

Blood pressure, Blood Sugar, Smokers and their Relationship with Physiological Variables of Some Risk Factors

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Abstract

This study deals with the physiological measurements of fasting blood sugar (FBG), clinical blood pressure (CBP) and smokers and their association with risk factors (obesity, gender and age) among university students. A total of 257 students (77 females and 180 males) were registered. Including 41 healthy and 42 students who were FBG; 33 were healthy and 69 were suffering from CBP; 39 non smokers and 33 students who were smokers; aged 19-26 years. A statistically not-significant connection was found between FBG, CBP and smoking with obesity rates; but a significant difference between smoking and CBP with age and gender, respectively. These findings highlight the prevalence of FBG and CBP also smoking in students and its relation to certain risk factors such as obesity, sex and age among selected student groups.

Keywords: *blood glucose, blood pressure, smoking, risk factors.*

Introduction

It is important to prove now that many factors such as obesity, sex and age are linked to BG, BP and smoking. The obesity is a hazard factor to many diseases, as diabetes and hypertension¹. In 2030, around 438 million people worldwide (7.8%) in adult population are suffering from diabetes. This global rise in the propagation of diabetes is attributed to urbanization, population growth, aging and obesity². According to³ there is a significant impact of diabetes with gender, and women are more probability to develop diabetes than men. A study in Iraq found that the diabetes prevalence was 15.2% in female compared with 11.8% in males⁴. Despite the increasing burden of obesity and HBP in growing countries, there was limited information about BMI contribution in BP in these populations, especially among students. BMI is independently and positively connected with mortality and morbidity due to HBP, cardiovascular disease CVD and diabetes II⁵. For all BMI categories in study⁶, age was higher with HBP and HBP in men than in women. The systolic-BP and diastolic-BP increased with age, both for men and women⁷. Smoking is one of the leading causes of death as well as the main challenge to public health all over the world⁸. Smoking is connected with low weight⁹. Lack of smoking propagation has been proposed as one of the agents connected with a high

in obesity¹⁰. There may be a causal impact of smoking on weight because nicotine is a metabolic stimulant as well as appetite suppressant¹¹. The difference in CVD risk among smokers and non-smokers is significant in middle age, particularly for men¹².

Materials and Method

Criteria of participants

A sample of 257 students was selected randomly among students. About 83 participants of FBG with mean(X)±standard deviation (SD) of age were divided to: health (<100 mg/100cm³; 21.97±1.49), pre-diabetes (100-125 mg/100cm³; 21.83±1.59), diabetes (≥126 mg/100cm³; 21.77±1.09), and hypoglycemia (≤70 mg/100cm³; 21.66±2.30). In addition, 102 participants of a CBP-level with X±SD of age, systolic blood pressure (mmHg), diastolic blood pressure (mmHg) and pulse pressure (Min) were divided as: normotensive (<120/<80; 21.38±1.706, 110.87±5.129, 72.16±6.126, 86.29±11.07), EPB, elevated blood pressure (120-129/<80 mmHg; 21.96±2.007, 124.78±2.848, 75.71±4.767, 86.40±11.09), hypertension (130-139/80-89 or ≥140/90 mmHg; 22.00±1.647, 144.68±10.90, 90.41±6.873, 84.82±9.26), and hypotension (<90/60 mmHg; 20.28±1.603, 84.57±6.160, 56.57±3.101, 84.28±8.76). In addition, only 72 men were employed

for smoking and the periods of cigarette smoking of 2-3 year with $X \pm SD$ of age were divided into 39 non-smokers (control; 22.25 ± 1.91), 9 light-smokers (≤ 10 cigarette daily; 22.11 ± 1.96), 16 moderate-smokers (11-20 cigarette daily; 22.06 ± 1.80), and 8 heavy-smokers (≥ 20 cigarette daily; 22.25 ± 1.90).

Collection of data and measurement

The data were gathered utilizing a self-administered questionnaire. It is built on several axes such as: age, smoking case, duration of smoking, the number of cigarettes smoked per day, the family history of diabetes and physical activities. The criteria for selecting students were that no one should suffer any medical complication such as heart disease, stroke or any other disorder. BG was measured in the morning after fasting for at least 8-10 hours, using the active glucose Accu-chek meter. BP was measured by the electronic pressure device by taking the pressure rate while students rested for at least 10-15 minutes.

Measurement of obesity.

