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PREVALENCE OF HYPERTENSION AND ASSOCIATED VARIABLES IN HOSPITAL STAFF IN IRAN

Leyla SAHEBI
Reza Gholi VAHIDI
Seyed Housein MOUSAVI

National Public Health Management Center, Tabriz University of Medical Sciences

Tabriz, Iran

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Correspondence to:
Leyla Sahebi
Department of Public Health, National Public Health Management Center, Tabriz University of Medical Sciences, Tabriz, Iran

Phone: +98 914 3094167
E-mail: sahebileila@yahoo.com

ABSTRACT

Introduction: The aim of this study was estimating the prevalence and risk factors of pre hypertension (Pre-HTN) and hypertension (HTN) among the staff of Shiraz (located at south of Iran) hospitals.
Methods: A random sample of 1027 staff was selected. Sampling method was categorical random sampling. Part of the data was collected using interviews, while the rest was obtained from clinical examinations.
Results: In this study 30.5% were males and 69.5% females. The prevalence of pre hypertension (Pre-HTN) and hypertension (HTN) was 37.0% and 8.6% respectively. Among these, 95.45% had Grade 1 and 4.55% Grade 2 hypertension. The prevalence of Pre-HTN and HTN was significantly higher in men than in women. Only 6% of hypertensive staff were on anti-hypertensive pharmacological treatment. Among the treated patients, BP was under control in 35% of staff. Multiple multi nominal regression analysis revealed that overweight and non-smoking males were strongly associated with Pre-HTN. The Male gender, increasing age, to work in clerical group and job dissatisfaction was strongly associated with HTN.
Conclusion: The strikingly low level of knowledge and failure to control hypertension in hospitals are problems that need to be considered. Due to prominent difference in prevalence of this disease in men and women, male hospital staff should be considered as a high-risk group. Body mass index (BMI) and job satisfaction are two adjustable variables which need practical remedies. Advancement of knowledge and emphasis on physical activities for white-collar personnel are important steps that have potentially positive effects. In addition, although more studies are needed to investigate the relationship between cigarette smoking and blood pressure, it is prudent to monitor blood pressure closely in cardiac patients who are obligated to quit smoking.

Keywords: *hypertension; hospital staff; Iran*

INTRODUCTION

Hypertension is an important public health problem worldwide because of its high prevalence and detrimental squeal [1-2]. It is ranked third as a cause of disability-adjusted life-years and a leading risk factor for mortality [3]. Hypertension is the most common treatable risk factor [4]. It is an extremely common finding in the community and a risk factor for myocardial infarction, stroke, congestive heart failure, stage renal disease, and peripheral vascular disease [5-7].

Large population-based cohort studies consistently show continuous, strong and graded relationship between blood pressure and the subsequent occurrence of various atherosclerotic events [8-9]. In the middle of all this, the relationship between BP and risk of CVD events is continuous, consistent, and independent of

Table 1. *WHO Classification of blood pressure for adults*

Category	Systolic, mmHg	Diastolic, mmHg
Hypotension	< 90	or < 60
Normal	90 – 119	and 60 – 79
Pre hypertension	120 – 139	or 80 – 89
Stage 1 Hypertension	140 – 159	or 90– 99
Stage 2 Hypertension	≥ 160	or ≥ 100

other risk factors [6-7]. On the basis of available information, For individuals 40–70 years of age, each increment of 20 mmHg in systolic BP (SBP) or 10 mmHg in diastolic BP (DBP) doubles the risk of CVD across the entire BP range from 115/75 to 185/115 mmHg [6-7]. Furthermore, hypertension can intensify the effects of other cardiovascular risk factors such as dyslipidaemia, smoking, diabetes mellitus, and obesity [10]. Cardiovascular disease (CVD) is responsible for 30% of all deaths worldwide [11-12]. It remains the most common cause of death in industrialized countries [13] and Iran [14]; furthermore prevalence of cardiovascular disorder and hypertension is rising in Iran [15-17].

