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Dietary Adherence and Its Determinants among Hypertensive Patients in Wolaita Zone Public Hospitals, Southern Ethiopia: A Mixed-Methods study

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Abstract

Introduction

Hypertension is a significant health problem in Ethiopia, and following dietary guidelines is key to managing it and preventing long-term complications. Dietary adherence is vital for managing uncontrolled hypertension, but prior research has focused mainly on medication and has overlooked the factors that shape eating behaviors. As a result, patient-centered strategies are limited, and no study has jointly assessed dietary adherence and its underlying causes using mixed methods.

Objective: To assess dietary adherence and explore its determinants among hypertensive patients attending public hospitals in the Wolaita Zone, Southern Ethiopia, using a mixed-methods approach.

Method

A mixed-methods study employing an explanatory sequential design was conducted among 374 hypertensive patients attending public hospitals in the Wolaita Zone, Southern Ethiopia, from February 26 to April 25, 2024. The quantitative component used a cross-sectional survey with a structured interviewer-administered questionnaire. A binary logistic regression model assessed the relationships between the outcome and explanatory variables, with statistical significance set at a p-value of < 0.05 in SPSS version 29. For the qualitative component, in-depth interviews were conducted with 12 purposively selected hypertensive patients to explore experiences, barriers, and facilitators of dietary adherence. Qualitative data were analyzed thematically using Colaizzi's descriptive phenomenological approach with Open Code version 4.02.

Result

It was found that the rate of good dietary adherence among the study participants was 30.21%. Being female (AOR = 2.29, 95% CI: 1.13–4.62, p = 0.021), being 40–59 years old (AOR = 4.48, 95% CI: 1.09–18.47, p = 0.047), having been diagnosed with hypertension for more than four years (AOR = 4.03, 95% CI: 1.67–9.76, p = 0.002), and having normal weight (AOR = 6.30, 95% CI: 1.74–22.90, p = 0.002) were positively associated with good dietary adherence. Three main themes emerged from the in-depth interviews: understanding of dietary recommendations and perceived importance; structural, economic, and environmental barriers; and behavioral, cultural, and psychological influences.

Conclusion

Dietary adherence among hypertensive patients in Wolaita Zone public hospitals was low. Being female, aged 40–59 years, having a longer duration of hypertension (>4 years), having normal weight, social support, and good knowledge about hypertension were significantly associated with better dietary adherence. People's knowledge, challenges, support systems, and personal experiences strongly influence their dietary habits. Strengthening education, enhancing social support, and providing personalized counseling can improve dietary adherence among hypertensive patients.

Keywords: Dietary adherence, DASH diet, Hypertensive patients, Wolaita Sodo

Introduction

Hypertension (HTN) is a chronic medical condition characterized by elevated blood pressure (BP) in the arteries. Globally, approximately 62% of cardiovascular diseases and 49% of ischemic heart diseases are attributable to high BP[1]. Hypertension increases the workload of the heart to circulate blood, leading to serious complications such as stroke, coronary heart disease, congestive heart failure, and chronic kidney disease or impaired renal function [2]. Dietary adherence, defined as the extent to which individuals follow recommended diets, is essential for controlling hypertension. Poor adherence reduces treatment effectiveness, increases health risks, and elevates healthcare costs[3].

Globally, hypertension contributes substantially to the burden of cardiovascular disease, and its prevalence is projected to increase by 30% by 2025. However, prevalence has declined in high-income countries from 38% in 1990 to 32% in 2019, and in the European region from 45% in 1990 to 37% in 2019. These declines have been offset by slight to moderate increases in other regions, including the Western Pacific region (24% to 28%) and the South-East Asia region (29% to 32%)[4]. Adherence to the recommended diet is generally low, reported at 22.5% in Pakistan[5]and 7% in Gorgan city, Iran[6]. In Africa, the overall pooled prevalence of hypertension increased from 19.7% in 1990 to 27.4% in 2000, 30.8% in 2010, and 36% in 2019[7, 8], while dietary adherence was 20% in Benin[9], and 22.6% in Uganda[10]. In Ethiopia, the current prevalence of hypertension is reported as 24.43% in Dire Dawa, 27.9% in Northwest Ethiopia (Dabat and Gonder), 28.3% in Jigjiga, 25% in Addis Ababa, and 22.4% in Durame[11]. A study conducted in Bahir Dar city, Ethiopia, reported dietary adherence among hypertensive patients to be 32.8%[12].

Uncontrolled blood pressure (BP) is a major contributor to cardiovascular diseases, stroke, retinal damage, end-stage renal disease, and other life-threatening complications. It accounts for a large

proportion of overall mortality and can drive individuals into poverty due to the high cost of medical care[13]. Uncontrolled hypertension also has a significant negative impact on health[14], contributing to 62.3% of all cardiovascular-related deaths[15]. Previous studies have identified various risk factors associated with uncontrolled hypertension and inadequate dietary adherence. Modifiable risk factors include unhealthy diets, physical inactivity, obesity, tobacco and alcohol use, and being overweight, while genetic, environmental, clinical, behavioral, and psychosocial factors also contribute to uncontrolled blood pressure [16, 17].

Multimodal interventions are used for the prevention and treatment of hypertension, with dietary approaches recommended as the primary intervention[18]. Lifestyle modifications include consuming fruits, cereals, vegetables, low-fat meat, low-fat dairy products, and foods low in cholesterol, as they are rich in potassium, magnesium, calcium, and dietary fiber. Additionally, limiting total fat and saturated fat intake, restricting sodium to no more than 1,500 mg daily, moderating alcohol consumption, achieving weight reduction, quitting smoking, and engaging in regular exercise are important for the prevention of hypertension[19] and serve as adjuncts to medication in patients already receiving drug therapy[20-23]. Following dietary recommendations is essential for managing hypertension, as it can significantly lower blood pressure and help prevent complications[24, 25].

In most developed countries, various programs targeting uncontrolled hypertension, particularly through awareness creation, are widely implemented. In contrast, due to limited access to healthcare, hypertension awareness remains low in developing nations, including Ethiopia[26]. Despite the recognized importance of dietary modification in hypertension management, evidence on patients' adherence to recommended dietary practices and the lived experiences influencing these behaviors is limited. Existing studies in Ethiopia have primarily focused on medication

adherence, with little attention to the day-to-day challenges, cultural influences, perceptions, and personal experiences that shape dietary choices. Consequently, the development of comprehensive, patient-centered interventions is constrained, as no study has simultaneously quantified dietary adherence and explored its underlying determinants using a mixed-methods design. To address this gap, the present study aimed to assess dietary adherence and examine its determinants among hypertensive patients attending public hospitals in the Wolaita Zone, Southern Ethiopia, using an integrated mixed-methods approach.

Materials and Methods

Study design, Period, and setting

A mixed-methods study employing an explanatory sequential design was conducted among hypertensive patients in both the inpatient and outpatient departments of Wolaita Zone public hospitals from February 26 to April 25, 2024. A cross-sectional design was used for the quantitative component, while descriptive phenomenology was applied for the qualitative component.

Wolaita Sodo, the political and administrative center of Wolaita Zone, is located approximately 328 km south of Addis Ababa, the capital city of Ethiopia. The zone has 68 health centers, 9 public hospitals, and 5 private hospitals.

Population

Quantitative study

The source population comprised all adult hypertensive patients attending chronic follow-up clinics in Wolaita Zone public hospitals. Eligible participants were adults (≥18 years) who had been diagnosed with hypertension and were on follow-up for at least six months. Patients with severe illness, cognitive impairment, or hearing difficulties that prevented effective communication were excluded from the study.

Qualitative study

Participants for the qualitative component were purposively selected from the quantitative sample to capture variations in dietary adherence, age, sex, and duration of illness, ensuring rich and diverse perspectives. In addition, key clinicians providing hypertension care were included as key informants.

Inclusion and Exclusion criteria

For quantitative study

Adult patients aged 18 years and above, diagnosed with hypertension, attending chronic follow-up clinics in Wolaita Zone public hospitals, on follow-up for at least six months prior to the study, and able and willing to provide informed consent were included in the study. Patients who were critically ill at the time of data collection, those with cognitive impairment, severe mental illness, or hearing problems that hindered communication, and pregnant women diagnosed with gestational hypertension were excluded.

For qualitative study

Hypertensive patients who participated in the quantitative phase and were purposively selected based on dietary adherence status, age, sex, or duration of illness were invited to take part in the qualitative component. Only patients willing to participate in in-depth interviews were included. Patients who were unable to participate due to illness, communication difficulties, or time constraints were excluded.

