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THE RELATION BETWEEN SMOKING PATTERN AND HYPERTENSION AMONG ADULTS IN ERBIL CITY

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Abstract

background: . Smoking is known to cause acute elevation of blood pressure, yet its chronic effect on hypertension is controversial. Aim of the study: To identify the association between smoking patterns and hypertension among adults in Erbil City **Methods:** A case-control study was conducted from 1st of January 2023, to1st of October 2023, at Briaty primary health care center in Erbil city/Iraq. A total of 200 adults aged 18-65 years were enrolled, divided into hypertensive cases and non-hypertensive controls. Data were collected through direct interviews using a structured questionnaire which cover the sociodemographic characteristics, medical conditions and the pattern of smoking . The data analyzed using either t-test or Chi-square tests to identify the associations between variables, with a significance level set at $p \leq 0.05$. **Results:** Significant associations were found between hypertension and several demographic and lifestyle factors, including age, residence, educational level, occupation, diabetes mellitus, cardiovascular diseases, BMI, and socioeconomic status. Older adults (51-65 years), urban residents, illiterate individuals, and unskilled workers showed higher hypertension prevalence. Hypertension was also significantly associated with diabetes mellitus and cardiovascular diseases, with higher BMI being a notable risk factor. However, no significant associations were found between hypertension and smoking patterns; type of smoking, duration of smoking, age of beginning smoking, smoking amount, and duration of quitting smoking. **Conclusion:** The study highlights that while several demographic, socioeconomic, and health-related factors are significantly associated with hypertension, no significant association was found between smoking patterns and hypertension. Future research with larger samples and longitudinal designs is needed to further explore this relationship.

Keywords: Hypertension, Smoking Patterns, Socioeconomic Factors, Demographic Factors.

INTRODUCTION

World Health Organization (2023) states that if blood pressure is taken twice and the systolic reading is at least 140 mmHg or more on both occasions, or the diastolic reading is at least 90 mmHg or more on both days, hypertension is diagnosed..[1]

Smoking can cause an acute elevation of blood pressure by vasoconstriction and acceleration of heart rate. Controversial epidemiological studies have reported that blood pressure levels among smokers were the same, lower or higher than those of nonsmokers.[2]

The prevalence of smoking in Iraq is influenced by psychological stress from prolonged conflict, cultural acceptance, and family behavior. Studies indicate that stress, depression, and familial influence are key factors, with 29–31% of Iraqi men and 3–4% of women actively smoking. However, the actual rates for women might be underreported due to cultural norms against public smoking. [3] Smoking damages almost all of the body's organs, including the blood vessels, lungs, reproductive system, bladder, bones, eyes, mouth, heart, and digestive system.[4]

The prevalence of tobacco smoking in Iraq was higher among men under 40, those with less education, non-governmental employees, and self-employed individuals. Although it was greater among women who were self-employed and elderly. [5] Some studies revealed that in Erbil City, both sexes between the ages of 38 and 48 had the highest smoking rates, it's assumed that 68.0% of Erbilan residents began smoking between the ages of 18 and 21.[6]

There are different types of smoking tobacco like Roll your own, Cigars, Bidis, Pipes, Kreteks, water pipes and sticks, these types differ in it's contents, ways of preparation, area of usage and each has its own effects on human health, [7]

Although it is well established that smoking cigarettes increases the risk of cardiovascular disease (CVD), it is unknown how smoking affects blood pressure. Some studies showed significant association between smoking and hypertension [8, 9], other showed the reverse [10], according to researcher's knowledge no similar study was done in Erbil city.

The Aim of this Study is to determine the association between smoking pattern and hypertension among adults in Erbil city, further objectives intended to detect the proportion of smoking among cases with and without hypertension and to identify the correlation between the smoking pattern and its status with hypertension.

PATIENTS AND METHODS

A case-control study, was carried out at Briaty primary health care (PHC) center in Erbil city in Kurdistan region/Iraq for the period from 1st January 2023 to 1st October 2023. A convenient sample of 200 patients aged 18-65 years diagnosed to have hypertension whether systolic , diastolic or both for at least 6 months duration were included in the study as case group with other 200 adult patients presented with other problem rather than hypertension as control group. Those with secondary hypertension, gestational hypertension or severally ill patients were excluded from the study

Data Collection: A structured questionnaire was used to collect data that related to: sociodemographic characteristics including socioeconomic status (SES),[11] chronic medical problems including cardiovascular diseases(CVD), diabetes mellitus (D.M) and obesity (assessed by calculating BMI), , beside smoking status and smoking pattern (type of smoking, amount of smoking, duration of smoking, age of starting smoking, duration of quitting smoking) of both studied groups were also assessed. The data were collected via direct interview using either arabic or kurdish language.

