RESEARCH ARTICLE

Clinical characteristics of migraine: A prospective cross-sectional study over nine years [version 1; referees: awaiting peer review]

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Abstract

Background: Migraine is the most common primary headache. This study aimed to describe clinical observations about migraine in outpatients in Iraq, including migraine types and subtypes, duration and frequency of acute attacks, severity, disability, effects on the quality of life, and complications.
Methods: This is an outpatient-based prospective cross-sectional study, conducted in the Misan province, Iraq over nine years, and included 1412 patients aged 12 to 50 years. The data was collected from clinical records of patients who attended outpatient clinics.
Results: The study included 1100 women (77.9%) and 312 men (22.1%); the women/men ratio being 3.5:1. The median age and standard deviation (SD) was 21 ± 5.42 years. The mean age at first attack of migraine was 17 ± 4.91 years. Migraine without aura was the most common type, accounting for 68% of the cases. The mean frequency of the attacks was (2 ± 4.63) days/month. In general, acute attacks were moderate to severe.
Conclusions: In our study, we observed that migraine causes a headache resulting in episodes of temporary functional disability and women suffered more than men (ratio of 3.5:1). The mean age at first attack was a young age, and a family history of migraine highly altered distribution. Migraine without aura was the most common type, and symptoms including nausea and vomiting and photophobia were experienced by patients, which were used to diagnose migraines. Experienced aura was the most common migraine with aura, but also aura without a headache and aura with migraine were prevalent; therefore, it is important to differentiate between migraine subtypes. Visual aura was the most common aura, while motor symptoms were very rare. Chronic persistent headaches were a common complication recorded. These features provide evidence for the creation of screening tools in migraine prevention migraine.

Keywords

Headache, Primary headache, Migraine, Misan

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Introduction

Migraine is the most common chronic inherited neurovascular disorder. The onset of migraine is typically between 15 and 24 years of age[1], and the prevalence is highest in patients aged 35–45 years, 75% of whom have moderate to severe headaches[2,3]. Diagnosis is based on clinical features, together with radiology images[4]. The majority of migraine patients experience temporary disability that affects their work and daily activities and, thus, their productivity and quality of life[5–7]. Regarding pathophysiology, the constriction and then dilation of cerebral blood vessels was believed, until 25 years ago, to cause the neurologic symptoms associated with a migraine[8]. In approximately 60 - 70% of patients with a migraine, the onset of the headache is preceded by a non-specific malaise and irritable feelings, such as euphoria, depression, food cravings, fatigue, hypomania, cognitive slowing, dizziness, or asthenia. These symptoms are called the migraine prodromes and may occur as early as 24 hours before the actual migraine[9–11], followed by the "aura", which is a focal neurological sign, and then a severe, throbbing headache with photophobia and vomiting[12]. About 15 - 20% of migraine patients experience aura within one hour of, or simultaneously with a headache[13]. The migraine aura consists of neurologic abnormalities, including visual loss, hallucinations, numbness, tingling, weakness, or confusion. The aura is due to the cortical spreading depression, a wave of abnormal electrical discharges that travels across the brain's surface and short-circuits the brain[14]. Furthermore, migraine is best conceptualized as a triad of a paroxysmal headache, nausea and/or vomiting, and an aura of focal neurological events (visual events)[15]. Patients with these three signs have migraine with aura (or "classical migraine"), while those with a paroxysmal headache (with or without vomiting) but do not have aura are classified as migraine without aura (or "common migraine")[16,17].

The aim of this study was to observe migraines clinically, leading to infer causality behind this disease, risk factors and triggers. Evidence gathered from this study will enable diagnosis of migraine and its probability to occur in persons who have similarity to patients observed in this study. We believe that early detection of these manifestations correlates with time and money saving on unnecessary investigations and medications used in management and treatment.

Methods

Study design

Outpatient-based prospective cross-sectional study, which was conducted in the Al-Sadder Teaching Hospital, Misan Province, Iraq, over nine years from 23rd January 2010 to 14th July 2018.

Study size

The total number of patients included in this study was 1510 and included all those that attended to outpatient clinics.

Participants

The cases were aged 12–50 years, of both genders, suffering from migraine headaches according to the criteria of the International Classification of Headache Disorders (ICHD-III b version)[4,5].

