Headache and blood pressure in primary health care setting in Kuwait

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ABSTRACT

Objectives: To identify the types of headache among patients, presenting at a primary health care setting, and to determine the correlation between headache and high blood pressure (BP).

Methods: This was a cross-sectional study administered in 2 primary health care centers (Fintas and AbuHalifa) of a regional health district in Kuwait from March 2003 to June 2003. Our study included 290 patients with different types of headache, and requested for BP measurement.

Results. The sample included patients, in the age group 15-80 years with an overall mean age of 41 (+13 SD) years. The male to female ratio was 1:2.7 and the majority (85%) of patients were Kuwaitis. Tension headache was the most frequent diagnosis (61.7%) among patients presenting with headache, followed by migraine (11.7%). The normal systolic BP was <140 mm Hg (52.8%), while 59% had normal diastolic BP, below 90 mm Hg. Increasing age was found to be associated with high BP levels ($p<0.001$). Diastolic BP was found significantly higher among males ($p<0.01$) Tension headache had higher levels of BP while migraine was found to have low levels. None of the sinusitis headache patients had high BP. Positive history of hypertension was found associated with high systolic and diastolic BP in tension and other type of headache ($p<0.001$).

Conclusion. Headache is a very common symptom among patients presenting at the general practice health care setting, with most cases diagnosed with tension-type headache, and females out numbering males. There was no positive correlation between headache and high BP. Physicians should discourage their patients from considering headache as a measure of their BP status.

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Patients often tell their physicians "I know when my blood pressure (BP) is high because I get a headache". The relation between headache and hypertension has been debated in the medical literature for almost a century.[1] In 1913, Janeway reported that hypertension and headache were associated.[2,3] However, following that classic paper, clinical and epidemiological studies have invariably reported conflicting data on the prevalence of hypertension in patients with headache.[4-10] Headache is one of the most frequent symptoms reported in medical practice, with an estimated annual prevalence of up to 90% in men and 95% in women.[11-19] There is a consensus within the International Headache Society (IHS) that chronic arterial hypertension of mild to moderate degree does not cause headache.[20] Some studies have shown higher prevalence of headache and migraine among hypertensive patients, while others such as Weiss, found no association between self-reported headache and BP, in a cross-sectional study in the United State of America.[21] The objective of our study is to identify the different types of headache that patients present in a primary health care setting,

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and to determine the correlation between headache and BP, in patients presenting with headache as the major complaint, and requesting for BP measurement to check whether they had elevated BP.

Methods. A cross-sectional study was carried out during the period from March 2003 to June 2003, in 2 health centers (Fintas and Abu-Halifa) in the Al-Ahmadi health region (one of the 5 major health regions in Kuwait). These 2 centers provide health services to a population of approximately 56,000 residents. The sample comprised 290 patients (0.52% of the population); gender and all ages, presenting with headache and requesting for BP measurement were included in the study. The data were obtained using a structured headache interview and BP examination, after soliciting the patient's agreement for participation in the study, and included information on such demographic factors as age, gender, nationality and occupation. The clinical data, apart from BP measurements, weres also recorded along with the history of hypertension, use of anti hypertensive drugs and type of headache, following IHS criteria for headache.[20]

A standardized protocol was used for BP measurement, and data recorded by 3 researchers. Patients were seated, while their BP was being measured using a mercury sphygmomanometer, after at least 4 minutes of rest, with cuff placed on the right arm. Systolic and diastolic pressure was recorded to the nearest 2 mm Hg. Blood pressure grading was carried out according to the World Health Organization (WHO) classification for hypertension.[22]

Statistical analysis. The data management, analysis and graphical presentation were carried out using the Statistical Package for Social Sciences, PC version 11.5, and descriptive statistics presented as Mean±SD. Association between variables was tested with Chi-square test and Crammers' V. Odds ratio (OR) with 95% confidence intervals (CI) was calculated for headache types and high BP. Student's t-test was applied for comparison of means between 2 groups and analysis of variance in more than 2, such as age groups. For analysis, systolic BP (SB) >140 mm Hg denoted higher level, and in DBP >90 mm Hg was high. The probability level of $p<0.05$ was considered as statistically significant.

