

Knowledge regarding risk factors of hypertension among entry year students of a medical university

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ABSTRACT

Context: Hypertension in youth is increasing, but there is a dearth of data about the knowledge of risk factors in this age group. **Aims:** To assess the knowledge of risk factors of hypertension among university students and associate it with the blood pressure, physical activity, family history of cardiovascular disease (CVD), and sociodemographic variables. **Materials and Methods:** A cross-sectional survey among students enrolled in the first year, in the four academic programs, with the use of a validated, self-administered questionnaire on physical activity in the past 30 days and knowledge of risk factors of hypertension. A score of 6 on 11 was considered as good knowledge for modifiable risk factors. Blood pressure was also measured. The data was analyzed using PASW-17, Chi square test, and binary logistic regression analysis was done. **Results:** Of the 110 participants, 69.2% were < 20 years of age, 76.4% were females, and 40% were Arabs. Stress, high cholesterol, obesity, and smoking were identified as risk factors by 75.5, 73.6, 77.6, and 71.8%, respectively; 69.1% considered high salt intake and 62.7% considered high calorie diet as risk factors. Energy drink was considered as a risk factor by 64.5%, coffee consumption 35.5%, physical inactivity 47%, and oral contraceptives 13.6%. Half the group did not consider a family history of CVD as a risk factor, 60% did not consider older age as a risk factor, and 88% did not think male gender was a risk factor. Knowledge of modifiable risk factors was better than that of non-modifiable risk factors. Although nationality, course of study, raised blood pressure, and history of diabetes showed significant association with good knowledge, their net effect was not significant by the Adjusted Odd's Ratio. **Conclusions:** The study identified some gaps in knowledge regarding both modifiable and non-modifiable risk factors of hypertension among students. A larger study would enable health promotion activities tailored to the needs of this age group.

Key words: Hypertension, knowledge, risk factors, university students

INTRODUCTION

Hypertension is a major contributor to the global disease burden.^[1] It poses an important public health challenge to both economically developing and developed countries, including Asia.^[2,3] The prevalence and rate of diagnosis of hypertension in children and adolescents appears to be increasing.^[4]

Hypertension confers the highest attributable risk to deaths from cardiovascular disease^[5] and epidemiological data provide convincing evidence that the risk of cardiovascular disease related to blood pressure is graded and continuous.^[6] This risk is evident even in childhood; with elevated blood pressure predicting hypertension in adulthood,^[7] and adverse effects of elevated blood pressure in childhood on vascular structure and function, specifically left ventricular hypertrophy, are already apparent in youth.^[8-10] Reduction of blood pressure reduces this risk in people with and without hypertension and is a desired goal in children and adults.^[11,12]

Even as most studies describe knowledge of hypertension and its risk factors in older adults and the elderly,^[13] there is a paucity of such data among teenagers and young adults,

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as they are considered to be at a lower risk of developing the disease. With a growing problem of hypertension worldwide, there is a concern that hypertension in young adults may also be on the rise and that cases are not detected because of inadequate screening in this age group.^[14]

The epidemiology of demographic transition states that a long-term shift occurs in mortality and disease patterns, whereby infectious diseases are gradually displaced by degenerative and man-made diseases as the chief form of morbidity and death.^[15] Furthermore, evidence shows that UAE is a country in transition where people have adopted western living patterns; risk factors such as sedentary lifestyle;^[16,17] obesity, stress, unhealthy diets;^[18,19] and smoking^[20-22] have all been demonstrated in young adults. The country also has an increased prevalence of hypertension 19–25%.^[23]

Knowledge of the predisposing risk factors is vital in the modification of lifestyle behaviors conducive to optimal cardiovascular health.^[24,25] Measuring and appropriately disseminating knowledge of the modifiable risk factors at an early age is an essential preventive educational approach. Strategies to achieve even a modest lowering of the levels of blood pressure in the population of children and young adults are therefore important public health goals. An attempt is made in the present study to assess the knowledge of risk factors of hypertension among university students and associate it with the blood pressure, physical activity, family history of CVD, and sociodemographic variables.