The obesity was estimated using body mass (BMI) index, measured by weight in kilograms (kg) divided by a height in the meters squared [kg/m^2]; BMI classification was based on WHO as: normal weight, 18.5-24.9; underweight, less than 18.5; and overweight 25-29.9. The waist circumference, (WC), is measured by placing the measurement meter tightly on the waist (cm) and the WC/risk level are classified as follows: Low (Women < 80 and Men < 90), high (Women 80-88 and men 94-102), and very high > 102 for smokers men.

Statistical analysis

The descriptive analysis was also used to show the $X \pm SD$ of the results. Gender, age and obesity were statistically tested by Chi-square (χ^2) test at $p < 0.05$.

Results and Discussion

Fasting blood glucose and obesity, sex and age

In Table 1: A statistically insignificant in BMI between FBG classes and healthy, although the highest percentage of pre-diabetes was obese compared with healthy. The statistically insignificant in WC of FBG levels compared with control, although the highest percentage was observed in diabetes from Low of

WC and hypoglycemia from a high of WC risk level. The prevalence of diabetes (77.77) in males, and pre-diabetes (66.66) also hypoglycemia (66.66) in females. Statistically insignificant in age in FBG categories, although the highest rate of pre-diabetes and diabetes was found in both gender in the 21-22 age group, and a higher proportion of hypoglycemia in the 23-24 age group compared to health.

Clinical blood pressure level and obesity, gender and age

In Table 2: No-significant relationship between the level of CBP and obesity measured by BMI and WC, although the highest rate of EBP and hypertension was overweight and obese compared to normotensive, respectively. Hypertension and EBP are the highest in low and high of WC risk level compared with normotensive, respectively. The male had a high percentage of hypertension (82.76) and a high percentage of hypotension (85.71) in female compared with normotensive. EBP and hypertension appeared 21-22 and 23-24 years of age, compared to normotensive, respectively.

Smoking status with obesity (BMI and WC) and age.

In Table 3: A statistically not-significant in obesity with BMI $\chi^2 = 5.652$ among smoking status. A statistically not-significant in CW risk level of smokers compared to non-smokers. And a significant in age in which the high percentage was appeared at age (21-22) years of light-smokers followed by low percentage appeared at age (23-24) years of moderate-smoker compared to non-smokers. In addition to high percentage that noted at age (21-22) years in light-smokers, moderate-smokers, and heavy-smokers compared to control, and heavy-smokers has been shown in age 25-26 years compared with non-smokers of a same age. Obesity is connected with poorer control of BP-levels and BG-levels making people with diabetes more susceptible to micro-vascular and cardiovascular diseases¹³. Other studies have shown a strong epidemiological link between the development of diabetes and obesity¹⁴. When the study trends¹⁵ were studied by BMI groups, disease increased only among those who have obese (18.0% to 20.1%), indicating that much of the rise in the prevalence of diabetes is due to the growing prevalence of obesity¹⁶, and diabetes was less

prevalent in males than in females in Iraq community¹⁷. In Turkey, there was a statistically non-significant relation between BP and sex¹⁸. Although this study was statistically insignificant in age with FBG, the results were favorable with¹⁹ the prevalence of disease and hazard factors among people aged 15 Years and older in Ethiopia. A significant connection was also found in²⁰ on college students between age, overweight, and sex, as well as between BG elevation with gender. Many people own a classification of BP without knowing it. The results of the current study were consistent with²¹, where a positive relationship was absorbed between obesity and hypertension, also²² which observed a positive connection between hypertension and BMI. The current study shows that male students had a high percentage of hypertension compared with a healthy and female students, and is close to²³. It is also appropriate with²⁴ that there is a positive connection with BP and increasing age.

The low prevalence of smoking has little impact, often less than 1%, on increasing the prevalence of obesity and reducing the healthy weight of the population²⁵. The BMI of smokers appeared a diminishing trend compared with nonsmokers²⁶. No-significant variation in the physical mean parameters such as obesity are found when calculating $X \pm SD$ in smokers and passive-smoker²⁷; but my results do not identical the results of²⁸, it was observed that both cigarette consumption and smoking frequency had positive effects with weight loss in adolescents. There has been a significant elevate over the past decade in the numbers of smokers of college age²⁹. Various studies have reported that the spread of smoking raises between the first to last year among college students, confirming the fact that the early years of the university are important to target anti-smoking activities³⁰. The University of Karbala, smokers (45.7%) smoked before the age of 18 years, and were positively correlated with male sex and growing age³¹.