Results. ***Systolic and diastolic BP grading.*** The study included a total of 290 patients. The mean SBP was 135.1 ± 20.6 and DBP 84.4 ± 11.4 mm Hg. Ninety-four (32.4%) patients had their SBP levels in the range 140-159 (mild), 31(10.7%) between 160 and 179 (moderate), and 12(4.1%) >180 (severe). As regard to DBP, 72 (24.8%) were in the range of 90-99 (mild), 33 (11.4%) between 100 and 109 (moderate) and 14 (4.8%) >110 (severe) (**Table 1)**. One hundred and thirty-seven (47.2%) were found having a higher SBP and 119 (41%) patients were found having higher DBP. Only 4-5% patients presented with severe hypertension.

Demographic characteristics and BP levels. The overall mean age was 40.9 ± 13.0 SD, ranging from 15-80 years. The majority were females (73.1%) and 84.8% were Kuwaiti patients. Kuwaiti females were significantly higher ($p<0.001$). The mean age was higher (42.9 ± 11.6 years) among males as compared to females (40.2 ± 13.5 years). However, no significant differences were observed in the mean age with respect to either gender or nationality groups. The most common age group was 35-44 years (31%), followed by 25-34 years (24%) and 45-54 years (22%). The maximum number of patients were housewives (43.4%), followed by professionals (21.4%) and employers (17.9%) (**Table 2**). The percentage of high SBP increased significantly from 24.3% in the age group of 25-34 to 93% among age ≥65 years. Similar increase of high DBP from 26-60% was observed in the same age groups. Higher BP was found to be associated with increasing age ($p<0.001$). Higher proportion of males had high BP but it was significantly higher among males with high DBP ($p<0.01$). No significant differences were noticed among Kuwaitis and non-Kuwaitis. Profession-wise, significant differences were

Table 1 - Patients according to blood pressure (BP) measurements (N=290).

Patient's BP	Systolic BP n (%)
BP levels	
<120	49 (16.9)
120-129	41 (14.1)
130-139	63 (21.7)
140-159	94 (32.4)
160-179	31 (10.7)
≥180	12 (4.1)
Mean ± SD	135.1 ± 20.6
BP levels	
<80	57 (19.7)
80-84	98 (33.8)
85-89	16 (5.5)
90-99	72 (24.8)
100-109	33 (11.4)
≥110	14 (4.8)
Mean ± SD	84.4 ± 11.4
Patients with ≥140 mm Hg BP were 137 (47.2%) and below 90 were 119 (415%)	

Table 2 - Patients presenting with headache according to demographic characteristics and blood pressure (BP) levels.

Demographic characteristics	Total patients n (%)	Systolic BP ≥140 n (%)	Diastolic BP ≥90 n (%)
Age group (years)			
15-24	23 (7.9)	3 (13)	2 (8.7)
25-34	70 (24.1)	17 (24.3)	18 (25.7)
35-44	90 (31)	42 (46.7)	42 (46.7)
45-54	65 (22.4)	41 (63.1)	34 (52.3)
55-64	27 (9.3)	20 (74.1)	14 (51.9)
≥65	15 (5.2)	14 (93.3)	9 (60)
p value		0.001	0.001
Gender			
Male	78 (26.9)	43 (55.1)	42 (53.8)
Female	212 (73.1)	94 (44.3)	77 (36.3)
p value		0.113	0.010
Nationality			
Kuwaiti	246 (84.8)	112 (45.5)	97 (39.4)
Non-Kuwaiti	44 (15.2)	25 (56.8)	22 (50)
p value		0.191	0.244
Occupation			
Employer	52 (17.9)	24 (46.2)	19 (36.5)
Professional	62 (21.4)	30 (48.4)	27 (43.5)
Laborer	22 (7.6)	10 (45.5)	12 (54.5)
Student	16 (5.5)	1 (6.3)	1 (6.3)
Household	126 (43.4)	64 (50.8)	54 (42.9)
Retired	12 (4.1)	8 (66.7)	6 (50)
p value		0.021	0.055
Total	**290 (100)**	**137 (47.2)**	**119 (41)**

Table 3 - Patients presenting with headache according to clinical features and blood pressure (BP) levels.

