

# Study of hypertension among Fayoum University students

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## Abstract

**Background:** Hypertension is considered as a public health problem world-wide because of its high frequency and concomitant risks for morbidities. The study aimed for, identification of the prevalence of pre-hypertensive and hypertensive Fayoum University students and their associated risk factors and morbidities. **Methods:** This was a two phases study first: cross-sectional descriptive study of (954) students from first and fourth academic year of both; Faculty of Medicine and Faculty of Social Sciences to detect the prevalence of hypertension. Second phase was a case control study of (139) students from both faculties. A self-administered questionnaire, with measuring weight, height, waist circumference and a lab investigation was done. **Results:** The hypertension and prehypertension prevalence was (5.7% & 47.4%) respectively. Their proportions increased significantly by age, sex with a (P-value = 0.000). There was a statistical significant difference between cases and controls regarding body mass index, some investigation and stress score. **Conclusion:** The university students were exposed to the problem of hypertension, which indicated the need for life style modification programs introduced in the curriculum of the university, with planning for treatment of hypertensive students.

## Keywords

Hypertension, Risk Factors, University Students

## 1. Introduction

Hypertension is a major concern to people worldwide, both directly and indirectly due to its consequences for causing several other diseases. It is a silent threat to the people health all over the world as there are 7.6 million premature deaths were attributed to high blood pressure worldwide [1]. The prevalence of hypertension continues to rise, from lowest as (3.4%) in India to the highest as (72.5%) in Poland and most of patients received medication are not adequately treated to optimal goal [2].

In the Eastern Mediterranean Region; the average prevalence of hypertension was (26%) and it affects approximately 125 million individuals, with a several million new cases of hypertension and more of

pre-hypertension [3]. The Egyptian National Hypertension survey of adults conducted in six Egyptian governorates estimated the prevalence of hypertension as (26.3%) [4].

Hypertension is classified into two group's primary hypertension of unknown cause and secondary hypertension caused by several organs affection [5]. The Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7) introduced a new blood pressure (BP) category, "pre-hypertension," defined as a systolic blood pressure (SBP) of 120 to 139 mm Hg and/or a diastolic blood pressure (DBP) of 80 to 89 mm Hg [6]. Pre-hypertension individuals have a greater risk of developing hypertension than those with lower blood pressure levels [7].

Adolescents and youth aged (10-24 years) represent (25%)

of the population [8]. According to the Egyptian Demographic and Health Survey (EDHS 2008), distribution of adolescents in Egypt aged 15-24 years was (21%). Hypertension increased progressively in younger age groups along the past 20 years [9]. The prevalence of hypertension among youth varies widely ranging from (1.3% to 21.6%) [10, 11]. Hypertension causes in young usually variable with age. Most of childhood hypertension is secondary to underlying disorder. Adolescents or young people having primary hypertension, represent up to (85-90%) of cases, with significant risk factors including family history, increasing Body Mass Index (BMI), sleep disorders, and black race [12]. The incidence of blood pressure related clinical events such as myocardial infarction, stroke, and renal disease appears to be dramatically increasing. This evidence proved that hypertension and its complications are a major health problem in Egypt, which needs to be targeted and treated at the right time else it can cause serious worries [13].

Aim of the study: This study aims at exploring the prevalence of hypertension and pre-hypertension among Fayoum University students. A secondary purpose is to investigate the risk factors and morbidities associated with hypertensive students.

## 2. Subjects & Methods

This was a two phases study first: cross-sectional descriptive study of a purposive sample of (954) students from first and fourth academic year of both; Faculty of Medicine and Faculty of Social Sciences in Fayoum University to identify the effect of age variation and the difference in practical and theoretical education by initial measuring of the blood pressure to detect the prevalence. Students with pre-hypertension and hypertension level were confirmed by the second and third measuring one week a part in a quiet room.

Second phase was a case control study of (139) students from both faculties to assess the risk factors contributing in developing of hypertension. The students were subjected to a self-administered Arabic questionnaire including background characteristics, lifestyle and family history of hypertension; accompanied with measuring of weight, height with an investigation of fasting blood sugar, lipid profile, renal function tests and stress score were done for both case and control groups.