The prevalence of hypertension has been widely reported in various regions of the world [18-19]. It affects approximately 1 billion worldwide [6]. The prevalence of hypertension according to new criteria (>140/90 mm Hg) varies between 15-35% in urban adult populations of Asia [20]. This range was estimated 19.4%, 17.8% and 18.3% among males, females and both sexes in Iran [21]. Recent data from the Framingham Heart Study suggest that individuals who are normotensive at age 55 have a 90 percent lifetime risk for developing hypertension [6]. Hypertension and stroke occur at a relatively younger age in Asia [20]. Overweight, higher social class and smoking are risk factors for hypertension in most of the countries of Asia [20]. Pharmacological treatment of hypertension has been shown to decrease the risk of cardiovascular disease complications. But non-pharmacological intervention provides an effective means to lower BP and has been emphasized increasingly as a useful method for both the prevention and treatment of hypertension [10].

This study was conducted to determine the prevalence of hypertension among hospitals staff of Shiraz (Iran), to identify associated professional risk factors, to determine of distribution status of Blood Pressure and to survey its related causes.

PATIENTS AND METHODS

The survey was conducted 2006 among staff of 24 hospitals of Shiraz who had at least, one-year record of service. A random sample of 1027 (20%) of the hospitals staff population was selected. Sampling method was categorical and the categories were nursing group (nurses, health workers and obstetricians), official group and the menial group. Sampling method of any group was carried out systematically. First data were collected by 2 questionnaires consisted of 1: demographical and occupational questions and 2: GHQ28 (General Health Question) for survey mental disorders. The cut point for disease was set at 22, so that individuals with a score of 22 or higher were evaluated as having psychological disorder, while those with a score below 22 were evaluated as normal[22]. Subjects reported more than 5 times headache during preceding year were invited to have a free general health examination, filling IHS (International Headache Society) questionnaire [23-24], followed by clinical interview, general physical and neurological examinations.

A face to face interview was conducted of eligible member's hospitals. BMI measurement: Height was measured with participants standing without shoes to the nearest 0.5 cm using a secured metal ruler, while weight was measured in light clothing using calibrated scales. Underweight, normal weight, overweight, and obesity were defined as BMI, 18, 18≤BMI≤ 24.9, 25≤BMI≤29.9, and BMI≥30, respectively [25]. BP was recorded by trained researchers, according to WHO (World Health Organization) standardized criteria [26]. BP was in the sitting position after 6 minute rest and the mean of two reading from right arm was used in the analysis. High BP was defined according to the JNC 7 (The Seventh Report of the Joint National Committee) and WHO Guideline criteria (Table1). Subjects receiving at least one antihypertensive drug and presenting with a normal BP level (<140/90mmHg) were controlled and those subjects having high blood pressure in spite of pharmacological treatment were classified as uncontrolled hypertensive 6, [26-28].

Occupational variables were (private/State hospital, night shift, work history, hours in week, sleeping pattern, second job, work status, and job satisfaction), questions were also asked about eating tea, consumption of drugs, sporting and life satisfaction. Univariate and multiple nominal regression tests were used to asses of relation BP with demographical and occupational variables, Analyses were performed using SPSS16.

RESULTS

A total of 1027 subjects, 313 (30.5%) men and 714 (69.5%) women, were included in this analysis. Mean age of men and women were 35.37 (95%CI=34.28-36.48) and 33.27 (95%CI=32.6-33.9) years, respectively.

Thirty-seven percent of participants (382 cases) had pre hypertension and 8.6% (88 cases) had hypertension, among these, 95.45% (84 cases) had Grade 1

