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Prevalence of Hypertension and its Associated Factors among School Teachers

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ABSTRACT

Background: The burden of hypertension is increasing, especially in low- and middle-income countries like Nepal. Occupation is one of the risk factors correlated with hypertension, among others. There is limited evidence about its prevalence among school teachers in Nepal. Therefore, the study aims to identify the prevalence of hypertension and its associated factors among school teachers.

Methods: A school-based cross-sectional study was conducted from September 1st to October 12th, 2023, at Amargadhi Municipality among two hundred twenty-three (223) school teachers using a two-stage stratified random sampling technique. Data on socio-demographic profiles and behavioral factors, including a history of diabetes and hypertension, as well as blood pressure, were collected using a standardized method.

Results: The overall prevalence of hypertension was 14.7% and 8.9% were taking antihypertensive medication. After excluding medication (n=203), 41% of participants had pre-hypertension systolic, and 3.9% had Systolic hypertension. Diastolic blood pressure followed a similar pattern: 53.7% had pre-hypertension, and 6.4% had hypertension. About 96% of them had controlled systolic blood pressure, and nearly 90% had controlled diastolic blood pressure. The mean diastolic and systolic blood pressures were 76.98 (8.72) mmHg and 115 (11.93) mmHg, respectively. The Stepwise regression showed that both diastolic and systolic blood pressure were significantly associated with sex and body mass index.

Conclusions: There is a high prevalence of hypertension and pre-hypertension among study participants. To effectively prevent and control hypertension, it is essential to prioritize school teachers in public health initiatives. As respected role models within their communities, teachers can influence the adoption of healthy lifestyles and behaviors.

Keywords: Behaviours; hypertension; school teachers; socio-demography.

INTRODUCTION

Hypertension (HTN) has affected 1.28 billion adults globally, with over 45% unaware of their condition, and two-thirds of them are in low- and middle-income countries (LMICs).[1] It is a leading risk factor for cardiovascular diseases, stroke, and kidney failure, disproportionately impacting LMICs. [1] In Nepal, nearly 30% of adults have HTN, driven by sedentary lifestyles, urbanization, and evolving dietary patterns.[2] Besides socio-demographic and behavioral factors, occupation significantly increases HTN risk, with high prevalence among school teachers. [3] School Teachers (STs) play a vital role in promoting healthy lifestyles and HTN awareness in communities, and face health challenges from sedentary work and workplace stress, affecting their well-being. [3,4] Although HTN is well-known in the Nepalese population, limited data exist on STs. [2] Therefore, this study aimed to identify the prevalence of HTN and its associated factors among school teachers in the Far-Western region of Nepal.

METHODS

A school-based cross-sectional study was conducted from September 1st to October 12th, 2023, at Amargadhi

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Municipality, the district headquarters of Dadeldhura District in the Far Western Province of Nepal. This municipality offers diversity as it is the hub of seven hilly districts in the far western province, with a population of 24,153, an 81% literacy rate, 38 schools, and 403 school teachers from all parts of the country.[5] Researchers have conducted little research and gathered limited evidence in this remote area. The study population consisted of teachers aged 18 years or older who were currently teaching at government and private schools within the study site. The required sample size for the study was 210, based on a prevalence of HTN among school teachers of 16.5% with an allowable error of 5% and a 95% confidence interval. [6] After factoring in a 5% non-response rate, the team adjusted the sample size to 221 and finalized it at 223 respondents. This study considered a 5% non-response rate because the study population is stable, highly accessible, and comprises a group of health-conscious individuals.

We applied Two-stage stratified sampling techniques to collect data from the school teachers. In the first stage, the researchers divided the schools into two strata: government and private. There were 26 government schools and 12 private schools. We decided to conduct the study at 18 schools out of 38 (approximately 47%) that are representative of the study population, due to financial constraints. We randomly selected 18 schools, including 11 government schools. In the second stage, we divided the selected schools into three groups: Primary (grades 1–5), Basic (grades 1–8), and Secondary (grades 9–12). Among the 26 government schools, there were 11 primary schools, nine junior high schools, and six senior high schools. Random selections included four primary schools, three basic schools, and four secondary schools. We randomly selected two primary, two basic, and three secondary schools from a pool of 12 private schools (five primary, three basic, and four secondary schools). We conducted complete enumeration in the selected schools, including all teachers—20 from primary, 27 from basic, and 77 from secondary levels in government schools, as well as 11 from primary, 27 from basic, and 61 from secondary levels in private schools.

