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ORIGINAL ARTICLE

Frequency of uncontrolled hypertension and associated risk factors attending cardiac outpatient Department Sindh Institute of medical sciences Shahdadpur.

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ABSTRACT… Objective: To determine the frequency of uncontrolled hypertension and its associated risk factors at Outpatient department of Sindh Institute of Medical Sciences Shahdadpur (SIMS). **Study Design:** Descriptive Cross-sectional study. **Setting:** Cardiac OPD of SIMS Shahdadpur. **Period:** 2023 to February, 2024. **Methods:** The sample size was 300 participants of both gender and were selected by convenience sampling. Data was collected on a designed questionnaire containing sociodemographic information, medical history, dietary habits, lifestyle, after taking informed consent from the participants who were fulfilling the inclusion criteria. Data was then analysed by hand sorting techniques, MS office and SPSS version 27.0. Ethical rules of the university were followed. **Results:** The research included 300 patients, with frequency of Uncontrolled Hypertension was concluded 62.6 %. A significant proportion had a history of irregular blood pressure check-ups (78.3%), while only 20.7% reported drug compliance. The education rate was relatively low, 66% were illiterate, and overweight and obesity were prevalent in 80.3% of the patients. Smoking was reported by 39.4% of the participants, and a majority (59.6%) belonged to a lower socioeconomic class and in rural residents (72.3%). **Conclusion:** Study's findings suggest that frequency of uncontrolled hypertension is more than half of the total Uncontrolled hypertension is more prevalent among rural residents, among females than males. Risk increase with age above 50years, Illiteracy, low socioeconomic groups, lack of physical activity, increase BMI, high salt diet, smoking, non-compliance to drugs, irregular checkup, stress and family history of hypertension.

Key words: Cardiac OPD, Hypertension, Risk Factor, Uncontrolled Hypertension.

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INTRODUCTION

Uncontrolled hypertension, affecting 1.2 billion people and causing 1.7 million deaths annually, is a major global health issue across all socioeconomic groups. A global goal for non-communicable diseases is to reduce hypertension prevalence to 33% by 2030, aiming to lower risks of heart failure and significantly reduce stroke incidence. The reduction aims to lower the risk of cardiac failure and reduce the likelihood of strokes and cerebrovascular diseases seven-fold.[1] Around 66.8% of uncontrolled hypertensive patients are in developed countries, 61.6% in developing countries, with two-thirds residing in low- and middle-income nations.[2] Two-thirds of uncontrolled hypertensive patients live in low- and middle-income countries, with rates of 66.8% in developed and 61.6% in developing countries.[3] Key risk factors include obesity, high salt intake (>5g/day), saturated fats, excessive alcohol (>75g/day), sedentary lifestyle, smoking, stress, low education, and poverty.[4] Farhadi F et al. reported a high prevalence of uncontrolled hypertension. Noreen N et al. found that 72.7% of hypertensive patients at a cardiac clinic had uncontrolled blood pressure, mainly due to poor adherence caused by financial constraints.[5]

The Second National Diabetes Survey of Pakistan reported a hypertension prevalence of 46.2%, with a control rate of 33% overall, 34.4% in rural central Punjab, and 29.22% in urban areas.[6] Uncontrolled hypertension was highest in rural Thatta, Sindh, Pakistan (71%), compared to Bangladesh (53%) and Sri Lanka (57%). According to a survey, only 40% of hypertensive patients were aware of their condition.[7]

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A study at Aga Khan Hospital, Karachi (July 2020–March 2022) investigated the association between uncontrolled hypertension and drug compliance. It found that 64% of patients were compliant, with 64.6% of them on monotherapy. Compliance was higher among patients aged 61–75 years and those with graduate-level education.[8] A meta-analysis and systematic review of 18 studies (from 1,240 articles) involving 42,618 participants estimated the overall prevalence of hypertension in Pakistan at 26.34%. Prevalence was higher in rural areas (31.42%) than urban areas (26.61%). Conducted due to the absence of a recent nationwide study the last being over 20 years old this review showed a rising trend in hypertension: 19.55% in the 1990s, 23.95% in the 2000s, and 29.95% in the 2010s.[9] Uncontrolled hypertension remains a major public health concern, yet awareness and focus on its modifiable risk factors are inadequate, particularly in semi-urban areas. This study, conducted in the Cardiac Outpatient Department of the Sindh Institute of Medical Science (SMIS), Shahdadpur, aims to address this gap by raising public awareness and identifying key risk factors contributing to uncontrolled hypertension. The findings are expected to enhance community understanding, support preventive strategies, and contribute to improved health outcomes in Shahdadpur and similar settings.

