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The correlation between hypertension and risk factors among ischemic heart disease patients in Babylon governorate

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Abstract---Hypertension is important risk factors for ischemic heart disease. And Ischemic heart disease is the most common cardiovascular disease and causes deaths in both males and females. Aim of our study to the correlation between hypertension and risk factors among ischemic heart disease patients in Babylon governorate. show in our results, the association of hypertension with age, gender, and socioeconomic status is highly significant p-value (0.0001, 0.0001 and 0.024) respectively. And family history, Diabetic mellitus and COVID-19 is significant with hypertension (0.002,0.0001. and 0.03 respectively. Smoking and exercise and alcohol intake are significant with hypertension p-value (0.0001, 0.022 and 0.009) respectively. Triglycerides, Low Density Lipoprotein, and High-Density Lipoprotein were significant with hypertension p-value (0.044, 0.031 and 0.0001) respectively. Waist Circumference and Body Mass Index are associated with hypertension p-value (0.036 and 0.0001) respectively. Conclusion The conclusion was that in our study, ischemic heart disease had statistically significant differences between modifiable and non-modifiable risk factors, especial those who have a history of Diabetic Miletus, COVID-19, and family history. also with Body mass index, Waist circumference lipid profiles which increase the probability of developing ischemic heart disease.

Keywords---hypertension, ischemic heart disease, risk factors.

Introduction

Ischemic heart disease(IHD) It's the term given to heart problems caused by narrowed heart arteries. When arteries are narrowed, less blood and oxygen reaches the heart muscle. This is also called coronary artery disease(CAD) and coronary heart disease(CHD). This can ultimately lead to heart attack; Ischemia often causes chest pain or discomfort known as angina pectoris (1) (2).Ischemic heart disease remains a major public health challenge worldwide. More effective and targeted strategies aimed at implementing cost-effective interventions and addressing modifiable risk factors are urgently needed, particularly in geographies with high or increasing burden (3). Hypertension−or elevated blood pressure−is a serious medical condition that significantly increases the risks of heart, brain, kidney and other diseases. An estimated 1.28 billion adults aged 30-79 years worldwide have hypertension, most (two-thirds) living in low- and middle-income countries (4).

Hypertension is the strongest or one of the strongest risk factors for almost all different cardiovascular diseases acquired during life, including ischemic heart disease (5) (6). According to epidemiologic data, cardiovascular mortality increases with blood pressure, starting as low as from the 110/70 mmHg level. Czech, European, and American guidelines from the early 21 st century recommend that blood pressure in patients with IHD be maintained below 130/80 mmHg. approximately 62% of strokes and 49% of CHD cases are attributable to suboptimal (above 115 mm Hg systolic) BP, a factor thought to account for more than 7 million deaths annually. Data from the INVEST aACCORD trials led, however, to the reappraisal of these strict recommendations and the blood pressure values currently recommended in secondary prevention correspond to high-normal blood pressure, i.e., 130–139 mmHg/80–89 mmHg. Therapeutic non-adherence (not following recommended medical or health advice, including failure to “persist” with medications and recommended lifestyle modifications) is a major contributor to poor control of hypertension and a key barrier to reducing CVD deaths. Adherence rates vary substantially in different populations and, in general, are lower for lifestyle change and more behaviorally demanding regimens (7).

Hypertension is associated with an unexpectedly high burden of cardiovascular mortality, and contributes to an increasing proportion of IHD deaths. Better management of hypertension and diabetes is urgently required to reduce premature cardiovascular mortality (8). In general, among other complications, hypertension can cause serious damage to the heart. Excessive pressure can harden arteries, decreasing the flow of blood and oxygen to the heart. This elevated pressure and reduced blood flow can cause Chest pain, also called angina, Heart attack, which occurs when the blood supply to the heart is blocked and heart muscle cells die from lack of oxygen. The longer the blood flow is blocked, the greater the damage to the heart, Heart failure, which occurs when the heart cannot pump enough blood and oxygen to other vital body organs, Irregular heart beat which can lead to a sudden death, Hypertension can also burst or block arteries that supply blood and oxygen to the brain ,causing a stroke(9).