We collected the data through face-to-face interviews and physical measurements at schools. We conducted an interview using standardized questions from the World Health Organization STEPs tool 3.2, which was validated in Nepali by the Nepal Health Research Council.[7] Both Blood Pressure (BP) and anthropometric measurements were taken using standardized techniques and calibrated instruments.

The questionnaire comprised two sections as follows:

It contained information on sex, age, marital status, ethnicity, education status, monthly income, living situation (with family or single), employment types, years of experience, and types of teachers (primary, basic, and secondary level). We categorized age, income, and years of experience based on their median values.

It included information on physical activities, vegetarianism, consumption of fruits and vegetables, servings of fruits on typical day, high saturated fat diet, insufficient fruit and vegetable consumption, trans-fat diet, extra salt intake, consumed processed food high in salt, eat deep-fried food, smoking tobacco, consumption of smokeless products, drinking Alcohol, Stress, family history of hypertension, body mass index (BMI), and blood pressure (BP).

The physical activities were measured by asking the following questions: [7]

Does your work involve vigorous-intensity activity that causes a significant increase in heart rate or heartbeat for at least 10 minutes continuously? – Yes/No

Does your work involve moderate-intensity activity that continuously causes a small increase in heart rate or heartbeat for at least 10 minutes? – Yes/No

We showed participants pictures of vigorous- and moderate-intensity activities to facilitate their responses. We adopted the pictures from the WHO STEPS Survey 2019.[8]. Height was measured to the closest centimeter by marking the measurement against the wall. We instructed Participants to stand bareheaded and shoeless on a flat surface with their back against the wall, their heels together, their spine aligned with their pelvis and shoulders, and the back of their head touching the wall. Their head position ensured that an imaginary horizontal line joined the corner of the participant's eye and the upper attachment of their ear.[8] We computed height by reading the pre-marked measurement on the wall to within 0.1 cm. We calculated the Body Mass Index (BMI) by taking the weight (kg) divided by the height squared (m^2). BMI was then classified as follows: underweight (< 18.5), normal weight (18.5-24.9), overweight (25-29.9), and obese (≥30).[9]

The second author, a trained health professional, measured BP using a calibrated aneroid sphygmomanometer (Microlife Aneroid Blood Pressure Kit, Swiss Brand).

Before taking their BP, participants sat quietly with back support for five minutes in a comfortable position with uncrossed legs. Two readings were taken on the left arm in a seated position after 5 minutes of rest using appropriate cuff sizes. We calculated the average of these two readings. We classified individuals as hypertensive if they had a systolic blood pressure (BP) of ≥140 mmHg, a diastolic BP of ≥90 mmHg, or were taking antihypertensive medication. We labeled pre-hypertension as systolic BP between 120–139 mmHg and diastolic BP between 80–89 mmHg. We categorized all other BP readings as usual.[10] Furthermore, we classified BP levels as controlled (systolic <140 mmHg & diastolic <90 mmHg) and uncontrolled (systolic ≥140 mmHg & diastolic ≥90 mmHg).[8]

We collected data electronically using Kobo Collect data collection software version 2023.2.4. Then, we cleaned the data using Microsoft Excel 2016 and transferred it into Stata/SE 15 (Stata Corp, 4905 Lake Way Drive, College Station, Texas 77845, USA).