The study was conducted during a period of 8 months (October to May 2009). A written permission from the dean of each faculty was taken and an agreement of the student in participation of the study considering as consent.

Ethical Consideration: This study was reviewed and approved by the Faculty of Medicine Research Ethical Committee. All collected data were kept confidential and privacy rights were respected during handling information. All participants had the right not to participate in the study. A simple idea about the factual importance of blood pressure was told to the students. Blood pressure readings were told to the students and the hypertensive students were advised to regular check for their blood pressure with lifestyle

modifications.

Data Analysis: Data was collected, coded, and double entered into Microsoft Access and data analysis was performed using SPSS software version 18 under windows 7, simple descriptive analysis in the form of percentages, arithmetic means, standard deviations, and inferential statistic test as chi square, was used to detect the prevalence of hypertension and pre-hypertension. The differences between case and control groups was interpreted using T-test, Mann-Whitney tests and logistic regression to identify the different risk factors, with a significant level of less than 0.05.

## 3. Results

The respondent was a group of (954) students; with the mean age of ( $\pm$  SD) of ( $19.2 \pm 1.5$  years). The male students were represented by 41.7% (N=398) where the female students were represented by 58.3% (N=556). The groups were taken from two faculties; Faculty of Medicine represented 25.8% (N=246) and Faculty of Social Sciences by 74.2% (N=708) of the sample. The students in the first academic year of the Faculty of Social Sciences represent the major group by 44.9% (N=428).

The initial prevalence of hypertension in the first visit (10.3%), this prevalence decreased to (6.3%) and (5.7%) in the second and third visit respectively. Prehypertension prevalence was (46.9%) in the first visit increased to (47.2%) and (47.4%) in the second and third visit.

The proportions of pre-hypertensive and hypertensive increased significantly by age ( $P=0.000$ ), in males more than in females ( $P=0.000$ ), and in medical students than in non-medical students ( $P=0.000$ ). The proportion of pre-hypertensive and hypertensive was more in the students of the first year of Faculty of Medicine than in the students of the first year of Social Sciences with statistical significant difference ( $P=0.002$ ). However the proportion of pre-hypertensive and hypertensive show insignificant among the students of the 4<sup>th</sup> year of both faculties ( $P=0.257$ ) (Table 1).

Table (2): showed that there was no significant difference observed between cases and controls regarding the sociodemographic characteristics in the study as age group ( $P=0.510$ ) sex ( $P=0.207$ ), type of faculty ( $P=0.250$ ), governorate ( $P=0.181$ ), and residence ( $P=0.158$ ) and the social state ( $P=0.663$ ).

As regards the possible risk factors of hypertension in university students there was significant difference between cases and control regarding, lifestyle risk factors as obesity expressed by body mass index ( $P=0.000$ ), waist circumference ( $P=0.000$ ) and stress score ( $P=0.032$ ). In addition there was statistical difference regarding some investigation like, fasting blood glucose ( $P=0.013$ ) total cholesterol level ( $P=0.000$ ), however no significant difference as regards creatinine ( $P=0.534$ ) Table (3).

There was no significant difference regarding diet consumption containing fats, oils and salts even high

biological proteins; fast food ( $P=0.458$ ), sweets ( $P=0.816$ ), and salty cheese ( $P=0.967$ ), dairy products ( $P=0.518$ ), fish ( $P=0.583$ ), poultry ( $P=0.156$ ) and red meat ( $P=0.550$ )

Using uni-variete logistic regression to recognized the main risk factor predictors; table (4) illustrates that the hypertension was significantly associated with; family

history of hypertension, family history of diabetes,  $BMI \geq 25 \text{ kg/m}^2$ , serum cholesterol  $>200 \text{ mg/dl}$ ,  $FBG >100 \text{ mg/dl}$ , presence of stress and high or middle social scoring levels. There was no effect of physical exercise, smoking, and triglycerides level  $>150$  or creatinine level.