Ethical Considerations: The study was conducted after receiving an academic scientifical and ethical approval of family medicine research ethics committee at Kurdistan Higher Council of Medical Specialties beside an official acceptance from directorate of health in Erbil city was also obtained. All patients were informed about the nature and the importance of conducting this research and only those who were willing to participate were included in the study documented by their verbal consent. Confidentiality and anonymity of their personal data were ensured.

Data Management and Statistical Analysis: all data were managed using the Statistical Package for Social Sciences (SPSS) version 28 and presented as frequencies, proportion and mean ± Sd . Data were analyzed using either t-test, or Chi square tests with a statistical significance level of ≤ 0.05.

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RESULTS

A total of 400 adult participants were enrolled in this study comprising both study groups, 200 cases with hypertension and another 200 patients as control group. Table 1 show the sociodemographic characteristics of the recruited adults; most of both groups were married and living in urban areas and around one third of both groups were illiterate.

More than half (56%) of hypertensive cases aged (51 – 65) years while 7% of them of young age group (18 – 35) year and 37% of them were (36 – 50) years old. On the other hand more than half (56%) of case participants compared to (43%) of control group had unskilled manual occupation while highly skilled professional occupation found among 17 % of cases and 21 % of control group. Meanwhile most of the participants of both groups were of low socioeconomic status

Table 1: Sociodemographic Characteristics of Both Study Groups

Variables	Categories	Study group		p-value
		Case	Control	
Age groups	18 - 35 years	14 (7%)	32 (16%)	0.001
	36 - 50 years	74 (37%)	94 (47%)	
	51 - 65 years	112 (56%)	74 (37%)	
Gender	Male	100 (50%)	100 (50%)	0.999
	Female	100 (50%)	100 (50%)	
Marital status	single	16 (8%)	16 (8%)	0.348
	married	170 (85%)	174 (87%)	
	divorced	0 (0%)	2 (1%)	
	widowed	14 (7%)	8 (4%)	
Residence	urban	144 (72%)	174 (87%)	0.001
	rural	56 (28%)	26 (13%)	
Educational level	illiterate	78 (39%)	58 (29%)	0.001
	primary	64 (32%)	48 (24%)	
	intermediate	22 (11%)	24 (12%)	
	institute	16 (8%)	4 (2%)	
	college	18 (9%)	46 (23%)	
	master	2 (1%)	6 (3%)	
	Ph.D or equivalent	0 (0%)	14 (7%)	
Occupation	Unskilled manual occupations	112 (56%)	86 (43%)	0.002
	Associate professional occupations	54 (27%)	62 (31%)	
	Skilled professional or senior managerial occupations	0 (0%)	10 (5%)	
	Highly skilled professional occupations	34 (17%)	42 (21%)	
Socioeconomic status	Low	162 (81%)	170 (85%)	0.287
	Middle	38 (9%)	30 (15%)	

Table 2 revealed that there is a significant statistical differences between both study groups related to their BMI, only 6 (12%) of cases and 26 (13%) of control have normal BMI, meanwhile 56% of hypertensive group were obese compered with only 35% of control group.

On the other hand a significant statistical association was found between hypertension and other chronic clinical conditions of the recruited participants; diabetes mellitus and CVD was detected among (30%) and (21%) respectively of case group compared to (17%) and (9%) of control group .

Table 2: Health Status of both Study Groups

Variable	Categories	Study group		p-value
		Case	Control	
Obesity	Normal*	12 (6%)	26 (13%)	<0.001
	Over weight**	76 (38%)	104 (52%)	
	Obesity***	112 (56%)	70 (35%)	
Diabetes mellitus	yes	60 (30%)	34 (17%)	0.003
	no	140 (70%)	166 (83%)	
Cardiovascular diseases	yes	42 (21%)	18 (9%)	0.001
	no	158 (79%)	182 (91%)	

*BMI(18.5-24.9) **BMI(25-29.9) ***BMI(>30) [12]

Regarding smoking status as shown in (Figure 1) the overall number of smokers among hypertensive adults were 56 (28%) including 40 (20%) of current smoker and 14(7%) of ex-smoker while among 60 smokers of normotensive group 54 (27%) were current smoker and 6 (3%) were ex-smoker with no significant statistical differences between both groups (p value 0.093)