We presented categorical variables using numbers and percentages, and we displayed numerical variables with their mean, median, standard deviation (SD), and interquartile range (IQR). We performed A stepwise multiple linear regression analysis to measure the association between dependent variables (systolic BP and diastolic BP treated as Continuous variables) and independent variables (socio-demographic and behavioral variables treated as independent variables). We excluded individuals who were under medication from the regression analysis to avoid misclassification bias, as treatment may result in normal or controlled blood pressure. Including them could confound the findings, while population homogeneity helps reduce overall bias. Some of them had normal BP, while others fell into the categories of PHTN or HTN. We assessed multicollinearity using the variance inflation factor (VIF) and tolerance, which measure the strength of the linear correlation between the independent variables in multiple regression analysis.VIF values ≥ 2.5 and tolerance values < 0.10 were considered indicative of multicollinearity.[11]

Further, we performed the Shapiro-Wilk W Test and the Breusch-Pagan test for residual analysis. We used the Shapiro-Wilk W test to check the normality of the residuals. At the same time, we used the Breusch-Pagan test to check for the presence of heteroscedasticity (i.e., whether residuals are uniformly distributed) in the Model.[11] Robust standard errors were computed for heteroscedasticity when the Chi-square test value was large. A p-value less than 0.05 was considered statistically significant.

We received ethical approval from the Institutional Review Board of the Karnali Academy of Health Sciences in Jumla (Reference No: 080/081/10). Additionally, we secured permission from the Amargadhi Municipality Office in the Dadeldhura District, along with approvals from the relevant schools. Each participant provided written informed consent before data collection. The objective of the survey was to inform the teachers and raise awareness of hypertension (HTN). Those with high blood pressure (BP) were informed and advised/referred to visit the nearest healthcare facilities.

RESULTS

A total of 223 respondents (teachers) participated in the study. The median age of the participants was 35 years (interquartile range, IQR: 29-45). The majority of the participants were aged below 35 years (52%), male (56.1%), married (80.7%), held a Bachelor's degree or higher (52.5%), and lived with a family member (83.9%). More than half (55.6%) of the participants were working in government schools, and 69.5% were on a contract basis. More than half (51.6%) had 10 years or more of experience. Additionally, 55.2% had an income below NPR 34,000 (approximately $262) and were primary level teachers (52.5%). The median income was NPR 34,000 ($262) (IQR: 17,000 ($131) - 42,000 ($323)) per month. (Table 1)

Nearly 35% of the participants had a sedentary lifestyle, 77% consumed insufficient amounts of fruits and vegetables, 4% consumed deep-fried foods daily, and 5.8% added extra salt to their meals. Additionally, 1.3% of the participants always consumed a high-saturated-fat diet, 3.2% always consumed processed food high in salt, and 9% always consumed a diet high in saturated fat. About 6% smoked, 14.9% used smokeless tobacco, 24.7% consumed Alcohol, and 15.7% experienced Stress. More than a quarter (32.3%) were overweight, and 5.8% were obese. (Table 2)

More than a quarter (28%) of participants had a family history of hypertension (HTN). The overall prevalence of HTN was 14.7% (n=33) (95% CI: 10.4-20.1%). Only 20 participants were taking antihypertensive medication, and 15 had controlled HTN. Of those participants on medication for HTN, 7 had high systolic blood pressure (BP), 9 had pre-hypertension (PHTN), and 4 had normal BP. Similarly, 10 participants had diastolic hypertension, 9 had pulmonary hypertension, and 1 had normal blood pressure. Further, out of the 33 participants with

hypertension (HTN), 13 undiagnosed cases (5.41%) were identified, and 9 of them were male. (Table 2)

Among 203 undiagnosed hypertensive participants, 41% had systolic PHTN, 3.9% had systolic HTN, and the remaining participants had regular systolic readings. Diastolic blood pressure followed a similar pattern: 53.7% had PHTN, and 6.4% had HTN. About 96% of the participants had controlled systolic blood pressure (BP), and nearly 90% had controlled diastolic BP. Overall, 36.6% of the participants had PHTN, and 85.2% had controlled HTN. The mean (SD) diastolic and systolic BP were 76.9 (8.72) and 115 (11.93), respectively. (Table 2)