Material and Methods

a cross-sectional study was carried in Babylon governorate. Sample size about 374 patients (old and new cases) from center, the interview was the method used with all patients. Data collection started on 3rd January, 2022 and ended on 27th April, 2022. Questionnaire characteristics (socio-demographic data (age, gender, socio-economic status and family and medical history, anthropometric measurement, smoking. Ex-smoking, physical activity, alcohol intake)

Calculate scores (Socio-economic status index, psychological stress score and Sleeping score)

The calculated SES score for Iraq. Divided into equal parts 3: high, medium and low socioeconomic levels.

SES=education+Occupation+housewnership*0.5+car0wnership*0.1+(age-20)/100-retired/unemployed/deceased (10) .

Statistical analysis

Analysis of data was carried out using the available statistical package of SPSS-28 (Statistical Packages for Social Sciences- version 28). Data were presented in simple measures of frequency, percentage, mean and standard deviation. The significance of difference of different percentages (qualitative data) were tested using Pearson Chi-square test (χ^2-test) with application of Fisher Exact test whenever applicable. Statistical significance was considered whenever the P value was equal or less than 0.05.

Aim of study

To determine correlation between hypertension and risk factors among ischemic heart disease patients in Babylon governorate.

Criteria for descriptive inclusion and exclusion of patients

Inclusion criteria for patients, appropriately selected patients were those referred to outpatient clinics and to inpatients in the intensive care unit of the center during the time of the study, after obtaining their consent to conduct the questionnaire. While Exclusion criteria for patients included the following, all patients who refused to participate in the study, patients with incomplete investigations

Result and Discussion

Table (1) the Socio-demographic characteristics of patient's with IHD. According to age group ranging (<50 - ≥70) years old, the highest percentage of years older at (38.5%,) were from (50---59) years. While in gender the highest percentage in males was (77.5%) And highest percentage (57.2%) living in urban area. But most of IHD patients (67.1%) in middle Socio-economic status. While for patients with a family history, the lowest percentage of (41.7%) of patients had a family history. And a higher percentage of patients with hypertension at (52.4%). The diastolic

blood pressure Mean ±SD 8.3±0.62, and the systolic blood pressure Mean ±SD 13.30+1.62. The proportion of patients with diabetes mellitus is ratio (50%).The percentage of patients infected with COVID-19 before ischemic heart disease is about (28. 6%).While the percentage of females who take oral contraceptives and menopause affects is (9.5 % and 76.2 %) respectively.

Table 1
Distribution of studied sample according to the Socio-demographic characteristics

		No	%
Age (years)	<50years	71	19.0
	50---59	144	38.5
	60---69	119	31.8
	≥70years	40	10.7
	Mean ±SD (Range)	57.2±9.5	
Gender	Male	290	77.5
	Female	84	22.5
Socio-economic status	Low	83	22.2
	Middle	251	67.1
	High	40	10.7
Family history of CVD	Yes	156	41.7
	No	218	58.3
Hypertension	Yes	198	52.4
	No	176	47.6
Diastolic blood pressure	Mean±SD	8.3±0.62	
Systolic blood pressure	Mean±SD	13.30+1.62	
Diabetes	Yes	187	50.0
	No	187	50.0
COVID-19 disease	Yes	107	28.6
	No	267	71.4

Table (2) Show lipid profile analysis for patients. The high proportion for LDL-C is (48.1 percent) for low risk and (10.4 percent) for high risk. HDL seems to be (87.4 percent) of the risk indication. Patients with high triglycerides have a (41.2). And Most of the participants' BMIs are overweight (41.7%). The highest percentage of patients was found to have a high risk (≥101M/≥87F) waist, at (54.5%). While Demonstrated the proportion of patients smoking cigarette and ex-smokers at (38%) and (20.9%), respectively, and patients not smoking a higher percentage at about (41. 2%).For exercise, the highest proportion of sedentary patients was (50.5%). And alcohol the lowest percentage (1.6%) of patients drink alcohol.