Inclusion criteria were: 1–8 attacks over four weeks, attacks fulfilling the International classification of Headache Disorders migraine diagnostic criteria, and absence of secondary causes of headaches.

Exclusion criteria: migraine onset at age >50, headaches attributable to underlying organic disorders, or no migraine attacks during the four weeks of assessment (this is made case by case for each patient from the point of diagnosis till the end of the study).

Data collection

All data were collected from participant records.

For all patients a full medical history and family history of migraine headaches was obtained, and a thorough clinical examination performed, including general examination, assessment of vital signs, Glasgow Coma Scale (GCS), neurological and physical examinations (as per the Seattle Children's Hospital Research Foundation migraine general assessment pathway).

All participants were assessed by a standard questionnaire from the Migraine Relief Center and a 4-week headache diagnostic diary procedure (as per the Migraine Trust guidelines)[4,18]. Disability due to acute migraine attacks was determined using the Migraine Disability Assessment Scale (MIDAS) questionnaire.

Statistical analysis

We implemented standard descriptive statistics and data analysis using IBM SPSS Statistics Software (version 20.0, SPSS, Inc., Chicago, Illinois, USA). All p-values < 0.05 were considered statistically significant for on-sample t-test. Mean and standard deviation were used to present data.

Ethical considerations

Written informed consent was obtained from the patients or the parents/guardians of minors for those below age of 18 years, for participating in this study, and was conducted according to the ethical standards established by the 1964 Declaration of Helsinki. The Medical Ethical Committee of Misan University approved this study (code:270000425).

Results

A total of 1,412 patients with a migraine headache were included, including 1,100 women (77.9%) and 312 men (22.1%); women/men ratio of 3.5:1. Median age ±SD was 21 ± 5.42 years. The mean age at first attack was 17 ± 4.91 years. About 30 ± 15.79 mean±SD of the patients reported a family history of migraine (Table 1).

Migraine without aura was the most common (69.4%) subtype. The mean frequency of attacks was 2 ± 4.63 days per month. The mean duration of attack was 24 hours. Nausea and vomiting, photophobia and other nonspecific symptoms were experienced by 15%, 20%, and 12.5% of the patients respectively, while the remaining patients experienced non-specific prodromes 1–1.5 hours before the attacks (Table 1). About 27% of the patients in this study experienced aura during the period of

Table 1. Clinical characteristic of a prospective cross-sectional migraine patients in Misan province, Iraq from 2010 to 2018.

Parameters		Type of a migraine *ICHD-3b Code										
		1.1	1.2	A.1.3.2	A.1.1.1	1.2.1	8.2	A.1.3	**Other	A.1.6	1.2.1.2	Total
Number (%)		980(69.4)	127(9)	92(6.5)	57(4)	45(3.2)	37(2.6)	35(2.5)	17(1.2)	12(0.8)	10(0.7)	1412(100)
Age, years median ±SD		23±7.01	19±1.93	28± 5.98	18±1.46	20±2.13	24±3.51	31±5.40	18±3.81	12±1.0	22±2.57	21±5.42
Age at onset, years mean		18	16	24	14	26	16	10	18	12	18	17±4.91
Gender	Female	780	94	66	57	25	27	7	26	12	6	1100(77.9)
	Male	200	33	26	0.0	20	10	5	9	5	4	312(22.1)
Family history of migraine (%)		40	60	30	2	30	20	30	20	--	30	30±15.79
Frequency days per month		2	2	4	1	1	15	0.5	1	--	0.5	2±4.63
Duration of attack, hours median		24	24	72	48	24	24	12	72	--	4	24
Nausea and vomiting (%)		20	30	10	15	30	10	10	15	15	30	15
Photophobia (%)		15	20	20	5	30	20	15	20	15	30	20
Other nonspecific symptoms (%)		10	20	15	5	20	5	10	10	20	15	12.5
Aura (%)		0	70	20	2	50	20	2	20	2	60	27

*International classification of headache disorder-3 version beta 2013

1.1= Migraine without aura

1.2= Migraine with aura

1.2.1= Migraine with typical aura

1.2.1.2 =Typical aura without headache

A.1.3.2 Chronic migraine with continuous pain

A.1.3 Chronic migraine (alternative criteria)

8.2 Medication-overuse headache (MOH)

A.1.1.1 Pure menstrual migraine without aura

A.1.6 Episodic syndromes-Childhood periodic syndromes

**Other subtypes (Ophthalmoplegic 'migraine' Retinal migraine, Familial hemiplegic migraine (FHM), Sporadic hemiplegic migraine, Basilar-type migraine, Abdominal migraine, Benign paroxysmal vertigo of childhood)

study, the most common being migraine with aura, but also aura without a headache and aura with migraine (Table 1).