Sample size determination

For quantitative study

Sample Size Determination for proportion

The sample size was calculated to address two specific objectives, and a total of 374 participants was determined to be adequate to represent both objectives. For the first specific objective, the sample size was calculated using a single population proportion formula, based on the following assumptions: a 95% confidence interval, a 5% margin of error, and a 10% non-response rate. Using a Z-value of 1.96 and an estimated proportion of dietary adherence of 32.8% [27] as follows:

The sample size was determined as: $\boldsymbol{n} = \frac{(\boldsymbol{Z\alpha/2})^2 \times \boldsymbol{pq}}{\boldsymbol{d^2}}$

Where: p = proportion of dietary adherence among hypertensive = 32.8% = 0.328

d = Margin of error = 5%,

Z = the confidence level required = (1.96),

$$n = \frac{(1.96)^2 * (0.328) * (0.672)}{(0.05)^2}$$

n = 339

By adding a 10 % non-response rate, the sample size for the first objective was **374**.

Sample size determination for factors

The sample size for the second objective was calculated by using Statcalc in Epi Info statistical software version 7.2.5, based on the following assumption: confidence level = 95% Power = 80%, The ratio of unexposed to exposed equivalent to 1, P1=proportion of outcome in the exposed group and P2=proportion of outcome in the unexposed group " Table 1"

Table 1: Sample Size Determination for Factors Associated with Dietary Adherence among Hypertensive Patients in Southern Ethiopia, 2023

Variable	Assumptions	Proportion (%)	AOR	Sample size(n)	Reference
Co-morbidities	✓ 95%CI ✓ 80% power ✓ Ratio (exposed to unexposed) =1:1	P1=45.3% P2=54.7%	2.8 (1.49-5.20)	**320**	**[**27**,** 28**]**
poor social support		P1=26.6% P2=63.4%	7.1 (2.85-17.46)	**169**	
Not having knowledge		P1=49.3% P2=50.7%	2.5 (1.36-4.585)	**339**	
Being alcohol drinker		P1=20% P2=80%	2.4 (1.17-5.07)	**241**	

CI; confidence interval AOR; Adjusted Odds Ratio

For qualitative study

The sample size for the qualitative component was determined based on data saturation, which was reached with 12 participants. Data saturation was considered achieved when no new themes or subthemes emerged from the interviews, occurring after the completion of 12 in-depth interviews.

Sampling Technique and Procedure

For quantitative study

Out of the nine public hospitals in Wolaita Zone, four were randomly selected. The sample size was proportionally allocated to each selected hospital based on the average number of hypertensive patients attending per month, using annual patient numbers obtained from each hospital's Health Information Management System (HIMS). The allocated sample for each hospital was further proportionally distributed across all adult wards—including the outpatient department, emergency outpatient department, medical ward, surgical ward, orthopedics, gynecology, ophthalmology,

adult ICU, and oncology—according to the average number of hypertensive patients per ward per month. Within each ward, hypertensive patients were selected using systematic random sampling (SRS): each patient was assigned a unique identification number, and every third patient was selected based on the inclusion criteria. The annual number of hypertensive patients in each randomly selected hospital was as follows: WSUCSH (14,100), Humbo (1,414), Boditi (800), and Bitena PH (1,100) "*Figure* 1".

Figure 1 Schematic Representation of Sampling Procedure for Hypertensive patients in Wolaita Zone Public Hospitals, Ethiopia, 2023.

For qualitative study

Purposive sampling[29] was used to select participants for the in-depth interviews, focusing on individuals who could provide rich and relevant insights into the lived experiences of hypertensive patients regarding dietary adherence.

Study variables

Dependent variable

Adherence to the recommended diet

Independent variables

Socio-demographic variables, Clinical factors, social factors, Behavioral factors

Operational definitions

Body Mass Index (BMI): Body Mass Index (BMI) was calculated as weight in kilograms divided by height in meters squared (kg/m²). BMI was categorized according to World Health Organization guidelines as follows: normal (BMI 18.5–24.9), overweight (BMI 25.0–29.9), and obese (BMI ≥30.0)[1]

Dietary adherence: Participants who regularly consumed the recommended food groups—including fruits, vegetables, whole grains, and low-fat dairy products—and minimized intake of saturated fats, added salt, and spices during the previous seven days were assessed for dietary adherence. Individuals scoring above the mean on the dietary adherence Likert scale were classified as having good dietary adherence.[30-32]

Hypertensive patients: An individual with SBP greater than 140 mm Hg and a DBP greater than 90 mm Hg[1]

Knowledgeable: Respondents scoring above the mean on the hypertensive knowledge assessment scale were classified as knowledgeable.[33].

Social support: The Oslo Social Support Scale (OSSS-3) was used to assess social support and categorized into three levels: a score of 3–8 indicated poor social support, 9–11 indicated moderate social support, and 12–14 indicated strong social support[27, 31, 34].

Data collection tools and procedure

For quantitative study

Data were collected from both outpatient and inpatient departments across all adult wards where hypertensive patients were found, using interviewer-administered questionnaires. The questionnaire was developed by reviewing relevant literature and adapting items from a previous study on dietary adherence[27, 31, 35]. The questionnaire consisted of eight sections: Part I – socio-demographic characteristics, Part II – clinical-related assessment, Part III – knowledge of hypertension, Part IV – dietary recommendation adherence, Part V – food-related factors, Part VI – alcohol consumption, Part VII – social support, and Part VIII – behavioral factors. Data were

collected by BSc nurses and supervised by MSc holders in the health field, who oversaw the data collection process.

Dietary adherence measurement

Dietary adherence was assessed using a structured questionnaire adapted from previously validated instruments used in similar studies[27, 36, 37]. The tool includes six dietary domains: (1) fruits, (2) vegetables, (3) whole grains, (4) low-fat dairy products, (5) saturated fats and oils, and (6) sodium intake. Each item is rated on a five-point Likert scale, with responses ranging from 1 ("none") to 5 ("all the time"). Scores above the mean indicate a higher level of adherence to the recommended dietary guidelines[38].

Reverse scoring was applied for saturated fat and sodium intake, with "none" = 5, "rarely" = 4, "sometimes" = 3, "most times" = 2, and "all times" = 1. Consumption of fruits, vegetables, whole grains, and low-fat dairy products was assessed by asking participants how frequently they consumed these items during the previous seven days. Participants who reported consuming these foods "all the time" or "most of the time" were classified as adherent, while those reporting "sometimes," "rarely," or "none" were classified as non-adherent.

Participants were asked how frequently they consumed saturated fats and oils during the preceding seven days. Those who responded "sometimes," "rarely," or "none" were considered adherent to the recommendations, while responses of "most times" or "all times" indicated non-adherence. Salt intake was assessed by asking about the addition of raw table salt during or after meals in the previous seven days, beyond the salt used during food preparation. Respondents who reported adding salt "rarely" or "none" were classified as adherent to recommended salt intake, whereas those reporting "sometimes," "most times," or "all times" were considered non-adherent.

Independent variable measurement

Knowledge of hypertension was measured using the Hypertension Knowledge-Level Scale (HK-LS), a validated tool consisting of 22 items covering domains such as definition, treatment, medication adherence, diet, lifestyle, and complications. For this study, items related to definition, lifestyle, diet, and complications were used to assess participants' knowledge. Each item was dichotomously scored (yes/no), with correct responses coded as "1" and incorrect responses coded as "0."[39].

Social support was evaluated using the Oslo 3-Item Social Support Scale (OSSS-3), which generates scores ranging from 3 to 14. Scores of 3–8 indicate poor social support, 9–11 indicate moderate social support, and 12–14 indicate strong social support[40].

Data Quality Assurance

For quantitative study

The questionnaire was pre-tested on 5% of the sample (n = 19) at Shone Primary Hospital, which was not part of the main study area. Based on the pre-test findings, necessary adjustments and modifications were made to improve the tool. Data collectors and supervisors received three days of training on the study objectives, the content of the questionnaire, and procedures for maintaining participant privacy and confidentiality. Data collectors were instructed to check each questionnaire for completeness, and supervisors rechecked the questionnaires after submission to ensure accuracy and completeness.

For qualitative study

Credibility

To build trust and encourage open, honest conversations, the researcher spent sufficient time engaging with participants, creating a comfortable environment where they felt safe to share their experiences in depth. Member checking was conducted by allowing participants to review their transcribed interviews, enabling them to confirm the accuracy of their statements and clarify any potential misunderstandings. Data were collected through both in-depth interviews and direct observations, providing a comprehensive understanding of the issues explored. Additionally, regular peer debriefing sessions with the research supervisor were held to reflect on the findings, identify potential biases, and enhance the credibility and authenticity of the interpretations[41].

Dependability

All methodological decisions including the development of interview guides, coding procedures, and any modifications made during the research process—were carefully documented to provide a clear and auditable trail. A semi-structured interview guide was used to ensure consistency across interviews while allowing the flexibility needed to explore emerging themes and capture participants' perspectives in depth[41].