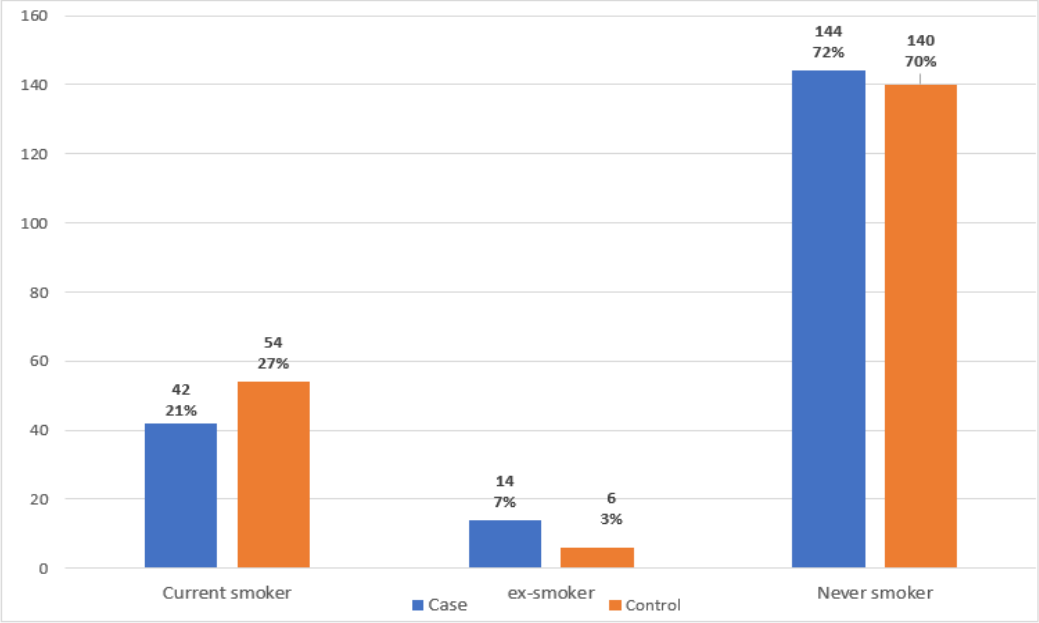

Figure 1: Smoking status of both study groups. (P value=0.093)

Out of 56 smokers (Figure 2) among the hypertensive adults 42 (85%) of them smoke cigarette and only 4(7.1%) smoke waterpipe, at the same time the study revealed that out of the 60 smoker adults among the control group 43(71.7%) of them smoke cigarette and only 3(5%) smoke waterpipe Moreover no significant statistical differences (p value=0.114) had been found between hypertensive and normotensive patients in relation to the type of smoking whether they smoke cigarette, water pipe, both of them or all other types (including vape).

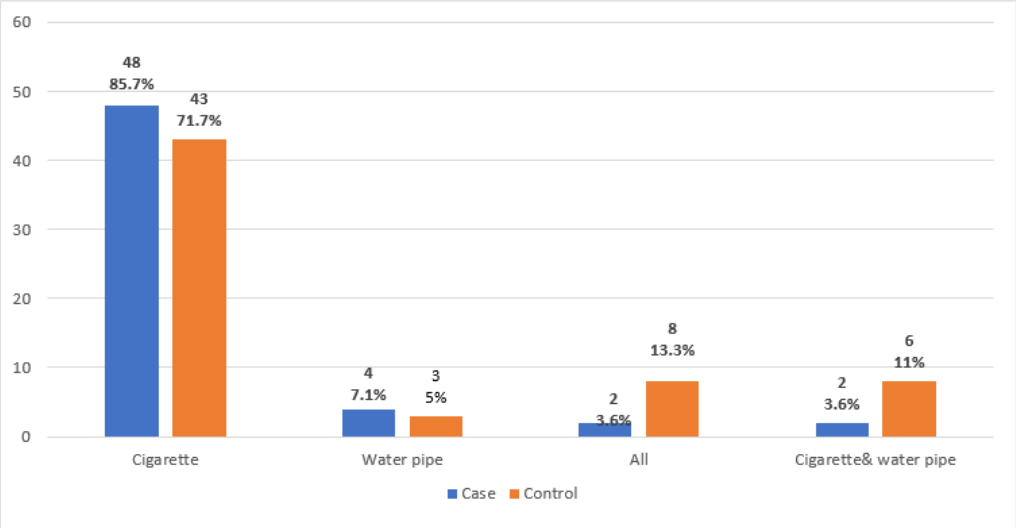

Figure 2: Types of smoking of both study groups (Case n=56, control n=60) (P value= 0.114)

This study revealed that the pattern of smoking (Table 3) including duration of smoking, age of beginning smoking, smoking amount and duration of quit smoking were not associated with hypertension, so far no statistical significant differences had been found between the pattern of smoking among hypertensive adults and those of normotensive group, with an overall mean duration of smoking of (21.05±13 years of cases, 20.73±11.51 years of control), mean age of beginning smoking within (22.71±10.20 years of cases, 21.27±5.49 years of control), and the mean amount of smoking was between (4.67±5.04 of cases, 6.82±11.24 of control) cigarette per day while the mean duration of quitting smoking was within (8.29±9.41 years of cases, 6.33±4.59 years of control) .