Migraine prevalence rates per year in this study are shown in Table 2; migraine without aura was the highest recorded in 2016 as 73%, which is common subtype with the mean 67.6 ± 2.934. Migraine with aura, in 2012 recorded 10.2%. Chronic migraine with continuous pain presented in 7.5% in 2013, whereas prevalence of chronic migraine (alternative criteria) in 2014 was 3.4%. In 2013, migraine with typical aura recorded a high rate as 4.3%, but in 2010, it was reported 1.2% had typical aura without headache. The medication-overuse headache reported a high rate in 2013 as 3.7%. Pure menstrual migraine without aura, and episodic syndromes-childhood periodic syndromes reported high rates in 2018 as 5.5% and 1.8%, respectively. Finally, others subtypes of migraine present in 2017 with a high prevalence rate 2.3%.

Visual aura was the most common (50%), while unilateral sensory symptoms, being second in frequency (42.17%). The transient dysphasic speech disturbance was the third most frequent (4.82%). Motor symptoms were very rare (0.6%), especially with a hemiplegic migraine (Table 3).

The duration (hours) and frequency (days per month) for migraine without aura, migraine with aura and chronic migraine with continuous pain exhibited are shown in Table 4. We also considered disabling symptoms, systemic blood pressure, changes in consciousness level (assessed by GCS in adult and pediatric groups, and trigger factors in relation to migraine without aura,

Table 2. Migraine prevalence rates per year in a prospective cross-sectional of migraine patients in Misan province, Iraq 2010–2018.

Migraine ICHD-3B* Code	2010 *n*= 169 (%)	2011 *n*=170 (%)	2012 *n*=157 (%)	2013 *n*=161 (%)	2014 *n*=175 (%)	2015 *n*=172 (%)	2016 *n*=160 (%)	2017 *n*=174 (%)	2018 *n*=109 (%)	Mean±SD
1.1 *n*=980	65	70.5	66	67	67	70	**73**	66	64	67.6±2.934
1.2 *n*=127	10	8	**10.2**	8.7	7.4	8.7	7.5	9.2	9.2	8.7±1.041
A.1.3.2 *n*=92	6.5	5.9	5	**7.5**	7.4	5.2	6	6.3	7.3	6.4±0.982
A.1.1.1 *n*=57	3.6	3.5	4.5	3.1	4.6	3	3.8	4.6	**5.5**	3.96±0.890
1.2.1 *n*=45	2.6	2.6	3.8	**4.3**	1.7	2.3	3	4	3.7	3.0±0.90
8.2 *n*=37	3	1.8	2.5	**3.7**	2.9	1.7	1.8	3	2.8	2.58±0.682
A.1.3 *n*=35	2.4	1.8	3.2	1.2	**3.4**	1.7	1.8	2.3	2.8	2.179±0.737
****Others *n*=17**	1.2	0.6	0.64	1.3	0.6	1.7	1.3	**2.3**	1.8	1.271±0.594
A.1.6 *n*=12	1.2	0.6	0.64	0	1.5	1.2	0.6	0.6	**1.8**	0.84±0.558
1.2.1.2 *n*=10	**1.2**	0.6	0.64	1.3	0.6	0	0.6	0.6	0.9	0.71±0.294
Total *n*=1412	99.7	100	99.62	99.8	100	99.6	99.4	99.6	99.8	99.72±0.197

*International classification of headache disorder-3 version beta 2013

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**Others subtypes (Ophthalmoplegic 'migraine' Retinal migraine, Familial hemiplegic migraine (FHM), Sporadic hemiplegic migraine, Basilar-type migraine, Abdominal migraine, Benign paroxysmal vertigo of childhood)

Table 3. Symptoms in patients with migraine with aura in prospective cross-sectional migraine patient in Misan province, Iraq (*n* =127).

Parameter		N(%)
Homonymous visual symptoms	**Fortification spectra: shimmering, silvery zigzag lines**	83(50)
	Temporary visual field loss	4(2.41)
Unilateral sensory symptoms	**Tingling and numbness**	70(42.17)
Dysphasic speech disturbance	**Transient aphasia**	8(4.82)
Motor symptoms	**'A hemiplegic migraine'**	1(0.6)

migraine with aura and chronic migraine with continuous pain (Table 4).