**Table (1).** General characteristics of the students.

Variables	Students No = 954		Normal No=445		Pre-Hypertension No=455		Hypertension No=54		P- value
	N	%	N	%	N	%	N	%	
Age Groups									
17-19 years	543	56.9	290	53.4	230	42.4	23	4.2	0.000*
20-22 years	411	43.1	155	37.7	225	54.7	31	7.5	
Sex									
Males	398	41.7	128	32.2	236	59.3	34	8.5	0.000*
Females	556	58.3	317	57.0	219	39.4	20	3.6	
Faculty									
Medicine (FOM)	246	25.8	88	35.8	139	56.5	19	7.7	0.000*
Social sciences (FOSS)	708	74.2	357	50.4	316	44.6	35	4.9	
Academic year									
First Year (FOM)	115	12.0	46	40	60	52.2	9	7.8	0.002*
First Year (FOSS)	428	44.9	244	56	170	39.7	14	3.3	
Fourth Year (FOM)	131	13.7	42	32.1	79	60.3	10	7.6	0.257
Fourth Year (FOSS)	280	29.4	113	40.4	146	52.1	21	7.5	

\* $P < 0.05$  is considered significant,  $P < 0.01$  is considered highly significant.

**Table (2).** Distribution of socio-demographic characteristics among cases and controls.

Characteristics	Cases N=46	%	Controls N=93	%	P- value
Age group					
17-19	23	50	52	55.9	0.510
20-22	23	50	41	44.1	
Sex					
Males	24	52.2	38	40.9	0.207
Females	22	47.8	55	59.1	
Faculty					
Medicine	22	47.8	35	37.6	0.250
Social sciences	24	52.2	58	62.4	
Governorate					
Fayoum	40	87	72	77.4	0.181
Others	6	13	21	22.6	
Residence					
Urban	21	45.7	31	33.3	0.158
Rural	25	54.7	62	66.7	
Social state					
Married	1	2.2	5	5.4	0.663
Not married	45	97.8	88	94.6	

**Table (3).** Distribution of some possible risk factors among cases and controls.

Risk Factors	Cases N=46	%	Controls N=93	%	P- value
Family history (FH) of Hypertension	28	60.9	29	31.2	0.001*
FH of Diabetes	20	43.5	20	21.5	0.007*
FH of Cardiac	3	6.5	4	4.3	0.68
Stress Score	33	71.7	45	48.3	0.032*
$BMI \geq 25$	35	76.0	20	21.5	0.000*
Cholesterol $\geq 200$	20	43.5	13	14	0.000*
FBS $\geq 100$	16	34.8	15	16.1	0.013*
Creatinine $>1 \text{ mg/dl}$	11	23.9	18	19.4	0.534

\* $P < 0.05$  is considered significant,  $P < 0.01$  is considered highly significant.

**Table (4).** Uni-variete logistic analysis (predicators of hypertension)

Risk factors	P- value	Odds ratio
Family history of hypertension	0.001*	3.433
Family history of diabetes	0.008*	2.808
$BMI \geq 25 \text{ kg/m}^2$	0.000*	11.614
Triglycerides $>150 \text{ mg/dl}$	0.378	2.093
Total Cholesterol $>200 \text{ mg/dl}$	0.000*	4.734
$FBG >100 \text{ mg/dl}$	0.015*	2.773
Presence of stress	0.010*	2.708
Smoking	0.576	0.644
Creatinine level $>1$	0.534	1.310
Exercise	0.428	0.748
Social scoring for middle and high against low and very low	0.008*	2.776

## 4. Discussion

Hypertension is a disease which leads to other serious medical complication that is why it is a public health problem worldwide, especially in developing countries. Hypertension increased progressively in young age groups over the past 20 years. The National Hypertension Project results indicated that hypertension is highly prevalent in Egypt, and the awareness, treatment and control are relatively limited (13).