Confirmability

To enhance objectivity, the research supervisor independently reviewed the coding framework, thematic structure, and supporting data to ensure that interpretations accurately reflected participants' narratives. Direct quotations and illustrative excerpts from participants were included in the findings to improve transparency and clearly demonstrate the link between the data and the interpretations[41].

Transferability

Detailed contextual information regarding the study setting, participant demographics, and socio-cultural background was provided to enable readers to assess the potential transferability of the findings to other contexts. Participants were purposively selected to capture a diverse range of backgrounds and experiences, thereby enhancing the richness and contextual relevance of the insights obtained[41].

Data handling procedures

All interviews were audio-recorded and transcribed verbatim to preserve the accuracy and integrity of participants' accounts. Each transcript was carefully cross-checked against the original audio to verify fidelity and correct any discrepancies. Transcripts and coding were reviewed multiple times to ensure consistency and accurately reflect participants' perspectives. Both raw and processed data were securely stored in password-protected digital folders, accessible only to the research team, ensuring the confidentiality and security of all information.

Researcher reflexivity

Reflexivity was maintained throughout all stages of the research to strengthen the credibility and trustworthiness of the findings. The researcher acknowledged the potential influence of prior professional experience and personal familiarity with frailty. To minimize bias, bracketing—the deliberate effort to set aside personal assumptions and professional perspectives—was practiced during both data collection and analysis. Additionally, reflective journaling and regular discussions with the research supervisor supported ongoing self-awareness and critical reflection throughout the study.

Data Processing and Analysis

For quantitative study

Data were coded, entered into EpiData version 4.6, and exported to SPSS version 29 for further management and analysis. Univariate analysis was conducted to summarize the characteristics of the study population. Continuous variables were presented as mean ± standard deviation (SD), while categorical variables were reported as frequencies and percentages. Bivariate analysis was used to examine the association between each independent variable and the dependent variable, and crude odds ratios (COR) were calculated. Variables with a p-value < 0.25 in the bivariate analysis were included in the multivariable logistic regression analysis to identify factors associated with dietary adherence among hypertensive patients. Adjusted odds ratios (AOR) were reported to measure the strength of these associations.

A 95% confidence interval (CI) was reported, and statistical significance was set at a p-value < 0.05. Results were presented using text, tables, and figures. Model fitness was assessed using the Hosmer–Lemeshow goodness-of-fit test, which indicated an adequate model fit ($p = 0.67$). Multicollinearity was evaluated using the variance inflation factor (VIF) and tolerance values for each independent variable. VIF values ranged from 1.044 to 1.58, and tolerance values ranged from 0.65 to 0.95, confirming that multicollinearity was not a concern in the final model.

For qualitative study

The data were analyzed using Colaizzi's (1978) descriptive phenomenological approach[41, 42] to gain an in-depth understanding of how hypertensive patients adhere to recommended practices. This approach was selected because it enables the researcher to remain closely connected to participants lived experiences and to reveal the underlying meanings of their narratives.

All interviews were transcribed verbatim from the audio recordings and subsequently translated from Amharic into English by the primary investigator. Each transcript was read multiple times to develop a thorough and holistic understanding of participants' experiences with hypertension. During this immersion in the data, the researcher recorded notes and reflections to capture emerging insights, nuances, and the emotional tone of the participants' narratives.

Using Open Code (version 4.02), the transcripts were systematically coded, dividing the data into small, meaningful units that captured key ideas or emotions. Codes with similar meanings or relationships were then clustered into broader categories. From these categories, overarching themes were identified, reflecting the shared essence of participants' experiences. The researcher iteratively refined codes and themes to ensure interpretations were grounded in participants' words, and member checking was conducted to confirm the accuracy of the findings.

Ethical consideration

Ethical clearance and approval were obtained from the Institutional Ethical Review Board (IERB) of the College of Health Sciences and Medicine, Wolaita Sodo University (ERC Project No.: CHSM/ERC/04/15/Ref. No/CRCSD 4/1996/301). Following approval, formal letters were submitted to the directors of the selected hospitals through the Research and Community Service Directorate. Written informed consent was obtained from all participants after providing a clear explanation of the study's purpose, procedures, potential risks, and benefits. Participation was entirely voluntary, and respondents were informed of their right to withdraw from the study at any stage without any consequence. Confidentiality and privacy were strictly maintained throughout data collection, storage, and reporting.

Result

Result part of quantitative study

Socio-demographic characteristics of respondents

A total of 374 hypertensive patients participated in the study, of whom 55.3% were female. The mean age was 50.25 ± 13.45 years, with the largest proportion (42.8%) falling within the 40–59-year age group. More than half of the participants were of Wolaita ethnicity (57.5%), followed by Amhara (16.3%), and the majority were Protestant (63.6%). Most respondents (85.8%) resided in urban areas, 62% were married, and 61.5% lived with their spouse. Regarding educational status, 32.6% could read and write, 10.7% had no formal education, and 23.5% had completed college or university-level education. In terms of occupation, 33.2% were unemployed, while 16% were government employees. Monthly income varied, with 46% earning ≥ 3,500 ETB and 26.5% earning ≤ 1,499 ETB "Table 2"

Table 2: Socio-demographic and socio-economic characteristics of the study participating hypertensive patients attending Wolaita Zone public hospitals, Southern Ethiopia, 2024 (n=374)

Variable	Categories	Frequency	Percent (%)
Sex	Female	207	55.3
	Male	167	44.7
	18-39	95	25.4
Age category	40-59	160	42.8
	≥60	119	31.8
	Single	55	14.7
Marital status	Married	232	62.0
	Divorced or separated	42	11.2
	Widowed	45	12.0
	Unable to read and write	40	10.7
Level of education	Read and write	122	32.6
	Primary	53	14.2
	Secondary	71	19.0

	College/University & above	88	23.5
(Table 2 continued)			
	Governmental employee	60	16.0
	Private employee	46	12.3
Work status	Private business	88	23.5
	Retired	56	15.0
	Non-employed	124	33.2
	Wolaita	215	57.5
	Gamo	41	11.0
Ethnicity	Amhara	61	16.3
	Oromo	37	9.9
	Gurage	20	5.3
	Protestant	238	63.6
Religion	Orthodox	86	23.0
	Muslim	46	12.3
	Other	4	1.1
Average monthly	≤1499	99	26.5
income (ETB)	1500 – 2499	61	16.3
	2500 – 3499	42	11.2
	≥3500	172	46.0
Place of residence	Urban	321	85.8
	Rural	53	14.2
Whom you live	Live alone	42	11.2
with	Live with husband/wife	230	61.5
	Live with other families	102	27.3

**Other religion indicates: Catholic, Johoba*

**Non-employed indicates: Farmer, Housewife and Pastors*

Clinical characteristics

Among the 374 study participants, 53.5% had been diagnosed with hypertension for ≥4 years, and 56.4% reported a family history of hypertension. Most participants (75.9%) received monthly hypertension- and diet-related messages through nutritional education during their medication refill visits. Based on body mass index (BMI), 51.1% of participants were classified as overweight or obese.

Regarding hypertension knowledge, 61.8% of respondents were categorized as knowledgeable, with a mean knowledge score of 7.56. Co-morbidities were present in 12.3% of participants, with diabetes mellitus being the most common (80.45%), followed by renal problems (8.7%). Hypertension-related complications were reported in 20.6% of participants, with eye-related complications being the most prevalent (53.2%), followed by metabolic syndrome (22.1%)"*Table 3*"

Table 3: Clinical characteristics of study participating hypertensive patients attending Wolaita Zone Public Hospital, Southern Ethiopia, 2024 (n=374)

Variables	Categories	Frequency	Percent (%)
Family history of HTN	Yes	211	56.4
	No	163	43.6
Duration diagnosed for HTN per year)	< 2	66	17.6
	2-4	108	28.9
	> 4	200	53.5
HTN concerning Knowledge	Knowledgeable	231	61.8
	Not knowledgeable	143	38.2
Presence of HTN complication	Yes	77	20.6
	No	297	79.4
Type of HTN complication	Eye problems	41	53.2
	Heart failure	8	10.4
	Metabolic syndrome	17	22.1
	Other	11	14.3
Presence of co-morbidity	Yes	46	12.3
	No	328	87.7
Type of comorbidity	DM	37	80.45
	Renal problems	4	8.7
	CHD	3	6.5
	CHF	2	4.35
Getting nutritional education	Yes	284	75.9
	No	90	24.1

BMI classification	Normal weight	183	48.9
	Over weight	108	28.9
	Obese	83	22.2

*Other HTN complications: stroke, kidney disease, erectile dysfunction and memory loss