Table 2
Distribution of studied sample according to risk factors

		No	%
LDL-C (mmol/L)	No risk (<2.4)	155	41.4
	Low risk (2.4-4.0)	180	48.1
	High risk (>4.0)	39	10.4
HDL (mmol/L)	Favorable (>1.0M/ >1.16F)	47	12.6
	Risk (<0.9M/ <1.16F)	327	87.4

Cholesterol (mmol/L)	No risk (<5.18)	338	90.4
	Low risk (5.18-6.19)	25	6.7
	High risk (≥6.20)	11	2.9
Triglycerides (mmol/L)	No risk (0.4-1.82)	220	58.8
	Risk (>1.82)	154	41.2
BMI (Kg/m2)	Underweight (<18.5)	-	-
	Normal (18.5-24.9)	43	11.5
	Overweight (25-29.9)	156	41.7
	Obesity I (30-34.9)	117	31.3
	Obesity II (35-39.9)	46	12.3
	Extreme obesity III (≥40)	12	3.2
Waist (cm)	Low risk (≤94M/ ≤80F)	79	21.1
	Moderate (95-100M/ 81-86F)	91	24.3
	High risk (≥101M/ ≥87F)	204	54.5
Type of smoking	Cigarette	142	38.0
	Ex-smoker	78	20.9
	Not	154	41.2
physical activity	Sedentary (<1/w)	189	50.5
	Moderate (1/w)	54	14.43
	Moderate (2-3/w)	85	22.27
	Moderate (4-5/w)	31	8.3
	Moderate (>5/w)	15	4.01
Alcohol	Yes	6	1.6
	No	368	98.4

Table (3) Association between hypertension and socio-demographic characteristic, shows highest percentage of have Hypertension (40.4%) at age (60-69) years, while ≥70 age lower percentage of 13.6. there are significant between HT and age (p= 0.0001). And gender highest percentage male has HT 69.7%, while female 30.3 % the association significant p=0. 0001. The correlation between socioeconomic status and HT is significant at p=0.024, with 72.2 percent of middle SES having HT compared to 11.1 percent of high SES.

Table 3
Assciation hyoertension with some socio-demographic charactristic (age,gender and socio-economic status)

		Hypertension				P value
		No		Yes		
		No	%	No	%	
Age (years)	<50years	40	22.7	31	15.7	0.0001*
	50---59	84	47.7	60	30.3	
	60---69	39	22.2	80	40.4	
	≥70years	13	7.4	27	13.6	
Gender	Male	152	86.4	138	69.7	0.0001*
	Female	24	13.6	60	30.3	
Socio-economic status	Low	50	28.4	33	16.7	0.024*
	Middle	108	61.4	143	72.2	
	High	18	10.2	22	11.1	

Table (4) The percentage of patients with hypertension who have a family history of cardiovascular disease (CVD) is shown (48.98 percent). HT is associated with an increased risk of ischemic heart disease a (p= 0.002). And diabetics have HT at a significantly higher rate (58.1 percent), compared to those who do not have HT (40.9%), making the relationship statistically significant (p = 0.0001). And About (33.3%) of covid-19 patients with HT infection have a significant correlation (p=0.03).

Table 4
Assciation hypertension with Family and medical history

		Hypertension				P value
		No		Yes		
		No	%	No	%	
Family history of CVD	No	117	66.5	101	51	0.002*
	Yes	59	33.5	97	48.89	
Diabetes	No	104	59.1	83	41.9	0.0001*
	Yes	72	40.9	115	58.1	
Covid-19 disease	No	135	76.7	132	66.7	0.03*
	Yes	41	23.3	66	33.3	

Table (5) Results showed the relationship between HT and Life style risk: showed high significance (p=0.0001) between Hypertension and smoking status, the ratio between current smoker with HT about (29.3%) and EX-smoker (25.8%). And Exercise, high percentage with Sedentary (<1/w) patients have HT about (54%), the p-value=0.022 association significant. The correlation between alcohol use and hypertension is statistically significant (p = 0.009).