MATERIALS AND METHODS

Gulf Medical University Ajman, United Arab Emirates (UAE) has four colleges, namely, College of Medicine, College of Dentistry, College of Allied Health Sciences and College of Pharmacy, with multinational students. For the academic year 2009 – 2010 it had an annual intake of 160 students (60 in MBBS, 40 in DMD, 35 in Pharm D, and 25 in BPT), in the four programs, out of which 110 students who were present on the day of data collection participated in the study with a response rate of 68.75%.

The study was approved by the Ethics Committee of the Gulf Medical University. The survey was conducted using a pre-tested, structured, self-administered questionnaire. The questionnaire included sociodemographic variables like age, gender, nationality, ethnicity, and religion, and questions on the knowledge regarding the modifiable and non-modifiable risk factors for hypertension and a 30-day recall of physical activity. The students were categorized as less active if they did not practice any planned regular

physical activity for at least 30 minutes / day for five days a week. To assess the knowledge on risk factors of hypertension, eleven modifiable and three non-modifiable risk factors were included. Each modifiable risk factor was given a score of one if it was answered correctly and zero for a wrong answer. Out of a total score of eleven a score of six and more was considered as good knowledge and a score less than six considered poor knowledge. This was validated by three experts in the area of public health, epidemiology, and internal medicine.

The investigators explained to the respective class the purpose of the study and sought verbal consent before distributing the questionnaires. Anyone was permitted to opt out of the study, however, all present in the classroom participated. When collecting back, the researchers checked and ensured the completeness of the questionnaires.

Blood pressure was measured by the same team using a mercury sphygmomanometer, twice, with a gap of one minute, and interpreted as per the blood pressure guidelines issued in 2003, by the National Heart, Lung, and Blood Institute as shown in Table 1.^[26]

Data was analyzed using PASW-17 (IBM, Chicago, Illinois). Chi Square test was done for association between knowledge of risk factors and age, gender, nationality, course, diet, physical activity, smoking, presence of hypertension, and family history of diabetes, hypertension, kidney disease, stroke, and CVD. In addition to the variables that showed a significant *P*-value (*P* < 0.05), gender (*P* value 0.09) and presence of pre / hypertension (*P* value 0.07) were included in the binary logistic regression analysis, to identify the Crude Odds Ratio (OR). Those factors with crude OR > 1 were included in the multiple binary logistic regression analysis, to calculate the Adjusted Odds Ratio.

RESULTS

The study assessed the knowledge of eleven modifiable and three non-modifiable risk factors of hypertension and its association with study variables in 110 entry level students in one medical university. The response rate was 68.75%.

Table 1: Blood pressure guidelines, 2003

Category	Systolic blood pressure (mmHg)	Diastolic blood pressure (mmHg)
Normal	Less than 120	Less than 80
Pre-hypertension	120 – 139	80 – 89
Hypertension – Stage 1	140 – 159	90 – 99
Hypertension – Stage 2	160 and above	100 and above

Table 2 shows the sociodemographic profile of the study participants. Majority [74(69.2%)] of the participants was less than 20 years of age, 84 (76.4%) were females, 51 (46.4%) were in the MBBS course, and 44 (40%) were Arabs.

Of the 110 participants, stress, high cholesterol, obesity, and smoking were identified as risk factors by 83 (75.5%), 81 (73.6%), 81 (73.6%), and 79 (71.8%), respectively. Seventy-six (69.1%), considered high salt intake as a risk factor for hypertension, and 69 (62.7%) a high-calorie diet. Energy drink and coffee consumption were considered as risk factors by 71 (64.5%) and 51 (46.4%), respectively. Nearly half, 52 (47%) of the respondents were aware of physical inactivity being a risk factor, whereas, only 15 (13.6%) had knowledge of the risk of oral contraceptives in hypertension. The overall knowledge of modifiable risk factors was better than that of non-modifiable risk factors, wherein 97 (88%) did not know the risk related to male gender, 66 (60%) the risk with increasing age, and 56 (50%) the risk of family history of cardiovascular diseases [Table 3].