METHODS

A cross-sectional survey was conducted at Cardiac Outpatient Department (OPD) of Sindh Institute of Medical Science (SIMS) Shahdadpur. Patients selected were aged 40 years or above. Study was conducted from December, 2023 to February, 2024. Patients who were already diagnosed as hypertension were take conveniently into the study. Based on the prevalence of uncontrolled hypertension in Pakistan, sample size was calculated using formula and a total of 296. A predesignated questionnaire was used for data collection. The questionnaire contain sociodemographic information as age, gender, residency, educational level, monthly income, occupation. Dietary habits were assessed by history of low salt intake, use of cooking oil or ghee, lifestyle was assessed by history of exercise, physical activity, smoking, alcohol consumption. The clinical characteristics include duration of hypertension, regular blood pressure check-up, drug compliance, number of anti-hypertensive drugs used. Patients chart were also reviewed for information. Survey questionnaire was checked for errors. The data was entered into SPSS version 27.0.The variables age, gender, education, socioeconomic status, physical activity, BMI, smoking, alcohol consumption, low salt, saturated fat, stress, sleep, family history of hypertension, regular checkup, number of medicine, drug compliance, were analyzed by frequencies, percentages. The data is presented in tables. Chi Square test was applied to check related association of risk factors with uncontrolled hypertension. Results were found to be significant at p value <0.05.

RESULTS

The study included 300 participants, with a majority being female (58%) and males comprising 42% of the sample. The most represented age group was 40–49 years, accounting for 52%, followed by those aged 50–59 years (31%), and 17% were aged above 60 years. In terms of marital status, the vast majority were married (92.6%), while widowed individuals made up 6.3%, and only 1% were divorced. The educational background of participants showed that a significant portion were illiterate (55.6%), with 22.3% having secondary education, 15.3% with primary education, and only 6.6% were graduates (Table-I).

In table-III compares BMI, alcohol and smoking habits, fat usage, and salt intake between two groups of hypertensive individuals: controlled (N = 112) and uncontrolled (N = 188). Among the uncontrolled group, the majority were overweight (44.1%) or obese (34%), with a smaller percentage having normal BMI (19.6%), and only 2.6% were underweight. In the controlled group, 35.7% were overweight, 33% obese, 24.1% had normal BMI, and 7.1% were underweight, indicating a slightly more favorable BMI distribution compared to the uncontrolled group. The majority in both groups did not consume alcohol (80.3% in uncontrolled and 89.2% in controlled hypertension). A higher proportion of non-smokers was seen in the controlled group (67.8%) compared to the uncontrolled group (58.5%). Ex-smokers were minimal in both groups (2.1% and 1.7% respectively). In the uncontrolled hypertensive group, 68% used ghee for cooking,

while only 31.9% used cooking oil. In contrast, the controlled group predominantly used cooking oil (67.8%), and only 32.1% used ghee, showing a healthier fat choice in the controlled group. High salt intake was more common among the uncontrolled group (16.4%) than the controlled (11.6%). Medium salt intake was reported by 61.1% of uncontrolled and 26.7% of controlled. Notably, 61.6% of the controlled group consumed low salt, compared to only 22.3% of the uncontrolled, indicating better dietary compliance in the controlled hypertensives.

TABLE-I

Sociodemographic characteristics:

Variable	Category	Frequency N (%) N=300
Sex	Male	126 (42%)
	Female	174 (58%)
Age in Years	40-49	156 (52%)
	50-59	93(31%)
	>60	51(17%)
Marital Status	Married	278(92.6%)
	Divorced	3(1%)
	Window	19(6.3%)
Educational level	Illiterate	167(55.6%)
	Primary	46(15.3%)
	Secondary	67(22.3%)
	Graduate	20(6.6%)
Socioeconomic status	Lower	187(62.3%)
	Middle	90(30%)
	Higher	23(7.6%)
Occupational Status	Unemployed	89(29.6%)
	Skilled	65(21.6%)
	Government	117(39%)
	Labourer	29(9.6%)
Residential status	Urban	87(29%)
	Rural	213(71%)

TABLE-II

Frequency of uncontrolled hypertension among participants and their characteristics:

Variables	Category	Uncontrolled n(%)	Controlled
Hypertension	Status of hypertension	188(62.6%)	112(37.4%)
Age in Years	40-49	70(37.2%)	55(49.1%)
	50–59	86(45.7%)	35(31.2%)
	>60	32(17.1%)	22(19.6%)
Sex	Male	81(43.1%)	68(60.8%)
	Female	107(56.9%)	44(39.2%)
Residential Status	Urban	54(28.7%)	40(35%)
	Rural	134 (71.3%)	72(65%)
Educational Status	Illiterate	118(62.7%)	45(40.1%)
	Primary	25(13.3%)	19(16.9%)
	Secondary	29(15.4%)	30(26.7%)
	Graduate	16(8.5%)	28(25%)
SocioEconomic Status	Lower	112(59.6%)	75(66.9%)
	Middle	68(36.2%)	22(19.6%)
	Upper	8(4.2%)	15(13.3%)