Table 5
Correlation between Hypertension and lifestyle risk (smoking, Exercise and alcohol)

		hypertension				P value
		No		Yes		
		No	%	No	%	
Smoking	Not	65	36.9	89	44.9	0.0001*
	Cigarette/Shisha	84	47.7	58	29.3	
	Ex-smoker	27	15.3	51	25.8	
physical	Sedentary (<1/w)	82	46.7	107	54.0	0.022*
activity	Moderate (1/w)	22	12.5	32	16.2	
	Moderate (2-3/w)	40	22.72	45	22.7	
	Moderate (4-5/w)	21	11.93	10	5.1	
	Moderate (>5/w)	11	6.25	4	2.0	
Alcohol	Yes	0	-	6	3.03	0.009*
	No	176	100	192	96.96	

Table (6) relationships between hypertension and Lipids profile levels: A p-value of (0.044) indicates that LDL-C and HT have a statistically significant relationship.

While the p-value of 0.031 for HDL-C is significant, the maximum percentage of people with low HDL and HT is around (90.9 percent). And There is a considerable correlation between triglyceride levels and hypertension (p-value 0.0001), the percentage of people who have HT and risk high TG about (50.5 percent). Physical measurements with HT: There is a significant association between BMI and HT, the high proportion, according to the p-value of 0.036, which demonstrates that this relationship exists. Overweight and suffering from HT (39.4 percent). In addition, 65.7 percent of high risk waist with HT, which has a p-value of (0.0001).

Table 6
Correlation between Hypertension with lipids profile and physical measurement)

		hypertension				P value
		No		Yes		
		No	%	No	%	
LDL-C (mmol/L)	No risk (<2.4)	63	35.8	92	46.5	0.044*
	Low risk (2.4-4.0)	89	50.6	91	46.0	
	High risk (>4.0)	24	13.6	15	7.6	
	Mean±SD	2.75±1.02				
HDL (mmol/L)	Favorable (>1.0M/ >1.16F)	29	16.5	18	9.1	0.031*
	Risk (<0.9M/ <1.16F)	147	83.5	180	90.9	
	Mean±SD	0.75±0.2				
Triglycerides	No risk (0.4-1.82)	122	69.3	98	94.5	0.0001*
(mmol/L)	Risk (>1.82)	54	30.7	100	50.5	
	Mean±SD	1.84±1.03				
BMI (Kg/m2)	Underweight (<18.5)	-	-	-	-	0.036*
	Normal (18.5-24.9)	24	13.6	19	9.6	
	Overweight (25-29.9)	78	44.3	78	39.4	
	Obesity I (30-34.9)	57	32.4	60	30.3	
	Obesity II (35-39.9)	15	8.5	31	15.7	
	Extreme obesity III (≥40)	2	1.1	10	5.1	
	Mean±SD	30.06±4.75				
Waist (cm)	Low risk (=<94M/ =<80F)	50	28.4	29	14.6	0.0001*
	Moderate (95-100M/ 81-86F)	52	29.5	39	19.7	
	High risk (≥101M/ ≥87F)	74	42.0	130	65.7	
	Mean±SD	100.97±10.43				

*Significant difference between percentages using Pearson Chi-square test (χ^2-test) at 0.05 level.

Discussion

The correlation between HT and age was significant, with a p-value of 0.0001, in agreement with a 6-year follow-up study in the Greece where the association between HT patients and age and incidence IHD was significant at a p-value of 0.001(11). While the correlation between HT and SES was significant, with a p-value of 0.024, in agreement with the hospitalized patients with heart disease in Isfahan, Iran, found association between SES and HT the incidence IHD was significant at a p-value of 0.005 (12). And The correlation between HT and family history was not significant, with a p-value of 0.0002, in agreement with study about Hypertension and acute coronary syndromes in Romania was significant at a p-value of 0.009 (13) . While the association between HT and Covid-19 was

significant, with a p-value of 0.03, in agreement with a study in the turkey where the association between HT patients and Covid-19 was significant at a p-value of 0.0.001(14)**.** Correlation between hypertension and smoker status significant the p-value (0.0001), which agreement The Jackson Heart Study found significant p-value (0.001) (15).

