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ORIGINAL ARTICLE

Migraine without Aura Correlation with Anxiety Level and Socio-Demographic Characteristics

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ABSTRACT

Purpose: Different types of migraine may be studied separately to understand their epidemiology and pathophysiology better. No studies have investigated patients with associated factors of anxiety severity in migraine without auras. Therefore, in this study, anxiety and its associated factors were investigated in a sample of Saudi Arabian patients with migraine without aura.

Methods: A cross-sectional study of 122 conveniently sampled migraine patients at Madinah hospitals, Saudi Arabia, completed the Generalized anxiety disorder-7 scale (GAD-7), and a tool for social, demographics, and clinical information.

Results: The majority of patients who did not have an aura with their migraine were female (67.2%); many did not report participating in sports activities (58.2%), or have a family history of migraine-headaches (74.6%). Anxiety severity was higher in migraine-without-aura patients, and those undergoing treatment for co-morbid conditions (β = .547, p = .042), those without family history of migraine/chronic headache (β = .016, p = .016), and patients with high frequency of migraine medication use (β = .009, p = .009).

Discussion: The correlation of the anxiety severity level in patients who have migraines without aura may have important clinical, and epidemiological implications. females with their change in hormonal stat have a higher prevalence of migraine without aura, those with no habitual sport activity, and family history of migraine may indicate the need for targeted screening for migraine in these groups.

Keywords: migraine; headache; sports; family history; trauma; GAD

INTRODUCTION

Migraine is a disease mainly characterized by headache of primary origin in the International Classification of Headache Disorders-3rd edition (ICHD-3)[1].It occurs widely in populations with debilitating social, and economic costs[2,3].Migraine is the third most prevalent disease, and also ranks second in terms of disability caused by the burden of the disease in people below 50 years of age[4,5].Migraine without aura is one of two major subtypes of migraine, wherein headache episodes are not preceded by warning signs [3].These headaches episodes are recurring (at least five attacks, may last for four hours to three days if not treated, and/or if treatment is not successful[2].Most often these headaches will start on one side of the head, have a quivering nature, are moderate to severe in intensity, and may get worse with exercise. Nausea and/or photophobia-/phonophobia may often be related, and co-occur with, these headaches[5].

Migraine is common worldwide and in Asian countries; a recent comprehensive literature review of 41 articles from China, Japan, and Korea found prevalence ranges from 6% to 14.3% among adults[3]. there is a low level of awareness, and possibly under-diagnosis of the problem [6].A survey of all 13 regions of Saudi Arabia found an adjusted 1-year prevalence of all types of headache to be as high as 65.8%, while migraine prevalence was found to be 25.0%, and tension-type headache, 34.1%x[7] A study exploring recent trends of disease in Saudi Arabia from 1997-2017, found that both migraine, and anxiety disorders are major challenges for healthcare[7-8].This shows an overwhelming burden of migraine-headache disorder on Saudi healthcare system. More studies are needed to understand the different facets and dimensions of this disease to better understand the enormity of the problem, its different sub-types, and their associated factors. Therefore, in this study, a sample of Saudi Arabian patients with migraine without aura was studied.

A recent systematic review of 11 studies from around the world on the subject of co-morbid migraine and anxiety found a median prevalence rate of 43%. This suggests almost one in every two migraine patients has co-morbid complaints of anxiety disorders[9]. However, none of the studies were from the Middle East, highlighting a gap in the published reports on the migraine-anxiety relationship from these countries. Previous studies do strongly suggest that different types of migraine be studied separately[9-10]. Female patient with migraine and hormonal change during menstruation, pregnancy, and also the use of hormonal contraceptives and hormone replacement treatment may influence migraine occurrence [5]. Furthermore, to the best of this author's knowledge there are no previous studies investigating the associated factors in patients of anxiety severity in migraine without aura. Therefore, in this study, anxiety, and its associated factors, were investigated in a sample of 122 Saudi Arabian patients with migraine without aura.