Table 2. *Prevalence of hypertension according to selected classical predictor*

Predictor	Cofactor	N*		Pre hypertension		hypertension		PR**
		n	(%)	n	(%)	n	(%)	
Global		1027		382	37.2	88	8.6	
Age group (Year)	19-35	635	61.8	224	35.3	31	4.9	1
	36-45	242	23.6	91	37.6	35	14.5	2. 95
	>45	150	14.6	67	44.7	22	14.7	3.0
Sex	Female	714	69.5	231	32.4	37	5.2	1
	Male	313	30.5	151	48.2	51	16.3	3.13
Education groups	Collegiate	567	55.2	206	36.3	30	5.3	1
	Elementary& diploma	382	37.2	141	36.9	47	12.3	2.32
	lower &equal primary	78	7.6	35	44.9	11	14.1	2.66
Married status+	1	328	31.9	123	37.5	14	4.3	1
	2	646	62.9	238	36.8	71	11.0	2.56
	3	53	5.2	21	39.6	3	5.7	1.33
Job groups	Nurse	542	52.8	194	35.8	23	4.2	1
	Clerical& managerial	232	22.6	83	35.8	29	12.5	2.98
	Menial	253	24.6	104	41.5	36	14.2	3.38
Sleeping status	Normal	627	61.1	243	38.8	54	8.6	1
	Abnormal	400	38.9	139	34.8	34	8.5	0.99
Sleeping hours (Hours/Day)	<5	42	4.1	16	38.1	6	14.3	2.42
	5-8	650	82.8	322	37.9	74	8.7	1.47
	>8	135	13.1	44	32.6	8	5.9	1
History of work	<10	629	61.2	229	36.4	35	5.6	1
	10-20	217	21.1	84	38.7	26	12.0	2.14
	>20	181	17.6	69	38.1	27	14.9	2.67
BMI***	<25	669	65.1	222	33.2	44	6.6	1
	25-30	286	27.8	126	44.1	33	11.5	1.74
	>30	72	7.0	34	47.2	11	15.3	2.32
Having tea	Yes	834	81.2	326	39.1	71	8.5	1
	No	193	18.8	56	29.0	17	8.8	1.04
Having coffee	Yes	112	10.9	43	38.4	7	6.2	1
	No	915	89.1	339	37.0	81	8.9	1.44
Smoking	No	968	94.3	361	37.3	78	8.1	1
	Yes	59	5.7	21	35.6	10	16.9	2.86
Sporting	No	706	68.7	245	34.7	53	7.5	1
	Yes	321	31.3	137	42.7	35	10.9	1.45
Having mental disorders ****	No	468	45.6	163	34.8	33	7.1	1
	Yes	559	54.4	219	39.2	55	9.8	1.38
Having shift work	No	445	43.3	173	38.9	28	6.3	1
	Yes	582	56.7	209	35.9	60	10.5	1.66
Having second job	No	906	88.2	335	37.0	74	8.2	1
	Yes	121	11.8	47	38.8	14	11.6	1.41
Handedness	Right	832	81.0	303	36.4	72	8.7	1
	Left	98	9.5	40	40.8	11	11.2	1.28
	Right &Left	97	9.4	142	40.2	5	5.2	.59
Work status	Walking	556	54.12	200	36.0	42	7.6	1
	Seating	123	12.0	40	32.5	15	12.2	1.6
	Walking& Seating	348	33.9	142	40.8	31	8.9	1.71
Blood Group	A	231	22.5	85	36.8	15	6.5	1
	B	216	21.0	72	33.3	15	6.9	1.06
	AB	114	11.1	43	37.7	5	4.4	.68
	O	361	35.4	145	39.8	42	11.5	1.77

+Marital status; 1: single 2: married 3: widow (widower) and died spouse
**N= number of workers (global and in each level);*
***PR = prevalence ratio (calculated based on current criteria of 140/90 mm Hg)*
****BMI=Body Mass Index*
*****The criteria for diagnosis by GHQ28*

and 4.55% (4 cases) Grade 2 hypertension. Isolated systolic hypertension had lower prevalence (30cases; 2.9%) within the population in contrast with diastolic hypertension (78 cases; 7.6%). The average of SBP (systolic BP) and DBP (diastolic BP) were 111.27 (95%CI=110.54-112.0) and 72.71 (95%CI=72.14-73.28) mm Hg respectively. The average SBP and DBP hypertensive staff were 146.00 (95%CI=143.0-148.98) and 91.09 (95%CI=90.2-91.98) mm Hg, respectively.