TABLE-III

Frequency of uncontrolled hypertension among participants and their characteristics:

Variable	Category	Uncontrolled (N=188)	Controlled (N=112)
BMI	Underweight	5(2.6%)	8(7.1%)
	Normal	37(19.6%)	27(24.1%)
	Overweight	83(44.1%)	40(35.7%)
	Obese	64(34%)	37(33%)
Alcohol Consumption	Yes	37(19.6%)	12(10.7%)
	No	151(80.3%)	100(89.2%)
Smoking Status	Non Smoker	110(58.5%)	76(67.8%)
	Smoker	74(39.3%)	36(32.1%)
	Ex-Smoker	4(2.1%)	2(1.7%)
Use of Fats	Cooking oil	60(31.9%)	76(67.8%)
	Ghee	128(68%)	36(32.1%)
Salt Intake	Low	42(22.3%)	69(61.6%)
	Medium	115(61.1%)	30(26.7%)
	High	31(16.4%)	13(11.6%)

TABLE-IV

Comparison of physical activity and drug compliance

Variable	Category	Uncontrolled (N=188)	Controlled (N=112)
Physical Activity	No activity	30(15.9%)	22(19.6%)
	Domestic Activity	76(40.4%)	27(24.1%)
	Occupational Activity	82(43.6%)	63(56.2%)
Exercise	Yes	37(19.6%)	67(59.8%)
	No	151(80.3%)	45(40.1%)
Blood Pressure Check Up	Regular	41(21.8%)	79(70.5%)
	Irregular	147(78.1%)	33(29.4%)
Drug Compliance	Yes	39(20.7%)	78(69.6%)
	No	149(79.2%)	34(30.3%)

Several factors were associated with uncontrolled hypertension in our study, including age, female gender, unhealthy dietary habits (such as non-adherence to a low-salt diet and the use of ghee instead of cooking oil), physical inactivity, obesity, smoking, and alcohol consumption. These risk factors are also widely documented in literature from other regional and international studies.[20] A higher prevalence of uncontrolled hypertension has been reported in hospital settings in Afghanistan (77.3%) and in rural areas of Thatta, Sindh (71%), compared to 53% in Bangladesh and 57% in Sri Lanka. These rates indicate even worse outcomes than those found in our study. Uncontrolled hypertension was more prevalent among overweight and obese individuals, and those from low or middle socioeconomic backgrounds. Common contributing factors included smoking, physical inactivity, high salt intake, comorbid conditions, high BMI, poor medication compliance, and psychological stress, with similar patterns observed across numerous studies.[11,12,13]

Age was a significant predictor in our study. The prevalence of uncontrolled hypertension was highest in the 50–59-year age group (n=80; 45.7%), followed by the 40–49-year group (n=69; 36.7%). Similar studies have shown that individuals aged ≥50 years are more than twice as likely to have uncontrolled hypertension compared to younger age groups. Our findings are also consistent with population-based data indicating a higher prevalence of uncontrolled hypertension among older adults. Uncontrolled hypertension was more prevalent among females (n=107; 56.9%) in our study (Table 4.3), a trend also reported in international data, which indicates that after the age of 51, the prevalence tends to be higher in women. In younger age groups (30–50 years), men typically show higher rates, but this reverses with age.[13,14]

In terms of residence, the burden was higher in rural areas (n=136; 72.3%). This mirrors findings from other rural regions in Pakistan, where rates ranged from 70.78% to 77.7%. Limited access to healthcare facilities, poverty, and irregular monitoring are key contributing factors in these areas. Our study also examined multiple determinants of blood pressure control. Illiteracy was reported in 66% (n=124) of patients, regular blood pressure check-ups were reported by only 22.3% (n=42), while 63.8% (n=120) had irregular check-ups. Drug compliance was poor, reported at 20.7% (n=39), and 58.5% (n=110) were on monotherapy. These trends are consistent with findings from studies conducted across South Asia and Africa, as well as reports from the World Health Organization, all of which highlight the importance of education, monitoring, and therapy adherence in managing hypertension effectively.[7,15,16,17,18]

Among all risk factors, the most strongly associated with uncontrolled hypertension was high BMI. In our study, 43.6% of participants were overweight, and 36.7% were obese. Additionally, 80.3% reported no regular physical activity. Physical inactivity has been shown to increase the risk of uncontrolled hypertension by 1.8 times, as confirmed by studies conducted across Asia and Africa. An unhealthy diet was the third most common associated factor. Non-adherence to a low-salt diet was observed in 78% of patients, and 66.5% used ghee for cooking. High salt consumption (over 5 grams per day), especially in salt-sensitive populations such as the elderly and individuals with chronic conditions, is a well-established contributor to poor hypertension control. Alcohol consumption was reported in 19% of patients. Excessive alcohol intake more than 30 drinks per week has been linked to a 12–15% increased risk of hypertension, while cessation can reduce prevalence from 42% to 12%.[3,19,20,21,22]