MATERIAL AND METHODS

Participants and Procedures: An observational design with a cross-sectional data collection approach was implemented for this research study. Participants were patients visiting outpatient departments of hospitals in Madinah, Kingdom of Saudi Arabia, from October 2018 to January 2020. Inclusion criteria were adults complaining of headache/migraine for at least six months, and clinical diagnosis of migraine without aura. Exclusion criteria were complaints of headache/migraine for at least six months but not clinically confirmed cases of migraine without aura in

patients less than 18 years old. Clinical diagnosis was based on the classification of the neurological consultant. One hundred twenty-two clinically diagnosed patients of migraine without aura (ages: 18-44 years) completed this study.

Participants were approached during their outpatient visits by the researcher. Participants received a brief explanation of the reasons and intended objectives of the study in Arabic. All patients who agreed to participate signed a written informed consent. All participants gave written consent to participate and publish. Participants were required to complete information for an interviewer-administered questionnaire booklet during their outpatient visits. The questionnaire booklet contained additional information on the study, such as purpose, contact details of the research coordinator, statement clearly indicating no monetary benefit/loss to them, nonexposure to any harmful procedures, freedom to withdraw, etc. Due diligence was used to ensure confidentiality of participants' details at all stages. Review board approval was granted from the ministry of health; all the study procedures strictly followed the guidelines as laid down in the guidelines of the institutional committee, national ethical guidelines for research involving human participants, Ministry of Health, Kingdom of Saudi Arabia, and the Declaration of Helsinki x. All participants were asked to complete the study questionnaire booklet with questions related to the Generalized anxiety scale-7, and a socio-demographic, and medical history tool[8].

Generalized anxiety scale-7 (GAD-7): is one of the most commonly used tool to assess severity of anxiety symptoms[11].The questionnaire has been validated in various demographics including Afro-Asians in Ethiopia and Saudi Arabia[11-14].The tool has seven questions, all are scored on Likert scales where increasing scores indicate increasing weekly frequency of anxiety symptoms; specifically, '0' suggests 'not at all', and '3' denotes 'nearly every day'. The individual item scores of all seven questions are added to derive a total score of the GAD-7 scale; herein again higher scores imply more severe and frequent occurrence of anxiety symptoms. McDonald's Omega (maximum likelihood approach) value of 0.71 suggested that the reliability of the GAD-7 scale in this study's sample was good.

Questionnaire for collecting social, demographic, and medical history: A questionnaire was used to collect social, demographic, and medical history information and specifically age, body mass index (BMI), gender, sports activity, whether currently under treatment for other medical conditions, history of head or neck injury, family history of migraine or chronic headache, and use of migraine medication. For age the question was open ended, for BMI height and weight information were recorded. Closed-ended questions were used for all other information.

Statistical analysis: Information recorded in completed questionnaire booklets were transferred to an Excel file. The dataset obtained was cleaned after inspection of the descriptive statistics. The dataset was then converted into SPSS file format for analysis using SPSS version 26.0. The analytical tests usually employed to present descriptive statistics such as mean, percentage, standard deviation (SD), etc., were used to document variables related to social, demographic, and medical history. Multivariate analysis using multiple linear regression was used to assess association between the severity of anxiety symptoms (dependent variable: GAD-7 score), and independent variables, namely age, BMI, gender, sports activity, currently under treatment for other medical conditions, history of head or neck injury, family history of migraine or chronic headache, and use of migraine medication. The severity of anxiety symptoms (dependent variable: GAD-7 score), age, and BMI were continuous variables, while, gender, sports activity, receiving treatment for other medical conditions, history of head or neck injury, family history of migraine or chronic headache, and use of migraine medication were categorical variables.

RESULTS

Participants' characteristics: The mean values of age, BMI, and GAD-7 total scores were 26.7 ± 6.6 years, 24.8 ± 3.2 kg/m^2, and 4.2 ± 2.7, respectively (Table 1). Most participating patients with migraine without aura were female (67.2%). The majority of patients (58.2%) reported not participating in any sports activities. Nearly 38.5% of participating migraine patients were receiving treatment for medical conditions. Some 38.5% of participating migraine patients had a history of head or neck injury. Three-fourths of participants, 74.6%, had a family history of migraine or chronic headache. A substantial number of participating migraine patients (46.7%) reported frequently (often-very often) using migraine medication (Table 1).