Tables 3 and 4 demonstrate that socio-demographic and behavioral variables are associated with blood pressure, as identified through stepwise multiple linear regression analysis. Table 3 shows that sex, monthly income, body mass index, family history of HTN, use of smokeless tobacco products, and history of diabetes were significantly associated with systolic BP ($p<0.05$). The adjusted R^2 was 0.3068, indicating a 30.68% variation in systolic BP explained by the change in dependent variables, while the remaining 69.32% remained unexplained. The model was significant at a 5% level of significance (F-statistic = 9.39, $p<0.001$). The VIF value was less than 2, indicating that the model has no multicollinearity. Further, the residuals of diastolic BP are not uniformly scattered, i.e., heteroscedasticity (Breusch-Pagan test = 0.39, $p<0.0001$). The Shapiro-Wilk W test shows that the residuals are normally distributed ($z = 1.60$, $p = 0.055$). (Table 3)

Table 4 shows that sex and body mass index were strongly associated with diastolic BP ($P<0.001$). Additionally, monthly income, service duration (in years), types of teachers, body mass index, and family history of hypertension were also associated with diastolic blood pressure ($p < 0.05$). The adjusted R^2 value is 0.3545, indicating that 35.45% of the variation in diastolic blood pressure can be explained by changes in the independent variables, while the remaining 64.55% remains unexplained. The ANOVA test showed the model is significant (F-statistic = 15.14, $p<0.001$). The VIF value was less than 2, indicating that there is no multicollinearity problem in the model. Furthermore, the residuals of diastolic BP are uniformly scattered, i.e., no heteroscedasticity (Breusch-Pagan test = 0.39, $p = 0.53$). The Shapiro-Wilk W test shows that the residuals are normally distributed ($z = 1.54$, $p = 0.93$). (Table 4)

Table 1: Socio-Demographic Characteristics of School Teachers (N=223)

Variable	Number	%
Sex		
Male	125	56.1
Female	98	43.9
Age (Years)#		
<35	116	52.0
≥35	107	48.0
Types of School		
Government	124	55.61
Private	99	44.39
Marital Status		
Married	180	80.7
Unmarried	43	19.3
Ethnicity		
Brahmin	105	47.1
Chhetri	90	40.4
Dalit	14	6.28
Janjati	6	2.69
Others*	8	3.59
Education Status		
SLC/SEE	22	9.9
10+2 (Secondary)	84	37.7
Bachelor and above	117	52.5
Living with Family		
Yes	187	83.9
No	36	16.1
Employment Types		
Permanent	68	30.5
Temporary/Contract	155	69.5
Service duration (years)#		
<10	108	48.4
≥10	115	51.6
Types of Teacher		
Primary Teacher	117	52.5
Basic Teacher	50	22.4
Secondary Teacher	56	25.1
Income(NPR)#		
<34000 ($ 262)	123	55.2
≥34000	100	44.8

Use median values for classification, * Others = Thakuri, Giri, Dasnami, Puri, Nath. $1=NPR130

Table 2: Behavioural Activities and Hypertension of School Teachers (N=223)		
Variable	Number	%
Physical Activities(n=223)		
Vigorous	18	8.1
Moderate	129	57.8
Sedentary	76	34.2
Vegetarian(n= 223)		
Yes	32	14.3
No	191	85.7
How many days do you eat fruit/ vegetables in a typical week? # (n=223)		
<3	105	47.1
≥3	118	52.9
How many servings of fruit do you eat on one of the typical days? (n=220), 1 servings = 80 gms #		
<2	79	35.9
≥2	141	64.1
% of insufficient fruits and vegetables (less than 5 per week)	173	77.6
How often do you eat a high-fat saturated diet? (n=223)		
Always	36	16.1
Often	30	13.5
Rarely	53	23.8
Sometimes	95	42.6
Never	9	4
How often do you eat a Trans-fat diet? (n=220)		
Always	3	1.3
Often	29	13.2
Rarely	64	29.1
Sometimes	99	45
Never	25	11
Add extra salt while eating food (n=223)		
Always	13	5.8
Often	14	6.3
Rarely	103	46.2
Sometimes	39	17.5
Never	54	24.2