Behavioral and social characteristic

Regarding social support, 26.5% of participants reported poor support, 53.5% had moderate support, and 20.1% had strong support. More than half of the participants (53.5%) engaged in regular, planned physical activity as recommended. Concerning substance use, 9.1% of respondents had ever smoked cigarettes, of whom 6.1% were current smokers. Additionally, 18.4% of participants reported consuming alcohol "*Table 4*"

Table 4: Behavioral and social characteristics of study participating hypertensive patients attending Wolaita Zone public hospitals, Southern Ethiopia, 2024 (n=374)

Variables	Categories	Frequencies	Percent (%)
Presence of regular physical exercise	Yes	200	53.5 %
	No	174	46.5 %
Alcohol consumption	Alcoholic	69	18.4 %
	Not alcoholic	305	81.6 %
Cigarette smoking	Smoker	34	9.1 %
	Not smoker	340	90.9 %
Social support status	Poor social support	99	26.5 %
	Moderate social support	200	53.5 %
	Strong social support	75	20.1 %

Prevalence of Dietary adherence

Overall, less than one-third of participants (30.2%; 95% CI: 25.5–35.1%) demonstrated good adherence to the recommended dietary guidelines "Fig 3". Adherence to specific dietary components varied: 67.4% adhered to fruit intake, 66.6% to vegetable consumption, 61.8% to whole grains, and 59.1% to low-fat dairy products. Additionally, 56.1% adhered to

recommendations regarding saturated fats and oils. Adherence to recommended sodium intake was the highest, with 84.8% (n = 314) of participants meeting the guidelines "Fig 2"

Fig 2: **Level of recommended dietary adherence of study participating hypertensive patients attending Wolaita Zone public hospitals, Southern Ethiopia, 2024 (n=374)**

Fig 3: Dietary adherence category among study participating hypertensive patients attending Wolaita Zone public hospitals, Southern Ethiopia, 2024 (n=374)

Factors associated with dietary adherence

After adjusting for potential confounders, several factors showed significant associations with adherence to the recommended diet. These included sex, age, place of residence, duration since hypertension diagnosis, presence of hypertension-related complications, level of social support, cost of fruits and vegetables, hypertension knowledge, meal preparation practices, and body mass index (BMI).

Female participants were significantly more likely to adhere to the recommended dietary guidelines, being 2.29 times more likely to show good adherence compared to their male counterparts (AOR = 2.29, 95% CI: 1.13–4.62, p = 0.021). Participants aged 40–59 years also demonstrated higher adherence, with 4.48 times greater odds than those in other age groups (AOR = 4.48, 95% CI: 1.09–18.47, p = 0.047). Urban residents had lower odds of adherence compared to rural residents (AOR = 0.61, 95% CI: 0.11–0.82, p = 0.050).

Longer duration since hypertension diagnosis was positively associated with dietary adherence, as participants diagnosed for more than four years were 4.03 times more likely to adhere compared to those with a shorter duration of illness (AOR = 4.03, 95% CI: 1.67–9.76, p = 0.002).

Participants who had hypertension-related complications were 77% less likely to adhere to recommended dietary practices compared to those without complications (AOR = 0.23, 95% CI: 0.07–0.77, p = 0.017). Additionally, individuals who shared meals from a common plate with family members were 90.2% less likely to adhere to dietary recommendations than those who ate separately (AOR = 0.098, 95% CI: 0.037–0.26, p < 0.0001).

Participants who perceived fruits and vegetables as expensive were significantly less likely to adhere to the recommended diet. Those who reported that fruits were costly had 87% lower odds of adherence (AOR = 0.13, 95% CI: 0.049–0.33, p < 0.0001), while those who perceived fruits as moderately expensive had 61% lower odds (AOR = 0.39, 95% CI: 0.14–0.70, p = 0.038).

Social support also showed a strong association with dietary adherence. Participants with poor social support had 83% reduced odds of adhering to dietary recommendations (AOR = 0.17, 95% CI: 0.042–0.66, p = 0.029), and those with moderate support had 75% lower odds (AOR = 0.25, 95% CI: 0.07–0.86, p = 0.031) compared to individuals with strong social support.

Hypertension knowledge was another important predictor. Participants with no knowledge of hypertension were 91% less likely to adhere compared to knowledgeable individuals (AOR = 0.09, 95% CI: 0.03–0.33, p < 0.0001).

Body mass index (BMI) was significantly associated with dietary adherence as well. Participants with normal body weight were 6.3 times more likely to adhere to the recommended diet compared with those who were overweight or obese (AOR = 6.3, 95% CI: 1.74–22.9, p = 0.002) “Table 5”.

Table 5: **Bivariable and multivariable logistic regression analysis model among study participating hypertensive patients attending Wolaita Zone public hospitals, Southern Ethiopia, 2024 (n=374)**

Variable		Dietary adherence		Bivariable	Multivariable	
		Good	Poor	COR (CI)	AOR (CI)	p-value
Sex of respondent	Female	88 (23.53%)	119(31.82%)	4.2(2.53, 6.97)	2.29 (1.13,4.62)	0.021
	Male	25 (6.68%)	142 (37.97%)	1		
Age category	18 – 39	19 (5.08%)	76 (20.32%)	4.0 (1.6, 9.98)	1.75 (0.37, 8.26)	0.007
	40 -59	87 (23.26%)	73 (19.52%)	19.1(8.36,43.49	4.48(1.089,18.47	0.047
	≥ 60	7 (1.87%)	112 (29.95%)	1		
Place of residence	Urban	103 (27.5%)	218 (58.29%)	2.03(0.98, 4.2)	0.61 (0.11,0.82)	0.05
	Rural	10 (2.67%)	43 (11.5%)	1		
Year diagnosed for HTN	< 2	24 (6.42%)	42 (11.23%)	1.6 (0.86, 2.8)	3.5(1.1, 11.0)	0.006
	2-4	35(9.36%)	73 (19.52%)	1.3(0.78, 2.16)	4.03(1.67, 9.76)	0.0019
	≥ 4	54 (14.4%)	146 (39.04%)	1		
HTN complication	Yes	22 (5.88%)	55 (14.71%)	0.9 (0.63,1.92)	0.23 (0.07,0.77)	0.017
	No	91(24.3%)	206 (55.08%)	1		
Had separated meal	No	14 (3.74%)	220 (58.82%)	0.026(0.014, 0.05)	0.098(0.037,0.26	<0.0001
	Yes	99 (26.5%)	41(10.96%)	1		
Cost of fruit	Costly	20 (5.35%)	209 (55.88%)	0.054(0.03,0.09	0.13 (0.049,0.33)	<0.0001
	Cheap/fair	93 (24.9%)	52 (13.9%)	1		
Cost of vegetable	Costly	24 (6.42%)	200 (48%)	0.1(0.05, 0.14)	0.39 (0.14, 0.7)	0.038
	Cheap/fair	89 (23.8%)	61 (16.31%)	1		
Social support category	Poor	20(5.35%)	79 (21.12%)	0.38(0.2, 0.75)	0.17(0.04, 0.66)	0.029
	Moderate	63 (16.8%)	137 (36.63%)	0.69(0.4, 1.19)	0.25(0.07, 0.86)	0.031
	Strong	45 (12%)	30 (8.02%)	1		

HTN Knowledge	No	6 (1.60%)	137 (36.63%)	0.05(0.02,0.12	0.09 (0.03,0.33)	<0.0001
	Yes	107(28.6%	124 (33.16%)	1		
BMI classification	Normal	88 (23.53%)	95 (25.40%)	8.68(3.96,19.03	6.3(1.74, 22.9)	0.002
	Overweight	17 (4.55%)	91 (24.33%)	1.75(0.7, 4.28)	1.5(0.39, 5.7)	0.005
	Obese	8 (2.14%)	75 (20.05%)	1		

CI, confidence interval**;** AOR, adjusted odds ratio**;** COR, crude odds ratio

Significant variable only (Backward variable selection)

**1 indicates for reference group*

**AOR has significant association at p- value ≤ 0.05.*

**The reference category indicator is the last*

Result part of qualitative study

Sociodemographic characteristics of the study participants

A total of twelve hypertensive patients participated in this study. Men made up half of the participants, and women made up the other half. Participants ranged in age from 18 to 75 years, with a mean age of 42 years, demonstrating that both younger and older persons with hypertension were included. In terms of marital status, 58.3% of them were married. According to the occupational distribution, 33.3% of the study participants were unemployed and 33.3% were self-employed. The majority of the participants had experienced high blood pressure for two to five years. During their follow-up care, 58.3% of the patients said they received nutritional advice "*Table 6*"

Table 6 Sociodemographic Characteristics of Hypertensive patients in Wolaita Zone public Hospitals, Southern Ethiopia, 2024

