical stimuli (Tayel, 2008; Haque *et al*. 2012). However, it is important to recognize that migraine trigger factors are highly individual (Migraine Association of Ireland, 2011).

For many people, several trigger factors are found in the workplace; including long periods spent in front of a computer screen, poor posture at an office desk, loud noise or bright lights, and strong smells (Migraine Association of Ireland, 2011). In the present study prolonged sitting in front of computer screens, job stress, and long working hours were the commonest work-related triggers for migraine.

It was not surprising that 100% of employed migraineurs in the present study used medications to relive their pain. Moreover, sleeping, and resting in dark quiet room were also frequently reported behavioral measures. In contrast to this finding, recent studies conducted in other Arab countries revealed that nearly one third the study sample used medications to relieve migraine headache (Deleu *et al*. 2002; Tayel, 2008). This discrepancy can be attributed to socio-cultural differences and different age distribution of the study samples. For example in Egypt and some other developing countries, self-medication is common among individuals and many drug products, including pain killers, are sold over the counter (OTC) without any prescription (Sallam *et al*. 2009).

The World Health Organisation classifies migraine as the 12th leading cause of disability worldwide among women and 19th overall. Although migraine is not a life threatening condition, it can impact on the quality of patients' lives (Migraine Association of Ireland, 2011). Many recent studies revealed reduced work performance and lost productivity among migraineurs (Lipton *et al.* 2001; Landy *et al*. 2011; Migraine Association of Ireland, 2011) that might be due to continuity of working with the headache (Bigal *et al*. 2001). Also, a prospective cohort study conducted on female public-sector employees detected excess risk (1.15) for medically certified absence episodes (≤ 3 days) due to migraine (Mäki *et al*. 2008). So, it was suggested that workplace interventions for severe or persistent migraines might have a positive return-on-investment for employers (Kessler *et al.* 2010).

Studies have shown that patients derive most benefit from a combination of behavioral interventions and medications; where effective behavioral and occupational strategies can help ensure appropriate use and maximum benefit from the medications, thereby preventing medication overuse headaches (McLean and Coutts, 2011). This combination was found to reduce, or even eliminate, up to 90% of migraine attacks in previous trials (Migraine Association of Ireland, 2011). Most studies that evaluated the effect of several new migraine medications and management strategies on lost workdays revealed significant improvement after three months or more (Burton *et al.* 2009). Consequently, the present study was conducted to assess the impact of the

specifically designed migraine coping program at work after three months. Modest but significant improvement in all studied migraine coping measures except for job performance score was detected. This finding supports those of other studies, where interventions that facilitate migraine self-management have been associated with reduced headache frequency, intensity, and disability (Buse and Andrasik, 2009). In the present study, the job performance score was not significantly improved after applying the program, as it is usually affected by other factors including personal characteristics, stress, perceived social support from co-workers, organizational climate, etc (Al-Ahmadi, 2009).

The diagnosis of migraine in the present study was based on both the International Headache Society (IHS) diagnostic criteria questionnaire and neurological assessment by a neurologist. Moreover, the one-year prevalence of migraine (migraine in the last year) was estimated which is a better indicator rather than the life time prevalence as it indicates current or active disease and it is less liable to recall bias. However, the job performance score that was measured was not a migraine headache-specific.

Conclusions:

It could be concluded that migraine is significantly prevalent in this sample of working mid-aged women compared with a sample of mid-aged housewives. Prolonged sitting in front of computer screens, job stress and long working hours were the commonest work-related triggers, along with other general triggers such as sensory and physical stimuli, lifestyle and hormonal changes. Medications and sleeping were the commonest pain reliving methods. After applying the migraine coping program, significant improvement in the studied migraine coping measures was detected, with no changes in job performance.

So, effective migraine management programs in the workplace might help in mitigating the personal, economic, and societal impact of migraine. This will require efforts from all stakeholders including public policy makers, health care professionals, and employers. At workplace, remediation of correctable environmental triggers may benefit employees' attendance and productivity. Occupational physicians and therapists can educate and train employees about healthy lifestyles, good triggers management strategies, effective relieving methods, and other self-help techniques. Also, "a migraine work survival kit" should be available at all workplaces that should include an ice pack for the head; a microwaveable hot pack for the neck or shoulders, juice or water; acute pain medications; and if dark, quit room is not available, an eye mask and a set of earplugs should also be packed. Occupational Health Departments at Ministry of Health, Health Insurance Organization, and University Hospitals can have important role through "outreach service - educational programs on migraine management" that provide employers with training on how to create 'migraine-friendly 'workplace' and help raise employees awareness. Finally, further epidemiologic studies should focus on identifying employees at higher risk for disease progression. Randomized controlled trials on working women at different occupations are also recommended to assess the impact of this specifically designed program and other migraine management strategies at workplace.

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