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Original Article

Drug Adherence and Knowledge Issues in Hypertensive Non-Medical Professionals Taking Sugar-Sweetened Soft Drinks

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Abstract

Hypertension has become the most common cause of many cardiovascular disorders in recent decades. The primary goal of this study was to assess the impact of health-related quality on hypertensive non-medical professionals who often consume soft drinks. A cross-sectional survey of 571 people was conducted using a questionnaire from March to July 2024. The data from hospitals in Loralai, Balochistan, was analyzed using descriptive statistical tests. About 26.54% had hypertension and were soft drink drinkers. The majority of the interviewees were unaware of their blood pressure levels, and 36.8% had hypertension symptoms. The findings of this study revealed significant gaps in information, diagnosis, and adaptation of preventative measures. The current situation is concerning due to a consistent lifestyle, a lack of awareness of high blood pressure, and the continued consumption of soft beverages.

Keywords: Hypertension, cross-sectional, Loralai, knowledge, diagnoses

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INTRODUCTION

Hypertension (high blood pressure) is one of the world's most common and preventable causes of morbidity and mortality. Hypertension is on the rise, and only a small percentage of those who suffer from it receive effective treatment. Stroke, heart failure, cardiovascular disorders, mortality during pregnancy, short-term memory loss, and renal failure are all linked to hypertension-1 (Duckitt & Harrington, 2005; Ezzati et al., 2002). According to the World Health Organization (WHO), hypertension is the second most common cause of cardiovascular disease in developing nations, and it is expected to overtake smoking as the leading cause by 20203 (Murray & Lopez, 1997). Approximately 1 billion people have hypertension condition and increasing progressively that in 2025 the number of hypertension may exceed 1.56 billion (Mohan & Campbell, 2009). The prevalence of High blood pressure was found 40% among 25-year-old adults and about 7.5 million people die due to this issue (Alwan, 2011).

Recent studies revealed that South Asian countries including Pakistan, India, Bangladesh, Sri Lanka, and Nepal possess the highest number of cardiovascular patients than any other country (Farag et al., 2014). Moreover, certain risk factors such as hypertension, diabetes, and myocardial infarction are more common at a younger age in South Asia (Joshi et al., 2007). Environmental factors, obesity, lack of exercise, any form of smoking, and habit of intake of high levels of cholesterol support the prevalence of hypertension at any stage of life (Perry et al., 1994). A similar kind of situation of hypertension was developed in Karachi, Pakistan, where it was recorded at 36% and observed a higher ratio in males at 34% than in females at 24% (Safdar et al., 2004). Previous studies provide an overview of hypertension prevalence in Pakistan, where 18% of people are suffering from hypertension

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only 50% of them are diagnosed and half of the diagnosed people are treated (Jafar et al., 2003). Hypertension is increasing due to a lack of knowledge, financial constraints, and ignorance regarding the intake of prescribed medications (Hashmi et al., 2007). Consumption of sugar-sweetened soft drinks has increased due to rich sources of sugar and calories, and they are linked with obesity and high blood pressure documented among adolescents. There is sufficient scientific evidence that decreasing sugar-sweetened beverage consumption will reduce the prevalence of obesity and obesity-related diseases.

The goal of this study was to determine the prevalence of hypertension concerns and drug adherence among non-medical professionals. The topic was chosen based on the small number of previously conducted research in this area, which was done using adapted World Health Organization questionnaires.

Material and Methods

Socio-demographic and behavioral characteristics

From March to July 2024, a cross-sectional survey was performed in the Loralai District of Balochistan. For our research, we visited a variety of private and government hospitals regularly. The volunteers were first given a one-week training on the survey before being approached by the participants. Both Pashto and Urdu were used to translate the questionnaire. A professor from the Pashto Department, University of Balochistan Quetta for translation of the questionnaire into Urdu (the national language of Pakistan. We approached those individuals, who were eligible for this study have aged between 20 to 35 years within the premises of hospitals. Data were excluded on mental retardation, physical abnormality, pregnancy, and certain genetic issues related to syndrome and chromosomal anomaly.

The sample size was calculated based on the non-medical professional's (NMP) numbers and estimated values. A total of 571 participants were approached, and 345 males and 155 females were selected in this survey. The prominent religion of the people at data collection sites is Muslims and only 1% of people belonged to another ethnicity. About 95% of participants are non-vegetarian and this variable therefore excluded and considered this factor as a limitation to this study. Therefore, for the most convenient approximately 142 participants per month data was taken. The patient questionnaire for hypertensive patients developed by the World Health Organization was adopted with some minor modifications (Parikh et al., 2008). The modified questionnaire was further categorized into two sections (a) the First section was constructed based on questions related to hypertension (b) the Second was focused on demographic characterizations including age group, ethnicity, marital status, financial status, education, lifestyle, and physical activity.

