ORIGINAL RESEARCH

Health Science Reports Open Access WILEY

Undiagnosed hypertension and associated factors among adult population in central zone of Tigray, Northern Ethiopia 2020: A cross-sectional study

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Abstract

Background and Aims: Undiagnosed hypertension is a major risk factor for cardiovascular diseases and complications such as heart attack and stroke. Limited information is available on the prevalence of undiagnosed hypertension and its associated factors in Ethiopia, particularly in the study setting. This study aimed to assess the prevalence of undiagnosed hypertension and its associated factors in the central zone of Tigray, Northern Ethiopia.

Methods: A community-based cross-sectional study was conducted from April 1 to May 31, 2020. A pretested structured questionnaire was used and both face-to-face interview and physical measurement were used to collect the data. Blood pressure was measured on two different days for each study participant, and an average of the measurements were taken. In addition, 736 participants were included in this study, through a systematic random sampling technique. Data were analyzed using SPSS version 23. Bivariate and multivariable logistic regression analyses were performed to identify factors associated with undiagnosed hypertension. Adjusted odds ratios and 95% confidence intervals were used to show the strength of the association and declare statistical significance at $p < 0.05$.

Results: In the study, the mean age of the participants was 51.9 (standard deviation: 17.9) years old. Prevalence of undiagnosed hypertension was found 15.4% ($N = 113$). The factors associated with undiagnosed hypertension were being divorced (adjusted odds ratio [AOR] = 15.2, 95% confidence interval [CI]: 8.2–28.3), alcohol consumption (AOR = 2.07, 95% CI: 1.22–3.51), not eating fruits (AOR = 4.1, 95% CI: 2.37–7.08), not eating vegetables (AOR = 3.47, 95% CI: 2.02–5.96) and poor knowledge (AOR = 3.05, 95% CI: 2.75–7.83).

Conclusion: Around one in six study participants had undiagnosed hypertension. Being divorced, drinking alcohol, not eating fruits, not consuming vegetables, and

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having poor knowledge of hypertension were significant factors. Public health interventions, like providing adequate hypertension health information, frequent screening, and implementation of an appropriate intervention for particular factors, are critical for reducing the burden of undiagnosed hypertension.

KEYWORDS
Ethiopia, prevalence, risk factors, undiagnosed hypertension

1 | BACKGROUND

Around one billion people are affected by hypertension globally, and this number is predicted to increase to 1.5 billion by 2025.[1] The World Health Organization (WHO) estimates that by 2025, three out of every four people with hypertension will live in low- and medium-income countries (LMICs), which will exceed the number of communicable, maternal, perinatal, and nutritional diseases by 2030.[2,3] Globally, hypertension is responsible for 7.6 million premature deaths and is a major risk factor for 54% of all strokes and 47% of all ischemic heart diseases.[4] In Africa, hypertension burden has increased steadily from 54.6 million in 1990 to 130.2 million in 2010. And is projected to rise to 216.8 million by 2030.[5]

In the early stages, hypertension symptoms are often undetectable, and many people go undiagnosed.[6] Around 50% of the world's population lives with undiagnosed hypertension.[7] In sub-Saharan Africa, a large proportion of the population with hypertension remains undiagnosed,[8] and only 27% know their disease status.[8] Most people are diagnosed with hypertension only when they require treatment or screening for other medical/surgical management.[9]

Undiagnosed hypertension was defined as individuals who were hypertensive but did not report that they had been told by a health professional that they had hypertension.[10] Undiagnosed hypertension is a major risk factor for cardiovascular diseases and complications such as heart attack and stroke.[8,11] Early detection of hypertension is a critical first step in the hypertension care cascade to improve care,[12] prevent disease, and save lives.[13]

Several studies have revealed a high prevalence of undiagnosed hypertension. A Study conducted in Wolaita Sodo Southern Ethiopia revealed that the prevalence of undiagnosed hypertension was 28.8%,[14] Hossana town Ethiopia 17.2%,[15] Bahir Dar City, Ethiopia 24.8%,[16] Southwest Ethiopia 21.2%,[10] Hawassa, Ethiopia 12.3%,[11] Gurage Zone, Ethiopia 15.3%,[17] Addis Ababa, Ethiopia 13.25%,[18] Debre Markos, Ethiopia 12.7%,[19] Nigeria 27.8%,[20] and Rwanda 18.7%.[21]