Table 2: Behavioural Activities and Hypertension of School Teachers (N=223)		
Variable	Number	%
How often do you eat deep-fried? (n=223)		
Daily	9	4
Sometimes	194	87
Never	20	9
Eat processed food high in salt (n=221)		
Always	7	3.2
Often	25	11.3
Rarely	78	35
Sometimes	71	31.8
Never	40	17.9
Smoke tobacco products (n=223)	13	5.8
Use smokeless tobacco products (n=222)	33	14.9
Drink Alcohol (n=223)	55	24.7
Having Stress (n=223)	35	15.7
History of Diabetics (n=223)	2	0.9
Family history of hypertension (n=223)	62	27.8
Body Mass Index (n=223)		
Underweight (<18.5)	11	4.9
Normal(18.5-24.9)	127	57.0
Overweight (25-29.9)	72	32.3
Obese(≥30)	13	5.8
Systolic Blood Pressure (n=203)##		
Normal (<120mmHg)	112	55.1
Prehypertension (120-139 mmHg)	83	40.9
Hypertension (≥140 mmHg)	8	3.94
Controlled (<140 mmHg)	195	96.0
Uncontrolled (≥140 mmHg)	8	3.94
Diastolic Blood Pressure (n=203)##		
Normal (<80 mmHg)	81	39.9
Prehypertension (80-89 mmHg)	109	53.7
Hypertension (≥90 mmHg)	13	6.4
Controlled (<90 mmHg)	190	93.6
Uncontrolled (≥90 mmHg)	13	6.40

Use median values for classification, ## 20 teachers who were taking anti-hypertensive medication were excluded from the analysis because of variation in

diastolic and systolic BP. Out of 20, Diastolic BP:10 had hypertension, 9 had prehypertension, and 1 had normal, Systolic BP: 7 had hypertension, 9 had prehypertension, and 4 had normal.

Table 3: Multiple Linear Regression Analysis of Factors Associated with Systolic Blood Pressure (n=203)

Systolic Blood Pressure	Coefficient (β)	Robust Std. Error	P Value	VIF	Tolerance
Sex (Female vs Male)	-5.16	1.43	**p<0.001**	1.39	0.72
Monthly income (NPR)	-3.40	1.30	**0.01**	1.26	0.79
Service duration (Years)	0.12	0.07	0.10	1.44	0.69
Vegetarian (Yes/No)	-2.43	1.51	0.11	1.08	0.93
Body mass index (Kg/m^2)	0.75	0.18	**P<0.001**	1.27	0.79
Drink alcohol (Yes/No)	2.62	1.64	0.11	1.38	0.73
Use smokeless tobacco products (Yes/No)	-5.94	2.25	**0.01**	1.36	0.74
Eat deep-fried food (Yes/No)	-4.44	2.51	0.08	1.06	0.95
History of diabetes (Yes/No)	-7.05	3.15	**0.03**	1.04	0.96
Family history of hypertension (Yes/No)	-4.07	1.62	**0.01**	1.06	0.95
Constant	134.94	8.44	P<0.001		

F stat =9.16, p<0.001, R2= 0.3337, Mean VIF = 1.23, Breusch-Pagan / Cook-Weisberg test for heteroscedasticity: chi2(1) = 19.8, Prob > chi2 = <0.0001 (Checked Prior to Robust Analysis)

Table 4: Multiple Linear Regression Analysis of Factors Associated with Diastolic Blood Pressure (n=203)

Diastolic Blood Pressure	Coefficient (β)	Std. Error	P Value	VIF	Tolerance
Sex (Female vs Male)	-5.11	1.08	**P<0.001**	1.48	0.68
Education	1.32	0.75	0.080	1.27	0.79
Living alone (Yes / No)	1.78	1.21	0.146	1.1	0.91
Monthly income (NPR)	-2.34	1.04	**0.026**	1.37	0.73
Service duration (years)	0.17	0.05	**0.001**	1.49	0.67
Types of teacher (Primary/Basic/Secondary	-1.59	0.68	**0.021**	1.13	0.88
Body mass index (kg/m^2)	0.54	0.14	**P<0.001**	1.29	0.78
Drink alcohol (Yes/No)	2.14	1.24	0.090	1.37	0.73
Use smokeless tobacco products (Yes/No)	-2.73	1.48	0.068	1.43	0.70
Having stress (Yes/No)	2.20	1.37	0.110	1.08	0.93
Family history of hypertension (Yes/No)	-3.04	1.05	**0.005**	1.06	0.94
Constant	72.35	5.36	**P<0.001**		