Clinical features	Total patients n (%)	Systolic BP ≥140 n (%)	Diastolic BP ≥90 n (%)
Headache type			
Tension	179 (61.7)	97 (54.2)	84 (46.9)
Migraine	34 (11.7)	12 (35.3)	12 (35.3)
Upper respiratory tract infections	32 (11)	12 (37.5)	9 (28.1)
Sinusitis	10 (3.4)	-	-
Others	35 (12.1)	16 (45.7)	14 (40)
p value			
Hypertension history			
Yes	107 (36.9)	81 (75.7)	65 (60.7)
No	183 (63.1)	56 (30.6)	54 (29.5)
p value			
Anti-hypertensive use			
Yes	101 (34.8)	78 (77.2)	62 (61.4)
No	189 (65.2)	59 (31.2)	57 (30.2)
p value			
Total	**290 (100)**	**137 (47.2)**	**119 (41)**

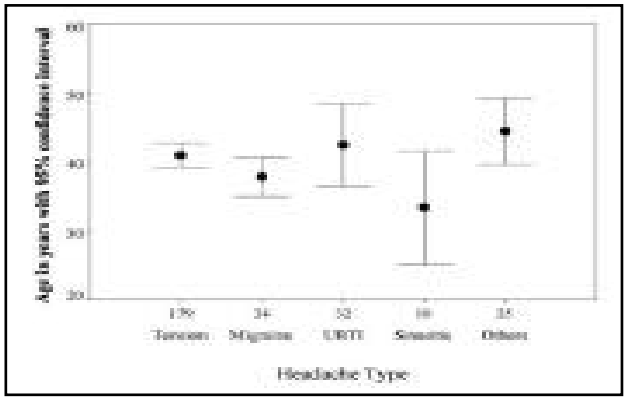

Figure 1 - Headache type and mean age. URTI - upper respiratory tract infections

observed, especially with regard to high SBP (p<0.021).

Clinical features and BP levels. Maximum patients, 179 (61.7%) were diagnosed for tension type of headache (**Table 3**). Headache due to migraine and upper respiratory tract infections (URTI), was each found in approximately 11% of the patients. Only 10 (3.4%) patients were diagnosed of sinusitis and remaining 35 (12.0%) as others, included pain due to toothache, ear pain, cervical pain and so forth. Only tension (54%) had a higher percentage of patients with high BP as compared to all other headache types. Similar distribution of headache types was observed by gender and nationality groups, with no significant differences. However, migraine was higher among females (13.2%) compared to males (7.7%). Tension was observed to be higher among non-Kuwaitis, whereas all other headache subtypes were found to be higher among Kuwaitis. Overall there was no significant difference (p=0.078) in the mean age of patients with respect to headache types, but migraine (37.8%) and sinusitis was found associated with comparatively lower mean age (33.4 years) (**Figure 1**). Thirty-seven percent were reported having history of hypertension, while 35% used anti-hypertensive drugs. Among these, approximately 76% had high SBP, and 60% and high DBP (p<0.001).

Hypertensive history, BP levels and headache subtypes. Tension type of headache was significantly associated with high BP levels, both systolic as well as diastolic, and also with positive hypertensive history (p<0.001) (**Table 4**). Migraine and sinusitis did not show any association with high BP levels. Upper respiratory tract infection was found to be associated with high SBP and positive hypertensive history (p<0.027). Both, systolic and diastolic high levels showed a significant association with other types of headaches, and as a whole, exhibited positive hypertensive history with high BP (p<0.001, OR=7.1 and 3.7).

Discussion. In this study, patients presenting with headache in a primary health care setting, and their relation to high BP was studied. Among 290 patients included in the study, headache was predominant in females more than males, a fact well documented in similar studies.[23-31] This predominance may be explained that females often seek medical care for assistance more than males. Marcelo et al[25] reported fewer males seeking medical care as compared to females. The mean age of patients was 40.9 ± 13 SD, a finding that is also reported internationally in other studies, with predominance in age groups 30-50 years. Younger ages were usually more complainers of symptomatic headache.[32] The final diagnosis of headache subtypes showed higher frequency of tension-type headache compared to migraine in both gender, and in all ages, while migraine was predominant as the second most frequent diagnosis in females. These findings are in conformity to those cited in many other studies.[11-14,33,34] The reason for female predominance with regard to migraine may be explained by the low threshold of tolerance to pain in some females or due to relation with hormonal factors, such as premenstrual tension, or due to more pronounced symptoms of migraine.[22,35,36] It is interesting that in males presenting with headache, the second most common cause of presentation was due to URTI and sinusitis. They presented with headache as the main complaint rather than symptoms of infection. This finding needs to be taken into consideration by clinicians treating such patients.