Lifestyle status was evaluated using two questions; participants' smoking and using soft drinks regularly in food. Participants were classified into three categories for physical activity low, moderate, and high. The last section was centered on the recent health status of participants especially focused on cardiovascular diseases. Completion of each questionnaire required about 30-35 minutes per participant.

Hypertension measurements

Blood pressure was measured three times with 10 10-minute rest intervals by using an automatic sphygmomanometer for accurate measurements (Parikh et al., 2008). The heights of participants were measured without their shoes with an error of 0.5 cm from the ground, while weight was measured with clothes excluding 0.5 kg weight. Height was measured thrice using a portable Stadiometer (Charder HM200P, Taiwan) with an amplitude of 100 cm and variation of 0.2 cm. A portable electronic scale (Camry DT612, China) was used to measure weight with a capacity of 160 kg and a precision of 150 g. Body mass index (BMI) was calculated as weight in kilograms divided by the square of height in meters. BMI was categorized into 3 groups including normal (18.5-25), overweight (25.1-30), and obese (30 kg/m2) individuals as recommended by World Health Organization (Organization, 2008). In this paper, we considered high blood pressure when data was above 180 mm Hg for systolic and 100 mm Hg for diastolic blood pressure. However, an average mean was used to draw results. The most recent diagnostic short-term guidelines state that blood pressure ≥140/90 mm Hg is subjected to the category of hypertension. The risk score factor was also calculated using an Excel-based calculator consisting of predictors such as age, sex, blood pressure, BMI, parental hypertension, and smoking without diabetics (Parikh et al., 2008). In the present study, we excluded alcohol consumption due to the ban by the Government and was not considered significant association with hypertension.

Statistical analysis

The Chi-square test's contingency table was used to estimate the association between demographic factors. The statistical tool kit option in Microsoft Excel 2016 and Paleontological Statistics software version 3.15 was used to assess other sections of the questionnaire using Z-score. The percentages were calculated using descriptive analysis. The alpha value was determined around the confidence level of 0.05, and the importance of the data was calculated around it.

Ethical approval

An ethical local committee was present to approve this work, and authorization was received from the University of Balochistan, Quetta (Registration no: 92, 18th 2024). Participants were given the option to opt out of the survey, however, the questionnaire was collected along with their signatures for the record. Participants with high blood pressure were also advised to seek additional evaluation and treatment at the local hospital.

Results

Overall, 571 non-medical professionals approached and 500 soft drink consumers responded during the survey giving a rate of 87.56%. Our study was the first attempt that was conducted in this area to study the hypertension problem in non-medical professionals frequently consuming soft drinks. Socio-demographic characterization finding was the first priority-based section of our questionnaire after adjusting for confounders including age group, ethnicity, financial status, education, lifestyles, physical activity, and blood pressure of respondents were recorded as significant (Table 1).

Table 1

An estimated value of socio-demographic and clinical characteristics among non-medical professionals, during 2020.

Constraints	Types	Male	Female	p-value*
Age group	18-24	245 (49.00%)	48 (9.60%)	0.00
	25-30	139 (27.80%)	68 (13.60%)	
Ethnicity	Pashtoon	360 (72.00%)	108 (21.60)	0.00
	Others	24 (4.80%)	8 (1.60%)	
Marital status	Single	135 (27.00%)	31 (6.20%)	0.09
	Married	249 (49.8%)	85 (17.00%)	
Financial status	Poor	65 (13.00%)	38 (7.60)	0.00
	Mediocre	259 (51.80)	55 (11.00%)	
	Rich	18 (3.60%)	5 (1.00%)	
Education	Illiterate	114 (24.83%)	36 (7.84%)	0.00
	Middle School	57 (12.41%)	35 (7.62%)	
	High School	85 (18.51%)	19 (4.13%)	
	Under-graduate	59 (12.85)	13 (2.83%)	
	Post-graduate	35 (7.61%)	6 (1.30%)	
BMI**	Normal	79 (15.80%)	17 (3.75%)	0.04
	Overweight	45 (9.00%)	22 (4.85%)	
	Obese	245 (49.00%)	45 (9.93%)	
Lifestyle	Smoking	179 (33.02%)	18 (3.32%)	0.00
	Using soft drinks	280 (51.66%)	65 (11.99%)	
Physical activity	Low	245 (57.10%)	79 (18.41%)	0.02
	Moderate	79 (18.40%)	13 (3.03%)	
	High	8 (1.86)	5 (1.10%)	
Blood pressure	Normal	233 (46.60)	83 (16.60%)	0.02
	High	152 (30.4%)	32 (6.40%)	