F stat =9.88, p<0.001, R2= 0.3651, Adj R2= 0.3281, Mean VIF = 1.28, Breusch

-Pagan / Cook-Weisberg test for heteroscedasticity: chi2(1) = 0.53, Prob. > chi2 = 0.466.

DISCUSSION

Our findings reveal that the prevalence of hypertension is a significant health concern for school teachers in far western Nepal. Our study found that the prevalence of HTN among school teachers was 14.7%, which was consistent with previous studies from Nepal, India, and other similar settings in Saudi Arabia and Ethiopia.[3,6,12,13] However, our prevalence is lower than the national HTN survey of the general population (26.9%) as well as findings from the meta-analysis (27.3%) of Nepal.[2,14] The present study reported that the PHTN rate among teachers was approximately 37%, which is lower than the general population but is consistent with

the results of the meta-analysis by Agho KE et al.[2,14] Similarly, another study from the state of Karnataka, India, reported that the prevalence of PHTN was 36% among school teachers. More than one-fourth of school teachers were at the PHTN stage.[3] The possible reasons for variation in the prevalence rate might be sample size differences, lifestyles, unhealthy diets, alcohol consumption, geographic differences, socioeconomic factors, measurement techniques of BP, and different study populations. [2,8]

This study identified 5.41% of undiagnosed cases of HTN and a high prevalence of PHTN cases. This may be due to a lack of awareness regarding the asymptomatic nature of the disease and to the inaccessibility of services that hinder early screening and identification.[15] The controlled blood pressure rate detected in our study is consistent with the previous study.[3] The major factors associated with diastolic blood pressure (BP) were sex, monthly income, service duration (years), types of teachers, body mass index, and family history of HTN. Likewise, sex, monthly income, body mass index, family history of HTN, use of smokeless tobacco products, and history of diabetes were associated with systolic BP. This reflects the differential associations of independent factors with diastolic and systolic BP because of distinct physiological mechanisms and reactions to various stimulations. It reflects the differential associations of independent factors with diastolic and systolic BP because of distinct physiological mechanisms and reactions to various stimuli.[10,16] Further, socioeconomic factors such as education, income, and occupation influence behaviours, including physical inactivity, diet, tobacco use, and alcohol use. These factors affect physiological processes that result in BP and other cardiovascular diseases.[10,16]

Our study found a negative association between sex and blood pressure (systolic (β = -5.16) and diastolic (β = -5.11)). This means that female teachers tend to have, on average, lower diastolic and systolic BP compared to their male counterparts. Furthermore, out of undiagnosed cases of HTN, 31% were female, and the rest were male. The results from India showed that female school teachers are less likely to develop HTN than their male counterparts.[3] Saudi Arabian male teachers were three times more likely to have PHTN and HTN than female teachers.[12] An Ethiopian study explained that male teachers had a higher prevalence of HTN than female ones.[13] All these findings are consistent with our study.[3,12,13] Similarly, we found that monthly income and service duration (years) were associated with HTN, consistent with a study from Bangladesh. [17]

The prevalence of HTN and obesity is increasing in the general population of Nepal.[13] One study from under-representative ethnic groups reported that 15.8% of the adult population were overweight and obese, and they were 1.34 times more likely to develop systolic hypertension than underweight participants.[18] Our study also revealed that 38.12% of school teachers were obese or overweight, and their body mass index (BMI) is highly significant with both systolic and diastolic BP. Similarly, a study from Bangladesh reported that nearly 64% of school teachers were overweight/obese and had HTN. [17] A South Indian study explains a strong association between overweight and HTN.[3] The literature reveals that BMI is positively associated with systolic and diastolic BP.[19] BMI is not only a factor in HTN but also has a causal relationship because weight loss is associated with reduced BP. Thus, the relationship between BMI and HTN is a crucial indicator in addressing HTN and controlling overweight/obesity, which needs intervention to prevent hypertension in these populations.[19]