In Ethiopia, hypertension prevention has not been given attention; therefore, most patients with hypertension know their status when complications develop.[22] Different factors contribute to an undiagnosed state of hypertension. According to a study conducted in Durame town, Southern Ethiopia: family history of hypertension, drinking too much alcohol, physical inactivity, and low seeking healthcare for hypertensive symptoms without serious illness were significantly associated with developing undiagnosed hypertension.[23] Being older, overweight, and having a family history of hypertension is significantly associated with undiagnosed hypertension.[24] A study conducted in Mizan-Aman Town, Bench Sheko Zone, Southwest Ethiopia revealed that older age, being male, low physical activity, low consumption of fruits and vegetables, and higher body mass index (BMI) were significantly associated with undiagnosed hypertension.[25] Those are drinking alcohol, diabetes mellitus, low socioeconomic status, poor knowledge, smoking, stress, physical inactivity, BMI > 25, older age, family history of hypertension, and chewing chat were significantly associated factors with undiagnosed hypertension.[10,11,14,16,17,26]

Even though the Ethiopian health sector development program projected improvement in the proportion of hypertensive adults diagnosed and aware of their status to 50% by 2022, studies revealed that they could not meet Ethiopia's target.[27,28] In Ethiopia, hypertension intervention focuses only on diagnosed/known hypertensive patients but ignores the larger population of undiagnosed hypertensive patients.[14]

Therefore, evidence on the prevalence of undiagnosed hypertension and its associated factors is imperative to prevent its complications and to ensure effective hypertension management. Limited information is available on the prevalence of undiagnosed hypertension and its associated factors in Ethiopia, particularly in the study area. Therefore, this study aimed to assess the prevalence of undiagnosed hypertension and its associated factors in the adult population in the central zone of Tigray, North Ethiopia.

2 | METHODS AND MATERIALS

2.1 | Study area and study period

The study was conducted in the central zone of Tigray, Adwa Town, which is located in northern Ethiopia. The study was conducted from April 1 to May 31, 2020 for 2 consecutive months.

2.2 | Study design and study participants

This was a community-based cross-sectional study. The source population for the study was adults aged 18 years and above who had lived for at least 6 months in the study setting. Already known hypertensive patients were excluded from the study and also due to

pregnancy-induced hypertension pregnant women were excluded from the study.

2.3 | Sample size determination and sampling technique

The sample size was calculated using a single-population proportion formula by considering the prevalence (P) of undiagnosed hypertension at 13.25%,[18] 95% confidence interval (CI), marginal error 3%, design effect 1.5, and 5% nonresponse rate. The total sample size was 736. From each of the five kebelles (Alula, Abnet, Debrch, Mebale, and Hayelom), 736 households were selected by systematic random sampling. If there was more than one eligible study participant in the household one participant was selected by the lottery method.

2.4 | Measurement and operational definition

A pretested structured questionnaire prepared in the local Tigrigna language was used to collect the data. The data collectors were trained and fluent in Tigrigna. Information on sociodemographic data, behavioral factors, clinical-related factors, health services, and hypertension knowledge was collected through face-to-face interviews. Weight, height, and blood pressure were measured using a trained data collector.

Alcohol consumption was assessed by asking study participants whether they had consumed alcohol in the past 12 months. They were classified as alcohol users if they had consumed alcohol in the previous 12 months.[28] Participants were described as physically active if they performed regular physical activities for 30 min or more per day, 5 days or more per week. They were physically inactive if they performed physical exercise less than 30 min per day or less than 5 days per week.[29]

A 26-item questionnaire was used to assess participants' overall knowledge of hypertensive diseases. The components of the knowledge questionnaire were knowledge of risk factors, knowledge of complications, knowledge of symptoms, and knowledge of medical treatment. It consists of 12 questions for knowledge of risk factors, five questions for knowledge of complications, six questions for knowledge of symptoms, and three questions for knowledge of medical treatment. It consisted of questions with yes (1) or no (2), the sum score converted to percentage, and classified as having poor knowledge (<50%) and good knowledge (>50%).[30]