Table 4 shows the association between the knowledge of risk factors with different demographic and other variables. Overall 66 (60%) of the 110 participants had good knowledge of the modifiable risk factors. Significantly higher proportion of Non-Arabs had 'good knowledge' when compared to the Arabs ($P < 0.03$), students enrolled in the medicine and physical therapy had significantly more than those enrolled in pharmacy and dentistry ($P < 0.02$). All eight smokers and 58 (56.9%) of the non-smokers had a good knowledge. The respondents who had pre-hypertension / hypertension showed good knowledge, more than normotensives, although not statistically significant. Family history of diabetes mellitus is seen to be significantly associated with good knowledge ($P < 0.04$) when compared to family history of hypertension, CVD, kidney diseases, and stroke. Dietary habit and physical activity did not show any significant association. Only the variables that showed significant level $P < 0.05$ from the chi-square test were included in the binary logistic regression analysis, to identify the crude odds ratio (OR) and confidence interval as seen in Table 5. However, gender and presence of pre- / hypertension with P-values of 0.09 and 0.07 were included and smoking excluded, because two cells had an expected value of less than five, making the chi square not valid.

Those factors with a Crude OR > 1 , that is, nationality, course, diagnosis of hypertension, and history of diabetes in the family were included in the multiple binary logistic regression analysis, to calculate the adjusted odds ratio. Results in Table 5 show that the net effect was not

Table 2: Sociodemographic characteristics of the participants

Variables	Participants n = 110	Number	%
Age	Less than 20 years	74	69.2
	More than 20 years	33	30.8
Gender	Male	26	23.6
	Female	84	76.4
Academic program	MBBS	51	46.4
	DMD	28	25.5
	Pharm D	18	16.4
	Physical therapy	13	11.8
Nationality	Indian subcontinent	33	30.0
	Arab countries	44	40.0
	African countries	22	20.0
	Others	11	10.0

Table 3: Knowledge regarding risk factors of hypertension among the participants

Risk factors	Knowledge		No knowledge	
	No.	%	No.	%
Reduced physical activity	52	47.3	58	52.7
Smoking	79	71.8	31	28.2
High cholesterol	81	73.6	29	26.4
High calorie food	69	62.7	41	37.3
High salt intake	76	69.1	34	30.9
Psychosocial stress	83	75.5	27	24.5
Oral contraceptives	15	13.6	95	86.4
Obesity	81	73.6	29	26.4
Coffee intake	51	46.4	59	53.6
High energy drink intake	71	64.5	39	35.5
Diabetes mellitus	55	50.0	55	50.0
Family history of CVD	54	49.1	56	50.9
Male gender	13	11.8	97	88.2
Older age group	44	40.0	66	60.0

CVD - Cardiovascular disease

significant and knowledge was not dependent on any of the factors.

DISCUSSION

The present study assessed the knowledge of risk factors of hypertension among entry level students in a medical university and associated with the blood pressure, physical activity, family history of CVD, and sociodemographic variables, so as to identify the areas to be emphasized in the health promotion practice related to hypertension.

Risk factors of hypertension are not well studied in young adults^[27] and public awareness of hypertension in countries undergoing epidemiological transition is dismal.^[28] However, the results of the present study indicate that more than 70% of the participants were aware that

Table 4: Association between knowledge of risk factors and specific demographic and other variables

Risk factors	Good knowledge		Poor knowledge		Total	P-value
	No.	%	No.	%		
Gender						
Male	19	73.1	7	26.9	26	0.09
Female	47	56.0	37	44.0	84	
Nationality						
Arab	21	47.7	23	52.3	44	0.03
Non-Arab	45	68.2	21	31.8	66	
Course						
Medicine	37	72.5	14	27.5	51	0.02
Physiotherapy	9	69.2	4	30.8	13	
Dentistry	12	42.9	16	57.1	28	
Pharmacy	8	44.4	10	55.6	18	
Diet						
Vegetarian	1	50.0	1	50.0	2	0.77
Mixed	65	60.2	43	39.8	108	
Physical activity						
Active	59	59.6	40	40.4	99	0.53
Less active	7	63.6	4	36.4	11	
Tobacco use						
Smoker	8	100.0	0	0.0	8	0.01*
Non-smoker	58	56.9	44	43.1	102	
Blood pressure						
Normal	37	53.6	32	46.4	69	0.07
Pre-hypertension / Hypertension	29	70.7	12	29.3	41	
Family history of hypertension						
Yes	29	59.2	20	40.8	49	0.52
No	33	57.9	24	42.1	57	
Family history of diabetes mellitus						
Yes	36	69.2	16	30.8	52	0.04
No	28	50.9	27	49.1	55	
Family history of kidney disease						
Yes	9	56.3	7	43.8	16	0.80
No	53	59.6	36	40.4	89	
Family history of stroke						
Yes	10	71.4	4	28.6	14	0.31
No	51	57.3	38	42.7	89	
Family history of CVD						
Yes	15	65.2	8	34.8	23	0.52
No	48	57.8	35	42.2	83	