Our results revealed that the global initial prevalence of hypertension in the first visit was (10.3%) dropped to (5.7%) in the third visit. (Rosner *et al.*, 2000; Ghannem *et al.*, 2001 Harrabi *et al.*, 2006 and Nur *et al.*, 2008) reported that the prevalence of hypertension in the age group (13-19 years) varied from (2% to 13%) [14, 15, 16, and 17]. In the present study the prehypertension and hypertension was increasing by age even in the same sex with statistical significantly

higher in the age group (20-22 years) than the age group (17-20 years). This was consistent with [18, 19] who reported that the prevalence increased by age. Also, [20, 21] reported the prevalence of prehypertension was (51.9% and 60.3%) in the age group from (17 to 24 years) old and increased with (31.2 %) for ages (20–39 years), (42.3%) for ages (40–59 years) and (44.2 %) for ages (60–69 years). In addition [22] revealed that hypertension prevalence increased progressively with age from (7.8%) in (25- to 34 years) old to (56.6%) in those (75 years) or older.

More than two third of people with hypertension have additional comorbidities, as obesity, glucose intolerance, decreased level of high density lipoprotein (HDL), elevated low density lipoprotein (LDL) and triglycerides and more than half of them have two or more comorbidities [5]. In the current study the cases had a significant higher body mass index, total cholesterol, fasting blood glucose and triglycerides. This was more or less consistent with [21,23,24] which documented that mean waist circumference was significantly higher among hypertensive as compared to those among non-hypertensive and increased total cholesterol, triglycerides, and glucose intolerance to be associated with hypertension.

In the current work the stress score was significantly higher among cases than controls. There was a direct relationship between stress and high blood pressure as reported by the study of [25] which was interviewed men worked at stressful jobs for several years. The study results showing that there was a systolic blood pressure elevation during the working hours.

## 6. Conclusion & Recommendation

- It was clear from the results of this study that Fayoum university students were exposed to increase prevalence of hypertension. Overweight, obesity and disturbance of lipid profile were strongest risk factors for hypertension in young adults.
- National strategies are essential for developing and implementing successful and sustainable hypertension prevention policies through community mobilization (governmental and non- governmental organizations).
- A comprehensive approach is needed to prevent the disease by early detection started as early as possible among school and university students through periodic medical examination by measuring blood pressure. These findings indicated the need for life style modification programs introduced in the curriculum of the university to prevent progression of hypertension, with planning for treatment of hypertensive students.