During data collection, weight, height, and blood pressure were measured as follows: weight was measured in light clothing and without shoes, via a calibrated UNICEF Seca digital weighing scale. A stadiometer in centimeters in an erect position at a precision of 0.1 cm without shoes was used to determine height. BMI: underweight (<18.5 kg/m^2), normal (18.5–24.9 kg/m^2), overweight (25–29.9 kg/m^2), and obese (≥30 kg/m^2 and above). Aneroid sphygmomanometers were used to measure the average blood pressure of the three measurements recorded during data collection. The blood pressure was measured on 2 separate days 2 weeks apart. The blood pressure was taken at first two times 30 min apart on the first day then we appointed to repeat the measurement after 2 weeks within the data collection period. Finally, the average of the measurements was taken to diagnose undiagnosed hypertension. During measurement, the participant was in a comfortable position: feet on the floor, arm supported at heart level, and the participant rested for 5 min before blood pressure measurement. The participant should be free from coffee, heavy exercise, and smoking for 30 min. The cuff bladder encircles at least 80% of the arm circle. It inflates 20–30 mmHg above the pulse extinction and deflates at a rate of 2 mmHg/s. Undiagnosed hypertension was defined as individuals who responded that they had not been told by a healthcare provider that they had hypertension but who would be diagnosed with hypertension based on the average blood pressure (BP) ≥ 140/90 mmHg.[19]

Eating fruit was assessed by three questions first, do you eat fruit, if yes the second question was in a typical week, on how many days do you consume fruit, the third question was how many servings of fruit do you consume on one of those days? (one serving = one orange/apple/banana/pe/mango/grapes), those who consumed at least one serving of fruit per day for three or more days per week were classified as fruit consumer.[31] Consuming vegetables was assessed by three questions: do you consume vegetables, if yes, the second question was in a typical week, on how many days do you consume vegetables, and how many servings of vegetables do you consume on one of those days? (one serving = three tablespoons of cooked vegetables); finally, those who consumed at least one serving of vegetable per day three or more days per week were classified as vegetable consumers.[31,32]

2.5 | Data quality control

To maintain data quality, the questionnaire was designed in English and translated into the local Tigrigna language to obtain the required information from the respondents. A pretest was performed 1 week before the actual data collection period at 5% of the sample size in other towns. Data collectors (two BSc nurses and three diploma nurses) and supervisors (one MSc in Adult Health Nursing) received 2 days of theoretical and practical training. Practical training aspects included selection of the correct cuff size, proper positioning during measurement, and anthropometric measurements. Supervision was undertaken during data collection by the supervisor and principal investigator. The collected data were checked and reviewed daily for completeness and consistency during the data collection period.

2.6 | Data analysis and management

Data were entered and analyzed using SPSS version 23. Frequencies and tables were used to present descriptive statistics for categorical variables and means for continuous variables.

Bivariate logistic regression was performed to assess the association between each independent and dependent variable. Variables with $p < 0.25$ significance level by bivariate logistic regression and $p > 0.25$ but have great significance for undiagnosed

hypertension were applied for multivariable logistic regression. Multicollinearity was checked using collinearity matrix, tolerance test, and variance inflation factors (VIF). Model fitness was checked using the Hosmer–Lemeshow test of goodness of fit considering good fit at p value ≥ 0.05.

Finally, multivariable logistic regression was used to assess the association between independent variables and the dependent variable and to control for confounding variables. Adjusted odds ratio and 95% CIs were applied to show the strength of the association, and $p < 0.05$ was used to declare statistical significance.

3 | ETHICAL APPROVAL

The study protocol was reviewed and approved by the ethical committee of Adigrat University Research and Community Service Directorate office (AGU/CMHS/2335/11). Information was collected after written informed consent from each participant. The respondents were informed that they had the right to refuse or discontinue participation at any time. Information was recorded anonymously and confidentiality and beneficence were assured throughout the study period. The study was performed according to the ethical principles of the Helsinki Declaration of Human Studies.