Table 1. Fasting blood glucose classes and obesity rates measured by BMI (kg/m²) and WC (cm), sexes and age (years).

BMI	Fasting blood glucose classes								Total
	Health	N(%)	Pre-diabetes	N(%)	Diabetes	N(%)	Hypoglycemia	N(%)	
normal	28	68.29	20	66.66	7	77.77	2	66.66	57
under weight	1	2.43	2	06.66	0	00.00	0	6.57	3
Over weight	12	29.26	6	20.00	2	22.22	1	33.33	21
Obese	0	0.00	2	6.66	0	0.00	0	0.00	2
Total	41	100	30	100	9	100	3	100	83
WC									Total
Low	30	73.17	21	70.00	8	88.88	1	33.33	60
High	11	26.82	9	30.00	1	11.11	2	66.66	23
Total	41	100	30	100	9	100	3	100	83
Sex									Total
Male	19	46.34	17	33.33	7	77.77	1	33.33	44
female	22	53.65	13	66.66	2	22.22	2	66.66	39
Total	41	100	30	100	9	100	3	100	83

Cont... Table 1. Fasting blood glucose classes and obesity rates measured by BMI (kg/m²) and WC (cm), sexes and age (years).

Age									Total
19-20	6	14.28	6	26.66	1	11.11	1	33.33	14
21-22	20	44.64	13	53.33	5	55.55	0	00.00	38
23-24	12	33.92	9	13.33	3	33.33	2	66.66	26
25-26	3	7.14	2	6.66	0	00.00	0	0.00	5
Total	41	100	30	100	9	100	3	100	83

Table 2. Clinic blood pressure level and obesity rates measured by BMI (kg/m²) and WC (cm), sexes and age (years).

BMI	Clinic blood pressure level								Total
	Normotensive	N (%)	EPB	N (%)	Hypertension	N(%)	Hypotension	N(%)	
under weight	2	6.06	2	6.06	2	6.90	0	0.00	6
normal	22	66.7	18	54.6	16	55.2	5	71.4	61
Overweight	7	21.2	11	33.3	8	27.6	2	28.6	28
Obese	2	6.06	2	6.06	3	10.4	0	0.00	7
Total	33	100	33	100	29	100	7	100	102
WC									Total
Low	25	75.75	22	66.67	22	75.86	5	71.43	74
High	8	24.24	11	33.33	7	24.14	2	28.57	28
Total	33	100	33	100	29	100	7	100	102
Sex									Total
Male	18	54.55	21	63.64	24	82.76	1	14.28	64
Female	15	45.45	12	36.36	5	17.24	6	85.71	38
Total	33	100	33	100	29	100	7	100	102
Age									Total
19-20	11	33.33	8	24.24	3	10.35	4	57.14	26
21-22	12	36.36	10	30.30	16	55.17	2	28.57	40
23-24	8	24.24	12	36.36	7	24.14	1	14.28	28
25-26	2	6.060	3	9.090	3	11.11	0	0.00	8
Total	33	100	33	100	29	100	7	100	102

Table 3. Smoking status and obesity rates measured by BMI (kg/m²) and WC (cm), and age (years).

BMI	Smoking status								Total
	Non-smoker	N(%)	light smokers	N(%)	moderate smokers	N(%)	heavy smokers	N(%)	
Under weight	1	2.56	0	0.00	2	12.5	0	0.00	3
Normal	28	71.79	6	66.66	10	62.5	4	50.00	48
Overweight	10	25.64	3	33.33	4	25.00	4	50.00	21
Total	39	100	9	100	16	100	8	100	72
WC									Total
Low	35	89.74	8	88.88	15	93.75	8	100.0	66
High	3	7.69	1	11.11	1	6.25	0	0.00	5
Very high	1	2.5	0	0.00	0	0.00	0	0.00	1
Total	39	100	9	100	16	100	8	100	72
Age									Total
19-20	9	23.07	1	11.11	2	12.50	0	0.00	12
21-22	13	33.33	6	66.66	10	62.50	5	62.50	34
23-24	11	28.20	1	11.11	1	6.25	2	25.00	15
25-26	6	15.38	1	11.11	3	50.00	1	12.50	11
Total	39	100	9	100	16	100	8	100	72

Conclusion

There was insignificant association between obesity and cases, but significant differences between age and sex with smoking rate and CBP level among students.

Conflict of Interest: Author declares no conflict of interest.

Ethical Clearance: This research was reviewed by the Research Review Board of the Department of environmental pollution at the University of Al-Qasim Green.

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