* Chi-square value not valid because of small numbers, CVD - Cardiovascular disease

stress, high cholesterol, and obesity were the risk factors of hypertension. It is interesting to note that all eight smokers had good knowledge of the risk factors. More than 60% were aware of high salt intake and a high-calorie diet being risk factors. However, a gap in knowledge was seen in two modifiable risk factors, namely, physical activity (52.7%) and oral contraceptives; 86.4% of the participants were not aware that these were risk factors for hypertension. More than 50% were not aware of the non-modifiable risk factors such as male gender (88.2%), increasing age (60.0%), and

positive family history of CVD (50.9%). These findings were similar to that a study done in Germany where the overall knowledge of risk factors was good, but less people could tell the association between physical activity (58%) and hereditary factors (48%) with hypertension.^[29]

In a study done in Seychelles, another country in epidemiological transition, it was seen that a high proportion showed good basic knowledge of hypertension, where 96% were aware of the association of hypertension with salt and

Table 5: Crude and adjusted odds ratios associating a 'good' level of knowledge of modifiable risk factors with specific demographic and other variables

Variables	Crude odds ratio	95% CI	Adjusted odds ratio	95% CI
Age	1.093	0.88 – 1.35	-	-
> 20 years				
< 20 years				
Gender				
Male	0.46	0.17 – 1.23	-	-
Female				
Nationality				
Arab	2.34	1.06 – 5.15	2.27	0.95 – 5.44
Non-Arab				
Course				
Medicine	1	-	-	-
Physiotherapy	0.3	0.99 – 0.92	0.44	0.13 – 1.48
Dentistry	0.85	0.22 – 3.21	0.7	0.16 – 2.94
Pharmacy	0.28	0.10 – 0.74	0.36	0.13 – 1.005
Diagnosis of hypertension				
Normal	2.09	0.91 – 4.75	1.95	0.78 – 4.88
Pre-hypertension/ hypertension				
History of illness in the family				
Diabetes	2.17	0.98 – 4.78	1.61	0.67 – 3.9
No diabetes				

obesity. The benefit of physical exercise on BP was also well recognized by 79% of the participants, most persons reported that smoking caused high blood pressure.^[30]

A recent study on knowledge and perceptions about hypertension among neo- and settled-migrants in Delhi, India, demonstrated that knowledge about hypertension was only moderate and comprehensive knowledge was lacking.^[31] Another study in Nepal, with regard to the knowledge about heart attack and hypertension, among individuals attending a cardiac camp showed that the respondents were aware of the basic facts regarding myocardial infarction and hypertension. However, lacunae in knowledge were noted, the knowledge scores for hypertension especially were significantly lower among the respondents.^[32]

An effort to reverse the major risk factors of hypertension is the key aspect of suggested lifestyle changes. Primary prevention aims to reduce or modify hypertension risk factors through the implementation of appropriate policies and educative programs, in order to avoid or delay the development of cardiovascular disorders,^[33] whereas, primordial prevention focuses on the prevention of the emergence of risk factors, and hence, the importance of the present study.

CONCLUSIONS

The present study identified gaps in the knowledge

regarding both modifiable and non-modifiable risk factors of hypertension among students from one University, which may not be representative of all university students. A larger study in the region is essential to gather such information about hypertension; as it is crucial to devise sound prevention and control programs, to improve knowledge attitudes and lifestyle practices early in life, to control hypertension.

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