* Data was calculated at a confidence interval of 95% by applying the Chi-square test

** Body mass index was measured by comparison of fat based on height with the weight of adults

As per statistical analysis for the age group, the majority of participants were males of Pashtun ethnicity who were married and had a mediocre financial situation (p0.0002). Males (n = 152, 30.4

%) had the highest rate of hypertension, followed by females (n = 32, 6.40 percent). Due to a lack of awareness and basic medical facilities, the incidence of hypertension increased significantly ($p < 0.02$). Per the BMI calculations, 49 % were obese, and this condition was aggravated by their lifestyle. An importantly limited number of cardiology diagnostic facilities (20%) and its related issues such as professional approaches including medical treatment (55%), diagnosis (37%), and availability of highly classified consultants (29%) were found to least. However, participants were aware of hypertension (82%) and it's related to circumstances mentioned in Table 2.

Table 2

A risk factor for hypertension assessed in soft drink consumers (n = 500*) in Loralai city of Balochistan.

Modalities	Output comes**	Prevalence***
Society behavioral response	+	80%
Health care unit for diagnoses	+	37%
Medical treatment availability	+	55%
Genetic counseling for adults	-	2%
Professional consultation	+	29%
Ethical concerned issues	-	5%
Issues concerns with Jobs.	-	30%
Public awareness	++	82%
Pedigree-related disease record	-	2%

* Participants after the final screening were taken 500 to cover this entire knowledge parameter

** ++ facility available, +facility available at some extant, - facility not available

*** Prevalence was determined using a Z-score

For effective data validation, a short comprehensive research was conducted on selected target participants (n = 184). (Table 3). A small percentage of sugar-sweetened soft drink drinkers ($p < 0.03$%) had a record of a previous diagnosis of hypertension. Additionally, a large percentage of participants were diagnosed with hypertension for the first time during emergencies. The majority of hypertension cases (n = 98, 53.30 %) were diagnosed in government institutions rather than private hospitals (n = 19, 10.32 %). The majority of the individuals had their blood pressure measured in hospitals (n = 80, p0.04), while fewer had their blood pressure measured at home (n = 31, $p < 0.007$).

Table 3

Determination of hypertension in soft drink consumers (n = 184) in Loralai city during 2018.

Modalities	Male	Female	p-value*
Previous history of hypertension	95 (51.63%)	22 (11.95%)	0.03
First-time diagnosis in emergency condition	69 (37.5%)	17 (9.23%)	0.04
First-time diagnosis in trauma center	36 (19.56%)	5 (2.71%)	0.30
Diagnose in Government hospitals	79 (42.93%)	19 (10.32%)	0.04
Diagnose in private hospitals	16 (8.96%)	3 (1.63%)	0.44
Visit a regular physician	65 (35.32%)	17 (9.23%)	0.02
Paid consultation fee	19 (10.32%)	9 (4.89%)	0.00
Regularly check blood pressure at home	22 (11.95%)	9 (4.89%)	0.00
Visit the hospital for blood pressure monitoring	64 (34.78%)	16 (8.69%)	0.04

*Z-score was applied and variable significant levels were determined for the male and female modalities comparison at 0.05 alpha values.

Statistical analysis (n = 13, $p<0.03$) estimation has shown that persistent hypertension is prevailing due to not taking prescribed medication to lower their blood pressure (Table 4). This condition becomes worse (n = 43, $p<0.003$), when respondents are taking medicine when they feel it is needed. About 92% of the respondents (n = 75, 95% female and n = 20, 82%

male) were found unaware of the side effects of medications used for hypertension treatment.

Table 4

Medication and adherence-related issues for hypertension questionnaire (n = 184).

Modalities	Male	Female	p-value
Prescribed medication to lower blood pressure	37 (20.10%)	7 (3.80%)	0.40*
Consult a physician about all your medications	72 (39.13%)	18 (9.78%)	0.03
Avoid taking regular medications	31 (16.84%)	5 (2.71%)	0.06
Cannot afford medication price	48 (28.08%)	4 (2.17%)	0.04
Prefer alternative medication	15 (8.15%)	2 (1.08%)	0.35*
Worried about medicine side effects	75 (40.76%)	20 (10.86%)	0.01
Take medication when feel its need	31 (16.84%)	12 (6.52%)	0.00
Mostly forget to take medication	14 (7.60%)	5 (2.71%)	0.06

*Data was found non-significant due to misinterpretation of the question conveyed by the coordinator

Discussion

More than one billion people are affected with hypertension worldwide and it could be increased to 1.56 billion people by 2025. However, even under intensive research work and medication procedures presence; hypertension is progressively increasing (Kannel, 1996). Age factor is documented as an important risk factor for hypertension and other cardiovascular diseases in different studies (Bansal et al., 2012). The present study results also agreed that 36.8% of participants were recorded as having hypertension and 48.91% of people consult a physician for treatment. Significant results were obtained indicating that 60 (26%) participants were found to have hypertension and 70% of them were never examined for their blood pressure in any Health Care Centre. In one report, according to the National Health Survey of Pakistan, 18% of adults and 33% of adults above 45 years old were suffering from hypertension. It was also included that 50% of people were diagnosed and half of them were given treatments (18%) (Jafar et al., 2003). We have estimated that hypertension prevalence was significantly higher in married people (66.8%) and least in unmarried (33.2%); these calculated values are following results given by Arjun (Lakshman et al., 2014).