4 | RESULT

4.1 | Sociodemographic characteristics

Seven hundred thirty-six participants were included in the study, with a 100% response rate. Among the participants, 393 (53.4%) were female, and the mean age of the study participants was 51.9 (SD ± 17.9) years. The study found that 452 (61.4%) of participants were married (Table 1).

4.2 | Prevalence of undiagnosed hypertension and behavioral characteristics

In this study, 15.4% ($N = 113$) of participants had undiagnosed hypertension. Of all participants, 447 (60.7%) were alcohol consumers. The majority of 485 (65.9%) had a good level of knowledge and 251 (34.1%) had a poor level of knowledge regarding hypertension (Table 2).

4.3 | Clinical-related characteristics

Of the total study participants, 85 (11.5%) had a family history of hypertension and 98 (13.3%) had a family history of chronic illnesses other than hypertension. Among the hypertensive patients, eight (7.1%) had chronic illnesses other than hypertension, 14 (12.4%) had a family history of hypertension, and two (2.8%) had chronic illnesses other than hypertension.

TABLE 1 Sociodemographic characteristics of the study participants.

Variables	Total (%)	Undiagnosed hypertension	
		Yes (%)	No (%)
Sex			
Male	343 (46.6)	49 (43.4)	294 (47.2)
Female	393 (53.4)	64 (56.6)	329 (52.8)
Age			
18–29	124 (16.8)	13 (11.5)	111 (17.8)
30–49	157 (21.3)	20 (17.7)	137 (22)
≥50	455 (61.8)	80 (70.8)	375 (60.2)
Religion			
Orthodox Christian	707 (96.1)	110 (97.3)	597 (95.8)
Muslim	11 (1.5)	1 (0.9)	10 (1.6)
Other	18 (2.4)	2 (1.8)	16 (2.6)
Marital status			
Married	452 (61.4)	40 (35.4)	412 (66.1)
Single	126 (17.1)	14 (12.4)	112 (18)
Divorce	92 (12.5)	51 (45.1)	41 (6.6)
Widowed	66 (9)	8 (7.1)	58 (9.3)
Educational status			
No formal education	252 (34.2)	37 (32.7)	215 (34.5)
Primary school	111 (15.1)	20 (17.7)	91 (14.6)
Secondary school	157 (21.3)	22 (19.5)	135 (21.7)
Diploma	118 (16.1)	23 (20.4)	95 (15.2)
University and above	98 (13.3)	11 (9.7)	87 (14)
Occupation			
Employed	156 (21.2)	26 (23)	130 (20.9)
Marchant	265 (36)	41 (36.3)	224 (36)
Farmer	104 (14.1)	16 (14.2)	88 (14.1)
Unemployed	211 (28.7)	30 (26.5)	181 (29.1)
Monthly average income			
<2000	373 (50.7)	51 (49.6)	317 (50.9)
2001–4000	156 (21.2)	24 (21.2)	132 (21.2)
>4000	207 (28.1)	33 (29.2)	174 (27.9)

4.4 | Healthcare service-related characteristics of the participants

Most participants, 545 (74%) accessed healthcare services at health centers, 134 (18.2%) accessed healthcare services at the hospital, and 57 (7.7%) accessed healthcare services at private clinics. Only 124 (16.8%) participants had community-based health insurance and 349 (47.4%) had visited a health facility in the previous 12 months for their own health.

TABLE 2 Behavioral factors of undiagnosed hypertension.