The study conducted in western Nepal revealed that a family history (FH) of HTN is a significant contributor to the risk of HTN among 25–65-year-old adults.[20] More than 60% of school teachers from India and Bangladesh reported a family history of HTN, which is higher than in our study (27.8%)..[17,21] We also showed that both systolic and diastolic blood pressure (BP) were highly significant with FH. Ethiopian teachers with FH were 3.39 times more likely to develop HTN than those without FH.[13] These findings suggest that a family history of HTN is another important variable associated with HTN for controlling BP among school teachers in Nepal. Therefore, those at risk should take extra precautions to prevent HTN.

Though the prevalence of self-reported diabetes is less than 1% in the current study, we still found that it is correlated with hypertension (HTN), which is consistent with previous studies.[3,17] The survey of 1,476 school teachers from Jeddah reported that HTN was strongly correlated with fasting blood glucose.[12] Another study from India described that teachers with diabetes were twice as likely to have HTN.[3] A previous study reported that diabetes mellitus and HTN are common illnesses that coexist more frequently than would be predicted by chance alone.[22]

There are inconclusive findings on the causal relationship between HTN and smokeless tobacco product (ST) use.[23] However, we found that the consumption of ST is significantly correlated with systolic blood pressure (BP) among school teachers. Our finding aligns with

results from an Ethiopian study but contrast with those from a study conducted in Bangladesh.[13,17] There are inconsistent findings between studies because of study design, study participants, adjusting study variables, and duration of tobacco use.[24] It may also be the effect of smokeless products on BP due to differences in composition.[24]

In this study, 4% of school teachers reported consuming deep-fried food, with the majority being female (57%). A Korean study explained that women who ate deep-fried food twice a week were at a higher risk of HTN than those who consumed less.[25] It is important to conduct additional studies on hypertension and contrast diabetes using a standard dietary intake tool to confirm the relationship. [26] Most studies address the total prevalence of HTN and its control instead of focusing on distinct analyses for systolic and diastolic BP, which is important for public health for implementing health awareness programs and controlling HTN.[8] Therefore, we conducted separate analyses because systolic and diastolic BP have distinct roles in the development of cardiac failure.[27,28] However, we employed a casual measurement of BP to categorize participants as normal, prehypertensive, and hypertensive instead of the 'usual' BP.[8] This type of measurement varies among participants in a cross-sectional study over time. We measured BP twice to solve this issue and calculated the averages of these two measurements for data analysis. We presumed that the repeated measurement of BPs was an unbiased estimator of the usual average levels of BP.[8,29] We cannot apply it to the general population because the sample is only representative of school teachers in Amargadhi Municipality. Though face-to-face interviews were performed, recall and social desirability bias are still possible because of self-reported diabetes mellitus and family history of hypertension (HTN). Furthermore, we did not gather comprehensive data on physical activity regarding factors such as the frequency and duration of vigorous and moderate exercise. This highlights the need for additional research in these areas.

CONCLUSIONS

The prevalence of hypertension among school teachers was 14.9%. The prevalence of pre-hypertension was 36.6%, indicating a risk of developing hypertension in the future. Several factors, such as sex, BMI, history of diabetes, family history of hypertension (HTN), use of smokeless tobacco, service duration, and types of teachers, are differently associated with increasing diastolic and systolic blood pressure (BP) among school teachers. Since school teachers are role models for the community, they should be trained to promote healthy lifestyles and behaviors for the prevention and control of hypertension (HTN). In addition, conducting regular screening programs for the early detection of HTN and large-scale follow-up studies among teachers from different parts of the country to establish cause-and-effect relationships is recommended.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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