The overall prevalence of pre hypertension and hypertension was significantly higher in men than in women (48.2%, 95%CI=45.38-51.02 and 16.3%, 95%CI=12.2-20.4, vs. (32.4%, 95%CI=28.96-35.84 and 5.2%, 95%CI=3.63-6.77) respectively, (Table3). Prevalence of hypertension increased progressively with age, from 4.9% (95%CI=3.22-6.58) in 19 to 35 year-olds to 14.7% (95%CI=9.1-20.3) in those 46 to 76 years-olds (Table2). The prevalence of hypertension among overweight (11.5%) and obese (15.3%) groups was, respectively, 1.74 and 2.32 times higher than staff whose BMI was within the normal range (Table 2).

There was a clear inverse relation to educational level, the prevalence of hypertension ranged from 14.1% among staff with lower educational levels to 5.3% among those with a college education (Table 2). The prevalence of hypertension among married staff was 2.56 and 1.93 times higher than singles and without spouse (widow/widower/died) staff respectively (Table 2). The prevalence of hypertension among clerical/management group and menial group was 2.98 and 3.38 times higher than nurse group respectively (Table2). There was a clear inverse relation to sleeping range , the prevalence of hypertension ranged from 14.3% among staff with lower sleep range to 5.9% among those with higher sleeping range (Table 2). Prevalence of hypertension according to some predictors has presented in Table2.

The awareness of hypertension was 3% (13 of 470 cases) but receiving antihypertensive drug was (26 cases) so that 6% (13 cases) of the staff receiving antihypertensive drug was not aware of his/her hypertension). The ratio of control hypertensive was 35% (9 of 26 cases). Among uncontrolled cases (17 cases) 47 %(8 cases), 12% (2 cases) and 41% (7 cases) were unmoral DBP, SBP and DBP&SBP respectively.

Univariate nominal regression showed that the odds of having pre hypertension increased, in males, (OR=2.6, P<0.001, 95%CI=1.96-3.52) with increasing age; in staff with 19-35 ages compared with higher 45 ages (OR=1.86, P<0001, 95%CI=1.26-2.7) and in staff with 35-45 ages compared with higher 45 ages (OR=1.4, P<0001, 95%CI=0.89-2.19), in clerical group in comparison with nursing group (OR=1.56, P<0.006, 95%CI=1.14-1.85), with increasing body mass index (OR=2.29, P<0.002, 95%CI=1.34-3.89), with having physical activity (OR=1.53, P=0.003, 95%CI=1.16-2.6), in lower and equal primary school group (OR=1.75, P<0.030, 95%CI=1.06-2.93) compared with Collegiate group, in staff without chronic headaches (OR=1.39, P<0.015 ,% 95 CI=1.066-1.8) with having tea (OR= 1.6, P<0.008, 95%CI=1.1.13-2.26) and with increasing rate of having tea (OR=1.63, P<0.017, %95 CI=1.09-2.43).

Also univariate nominal regression showed that the odds of having hypertension increased, in males, (OR=5.54, P<0.001, 95%CI=3.46-8.88) with increasing age (OR=4.42, P<0.001, 95%CI= 2.4-8.1), in clerical group compared with nursing group (OR=3.73, P<0.001, 95%CI=1.9-5.78) with increasing body mass index (OR = 3.73, P<0.001, 95%CI= 1.73-8.06) with having physical activity (OR=1.81, P<0.013, 95%CI=1.16-2.6), in lower and equal primary school group (OR=3.79, P< 0.030, 95%CI=1.74-8.28) and in diploma & high school groups compared with Collegiate group (OR=2.67, P<0.0001, 95%CI=1.63-4.54) with increasing rate of having tea (OR=3.2, P<0.0003, % 95 CI=1.49-6.94) in staff having mental disorders (OR=1.591, P<0.049, %95 CI=1.02-2.53) in staff without child (OR = 2.29, P<0.022, %95CI=1.13-4.63), in staff without life satisfaction (OR= 1.69, P<0.031, %95 CI=1.13-2.88) in staff having chronic disease (OR=1.8, P< 019, %95CI=1.1-2.99) in non smokers (OR=2.42, P<0.023, %95CI=1.13-5.18,) in married staff (OR=2.87, P<0.0001, %95CI=1.58-5.23) and with increasing work history (OR= 3.31, P< 0.0001, %95CI=1.087-5.78).