The prevalence of hypertension was recorded higher in illiterates (male n = 114, 24.83%, female n = 36, 7.84%) when compared to other education groups. Hypertension prevalence was found higher in Medicare (male n = 259, 51.80%, female n = 55, 11.00%) and the least was recorded with rich and poor financial status-bearing residents. However, in certain studies, higher hypertension prevalence was reported in upper-class people (18.9%, $p<0.001$) when compared to the lower class (7.8%) and was recorded higher in literature (Bhadoria et al., 2014).

In this cross-sectional study, the hypertension prevalence was significantly higher in the subjects of obese ($p<0.048$) and smoker ($p<0.002$) participants. Our findings are in agreement with other studies that obesity, lack of physical activities, and lifestyle have been identified as significant risk factors for the development of hypertension and related other cardiovascular complications (MacMahon, 1987). BMI was also recorded higher in obese people (male n = 245, 49.00%, female n = 45, 9.93%) and these values are in coherence with other results (Panesar et al., 2013).

The traditional diet of residents included high consumption of energy-dense food (particularly saturated fat), but it was combined with low physical activity. Such, a condition increases the chances the hypertension issue among young people. The prevalence was much higher in the mediocre families having hypertension; most probably it is due to a lack of education and awareness issues.

Smoking and the intake of soft drinks, both have been linked with adverse effects on health issues of the heart. Smoking is significantly associated with hypertension and is considered to be a risk factor for coronary heart disease and ischemic stroke (Bartecchi et al., 1994). The hypertension prevalence was higher in literates and the least was in post-graduates. Therefore, education plays a vital role in controlling and aware people of hypertension. Although limited healthcare units are available in this region, half the participants provided data about the provision of hypertension diagnosis. In the present study, genetic counseling (2%) and pedigree-related records (2%) were questionable risk factors because this facility almost did not exist. The

importance of family history for hypertension has its importance. It was estimated in one research about public awareness was recorded at 82%, but due to negligence and lifestyle caused an increase in hypertension (Narra et al., 2017). New research reveals that taking regular goat milk can lower blood pressure (Yusni, 2018). In this study, possible risk factors of hypertension have been discussed and ignorance of early-developed hypertension symptoms was found the most common factor. It was recorded that the majority of people prefer to visit Government hospitals and visit regularly their physicians. Blood pressure monitoring (male n = 64, 34.78%, female n = 16, 8.69%) at home compared with clinic blood pressure (male n = 22 11.95%, female, 4.89%) was recorded higher. Compared with clinic blood pressure monitoring alone, home blood pressure monitoring has the potential to overcome therapeutic inertia and lead to a small but significant reduction in systolic and diastolic blood pressure (Bansal et al., 2012). Hypertension measurement collections were made by trained fieldworkers under experienced health officials using standard methods. Therefore, statistical error is the least in this entire work compared with other similar studies on this topic.

The present study is the first to correlate the linkages between soft drink consumption and blood pressure in non-medical professionals. Sugar has been predisposed to high blood pressure in recent decades and is considered a rich source of processed foods; however, sucrose is added in beverages as a source of sugar in Pakistan (Sharif et al., 2014). The mechanisms that artificial sweeteners are indistinct to raise blood pressure; however, they may contribute to adverse metabolic effects (Brown et al., 2010).

CONCLUSION

The current situation is alarming due to the same persistent lifestyle and insufficient knowledge of high blood pressure. It is suggested that information about the development of a proper intervention bridge among these gaps must be filled in about the current status of hypertension patients. Soft drink has a direct link with an increase in hypertension and people having hypertension should be allowed to make decisions about care and treatment with their health consultant to control hypertension.

Authors' contributions

ZU and SA are the principal investigators who designed the theme of the study design, AI and AJ collected data and ZU statistically analyzed the data.

Conflict of Interest

For the compilation of this work, the authors received no financial aid or other support. Moreover, the authors have no financial stake in this study other than to share useful information about hypertension to improve quality of life. Since this research was conducted without the benefit of a research grant, a lipid profile was not performed.

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