

The Rate of Migraine Headache among Sample of Iraqi Diabetic Patients: A Cross Sectional Study

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Key words: Diabetes mellitus, migraine headache, Iraq, Significant, population, insulin therapy

Abstract: Migraine is characterized by recurrent attacks of headache and its pathophysiology is still enigmatic. A number of environmental factors has been suggested to play a role in the pathogenesis of migraine by some authors. Trials of linking metabolic derangements to the pathophysiology of headache episode in migraine patients have recently emerged in a number of literatures. Obesity and diabetes have been evaluated in a number of studies in relation to migraine. To evaluate the rate of migraine headache among a sample of Iraqi diabetic patients. Current cross sectional study included 200 patients already diagnosed as having type 1 or 2 diabetes mellitus. Those patients were reviewed for having criteria suggesting migraine headache according to “International Classification of Headache Disorders (ICHD)”. Variables included in the present study are: age, gender, type of diabetes mellitus, duration of diabetes and the level of HbA1c%. The study was conducted at the neurology unit, Al-Dewaniyah Teaching Hospital, Al-Dewaniyah province, Iraq. The study started on January, 2017 and ended at June, 2018. Number of diabetic patients with migraine was 58 out of 200 accounting for a rate of 29%. Migraineurs were more likely to be female gender in comparison with diabetic non-migraineurs, male to female proportion of 21/37 versus 79/63, respectively; the difference was significant ($p = 0.013$). Patients with type 1 diabetes were more liable to have migraine than patients with type 2 diabetes, 13 out of 29 (44.8%) versus 45 out of 171 (26.3%), respectively; the difference was significant ($p = 0.042$). According to the type of treatment, those patients on insulin therapy were more liable to be migraineurs than those patients on oral hypoglycemic agents, 38 out of 100 (38%) versus 20 out of 100 (20%), respectively, the difference was highly significant ($p = 0.005$). Patients with migraine had significantly longer duration of diabetes in comparison with those diabetics who are free of migraine, 7.18 ± 4.43

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years versus 4.18 ± 4.58 years, respectively ($p < 0.001$). The present study showed that the prevalence of migraine headache in diabetic patients is higher than in the general

population and its rate is significantly associated with the duration of diabetes, type 1 diabetes, insulin therapy and female gender.

INTRODUCTION

Migraine is characterized by recurrent attacks of headache and its pathophysiology is still enigmatic^[1,2]. A number of environmental factors has been suggested to play a role in the pathogenesis of migraine by some researchers^[3]. In terms of prevalence migraine headache affects a substantial number of individuals in communities that range from 5-15%, globally^[4-6]. The principal burden of migraine attacks is the poor associated quality of life and the goal planned by researcher is to improve the quality of life experienced by migrainers through prevention of recurrent headache assaults^[7, 8]. Trials of linking metabolic derangements to the pathophysiology of headache episode in migraine patients have recently emerged in a number of literatures^[9]. Obesity and diabetes have been evaluated in a number of studies in relation to migraine^[10]. Some of these studies supported the existence of high rate of migraine attacks in patients with diabetes^[11,12] whereas other studies either gave conflicting results or denied the association between diabetes and migraine^[13]. Obesity and diabetes together with hypertension and dyslipidemia are considered as components of metabolic syndrome^[8]. Resistance to insulin action is an essential component of metabolic syndrome and prognostically linked to cardiovascular and stroke in affected patients^[14, 15]. The association between metabolic syndrome and migraine headache is still under research^[2].

Type 2 diabetes mellitus affects patients of wide range of age and its rate is becoming increasingly high globally^[16]. This disease is associated with an increased risk of a number of other chronic illnesses^[17] and results in a number of complications such as diabetic retinopathy, neuropathy and cardiovascular events. With this regard the association between migraine and diabetes remains a matter of controversy. The duration of headache attack in migraine is 4-72 h and is often associated with increased sensitivity to sound and light and with nausea and vomiting^[18]. Migraine accompanied with a vast range of subtypes, multiple complications and a variable prognosis and has been better studied than other kinds of headaches^[19]. A "World Health Organization (WHO)^[20]" review of information worldwide found migraine to stand as one of the major illnesses and the most frequent cause of consultation for headache in South-East Asia, America, the Western Pacific and Europe. The cause behind migraine is still not identified^[21] and a lot of researchers have proposed that environmental factors and genetics are

dominant pathophysiologic migraine etiologies^[22]. A lot of studies have been carried out to discover migraine predisposing factors because it is a complicated disorder and a number of factors are involved. Among these factors that are proposed, fasting and hypoglycemia that are seen frequently in diabetic patients are.