Variables with P≤0.20 including: gender, age, job group, sleeping status, rate sleeping, having night shift, having child, work history, BMI, having chronic disease, having tea, smoking, sporting, job satisfaction, life satisfaction, having mental disorders, having chronic headaches, were entered and analyzed in multinomial regression model. The OR of a male staff having pre hypertension was 3.5 times higher than that for a female staff. Obese individuals (BMI>30) were 2.46 times more likely to have pre hypertension than individuals with a BMI<25 (OR 2.46, 95%CI=1.28-4.7). A non-smoker was 2.13 times more likely to have pre hypertension compared with a smoker (OR 2.13, 95%CI=1.02–4.35).

Odds of having hypertension increased, in males, with increasing age, in clerical group compared with nurse group and in job dissatisfaction. Using the multinomial regression model, the odds of hypertension prevalence increased as age increased. The OR of a male staff having hypertension was seven times higher than that for a female staff. Clerical groups had more odds to have hypertension than nurse group (OR 3.8, 95%CI=1.34-10.6). OR of staff with job dissatisfaction was 2.1 times higher than staff with job satisfaction (OR 2.1, 95%CI=1.02-4.31). (Table 3)

Table 3. *Relationship between pre hypertension and hypertension with demographical and occupational variables in hospitals staff*

Feature	Group	Pre hypertension			Hypertension		
		OR	P-Value	CI 95%OR	OR	P-Value	CI 95%OR
Age group (Year) (%)	*19-35*	1	-	-	1	-	-
	36-45	2.23	0.063	0.96-4.34	4.2	0.021	1.24-7.2
	>45	1.59	0.132	0.66-2.94	0.97	0.948	0.392-2.42
Sex (%)	*male*	3.5	0.0001	2.24-5.56	7.1	0.0001	3.36-14.9
Education groups (%)	*Lower & equal primary*	1	-	-	1	-	-
	Elementary &diploma	0.98	0.96	0.43-2.23	0.92	0.90	0.25-3.39
	Collegiate	1.34	21	0.55-2.1	1.15	0.75	0.49-2.7
Job groups (%)	*Nurse*	1	-	-	1	-	-
	Clerical& managerial	1.1	0.8	0.6-1.9	3.8	0.012	1.34-6.6
	Menial	1.08	0.8	0.59-2.0	0.93	0.87	0.37-2.33
Having child (%)	*yes*	1.36	.52	0.55-1.36	1.34	0.54	0.53-3.4
Sleeping status (%)	*Abnormal*	0.92	0.63	0.63-1.35	1.06	0.86	0.53-3.45
Sleeping hours (Hours/Day)	*<5*	1	-	-	1	-	-
	5-8	0.68	62	0.15-3.15	0.32	0.056	0.1-1.03
	>8	0.84	0.74	0. 30-2.36	0.179	0.059	0.27-.62
History of work	*<10*	1	-	-	1	-	-
	10-20	0.57	0.13	0.27-1.2	0.104	0.39	0.13-1.2
	>20	0.62	0.12	0.34-1.13	0.388	0.66	0.26-1.69
Having chronic disease*	*yes*	0.9	0.73	0.52-1.57	1.1	0.85	0.47-2.9
BMI**	*<25*	1	-	-	1	-	-
	25-30	2.46	0.007	1.28-4.7	12.1	0.17	0.73-16.25
	>30	2.65	0.378	0.7-2.59	0.84	0.74	0.29-2.4
Having tea (%)	*yes*	1.64	0.087	0.93-2.9	1.07	0.89	0.44-2.58
Amount of tea+	*1*	1	-	-	1	-	-
	2	0.92	0.68	0.93-2.9	1.08	0.07	0.92-8.26
	3	1.64	0.087	0.93-2.9	1.08	0.85	0.51-2.27
Smoking (%)	*yes*	0.47	0.044	0.23-0.98	0.57	0.28	0.2-1.57
Sporting (%)	*yes*	1.6	0.75	0.7-1.6	1.49	0.25	0.76-2.93
Satisfaction of job (%)	*no*	1.39	0.12	0.9-2.08	2.1	0.04	1.02-4.31
Satisfaction of live (%)	*no*	0.93	0.98	0.67-1.4	0.88	0.71	0.44-1.74
Having mental disorders (%) ***	*yes*	0.94	0.77	0.63-1.4	1.1	0.849	0.41-2.9
Having chronic headache****	*yes*	0.72	0.099	0.5-1.06	0.62	0.18	0.31-1.25
Having shift work	*yes*	1.37	0.124	0.92-2.04	1.45	0.31	0.72-2.94