Table 3: Smoking Pattern of Both Study Groups

Variables	Case Mean ± SD	Control Mean ± SD	P value
Duration of smoking (years)	21.05±13.40	20.73±11.51	0.890
Age of beginning (years)	22.71±10.20	21.27±5.49	0.339
Smoking amount (cigarette/day)	4.67±5.04	6.82±11.24	0.250
Duration of quit smoking (years)	8.29±9.41	6.33±4.59	0.638

DISCUSSION

Cigarette smoking causes various adverse cardiovascular problems and acts synergistically with hypertension to increase the risk of coronary heart disease, myocardial infarction, sudden coronary death and stroke, the precise effect of smoking on blood pressure remains unclear.[2]

The present study aimed to determine the association between smoking patterns and hypertension among adults in Erbil city. The study found significant associations between hypertension and several demographic and lifestyle factors, including age, residence, educational level, occupation, diabetes mellitus, cardiovascular diseases, BMI, and socio-economic status. However, it did not find a significant association between hypertension and smoking patterns, including the type of smoking, duration of smoking, age of beginning smoking, smoking amount, and duration of quitting

smoking as well as the smoking status whether the patient is current smoker, ex-smoker or non smoker.

In this study higher prevalence of hypertension found among older adults (51-65 years). This finding aligns with the global understanding that hypertension risk increases with age due to the natural hardening of the arteries and other age-related physiological changes.[13] The significant association between hypertension and urban residency could be attributed to lifestyle factors prevalent in urban areas, such as higher stress levels, sedentary lifestyles, and dietary habits .[14, 15]

Educational level also showed a significant association with hypertension. The higher prevalence of hypertension among the illiterate population suggests that education might play a role in promoting healthier lifestyles and better access to healthcare information and resources. This finding is consistent with previous studies that link lower educational attainment with higher health risks, including hypertension.[16] Occupational status was another significant factor, with unskilled workers having a higher prevalence of hypertension. This could be due to job-related stress, lower socioeconomic status, and limited access to healthcare. The association between low socioeconomic status and higher hypertension prevalence supports the theory that socioeconomic factors influence health outcomes. [17, 18]

The study found a significant association between hypertension and diabetes mellitus, as well as cardiovascular diseases. This finding is expected given the well-documented link between these conditions and hypertension .[19, 20] Individuals with diabetes or cardiovascular diseases are at higher risk of developing hypertension due to overlapping risk factors such as obesity, poor diet, and physical inactivity. On the other hand Higher BMI is a known risk factor for hypertension, as excess weight can increase the workload on the heart and contribute to arterial stiffness.[21] The significant differences in BMI between the hypertensive and normotensive adults in this study highlight the role of obesity in hypertension

Contrary to expectations, the study did not find a significant association between hypertension and smoking patterns. This result aligns with some epidemiological studies that reported no significant difference in blood pressure levels between smokers and non-smokers .[22] However, it contrasts with other studies that found a positive association between smoking and hypertension.[23] The lack of significant findings in this study could be due to several factors, including sample size, smoking habits, and cultural influences on smoking behavior. The non-significant association between hypertension and the type of smoking, duration of smoking, age of beginning smoking, smoking amount, and duration of quitting smoking suggests that other factors might mediate the relationship between smoking and hypertension. It is possible that the acute effects of smoking, such as vasoconstriction and increased heart rate, do not translate into chronic hypertension in the study population.[23] Additionally, the underreporting of smoking habits, especially among women due to cultural norms, might have affected the results.

Study Limitations:

The study has several limitations. The use of a convenience sample might introduce bias and affect the generalizability of the findings. The nature of the study being case -control one limits the ability to establish causal relationships since this type as other observational studies can suggest association between an exposure and a disease but they cannot prove that the exposure causes the disease Additionally, the

underreporting of smoking habits, particularly among women, could lead to an underestimation of the association between smoking and hypertension.

CONCLUSION

The study does not support a significant association between smoking patterns and hypertension . Future studies with larger, more representative samples and longitudinal designs are needed to explore the complex relationship between smoking and hypertension. On the other hand the significant association between hypertension and demographic, socioeconomic, and health-related factors reached in this study need to be addressed through further public health interventions including smoking cessation to overcome hypertension as a health problem and a risk factor for CVD .

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