Out of 1,412 patients with a migraine headache, enrolled in this study from 2010 to 2018, only a minority reported serious complications, such as chronic persistent headaches in 6.5% especially in migraine without aura and migraine with aura events (Table 5). The medication overuse headache 2.6% and thromboembolic stroke 0.7%, also recorded (Table 5).

Dataset 1. Excel sheet file of 1412 citizens from Misan province, Iraq whom suffer from migraine from 2010 to 2018

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Discussion

In this study, 1,412 patients diagnosed with migraine headaches, according to established criteria[4,19,20] were analyzed. Women were more affected (77.9%) than men (22.1%), and such a

Table 4. Severity of acute migraine attack in prospective cross-sectional of migraine patients in Misan province, Iraq (*n*=1412).

Parameters *n*=1199		Migraine without aura n= 980	Migraine with aura n=127	Chronic migraine with continuous pain n=92	Mean±SD	*P* value
		%				
Duration, hours	**4-12**	15	20	20	18.1±2.8	< 0.019
	12- <24	10	60	50	60±10	< 0.053
	24-<48	10	18	20	15.3±5.3	< 0.016
	48->72	5	2	10	4.64±4.04	< 0.006
Frequency, days per month	**2-4**	98	95	90	94.27±4.04	< 0.080
	5-7	3	3	7		
	8-10	0.5	0.9	2		
	11-13	0.3	0.3	0.5		
	14-16	0.1	0.1	0.5		
Disabling** **Symptoms+ = limited your ability (reduced by half or more) to work, or do what you needed to do for at least one day? *(MIDAS)**	**Concentrating**	8	10	4	3.78±4.35	< 0.005
	Understanding instructions	7	10	1		
	Dealing with others	10	20	4		
	Lifting	3	4	1		
	Walking	2	4	1		
	Standing	2	4	0.5		
	Studying	4	6	0.5		
	Miss work days per 3 months	5	10	8		
	Miss family, social, or leisure activities	6	10	2		
***Adult GCS Score**	**15**	99.8	99.5	100	99.76±0.25	
	3-14	0.2	0.5	0	0.23±0.25	
Pediatric GCS Score	**15**	100	99.4	100	99.79±0.34	
	3-14	0	0.6	0	0.2±0.34	
Systemic blood pressure (BP/mmHg)	**Systolic BP (≤ 90 mmHg)**	10	20	0	10.0±10.0	< 0.011
	Systolic BP (≥ 150mmHg)	2	2	1	1.58±5.77	< 0.003
Trigger factors	**Emotional stress or release from stress**	50	40	10	34.19±15.27	< 0.032
	Sleep disturbance Too much or too little sleep	10	20	5	7.29±19.05	< 0.009
	Dietary factors	2	2	1		
	Menstruation	4	6	0.5		
	Fasting	10	15	1		
	Hormonal therapy	20	18	5.0		
	Exposure to bright lights, loud noises, and smoke	60	70	20		
	Change in the weather	4	12	0.5		

**Modified from, Stewart WF, et al. Reliability of the Migraine Disability Assessment score in a population-based sample of headache sufferers. Cephalalgia 1999;19:107-14*
MIGRAINE DISABILITY ASSESSMENT SCALE (MIDAS) QUESTIONNAIRE,GCS =Glasgow coma Scale*

Table 5. Complications of migraine in prospective cross-sectional of migraine patients in Misan province, Iraq (*n*=1412).

Complications	Type of a migraine *ICHD.3b code	N (%)**
Chronic migraine	1.1, 1.2	92(6.5)
Headache attributed to the medication overuse	8.2	37(2.6)
Thromboembolic stroke	1.2	10(0.7)
Persistent aura without infarction	1.2.1.2	5(0.35)
Ischemic stroke	1.2	4(0.3)
Migraine triggered seizure	A.1.6	3(0.2)
Status migrainosus	1.2	2(0.14)
Transient ischemic attack	1.2,***FHM	2(0.14)
Total		155

* (International classification of headache disorder-3 version beta 2013)