Table 1: Participants' characteristics.

Characteristics	Mean ± SD/ Frequency (percentage)
Age (yr.)	26.7 ± 6.6
Gender	
Male	40 (32.8)
Female	82 (67.2)
BMI	24.8 ± 3.2
Sports activity	
Yes	50 (41)
No	71 (58.2)
Did not report	1 (0.8)
Currently under treatment for medical conditions	
Yes	47 (38.5)
No	74 (60.7)
Did not report	1 (0.8)
History of head or neck injury	
Yes	47 (38.5)
No	72 (59.0)
Did not report	3 (2.5)
Family history of migraine-chronic headache	
Yes	91 (74.6)
No	30 (24.6)
Did not report	1 (0.8)
Use of migraine medication	
Sometime	64 (52.5)
Often-very often	57 (46.7)
Did not report	1 (0.8)
GAD-7 total score	4.2 ± 2.7

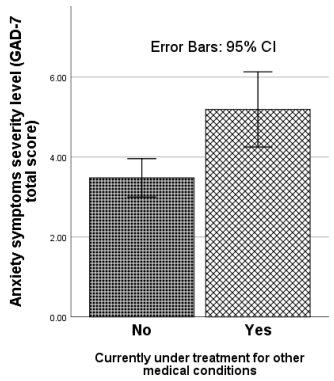

Figure 1. Anxiety symptoms severity level in patients with/without treatment of other medical conditions in migraine patients without aura

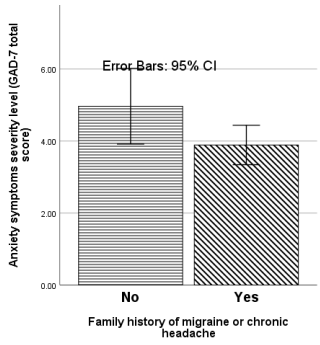

Figure 2. Anxiety symptoms severity level in patients with/without family history of migraine/chronic headache in migraine patients without aura

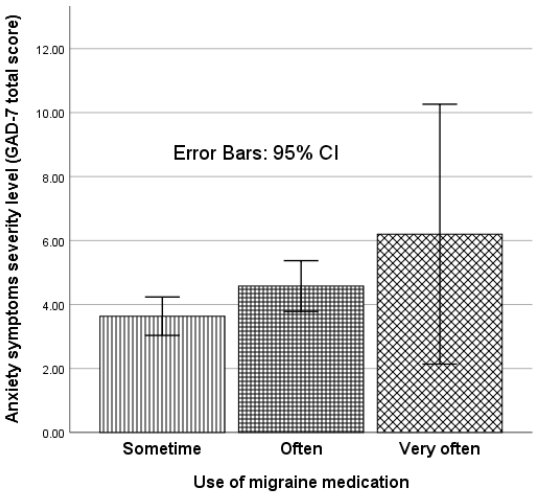

Figure 3. Anxiety symptoms severity level in patients with increasing frequency of migraine medication use in migraine patients without aura

* Unstandardized beta coefficient for intercept, for all other independent variables standardized beta coefficient are shown.

Anxiety symptoms severity level was assessed by GAD-7: Generalized anxiety disorder-7 scale

BMI: body mass index; SD: standard deviation; GAD-7: Generalized anxiety disorder-7 scale

Multivariate analysis: Multiple linear regression-predictors of the anxiety symptoms severity level in patients of migraine without aura

Table 2: Multiple Regression Predictors of the anxiety symptoms severity level in patients of migraine without aura

Independent variable	Beta Coefficient	Standard error	T values	P values	Model unadjusted R2; adjusted R2; P value
age	.095	.042	.909	.365	0.225, 0.168, <0.001
BMI	.165	.097	1.433	.155	
Gender	.045	.613	.418	.677	
Sports activity	-.160	.487	-1.790	.076	
Currently under treatment for other medical conditions	.204	.547	2.057	.042	
History of head or neck injury	-.083	.498	-.927	.356	
Family history of migraine or chronic headache	-.214	.546	-2.453	.016	
Use of Migraine medication	.234	.410	2.659	.009	
Intercept	-.868	2.370	-.366	.715	