And the Correlation between HT and physical inactivity is significant the p-value is 0.022, which agrees study in Europa found a significant p-value of 0.001(16) while the correlation between HT and alcohol intake was significant, with a p-value of (0.009), in agreement with study in Denmark about Alcohol Intake and Risk of Coronary Heart Disease was test showed statistically significant (P=0.0001) (17) .Correlation between hypertension and WC significant the p-v alue 0.0001, which agreement study in China found significant p-value 0.001.(18).While the correlation between HT and BMI intake was significant, with a p-value of0.036, in agreement with study in USA about Utility of a Body Shape Index Parameter in Predicting Cardiovascular Disease Risks (CHD,stroke ,MI) was test showed statistically significant (P=0.0001) for CAD (19) . The correlation between HT and LDL-C was significant, with a p-value of 0.044, in agreement with study in China where the association between HT patients and LDL-C incidence IHD was significant at a p-value of 0.001 (20). Positively associated between low HDL-With HT the p-value =0.031 .and high TG association with hypertension statistical significant 0.0001, similar study in china in population female found association low HDL and high TG with hypertension increase IHD the p-value =0.01 and 0.001 respectively (21).

Conclusion

We conclude from our study that hypertension is an important risk factor that causes ischemic heart disease, and the chance of developing ischemic heart disease increases if more than one risk factor is combined with patients. The risk of developing ischemic heart disease in hypertensive patients increases with increasing age, as well as gender, in males, and in the middle socio-economic status. As for the family history and medical history of the patient (Diabetes, COVID-19) showed high significance. There was a strong correlation between lipid profiles (low density lipoproteins and triglycerides) and hypertension, as well as low high density lipoproteins. Anthropometric measures (body mass index and waist circumference) showed a strong correlation. Also, sedentary lifestyle, smoking and alcohol consumption increase the likelihood of developing ischemic heart disease.

Recommendation

We recommend preparing a guide to teach the risk management of hypertension. As well as providing advice to patients with hypertension.

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References

1. Kasprzyk M, Wudarczyk B, Czyz R, Szarpak L, Jankowska-Polanska B. Ischemic heart disease – definition, epidemiology, pathogenesis, risk factors and treatment. Postępy Nauk Med. 2018;31(06):10–3.
2. AmerAmerican Heart Association. 2015. “Silent Ischemia and Ischemic Heart Disease | American Heart Association.” Heart.Org. Retrieved (https://www.heart.org/en/health-topics/heart-attack/about-heart-attacks/silent-ischemia-and-ischemic-heart-disease).ican. Silent Ischemia and Ischemic Heart Disease | American Heart Association [Internet]. Heart.org. 2015. Available from: https://www.heart.org/en/health-topics/heart-attack/about-heart-attacks/silent-ischemia-and-ischemic-heart-disease
3. Yuyun MF, Sliwa K, Kengne AP, Mocumbi AO, Bukhman G. Cardiovascular diseases in sub-saharan Africa compared to high-income countries: An epidemiological perspective. Glob Heart. 2020;15(1):1–18.
4. WHO. Ethiopia launches a national salt reduction media campaign to combat hypertension and heart disease | WHO | Regional Office for Africa [Internet]. World Health Organisation. 2021. Available from: https://www.afro.who.int/news/ethiopia-launches-national-salt-reduction-media-campaign-combat-hypertension-and-heart-disease
5. Kjeldsen SE. Hypertension and cardiovascular risk: general aspects. Pharmacol Res. 2018;129:95–9.
6. Špinar J. Hypertension and ischemic heart disease. Cor Vasa. 2012;54(6):e433–8.
7. Whelton PK, Carey RM, Aronow WS, Casey DE, Collins KJ, Himmelfarb CD, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults a report of the American College of Cardiology/American Heart Association Task Force on Clinical pr [Internet]. Vol. 71, Hypertension. 2018. p. E13–115. Available from: https://doi.org/10.1161/HYP.0000000000000065
8. Ke C, Gupta R, Shah BR, Stukel TA, Xavier D, Jha P. Association of Hypertension and Diabetes with Ischemic Heart Disease and Stroke Mortality in India: The Million Death Study. Glob Heart. 2021;16(1).
9. World Health Organization. The top 10 causes of death - Factsheet. WHO reports [Internet]. 2020;(December 2020):1–9. Available from: https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death
10. Omer W, Al-Hadithi T. Developing a socioeconomic index for health research in Iraq. East Mediterr Heal J. 2017;23(10):670–7.
11. Dimitriadis K, Tsioufis C, Mazaraki A, Liatakis I, Koutra E, Kordalis A, et al. Waist circumference compared with other obesity parameters as determinants of coronary artery disease in essential hypertension: A 6-year follow-up study. Hypertens Res. 2016;39(6):475–9.