**Mean age=10 years

1.1= Migraine without aura

1.2= Migraine with aura

1.2.1= Migraine with typical aura

1.2.1.2 =Typical aura without headache

A1.3.2 a Chronic migraine with continuous pain

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A1.6 Episodic syndromes-Childhood periodic syndromes, *Other subtype of migraine

***Others subtypes (Ophthalmoplegic 'migraine' Retinal migraine, Familial hemiplegic migraine (FHM), Sporadic hemiplegic migraine, Basilar-type migraine, Abdominal migraine, Benign paroxysmal vertigo of childhood)

3.5/1 female/male ratio is consistent with the results of large-scale studies[6,10,12]. This skewed sex ratio is mostly due to hormonal variation during menstruation and pregnancy, and to genetic predisposition[1]. The median age of first onset in this study was 21 ± 5.42 years, with range 12–45 years. Migraine without aura was the most common subtype (69.4%) in the sample. Childhood migraine prevalence was 0.8%, including migraine with aura and episodic syndromes/childhood periodic syndromes. The pediatric Glasgow Coma Scale (GCS) score in this subgroup ranged between 3 and 14, but this result was not significant. Patients experienced non-specific prodromes 1-1.5 hours before the attacks, including nausea, vomiting, and photophobia. About 27% of the patients in this study experienced transient aura during the study period. Visual aura was the most common (50%), while unilateral sensory symptoms, tingling and numbness was the second most frequent type of aura and transient dysphasic speech disturbance was the third, while motor symptoms were very rare. Aura occurs because of the spreading of a wave of depolarization (cortical spreading depression)[20], and is associated first with a reduction, and then an increase in blood flow, and affects the parieto-occipital cortex[10]. The mean frequency of acute migraine attacks was 2 ± 4.63 days per month; in very few patients (0.5%) the frequency of the attacks was 14–16 days per month, especially in patients suffering from migraine with aura and chronic migraine. The mean duration of acute attacks was 12–24 hours in 60% of the patients. The severity of acute attacks depends on their frequency, duration and disabling symptoms; in general, most of the acute attacks were moderate to severe[12]. In our study about 8% of migraine patients suffered from debilitating, disabling and incapacitating symptoms. Symptoms were considered disabling, if they reduced by half or more the patient's ability to work, or more generally to do what needs to be done, or at least 24 hours, thus impairing quality of life[2,11,18]. In this study about 10% of the patients had acute attacks associated with systemic hypotension (systolic blood pressure (BP) < 90 mmHg), especially in a migraine with aura, and women. Furthermore, systolic hypertension (≥ 150 mmHg) was found in 1.5% of the patients, especially in women. We found variation in the estimates of migraine prevalence and clinical characteristics symptoms, depending on the stage of the migraine (prodrome, aura, acute attack, and postdrome). One third of patients had a family history of migraine, showing that migraine is an inherited condition accompanied by episodic symptoms arising in the brain[10,19–21]. In our study chronic migraine with continuous pain and chronic migraine (according to alternative criteria) represented about 9% of the total sample, and had a detrimental influence on the patients' lives, impacting socio-economic functioning and quality of life. It usually develops from an episode of migraine, with or without aura, which turns into a continuum, with an undetermined annual conversion

rate[20,22]. Another important subtype of a migraine is medication-overuse headache (MOH), which represented about 2.6% of the whole sample.

The limitation of this study were that it was a single center, local, regional, monophasic study and there was high financial cost involved. Therefore, for future studies we recommend a multi-centric, national, and diphasic study to obtain more information and data to help advance management of migraine.

Conclusions

In our study, we observed that migraine causes a headache resulting in episodes of temporary functional disability and women suffered more than men (ratio of 3.5:1). The mean age at first attack was a young age, and a family history of migraine highly altered distribution. Migraine without aura was the most common type, and symptoms including nausea and vomiting and photophobia were experienced by patients, which were used to diagnose migraines. Experienced aura was the most common migraine with aura, but also aura without a headache and aura with migraine were prevalent; therefore, it is important to differentiate between migraine subtypes. Visual aura was the most common aura, while motor symptoms were very rare. Chronic persistent headaches were a common complication recorded. These features provide evidence for the creation of screening tools in migraine prevention migraine.

Data availability

F1000Research: Dataset 1. Excel sheet file of 1412 citizens from Misan province, Iraq whom suffer from migraine from 2010 to 2018., https://doi.org/10.5256/f1000research.16854.d229861[23]

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