A multiple linear regression was run to determine changes in the severity level of anxiety symptoms in patients with migraine headaches without aura from age, BMI, gender, sports activity, currently under treatment for other medical conditions, history of head or neck injury, family history of migraine or chronic headache, and use of migraine medication. The model was statistically significant, $F(8, 109) = 3.95$, $p < .001$, $R2 = .225$ (Table 2). Currently under treatment for other medical conditions ($p = .042$), family history of migraine or chronic headache ($p = .016$), and use of migraine medication ($p = .009$) significantly predicted anxiety symptoms severity level (Table 2). Those currently under treatment for other medical conditions had higher level of anxiety symptoms (Figure 1). Those without family history of migraine/chronic headache had higher level of anxiety symptoms (Figure 2). The severity of anxiety symptoms increased with greater frequency of migraine medication use in migraine patients without aura (Figure 3).

DISCUSSION

To the best of available information, this is the first study to investigate anxiety level, and its correlates in a sample of migraine without aura patients in Saudi Arabia. In this study, most migraine without aura patients were female, did not participate in sports activities, and had a family history of migraine headache. A substantial portion of the study sample were receiving treatment for other medical

conditions, had a history of head or neck injury, and reported frequently (often-very often) using migraine medication. Finally, anxiety severity was higher in those 1: currently under treatment for other medical conditions, 2: without family history of migraine/chronic headache, and 3: with increasing frequency of migraine medication use.

The gender-related finding in this study, i.e., more migraine without aura patients were female, is similar to previous reports[15,16].The higher prevalence in females is related to sex hormones and reproductive milestones [17].Migraine (including all subtypes) is usually more prevalent in females after puberty, reach a peak in their thirties, and drop off sharply during the post menopause phase[18].Additionally, some sex-related disparity may be accounted for by previously observed trends in underreporting of symptoms by male patients[19].The association between no sports activity, and migraine without aura in this study is similar to previous reports[20-22].A recent review concluded that though acute phases of exercise may set off migraine episodes, habitual physical activity might have a preventive effect[22].This is possibly explained by the release of neuropeptides, e.g., changes in hypocretin, lactate metabolism, etc., with acute phase of exercise[23-24].Habitual physical activity related to migraine prevention may be due to increases in plasma levels of β-endorphins, brain-derived neurotrophic factor, etc[25-28].

The association of migraine without aura with family history of migraine headache is similar to previous reports. The Turkish nationwide headache prevalence study found that family history of headache is a potential risk factor for migraine [29-30].This study showed a relationship between family history of migraine headache, and occurrence of migraine without aura.

In this study, about two-fifths of migraine without aura patients had a history of head-neck injury. A recent narrative review summarized that migraines are the most common type of headaches in post-traumatic patients[20,31-33].Similarly, a previous report found that head-neck injury was higher in people with chronic daily headaches[21].Furthermore, the results show a direct relationship between migraine without aura and history of head-neck injury.

Almost half of the study sample reported 'often-more often' frequency of migraine medication use. This may suggest an underlying over dependence and/or overuse of migraine medications in such patients in this cohort. Further research is needed to improve integrated and flexible management of patients with migraine to effectively manage pain without promoting migraine medication overuse [34-37].

The significance of a model predicting anxiety level changes with respect to social, clinical, and demographic factors does build on the previously established relationship between anxiety and migraine[38-42].Furthermore, the additional findings of three novel independent predictors of this relationship, i.e., anxiety-migraine without aura co-morbidity, is a novel outcome of this study.

Some of the notable limitations of this research are its modest sample size, use of non-probability sampling, and cross-sectional design. All these may limit generalizations from the findings. However, it is worth noting that patients with migraine without aura were recruited after expert clinical diagnosis unlike questionnaire-based studies.

In summary, anxiety severity was found to be higher in migraine without aura patients in those undergoing treatment for co-morbid conditions, who do not have a family history of migraine/chronic headache, and are frequently using migraine medication. A majority of migraine without aura patients were female, did not report habitual sports activities, and had family history of migraine-headache.

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