Smoking was reported in 39.5% of patients, a rate likely lower due to the predominance of female participants. Smoking has been identified as a key risk factor for both the development and poor control of hypertension. Tobacco use is also associated with early complications in hypertensive patients and has been recognized as an independent risk factor for uncontrolled hypertension in national surveys. Psychological stress was reported by 84% of participants. This includes financial, family, and job-related stress, all of which are widely reported as significant contributors to uncontrolled hypertension. Stress is more frequently present in uncontrolled hypertensive patients than in those with well-controlled blood pressure. Non-compliance to medication was high in our study (79.3%). Studies show that non-compliant patients are twice as likely to have uncontrolled hypertension. Common causes include forgetfulness and financial constraints, with forgetfulness alone responsible for one-third of treatment discontinuation. Similar patterns are seen across multiple studies, emphasizing that improving medication adherence is key to managing hypertension effectively.[7,23,24,25,26]

Socioeconomic factors played a major role. In our study, 60.1% of patients were from a low socioeconomic background, 24.5% were unemployed, and 62.7% were illiterate. Poor education is linked to poor health knowledge, unhealthy behavior, and non-adherence to therapy. Socioeconomic status, influenced by both education and income, has a strong association with uncontrolled hypertension. According to the World Health Organization, medication adherence is particularly poor in developing countries due to limited access to healthcare and underutilization of available resources. Adherence rates were reported as 62.4% in Africa, 43.5% in Asia, 36.6% in the Americas, and 6.6% in Europe, highlighting how economic inequality directly impacts disease control. Global data indicate that non-compliant patients are twice as likely to have uncontrolled hypertension. Multiple studies across regions including Malaysia, South Asia, and South Africa confirm that adherence to antihypertensive therapy is a critical preventive factor. Lastly, it has been emphasized in several studies that multi-drug regimens are often necessary to achieve blood pressure control. In our study, 58.5% of patients were on monotherapy, which proved insufficient. The primary reason for monotherapy use was financial constraint, with many patients opting for the most affordable drug or one provided by the hospital.[27,28,29]

This study has some limitations, primarily due to the fact that the study population was limited to patients attending the cardiac outpatient department (OPD) of a hospital, where the majority of attendees belong to low- and middle-income groups. As such, this is not a population-based study, and the results may overestimate the frequency of hypertension, awareness levels, and compliance with medication. This is likely because a significant portion of the study population comes from rural areas, with many being illiterate and having limited health awareness, low income, and restricted access to medical facilities.

A major contributing factor appears to be a lack of awareness regarding a healthy lifestyle, which is closely linked to limited health knowledge. Poor dietary habits and unhealthy lifestyle choices such as the consumption of saturated fats (e.g., ghee and butter), excessive salt intake, and lack of structured exercise are common. Although many participants engage in physical activity through daily labor, this does not equate to regular or proper exercise. Additionally, there is little to no awareness of the health risks associated with lifestyle factors such as physical inactivity and smoking. Despite these limitations, the findings are consistent with other regional studies. Importantly, this study highlights a significantly increased number of patients with uncontrolled hypertension, along with a high prevalence of associated risk factors within the urban and neighboring rural populations of our region.

CONCLUSION

This study demonstrates a high frequency of uncontrolled hypertension among patients attending the Cardiac OPD at SIMS Shahdadpur, with a greater prevalence observed in rural populations and among women. Uncontrolled hypertension was more common in individuals over 50 years of age, particularly among the illiterate and those from lower socioeconomic backgrounds. Key contributing

factors included lack of awareness about a healthy lifestyle, physical inactivity, increased BMI, smoking, poor dietary habits (such as high intake of salt and saturated fats), and non-compliance with medication. The findings highlight the critical role of poverty and limited health education in the poor management of hypertension. These results underscore the need for targeted public health interventions focused on lifestyle modification, health education, and improved access to healthcare, especially for underserved rural and low-income populations.

Ethical Approval

This study was reviewed and approved by the ethical research committee under reference number (PUMHSW/SBA/DME 324). The study adhered to the Helsinki Declaration, as well as national, international, and institutional ethical standards at all stages, given the involvement of human participants.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Khiar unisa:** Concept of research, writing manuscript.
2	**Imran Mirbahar:** Writing.
3	**Saqiba Khali:** Data analysis.
4	**Dur e Shahwar:** Initial writing.
5	**Noor Samoon:** Proof reading,
6	**Hanna Khair Tunio:** Data analysis, revision.