The rarity of Iraqi studies that deals with the correlation between migraine headache and diabetes and the presence of significant controversy on the existence of such correlation in the available published articles justified the conductance of the present study aiming at disclosing the exact rate of migraine in Iraqi patients with diabetes if it ever exists.

MATERIALS AND METHODS

Current cross sectional study included 200 patients already diagnosed as having type 1 or 2 diabetes mellitus. Those patients were reviewed for having criteria suggesting migraine headache according to "International Classification of Headache Disorders (ICHD)". Variables included in the present study are: age, gender, type of diabetes mellitus, duration of diabetes and the level of HbA1c%. The study was conducted at the neurology unit, Al-Dewaniyah Teaching Hospital, Al-Dewaniyah province, Iraq. The study started on January, 2017 and ended at June, 2018. Data were collected, summarized, presented and analyzed using Statistical Package for Social Sciences (SPSS) Version 23. Numeric variables were expressed as mean and standard deviation whereas categorical data were expressed as number and percentage. Chi-square test was used to study association between categorical variables and student t-test was used to compare mean between any 2 independent groups. The level of significance was chosen at p-value of equal or < 0.05 .

RESULTS AND DISCUSSION

The current study included as stated previously, 200 diabetic patients of whom there were 100 men and 100 women. Mean age of all patients was 40.62 ± 7.79 years with a relatively wide range of age 15-55 years. The number of patients with type 1 diabetes was 29 (14.5%) whereas patients suffering from type 2 diabetes were 171 (85.5%). According to mode of therapy this study included 100 patients on insulin therapy and 100 patients on oral hypoglycemic agents. The duration of diabetes was highly variable extending from as low as 2 months

Table 1: Characteristic of the study group

Characteristic	Values
Number of cases	200
Age, Mean \pm SD; range years	40.62 \pm 7.79; 15-55
Gender (M/F)	100/100
Type of DM (type 1/type 2)	29/171
Treatment (SI/OHA)	100/100
Duration of DM, Mean \pm SD (years); range	5.50, 4.66; 1 month-24 years
HbA1c%, mean \pm SD; range	8.97 1.93; 5.5-15
Migraine, n (%)	58 (29%)

SD: Standard Deviation; M/F: Male to Female; DM: Diabetes Mellitus; SI: Insulin; OHA: Oral Hypoglycemic Agents; n: number of cases

Table 2: Comparison between migraineurs and non-migraineurs

Characteristic	Migraineurs	Non-migraineurs	p-values
Age, mean SD	39.17 \pm 7.67	41.21 \pm 7.78	0.093
Gender, M/F	21/37	79/63	0.013
Type of DM, 1/2	13/45	16/126	0.042
Treatment, SI/OHA	38/20	62/80	0.005
Duration of DM, mean SD	7.18 \pm 4.43	4.18 \pm 4.58	<0.001
HbA1c%, mean SD	9.24 \pm 1.90	8.85 \pm 1.94	0.198

to as long as 24 years. Mean glycated hemoglobin (HbA1c%) was 8.97 \pm 1.93% with a range of 5.5-15% as shown in Table 1.