## References

- [1] Lawes CMM, Vander HS, and Rodgers A (2008). Global burden of blood pressure related disease for the international Society of hypertension. *Lancet*. 3:371(9623):1513-1518.
- [2] Bakris G, Hill M, Mancia G, Steyn K, Black HR, Pickering T, De Geest S, Ruilope L, Giles TD, Morgan T, Kjeldsen S, Schiffrin EL, Coenen A, Mulrow P, Loh A, Mensah G (2008). Achieving blood pressure goals globally: five core actions for health-care professionals. A worldwide call to action. *Journal of Human Hypertension*. 22 (1): 63-70.
- [3] WHO. (2004): United Arab Emirates (2003). Report on the regional consultation on hypertension prevention and control.
- [4] Ashour Z, Ibrahim MM, Appel LJ, Lawrence J, Ibrahim AS, Paul K (1995). The Egyptian National Hypertension Project (NHP): design and rationale. The NHP Investigative Team. *Hypertension*. (26): 880-885.
- [5] Kumar NL, Deepthi J, Rao YN, Deedi MK (2010). Study of lipid profile, serum magnesium and blood glucose in Hypertension. *Biology and Medicine*. 2 (1): 6-16.
- [6] Lenfant C, Chobanian AV, Jones DW and Roccella EJ (2003). Seventh report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7): resetting the hypertension sails. *Hypertension*. (41):1178 –1179.
- [7] Greenlund KJ, Croft JB, and Mensah GA (2004). Prevalence of heart disease and stroke risk factors in persons with prehypertension in the United States, 1999-2000. *Arch Intern Med*. (164) : 2113.
- [8] WHO. (1999): Programming for adolescent health and development. Report of a WHO/ UNFPA/ UNICEF Study Group on Programming for Adolescents Health (WHO Technical Report Series 886).
- [9] Egypt Demographic and Health Survey (EDHS), 2008.
- [10] Soudarssanane MB, Karthigeyan M, Stephen S, Sahai A (2006). Key Predictors of High Blood Pressure and Hypertension among Adolescents: A Simple Prescription for Prevention. Pondicherry, India, *Indian Journal of Community Medicine*. 31 (3):164-169.
- [11] Chukwunoso ECCE, Chidiebere EU, Lawrence USE (2010). Variations in the prevalence of point pre-hypertension in a Nigerian school-going adolescent population living in a semi-urban and an urban area. *BMC Pediatrics*. (10): 10-13.
- [12] Luma GB, and Spiotta RT (2006). Jamaica Hospital Medical Center Hypertension in Children and Adolescents. *American Family Physician*. 73 (9):1558-1568.
- [13] Ibrahim MM, Rizk H, Apple LJ, ElAroussy W, Helmy S, Sharaf Y, Ashour Z, Kandi IH, Rocella E, Whelton PK (1995). Hypertension, prevalence, awareness, treatment and control in Egypt. Results from the Egyptian National Hypertension Project (NHP). *Hypertension* (26) (6 Pt 1) :886-890.
- [14] Rosner B, Prineas R, Daniels SR, Loggie J (2000). Blood pressure differences between blacks and whites in relation to body size among US children and adolescents. *Am J Epidemiol*. 15; 151 (10):1007-1019.
- [15] Ghannem H, Harrabi I, Ben Abdelaziz A, Gaha R, Trabelsi L, Selmi H, Jeridi G, Ammar H, Essoussi AS (2001). Cardiovascular risk in school children in rural Sousse, Tunisia] *Arch Mal Coeur Vaiss*. 94 (12): 1381-1385.
- [16] Harrabi I, Belarbia A, Gaha R, Essoussi AS, Ghannem H (2006). Epidemiology of hypertension among a population of school children in Sousse, Tunisia. *Can J Cardiol*. 1; 22(3):212-216.

- [17] Nur N, Cetinkaya S, Yilmaz A, Ayvaz A, Bulut MO, Sümer H (2008). Prevalence of Hypertension among High School students in a Middle Anatolian Province of Turkey, *J Health popul Nutr.* 26 (1):88-94.
- [18] Jo I, Ahn Y, Lee J, Shin KR, Lee HK, Shin C (2001). Prevalence, awareness, treatment, control and risk factors of hypertension in Korea: the Ansan study. *J Hypertens.* 19 (9):1523-1532.
- [19] Wang Y, and Wang QJ (2004). The Prevalence of Prehypertension and Hypertension Among US Adults According to the New Joint National Committee Guidelines New Challenges of the Old Problem *Arch Intern Med.* 164 : 2126-2134.
- [20] Smoley BA, Smith NL, Runkle GP (2008). Hypertension in a population of active duty service members. *J Am Board Fam Med.* 21(6):504-511.
- [21] Gupta AK, McGlone M, Greenway FL, Johnson WD (2010). Prehypertension in disease-free adults: a marker for an adverse cardiometabolic risk profile *Hypertension Research.* (33): 905–910.
- [22] Ibrahim MM (1999). Epidemiology of Hypertension in Egypt, Saudi J. *Kidney Disease and Transplantation.* 10 (3) : 352-356.
- [23] Shanthirani CS, Pradeepa R, Deepa R, Premalatha G, Saroja R, Mohan V (2003). Prevalence and risk factors of hypertension in a selected South Indian population--the Chennai Urban Population Study. *J Assoc Physicians India.* (51):20-27.
- [24] Undhad AM, Bharodiya PJ, and Sonani RP (2011). Correlates of hypertension among the bank employees of Surat City of Gujarat, *National Journal of Community Medicine.* 2 (1):123-125.
- [25] Landsbergis PA, Schnall PL, Pickering TG, Warren K, Schwartz JE (2003). Life-Course Exposure to Job Strain and Ambulatory Blood Pressure in Men. *American Journal of Epidemiology.* 157(11): 998-1006.