Variables	Categories	Frequency	Percent (%)
Sex	Male	6	50
	Female	6	50
Age	Mean age=32(range from 18 to 75)		
Marital status	Married	7	58.3
	Single	3	25
	Divorced	1	8.3
	Widowed	1	8.3
Occupation	Employed	3	25
	Self employed	4	33.3
	Unemployed	4	33.3
	Others	1	8.3
Duration of Hypertension	<2 years	4	33.3
	2-5 years	5	41.7
	>5 years	3	25
Dietary counseling received	Yes	7	58.3
	No	5	41.7

Main theme of the study

These codes were subsequently distilled into three primary themes that articulate hypertensive patients' lived experiences, difficulties, and views concerning dietary adherence after being categorized into seven subthemes. The initial theme, *Understanding of Dietary Recommendations and Perceived Importance*, emphasizes patients' knowledge of nutrition advice, their views on what defines a nutritious diet, and the perceived relevance of following dietary recommendations for hypertension management. Participants showed varying degrees of understanding, with some recognizing the advantages of minimizing salt and fatty foods, while others displayed misunderstandings and a lack of clarity due to inconsistent guidance, viewing dietary compliance as significant but challenging to fully comprehend

The second theme, *Structural, Economic, and Environmental Barriers*, highlights the external difficulties that patients encounter while trying to adhere to suggested dietary guidelines. Numerous participants highlighted the elevated prices of fruits and vegetables, seasonal shortages of food, and restricted availability of healthier food choices. Insufficient dietary advice during regular check-ups, absence of practical recommendations, and conflicting family food choices additionally led to misunderstandings and lower compliance. Patients highlighted that these limitations diminished their confidence and capacity to uphold healthy eating patterns, despite their motivation and attempts.

The third theme, *Behavioral, Cultural, and Psychological Influences*, represents the individual, emotional, and cultural elements that influence patients' eating habits. Participants reported significant habitual inclinations toward salty and culturally cherished foods, emotional eating in times of stress, and challenges in altering established eating habits. In spite of these obstacles, certain individuals showed resilience through self-discipline, support from family, and personal coping methods like controlling portions and monitoring salt intake at home. Collectively, these themes provide a thorough, human-focused account of how hypertensive individuals perceive dietary guidelines, manage economic and social limitations, and handle the behavioral and emotional challenges associated with implementing lasting dietary modifications “Table 7”.

503

504 **Table 7 Themes, Sub-themes, and Main Codes inductively Emerged from Qualitative Data**

505 **Analysis on Dietary Adherence Among Hypertensive Patients in Wolaita Zone Public**

506 **Hospitals, Southern Ethiopia, 2024**

Themes	Sub-themes	Main codes
Understanding of Dietary Recommendations and Perceived Importance	Awareness and misconceptions about healthy diet	Limited nutrition knowledge, Misconceptions about salt, Misinterpretation of dietary advice, Cultural beliefs about food, Knowledge gaps
	Perceived benefits and motivators	Symptom relief, Improved BP control, Desire for healthy life, Fear of complications, Motivation to follow recommendations
	Interpretation of health information	Inconsistent counseling, Difficulty understanding instructions, Limited practical examples, Confusion about forbidden/allowed foods
Structural, Economic, and Environmental Barriers	Financial constraints and food inaccessibility	Family food preferences, Shared household meals, Cultural events/celebrations, social pressure, Lack of family support
	Social and household influences	Family food preferences, Shared household meals, Cultural events/celebrations, social pressure, Lack of family support
	Health system limitations	Brief counseling time, Lack of detailed diet plans, Inconsistent messages, Absence of follow-up nutrition support

Behavioral, Cultural, and Psychological Influences	Habitual and cultural food preferences	Strong preference for salty foods, Attachment to traditional dishes, Difficulty changing long-term habits
	Emotional and psychological factors	Eating due to stress, Varying motivation levels, Rejection of ongoing illness, Emotional dependence on comfort foods
	Coping and adherence strategies	Portion control, reducing salt at home, Seeking family support, Using food substitutes, Self-monitoring, Personal determination

Theme 1: Knowledge on Dietary Recommendations and perception

Awareness and Understanding of Dietary Recommendations

Participants demonstrated a general awareness that nutrition is crucial for managing hypertension; however, their grasp was frequently incomplete, inconsistent, or mixed with misunderstandings about what a healthy diet entails. Numerous patients acknowledged the necessity to cut back on salt, fatty foods, or alcohol, but they found themselves without straightforward, actionable advice on how to incorporate these suggestions into their everyday lives. Many participants mentioned that much of their understanding stemmed from short discussions during follow-up appointments or from their personal experiences, instead of formal counseling. A patient shared, "*They advise us to cut back on salt, but they don't demonstrate how to do it." At times, I'm unsure about which foods I can eat and which ones I cannot. "I simply attempt to infer from what I listen to*" [p.3]. Another participant mentioned, "*I recognize that diet matters, but I'm uncertain about what I should actually consume*. "*I just hear vague suggestions, so I interpret them as I see fit*" [p.1].

Certain participants linked dietary changes to better blood pressure results, whereas others were uncertain if diet by itself could have an impact. A patient remarked, "*When I cut back on salt, I feel improved, but I'm unsure if it's sufficient*." "*At times, I believe that medication is the sole answer*" [p.6]. The different degrees of comprehension led to confusion and made it challenging for many to comply.

Perceived Benefits and Motivations for Adherence

Participants indicated that sticking to their diet was significant for enhancing their health and avoiding complications, despite the difficulties involved. Multiple patients indicated observing beneficial physical changes while adhering to suggested diets, including fewer headaches, less dizziness, and consistent blood pressure levels. A participant stated, "*When I eat well—more vegetables and reduced salt—I feel lighter, and my blood pressure remains normal." "That motivates me to persist*" [p.2]. Some emphasized that fear of complications was a significant driving force: "*I don't want to face a stroke or kidney issues." "That anxiety motivates me to attempt adhering to the diet*" [p.5]. Despite these motivations, patients emphasized that understanding the benefits was not always enough to sustain long-term adherence, especially when practical barriers stood in the way.

Information Gaps and Inconsistent Dietary Counseling

A key concern expressed by participants was the absence of reliable, comprehensive, and actionable dietary guidance. Numerous individuals indicated that the advice received during their clinic appointments primarily centered on medication and blood pressure tracking, with only short remarks about diet. A participant stated, "*In follow-ups, the main focus is on the medication. The section on diet is quite brief. They advise to "stay away from salt*," but *they fail to clarify how to cook differently or what substitutes we might utilize*" [p.4]

Some individuals reported receiving contradictory messages from various health workers, creating uncertainty about what guidance to adhere to. A patient mentioned, "*Occasionally the nurses say one thing, and the next time another individual tells you something else*." "*This confuses us since we are unsure which option is accurate*" [p.7]. Participants consistently highlighted the necessity for straightforward, ongoing, and applicable dietary advice that corresponds with their cultural eating practices and financial circumstances.

Theme 2: Structural, Economic, and Environmental Barriers

The analysis showed that the dietary adherence in hypertensive patients was influenced by both personal commitment and the extent of support from the health system and structures around them. Although numerous patients showed openness to altering their diets and recognized the significance of nutritious eating, considerable financial limitations, irregular advice, and restricted availability of suggested foods hindered their ability to comply. Participants consistently highlighted that without accessible food choices, dependable advice, and family assistance, personal drive alone was inadequate to maintain lasting dietary changes

Financial Constraints and Food Inaccessibility

Participants consistently emphasized financial constraints as one of the most significant obstacles to upholding suggested dietary habits. Nutrient-rich options like fruits, vegetables, low-fat items, and lower-sodium substitutes were frequently characterized as costly or hard to find, particularly during specific times of the year. Numerous patients mentioned that they depended on less expensive, easier-to-find foods even though they understood these were not suitable for managing blood pressure. A participant remarked, "*We are advised to consume more vegetables and fewer greasy foods, but these items cost a lot*." "*At times, I consume what fits my budget, rather than what is suggested*." [p.2] Another person remarked, "*When prices rise, we are unable to adhere to*

the diet they suggest. "*We simply purchase whatever is offered, regardless of its healthiness*" [p.6]. Multiple participants noted that limited household income compelled them to focus on quantity rather than quality, complicating adherence.

Health System Limitations and Inadequate Dietary Counseling

Numerous patients characterized the healthcare system as offering minimal and irregular nutritional assistance. Even though healthcare providers recommended lowering salt intake and steering clear of fatty foods, participants observed that such guidance was frequently vague, generic, or not customized to their everyday situations. A patient mentioned, "*For the most part, the healthcare providers concentrate on the medication*. "*The dietary guidance is quite brief, and at times we struggle to implement it at home*" [p.4]. Another participant mentioned, "*Various health workers provide us with different information. One suggests steering clear of specific foods, while another recommends cutting back on them. We feel perplexed and are unsure about which guidance to adhere to*" [p.5]. Patients also pointed out that there were no follow-up nutrition sessions, written materials, or counseling that demonstrated alternative food options or culturally appropriate dietary adjustments. This lack of structured education left many unsure about how to translate recommendations into practice.