**The mean of chronic disease in having cardio vesicular disorder, cancerous, diabetic and renal disorder*
***BMI=Body Mass Index*
****The criteria for diagnosis by GHQ28*
*****The mean of chronic headache in having migraine, tension type headache (TTH) and mix headache (migraine and TTH with International Headache Society (IHS)*
+The amount of tea: 1:1-2 cup of tea, 2: 3-4: cup of tea and 3: >4 cup of tea.

DISCUSSION

Prevalence proportions of pre-hypertension and hypertension in hospital employees in Shiraz were 37% and 8%, respectively. Of those with hypertension, 95.5% had Grade I hypertension, while 4.6% had Grade II disease. In the previous studies, the prevalence of hypertension in Iranian adult population was 22% in 2000, [10] 17.2% in 2004,[28] and 23.35% in 2008.[29] Also, in a study conducted in Kerman-shah on health care sector workers with the age of 15 years or higher, this proportion was 15.8%. [30] In Asian studies, prevalence of hypertension in individuals above 15 years of age was more than 4 times in South Korea (33.7%) (2001)[31] and more than 3 times in Malaysia (27.8%) (2008)[13] compared to the present study. In Europe, the average prevalence of hypertension was 44.2% in 2003, specifically 37.7% in Italy, 38.4% in Sweden, 41.7% in the UK, 46.8% in Spain, 48.7% in Finland, and higher than all, 55.3% in Germany.[4] In North America, the average prevalence was 27.6%. In particular, this rate was 27.4% in Canada and 27.8% in USA.[4] The prevalence of hypertension in hospital staff was 9.7% in Spain (1997)[32] and only 8% in US hospitals. [33]Also, this prevalence was reported 5% in a general hospital in Spain (2007),[34] and was 26% in another study performed on hospital employees in Brazil (in São Paulo), where it was higher than the rate observed in the general population of the city of São Paulo. [36] So far, no study has been performed on hypertension in hospital employees in Iran. In the present study, the prevalence was lower than estimations reported in various studies of general population. This discrepancy can be due to population structure, since in the present study, 85.4% of employees were under 45 years of age, 62% were female, and 55% has university education. However, methodology and diagnosis criteria were similar and cannot be sources of the observed differences in estimations.