Approximately two-third of the samples had no previous history of hypertension, and almost all those known to be hypertensives were on antihypertensive therapy. Strikingly, 75.7% of the hypertensive patients were having SBP readings of >140 mm Hg and DBP >90 mm Hg. This result indicates that BP control in this group was sub-optimal at the day of examination, though readings were mostly in the mild and moderate grades of BP grading system. Reasons for such findings need to be corroborated through further investigation to reach a better control of BP. Thirty percent of patients with negative history of hypertension had BP levels elevated according to WHO classification of hypertension.[22]

Table 4 - Patients presenting with headache according to clinical features and blood pressure (BP) levels.

Headache type/ hypertensive history	Systolic BP ≥140	Systolic BP <140	Odds ratio (95% confidence interval)	Diastolic BP ≥90	Diastolic BP <90	Odds ratio (95% confidence interval)
Tension						
Yes (n=65)	55	10	9.43	46	19	5.16
No (n=114)	42	72	(4.35-20.45)	38	76	(2.67-9.96)
p value	0.001			0.001		
Migraine						
Yes (n=10)	6	4	450	6	4	5.16
No (n=24)	6	18	(0.94-21.56)	8	16	(0.29-6.12)
p value	0.001			0.714		
Upper respiratory tract infections						
Yes (n=15)	9	6	7.00	6	9	3.11
No (n=17)	3	14	(1.39-35.36)	3	14	(0.62-15.72)
p value	0.027			0.243		
Sinusitis						
Yes (n=4)	-	4	-	-	4	-
No (n=6)	-	6	-	-	6	-
p value	-			-		
Others						
Yes (n=13)	11	2	18.70	9	4	7.65
No (n=22)	5	17	(3.07-113.9)	5	17	(1.63-35.81)
p value	0.001			0.012		
All types						
Yes (n=107)	81	26	7.07	65	42	3.67
No (n=183)	56	127	(4.11-12.15)	54	129	(1.24-6.11)
p value	0.001			0.001		
Total	**137**	**153**		**119**	**171**	

Such result demonstrates the necessity of screening for hypertension, as recommended by hypertension protocols. The BP readings were higher in older individuals ($p<0.001$). Males had a higher mean of both SBP and DBP when BP was adjusted for age. Similar findings have also been reported by other studies.[2,26,32] When BP measurements were compared to headache types, it was found that SBP readings (47.2%) were higher than DBP readings (41%). This finding is not suggestive of a positive correlation between headache and BP levels at that day. This negative relation is cited in many similar studies carried out in other societies.[5,6,26,32] In addition, higher levels of readings were prevalent in tension type headache, while migraine cases showed lower levels of BP; a finding widely reported in literature.[32] Other types of headache had no correlation with BP at the day of examination.

Housewives constituted 43.4% of all patients in our sample, and >50% of them had BP measurements within normal range. These results may reflect the anxiety that housewives have rather than any organic disorders. No significant association was found between patients occupation and high BP levels.

In conclusion, headache is a common symptom presenting in general practice. A possible association between headache and arterial hypertension has long been discussed with contradictory results. Although, the headache classification of IHS does not include chronic arterial hypertension, of mild to moderate degree, as a cause of headache, general practitioners should be made aware of the diagnostic criteria of headache produced by IHS. Our negative results regarding headache's association with hypertension are in accordance with those found in other studies We have found no correlation between BP and headache as measured at the day of headache (point headache). The correct diagnosis of hypertension demands further ascertaining by repeated measurements of BP, according to the WHO criteria for the diagnosis and management of high BP. Moreover, headache appears to be a signal of socio-psychological disorder, rather than a truly hypertensive symptom. It is often precipitated or aggravated by the recognition of hypertension by the patient. Therefore, patients should be discouraged by their physician to consider headache as a symptom of their BP status. Prompt diagnosis and optimum treatment have to be carried out following consensus protocols. Screening patients for high BP, according to WHO criteria, is also strongly recommended for early detection of hypertension and better management in order to avoid long-term implications of the disease.

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