Social and Household Influences

Participants often mentioned how family food choices, communal meals, and cultural dining practices significantly impacted their dietary decisions. Patients who did not take charge of cooking depended on the meals prepared at home, which frequently did not conform to the suggested diet. A participant stated, "At home, everyone has the same meals. "I cannot make them prepare separate meals for me, so I usually consume what the family cooks, even if it contains

excessive salt" [p.1]. One more person mentioned, "It's quite challenging to stick to the diet during holidays or social events. Individuals anticipate that you will consume what they offer, and declining is challenging" [p.7].

Participants highlighted that without familial support, practical home modifications, and culturally aware guidance, following dietary recommendations proved difficult despite their individual dedication.

Theme 3: Behavioral, Cultural, and Psychological Influences

The results showed that patients with hypertension face significant behavioral, cultural, and emotional obstacles that greatly affect their capacity to follow dietary guidelines. Participants reported challenges in altering entrenched eating habits, emotional issues associated with dietary limitations, and societal expectations that support unhealthy food behaviors. In spite of these obstacles, numerous individuals showed a strong personal wish to enhance their well-being and utilized different coping techniques to sustain their motivation. These results indicate that dietary compliance is influenced not just by knowledge and resources, but also by the psychological and cultural pressures associated with managing a chronic condition

Habitual and Cultural Food Preferences

Participants often noted that entrenched eating habits and cultural food customs created considerable obstacles to sticking to dietary plans. Numerous individuals expressed strong likes for salty, spicy, or oily dishes—preferences cultivated over many years and reinforced by familial and societal customs. Modifying these habits was frequently characterized as challenging and emotionally draining. A participant mentioned, "*I was raised consuming foods rich in salt. Cutting back seems like consuming flavorless meals, prompting me to revert to my regular habits at times*"

[p.3]. A different patient shared, "*In our culture, we cook dishes using butter and spices. Taking those away makes the food taste different. "It is challenging to adapt*" [p.1]. Festive events and community gatherings were often noted as occasions when it was nearly impossible to adhere to dietary restrictions

Emotional and Psychological Factors

Participants reported feeling stress, frustration, and emotional distress while trying to adhere to dietary guidelines. For certain individuals, food acted as a way to cope during times of stress, complicating adherence further. A patient mentioned, "*Whenever I am feeling anxious or stressed, I consume anything that I can find." "In those times, I entirely disregard the diet*" [p.4]. One other mentioned, "*At times I feel weary of all the limitations*." "*It makes me feel down, and I simply want to eat what I love without worrying about my blood pressure*" [p.6]. Numerous participants indicated feeling inundated by the pressure to juggle everyday obligations with rigid dietary regulations, leading to emotional exhaustion and diminished motivation.

Coping and Adherence Strategies

In spite of the difficulties, numerous participants implemented different coping strategies to handle their eating habits and uphold adherence to the best of their ability. These involved minimizing portion sizes, slowly cutting down on salt, obtaining support from family, and employing alternatives like lemon, spices, or vegetables to enhance meal flavor. A participant mentioned, "I make an effort to manage my portion sizes. Although the food is salty, I consume just a small amount. "That's how I handle it" [p.2]. Another stated, "My family supports me. "They encourage me to reduce salt usage in my cooking, and that support makes it simpler for me" [p.5]. Some individuals mentioned self-motivation strategies based on the fear of difficulties: "When I consider

633 stroke or kidney failure, I drive myself to adhere to the diet." “Fear provides me the strength to
634 persevere” [p.7].

635 In general, these approaches demonstrated a significant motivation to enhance health despite the
636 cultural, emotional, and behavioral challenges encountered by patients.

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Discussion

This explanatory mixed-methods study assessed dietary adherence and its determinants among hypertensive patients attending Wolaita Zone Public Hospital, and the qualitative findings helped contextualize the quantitative results. The overall dietary adherence rate of 30.21% aligns with findings from Bahir Dar (32.8%) [12], Jimma (34.6%)[43], Bangladesh (33.5%)[44], Finland 30%[45] and Korea (35.5%)[46]. In contrast, this finding is lower than a study reported from Black lion hospital, Addis Ababa (69.1%)[47], and Dessie (76.4%)[48]. The discrepancy might be due to differences in the socio-economic status of participants, variation in study settings, and difference in the types of locally available staple foods.

On the other hand, this finding is found higher than study from Uganda (22.6%)[49] and Benin (20%)[50]. This variation can be explained by the variation in the study setting, adherence measurement tool, population and sample size used in the studies. However, the study's finding is found somewhat lower than those of studies conducted in Gorgon (43.5%)[51] Israel (50%)[52] and Nepal (53.3%)[53]. The possible explanation could be related to cultural differences and lack of organized setup in living areas in developing countries like Ethiopia. However, variations from study findings in Nepal[53] Turkey[54], Israel[55] and Gorgon[51], Probably could be due to the differences by dietary habits of the countries, dwelling of participants and sample size included in the study. The qualitative results offer additional context for these differences, showing that participants often encountered conflicting dietary advice, minimal practical support, and knowledge deficits, hindering their capacity to adhere to suggested diets[56]. Participants noted that the guidance provided was frequently concise and vague, resulting in uncertainty regarding which foods were permitted or prohibited, as well as how to incorporate dietary modifications into everyday habits [p.1–3]

This study found sex as a significant factor with dietary adherence i.e. females are more likely to follow their dietary recommendation. This is supported by study from Gorgan[51]. The reason behind could be females has a great role in food preparation and distribution beyond not less experience of eating out than males. Qualitative data reinforced this observation, as participants pointed out that women's participation in meal preparation and distribution in the household enables better control over dietary intake, whereas men had less opportunity to apply suggested changes[57]

Respondents those who counts two years and above for diagnosed to hypertension was found better adherent to their recommended diet as per recommended by health workers. This is in line with the findings from Black Lion Hospital, Addis Ababa, Ethiopia[58], and this could be due to respondents those has counts two years and above diagnosed for hypertension could share experiences on securing in-depth and progressed hypertension information. Qualitative interviews indicated that patients with longer disease duration developed better understanding, self-discipline, and experience in managing diet[59], suggesting that cumulative knowledge and habit formation improve adherence over time [p.4–6].

In many research findings, it is common to see having adequate knowledge about hypertension improves self-care practices including dietary adherence. For instance, the finding of a study conducted in Saudi Arabia[43], and Debre Berhan Town, Ethiopia[60], indicates respondents those have good hypertension knowledge tend to follow and practice their dietary recommendation. In this Study, participants those who had no hypertension knowledge were 91% times less likely to be adhere to the recommended diet as compared with who are knowledgeable about hypertension. Therefore, adequate knowledge on hypertension was found associated with dietary adherence. In addition, knowledge alone is not sufficient to be adherent hence it is dynamic and active process

requiring attitude, discipline, determination, commitment, empowerment and self-efficacy too. Qualitative findings highlighted misconceptions, inconsistent messages from different health workers, and limited counseling, which left many patients unsure of how to modify their diet effectively[61]. Knowledge alone, however, was insufficient to ensure adherence; successful dietary behavior also required motivation, discipline, commitment, and family support.

In this study, the participants having hypertension complication were found with poor dietary adherence as per the recommendation. This has been supported by finding from Bahir Dar, Ethiopia[12] and Addis Ababa[58]. This might be due having complex pharmaceutical and dietary recommendations of complication. Qualitative data suggest that complex medical and dietary regimens[62], coupled with emotional stress, hinder patients' ability to adhere, as participants reported challenges in balancing treatment requirements with daily responsibilities and coping with stress-related eating [p.4, Theme 3]

In this study, age was found significant factor with dietary adherence and it has been supported by study from Gorgon[51]. Age is significantly associated with recommended dietary adherence among hypertension patients as age between 40-59 were more likely to follow their dietary recommendation. The reason behind could be patients who were in this age category has a great role in food choice, preparation and distribution beyond having less experience of eating out than age category 18-39 this finding is supported by study from Bahir Dar city administration, Ethiopia[27]. Participants indicated that older adults often have more control over food choices at home and greater motivation to prevent complications[63], while younger adults may face greater exposure to social eating practices that conflict with dietary recommendations [P.6,8].