There are some controversies about factors involved in differences among various population groups and even among various cities. According to Wolf Maier, even though BMI, stress, and alcohol consumption are highly influential in these differences, the exact causes of substantial differences in estimations are not completely clear.[4] Comparing the prevalence of hypertension in hospital employees of other countries with general population; the rates have been lower than general population or even lower-class jobs (rejecting the healthy worker effect). For example, this rate was 20.2% in textile workers in Inida, [20] and it was 27.1% in governmental employees in Nigeria. [37] It is totally clear that a higher level of knowledge in hospital employees is not creating a higher performance for control of the disease. For example, in the present study, the level of knowledge was only 3%. In a study by Familoni in Nigeria, the knowledge level of factory workers was significantly higher than that of hospital white-collar employees [37]. Therefore, it is not right to believe that working in a medical environment causes a higher level of knowledge for all employees. In the present study, prevalence of systolic hypertension was lower than diastolic hypertension (2.9% vs. 7.5%). Similarly, in the study by Inho from South Korea, the prevalence of systolic hypertension was lower (4.33%) [31]. The average systolic and diastolic blood pressure was 111.27 mm Hg and 72.71 mm Hg, respectively.These average levels were 133.49 Hg mm and 84.54 Hg mm, respectively, in administrative employees in Nigeria [37]. The prevalence of pre-hypertension and hypertension was higher in men (48.2% and 16.3%) than in women (32.4% and 5.2%), and this difference was substantial and statistically significant using multivariate regression test. In this regard, there is no consensus among studies performed in Iran. For example, some studies report a higher prevalence in women, 16-17, 38 while other studies report a higher prevalence rate in men [29-30]. In studies performed in other countries, including Nigeria, [36] Malaysia,[13] India,[39] and Greece,[40] the prevalence of hypertension was lower in women than in men. Our estimations of the prevalence of hypertension in different age groups of men and women show that the prevalence of hypertension was higher in men even in the age group of above 50 years. However, in this age group, the prevalence of pre-hypertension was higher in women, a result which is consistent with the study performed in Malaysia [13]. In the current study, the prevalence of hypertension was correlated with increasing age, and this result is confirmed by many studies performed on this topic[1,3-4,7-8,11-13,16-19,27,29]. The prevalence of hypertension in married employees was 2.56 and 1.93 times the prevalence in single and divorced employees, respectively. The relationship between marital status and hypertension was not statistically significant in this study. According to Sheldon from Canada, low cohesive marriage increases the probability of systolic hypertension [41]. Lipowicz (2005) reported that never-married men had a higher blood pressure then married men and claimed that psychological stresses have an important effect in emergence of hypertension [42]. In studying the relationship between hypertension and educational level, a reverse correlation was found between educational level and blood pressure. This finding is consistent with results reported in Brazilian nurses and Malaysian general population [13-43]. In this model, the chance of hypertension for administrative employees was 3.8 times the chance for nursing personnel. In the present study, similar to some other investigations,[10,28,32,36,44] there was a statistically significant relationship between pre-hypertension and BMI, though some studies have found no correlation between blood pressure and BMI [13,31]. In our model, non-smoking individuals had a higher chance of hypertension, and this result is consistent with the study performed in Brazil.[13] Also, the chance for acquiring hypertension in employees who didn't have job satisfaction was 2.1 times the chance for other employees. This is most probably related to the high level of stress in employees without job satisfaction. According to Russell, a number of studies report a strong correlation between job stress and blood pressure and cardiac disease [45]. In a study performed in Taiwan (2007), there was a statistical correlation between working shifts and blood pressure [46]. However, such a correlation was not found in our study. In the present study, there was a reverse relationship between sleeping hours and increase of blood pressure. Similarly, a study in USA reported that insufficient sleep significantly increases the likelihood of hypertension [47]. In our model, this relationship was not statistically significant. According to our results, the employees who suffered chronic headache had blood pressure values comparable to the employees without headache. This is consistent with the findings of Walter [48].

CONCLUSIONS

Although the prevalence of hypertension in the current study was lower than general population, the low level of knowledge and poor control of hypertension in hospital employees call for timely actions for advancement of knowledge and control of the disease (Especially for male hospital workers). This study uncovers BMI and job satisfaction as two adjustable variables that can be influential in proper control of this disease. Proportionality between capabilities and duties, adjustment of tasks and working hours, and provision of facilities for spare time of personnel can have positive effects on mental well-being of employees, and hence, can lead to adjustment of their blood pressure values. Low level of activity and sedentary condition of administrative staff can be important causes for higher prevalence of hypertension in these employees compared to nursing staff. Proper education and expansion of physical activity can have positive effects in this regard. Noting the reverse correlation observed between smoking and hypertension, while the author believes more studies are required on this topic, proper cautionary measures for permanent control of blood pressure should be taken in cardiac patients who are compelled to quit smoking.

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