Number of diabetic patients with migraine was 58 out of 200 accounting for a rate of 29%, Table 1. Mean age of patients with migraine was relatively lower than that of patients without migraine, 39.17 \pm 7.67 years versus 41.21 \pm 7.78 years, however, the difference was not significant ($p = 0.093$). Migraineurs were more likely to be female gender in comparison with diabetic non-migraineurs, male to female proportion of 21/37 versus 79/63, respectively, the difference was significant ($p = 0.013$). Patients with type 1 diabetes were more liable to have migraine than patients with type 2 diabetes, 13 out of 29 (44.8%) versus 45 out of 171 (26.3%), respectively, the difference was significant ($p = 0.042$). According to the type of treatment, those patients on insulin therapy were more liable to be migraineurs than those patients on oral hypoglycemic agents, 38 out of 100 (38%) versus 20 out of 100 (20%), respectively, the difference was highly significant ($p = 0.005$). Patients with migraine had significantly longer duration of diabetes in comparison with those diabetics who are free of migraine, 7.18 \pm 4.43 years versus 4.18 \pm 4.58 years, respectively ($p < 0.001$). There was no significant difference in mean HbA1c level between the patients with migraine and patients without migraine, 9.24 \pm 1.90% versus 8.85 \pm 1.94, respectively, $p = 0.198$ as shown in Table 2.

The present study showed a relatively high rate of migraine among Iraqi diabetic patients, a rate of 29%. This rate is approximately similar to that reported by Haghighi *et al.* who described a rate of 27.9% among 147 diabetic patients^[23]. Split and Szydłowska^[24] gave a higher rate of migraine in diabetics as they stated that out of the

127 diabetic patients enrolled in their study, 95 had migraine in other words the rate of Split and Szydłowska's study was 74.8%. In general, the rates of migraine seen in the present study and the study of Haghighi *et al.*^[23] and of Split and Szydłowska's are higher than the rate of migraine in the general population all over the world that falls in the range of 5-15%^[1,2]. So, these studies collectively share the suggestion of an association between risk of migraine headache and diabetes mellitus. However, there are a number of studies that described lower incidence of migraine headache in patients with diabetes mellitus^[13, 11]. The current study showed no significant association between age of the diabetic patients and the rate of having migraine headache and this is similar to the finding of Haghighi *et al.*^[23]. However, the mean age of patients with migraine in our study relatively lower than that of patients without migraine, although in terms of statistics the p -value was not significant. Berge *et al.*^[17] demonstrated a substantial reduced rate of migraine among older individuals with diabetes mellitus. This protective effect of diabetes on migraine appears to be among patients older than 50 years old. These data suggested the existence of some age-related protective factor against migraine occurrence. The present study showed that diabetic women are more liable to have migraine headache than diabetic men and this is most likely related to some gender differences rather than diabetes itself. It is well known that migraine headache is more prevalent in women than in men and this may be related to some hormonal differences^[25]. In the present study, also it appears that rate of migraine is related significantly to type of diabetes, since, it is more frequently seen in term of percentage out of total in patients with type 1 diabetes than type 2 diabetes. This finding leads to a suggestion that the severity of insulin deficiency and or the treatment with insulin rather than oral hypoglycemic agents may contribute to the pathophysiology of migraine in diabetic patients. In support for the later postulation we found that patients on insulin therapy were significantly more liable to have migraine headache than those diabetic patients on oral hypoglycemic patients. On the other hand, the duration of diabetes was strongly correlated with the rate of migraine among diabetic patients.

In one study, the rate of migraine in diabetic patients with a history of hypoglycemia was higher than in patients without such a history in a significant way^[23]. Hypoglycemia can facilitate headache in a number of patients with diabetes mellitus^[26] and is one of the adverse effects of drugs used for treatment of diabetics. The CNS function relies on a fluent glucose supply and is liable to any reduction in glucose level. For that reason, the brain is a principal organ to be affected by low blood glucose concentration^[27]. In one study, hypoglycemia during night

facilitated migraine headaches in a number of patients with both diabetes and migraine. It demonstrates the association between the level of blood glucose and the attacks of migraine^[23]. The present study showed that the level of HbA1c% has nothing to do with the prevalence of migraine headache in diabetic patients and this result is similar to results of other studies^[23, 19].

CONCLUSION

The present study showed that the prevalence of migraine headache in diabetic patients is higher than in the general population and its rate is significantly associated with the duration of diabetes, type 1 diabetes, insulin therapy and female gender. Further studies may be needed to elucidate the exact pathophysiologic mechanism that links diabetes to migraine headache.

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