The Study participants those who gets fruits and vegetable cheaply and/or fairly were significantly associated with recommended dietary adherence among hypertension patients. The cost of fruits and vegetables can influence dietary choices, as well as affordability also, if fresh produce is expensive, individuals may have optioned for cheaper alternatives, this finding has been supported by a study from Hawassa city administration, Ethiopia[64]. Qualitative interviews reinforced this, as patients emphasized that high costs, seasonal unavailability, and household food preferences frequently limited their ability to follow dietary guidance[63], even when motivated [P.10, Theme 2].

This study found BMI as a significant factor in dietary adherence i.e. respondents with normal body weight are more likely to be adherent to the recommended diet. This finding is supported by a study from Bulgaria[65, 66]. The reason should be nutrition plays a key role in human health because it is the main energy source and can contribute to a good quality of life. The anthropometric indicator BMI is most often used to assess nutritional and health status. BMI is directly related to eating habits. Patients reported using strategies such as portion control, reducing salt, and using healthier food substitutes to maintain diet adherence[63], reflecting the link between nutrition awareness and weight management [P.5, Theme 3].

This study also found social support as a significant factor in dietary adherence; the study participants who had poor and moderate social support were found to be less adherent to the recommended diet than those who had strong social support. This finding was supported by the finding from the United States[66] that lack of strong social support may put individuals in socio-economic factors: poverty, illiteracy, a low level of education, unemployment, a lack of effective social support networks, culture, and lay belief about illness and treatment and family dysfunction can significantly affect dietary adherence. On the other hand, having strong social support can play

a crucial role in promoting healthy dietary habits and adherence. Without it, individuals may struggle to maintain a balanced diet, which can lead to poor health outcomes. Qualitative data highlighted peer and family encouragement, cooperative meal preparation, and shared coping strategies as essential for sustaining dietary adherence[67], particularly in the face of cultural, behavioral, and emotional challenges [p.7, Theme 3]. Patients without such support struggled to maintain long-term adherence, demonstrating that social context is a key determinant of dietary behavior

Limitation and strength of the study

Strengths

The explanatory mixed-methods design of this study facilitated the combination of quantitative and qualitative results, yielding an in-depth insight into dietary adherence in hypertensive individuals. The involvement of participants from various public hospitals in Wolaita Zone improved representativeness, while detailed qualitative interviews revealed behavioral, cultural, and psychological elements affecting adherence. The application of confirmed tools and thorough thematic analysis enhanced the trustworthiness and dependability of the findings.

Limitations

The cross-sectional approach restricts causal conclusions, and self-reported dietary compliance might be influenced by memory or social desirability bias. The qualitative sample was limited and intentionally chosen, which might restrict generalizability, and the research concentrated solely on patients from public hospitals, possibly leaving out those in private or community healthcare.

Certain determinants, like specific economic variables or cultural eating habits, might not be adequately represented in quantitative terms.

Conclusion

Dietary adherence among hypertensive patients in Wolaita Zone Public Hospitals was low, with only about one in three patients following the recommended diet. Our study found that factors such as sex, age, how long a person has lived with hypertension, BMI, social support, knowledge about hypertension, and access to fruits and vegetables played an important role in shaping adherence. The qualitative findings provided deeper insights, showing that many patients struggled with unclear or inconsistent advice from health workers, gaps in nutrition knowledge, financial difficulties, limited availability of healthy foods, family preferences, cultural practices, and emotional or behavioral challenges.

Despite these obstacles, patients showed remarkable resilience and creativity. They adopted strategies such as controlling portion sizes, reducing salt, using healthier food alternatives, and seeking support from family members to help maintain their diet. These efforts highlight the determination of patients to manage their health and the crucial role of diet alongside medication in controlling hypertension.

To improve adherence, hospitals should offer clear, written dietary guidance and personalized counseling. Early nutrition screening can help identify and address dietary issues, overweight, or obesity before they become complications. Addressing not just knowledge gaps, but also structural, social, and behavioral barriers, is essential for helping patients maintain healthy eating habits, control blood pressure, and reduce the risk of hypertension-related complications.

Abbreviations

BMI, Body Mass Index; AOR, Adjusted Odd Ratio; BP, Blood Pressure; CVD, Cardio Vascular Diseases; LMICs, Low and Middle-Income Countries; DASH, Dietary Approach to Stop Hypertension; OSSS, Oslo Social Support Scale; PA, SPSS, Statistical Package for Social Science, ETB; Ethiopian birr; DBP, Diastolic Blood Pressure; HTN, Hypertension

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Declarations

Authors' Contributions

The study, *"Dietary Adherence and Its Determinants among Hypertensive Patients in Wolaita Zone Public Hospitals, Southern Ethiopia: A Mixed-Methods Study,"* is the original work of the undersigned authors. All authors contributed significantly to the conception, study design, data collection, analysis, and interpretation of the results.

Originality and Publication Status

This manuscript has not been published previously and is not under consideration for publication elsewhere.

Ethics Approval and Consent to Participate

Ethical approval was obtained from Wolaita Sodo University Ethical Review Board (ERC Project number: CHSM/ERC/04/15/Ref. No/CRCSD 4/1996/301). Written informed consent was obtained from all participants prior to data collection. The study was conducted in accordance with the ethical principles and guidelines for research involving human subjects.

Consent for Publication

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Competing Interests

The authors declare that there are no conflicts of interest to disclose.

Trial Registration

This study is a mixed-methods study and not a clinical trial; therefore, trial registration was not required.

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Data Availability

The datasets generated and/or analyzed during the current study are not publicly available due to ethical restrictions related to participant confidentiality but are available from the corresponding author on reasonable request.

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Figures

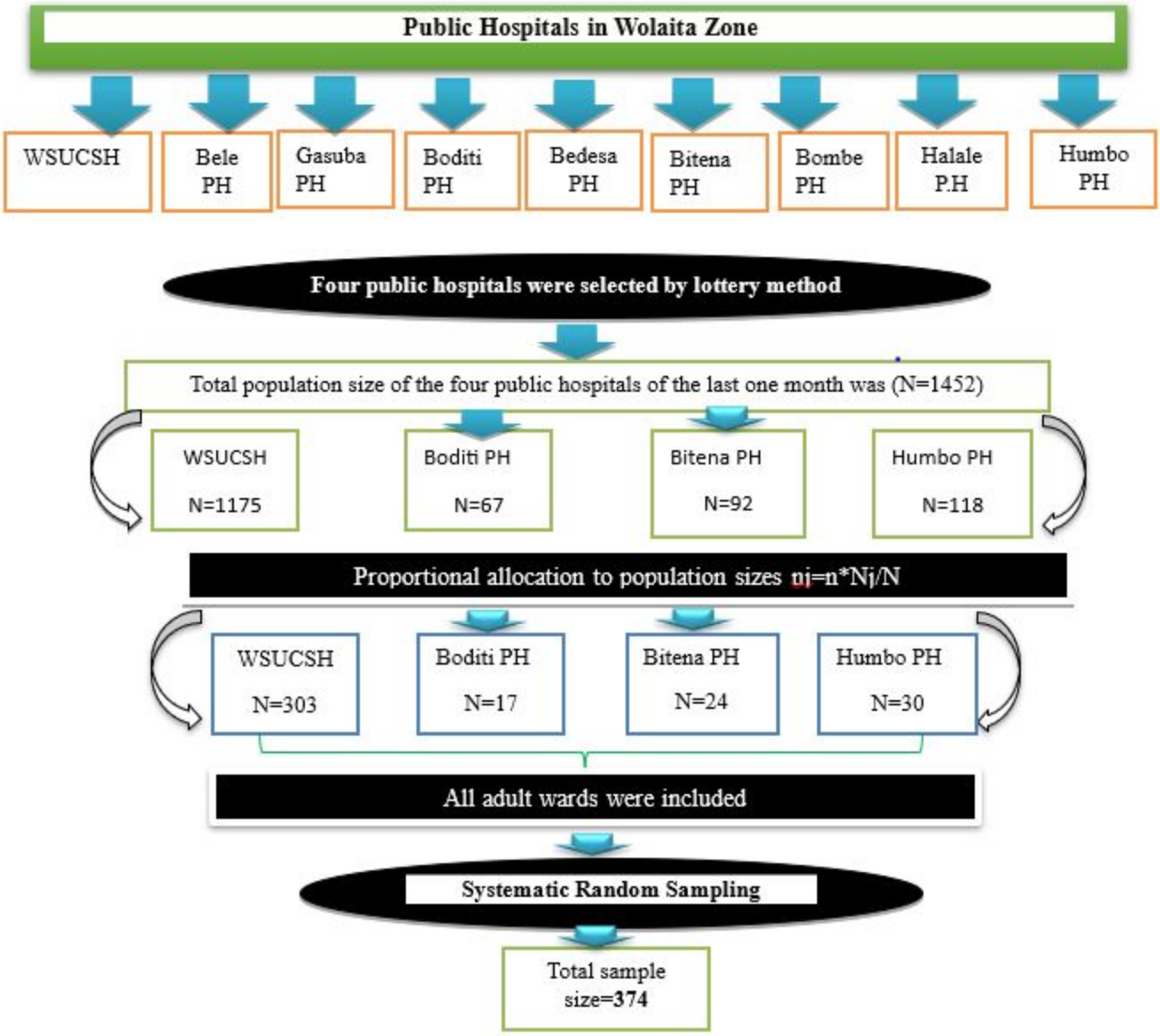


Figure 1

Schematic Representation of Sampling Procedure for Hypertensive patients in Wolaita Zone Public Hospitals, Ethiopia, 2023.