12. Davari M, Maracy MR, Khorasani E. Socioeconomic status, cardiac risk factors, and cardiovascular disease: A novel approach to determination of this association. ARYA Atheroscler. 2019;15(6):260–6.
13. Dorobantu M, Tautu OF, Fruntelata A, Calmac L, Tatu-Chitoiu G, Bataila V, et al. Hypertension and acute coronary syndromes in Romania: Data from the ISACS-TC registry. Eur Hear Journal, Suppl. 2014;16(SUPPL.A):20–7.
14. Barman HA, Atici A, Sahin I, Alici G, Aktas Tekin E, Baycan ÖF, et al. Prognostic significance of cardiac injury in COVID-19 patients with and without coronary artery disease. Coron Artery Dis. 2021;(March):359–66.
15. Oshunbade AA, Kassahun-Yimer W, Valle KA, Hamid A, Kipchumba RK, Kamimura D, et al. Cigarette smoking, incident coronary heart disease, and coronary artery calcification in black adults: The jackson heart study. J Am Heart Assoc. 2021;10(7).
16. Fortuin-de Smidt MC, Sewe MO, Lassale C, Weiderpass E, Andersson J, Huerta JM, et al. Physical activity attenuates but does not eliminate coronary heart disease risk amongst adults with risk factors: EPIC-CVD case-cohort study. Eur J Prev Cardiol. 2022;1–12.
17. Hvidtfeldt UA, Tolstrup JS, Jakobsen MU, Heitmann BL, Grønbæk M, O'Reilly E, et al. Alcohol intake and risk of coronary heart disease in younger, middle-aged, and older adults. Circulation. 2010;121(14):1589–97.
18. Chen Q, Li L, Yi J, Huang K, Shen R, Wu R, et al. Waist circumference increases risk of coronary heart disease: Evidence from a Mendelian randomization study. Mol Genet Genomic Med. 2020;8(4):1–11.
19. Aoki KC, Mayrovitz HN. Utility of a Body Shape Index Parameter in Predicting Cardiovascular Disease Risks. Cureus. 2022;14(4):2017–8.
20. Kexin W, Yaodong D, Wen G, Rui W, Jiaxin Y, Xiaoli L, et al. Association of Increased Remnant Cholesterol and the Risk of Coronary Artery Disease: A Retrospective Study. Front Cardiovasc Med. 2021;8(October).
21. Wu TT, Gao Y, Zheng YY, Ma YT, Xie X. Atherogenic index of plasma (AIP): A novel predictive indicator for the coronary artery disease in postmenopausal women. Lipids Health Dis. 2018;17(1):1–7.
22. Suryasa, W. (2019). Historical Religion Dynamics: Phenomenon in Bali Island. Journal of Advanced Research in Dynamical and Control Systems, 11(6), 1679-1685.
23. Salawali, A. Q. ., Tahir, A. M. ., & Hardjo, M. . (2021). The effect of family education on the fulfillment of family health tasks in handling case of hypertension post earthquake in Sigi regency. International Journal of Health & Medical Sciences, 4(1), 136-140. https://doi.org/10.31295/ijhms.v4n1.1625