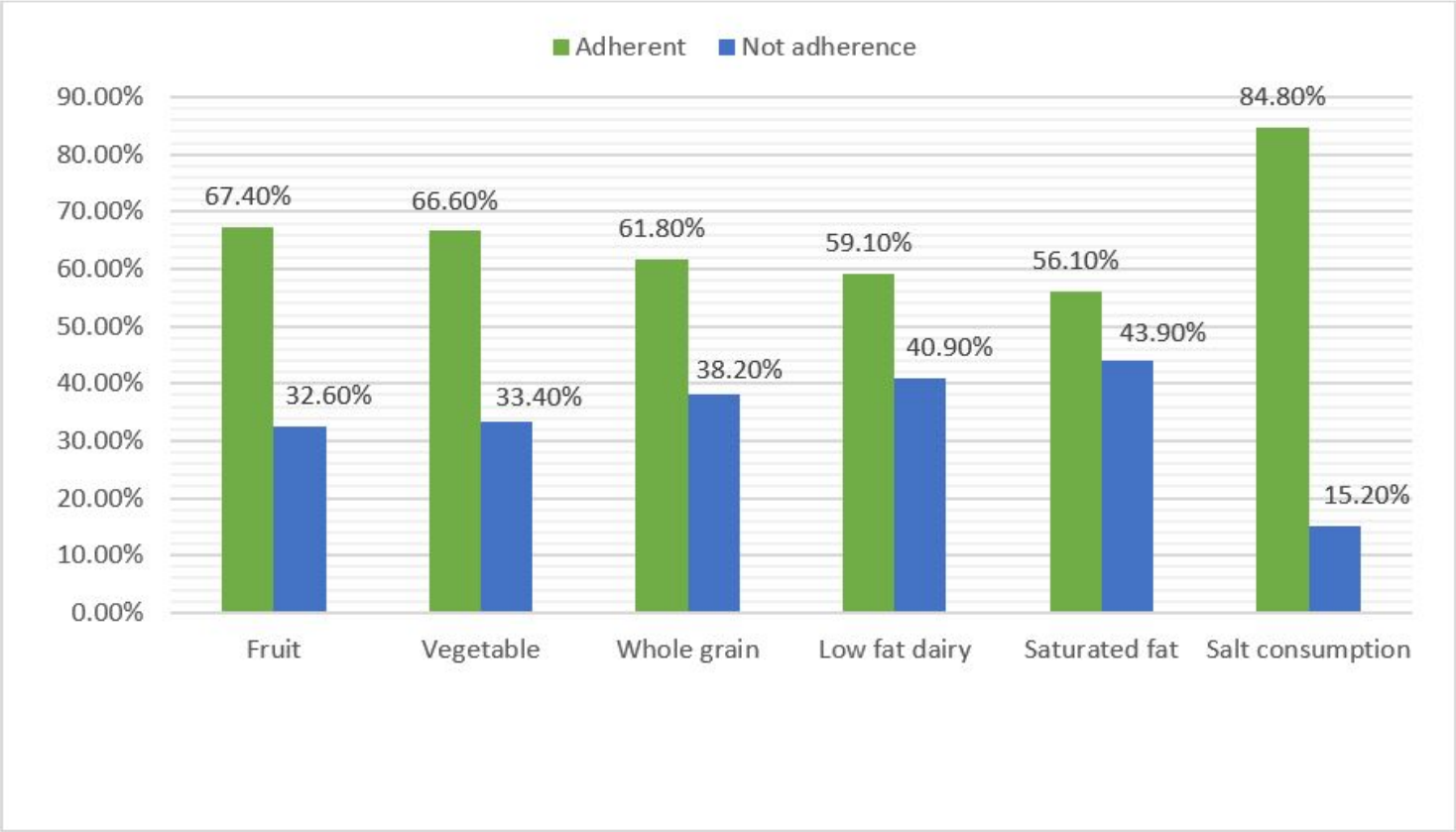


Figure 2

Level of recommended dietary adherence of study participating hypertensive patients attending Wolaita Zone public hospitals, Southern Ethiopia, 2024 (n=374)

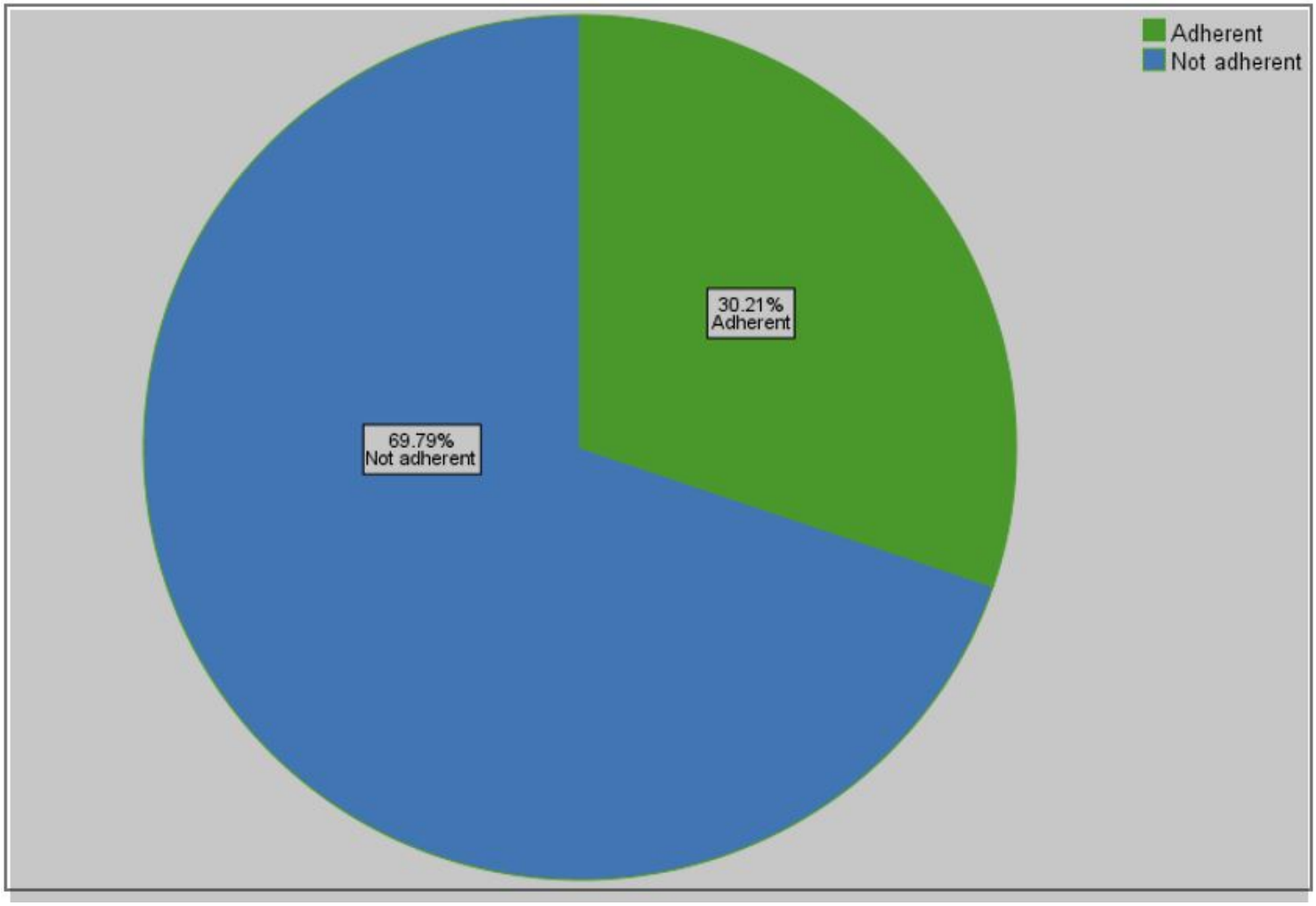


Figure 3

Dietary adherence category among study participating hypertensive patients attending Wolaita Zone public hospitals, Southern Ethiopia, 2024 (n=374)