		Undiagnosed hypertension	
Variables	Total (%)	Yes (%)	No (%)
Have you ever smoked a cigarette			
Yes	22 (3)	2 (1.8)	20 (3.2)
No	714 (97)	111 (98.2)	603 (96.8)
Have you ever chewed chat			
Yes	24 (3.3)	3 (2.7)	21 (3.4)
No	712 (96.7)	110 (97.3)	602 (96.6)
Regular physical exercise			
Yes	630 (85.6)	97 (85.8)	533 (85.6)
No	106 (14.4)	16 (14.2)	90 (14.4)
Have you ever drunk alcohol			
Yes	613 (83.3)	99 (87.6)	514 (82.5)
No	123 (16.7)	14 (12.4)	109 (17.5)
Alcohol use during the previous 12 months			
Yes	447 (60.7)	79 (69.9)	368 (59.1)
No	289 (39.3)	34 (30.1)	255 (40.9)
Eating fruits			
Yes	424 (57.6)	46 (40.7)	378 (60.7)
No	312 (42.4)	67 (59.3)	245 (39.3)
Consuming vegetables			
Yes	484 (65.3)	54 (47.8)	430 (69)
No	252 (34.2)	59 (52.2)	193 (31)
Sleep duration			
>6 h	566 (76.9)	84 (74.3)	482 (77.2)
<6 h	170 (23.1)	29 (25.7)	141 (22.6)
Stressful life			
Not at all	565 (76.8)	81 (71.7)	484 (77.7)
Some extent	171 (23.2)	32 (28.3)	139 (22.3)
Body mass index			
Normal weight	636 (86.4)	111 (98.2)	525 (85.6)
Overweight	71 (9.6)	1 (0.9)	70 (11.4)
Obesity	19 (2.6)	1 (0.9)	18 (2.9)
Knowledge of hypertension			
Good	485 (65.9)	49 (43.4)	436 (70)
Poor	251 (34.1)	64 (56.6)	187 (30)

4.5 | Bivariate and multivariable logistic regression results

Bivariate analysis revealed that age, marital status, alcohol use during the previous 12 months, fruit consumption, vegetable use, body mass, and knowledge of hypertension were significant determinants of undiagnosed hypertension.

Multivariate logistic regression revealed that marital status (adjusted odds ratio [AOR] = 15.2, 95% CI: 8.20–28.3), alcohol consumption during the previous 12 months (AOR = 2.07, 95% CI: 1.22–3.51), fruit consumption (AOR = 4.10, 95% CI: 2.37–7.08), consumption of vegetables (AOR = 3.47, 95% CI: 2.02–5.96) and knowledge of hypertension (AOR = 3.05, 95% CI: 2.75–7.83) were significant determinants of undiagnosed hypertension (Table 3).

5 | DISCUSSION

This study aimed to assess the prevalence of undiagnosed hypertension and its associated factors in the adult population of the central zone of Tigray, Northern Ethiopia. In this study, 15.4%; 95% CI: 12.9–18.1 of study participants had undiagnosed hypertension. In this study, being divorced, alcohol use during the previous 12 months, not eating fruits or vegetables, and poor knowledge of hypertension were significant determinants of undiagnosed hypertension.

In the present study, 15.4% 95% CI: 12.9–18.1 of participants had undiagnosed hypertension. This finding was supported by studies conducted in Addis Ababa Ethiopia 13.25%,[18] Gurage zone, Ethiopia 15.3%,[17] and Hossana town, Ethiopia 17.2%.[15] This similarity could be due to similar sampling strategies. However, the prevalence of undiagnosed hypertension was higher than those reported in studies conducted in Hawassa Ethiopia 12.5%,[11] Debremarkos Ethiopia 12.7%,[19] and Rwanda 18.7%.[21] This might be due to differences in the sociodemographic characteristics of the study participants; the average age of the current study participants was higher than that of the previously mentioned studies.

However, the prevalence of undiagnosed hypertension was lower than that reported in studies done in Wolaita Sodo Town, Ethiopia 28.8%,[14] Bahir Dar City, Ethiopia 24.8%,[16] and Nigeria (27.8%).[20] This might be because previous studies used a lower cutoff point to classify hypertension, which may have increased the prevalence of undiagnosed hypertension. The above difference might also be due to the inclusion criteria that previous studies used for all previously diagnosed hypertension and undiagnosed individuals, whereas our study assessed only undiagnosed/unknown hypertension. Another reason might be that previous studies were conducted on populations at increased risk of hypertension, whereas our study was conducted on the general population.

Marital status of the study participants was significantly associated with hypertension. Patients who were divorced were 15.2 times more likely to be at high risk of undiagnosed hypertension (AOR 95% CI: 8.20–28.3). This could be because being divorced leads to a stressful life, and poor self-care for their own health is less frequent and has lower rates of screening and diagnosis. Other justifications might be divorce-related emotional intrusion, and physical hyperarousal demonstrated significantly elevated resting blood pressure at entry into the study.[33]

TABLE 3 Bivariate and multivariable logistic regression for undiagnosed hypertension.

Variable	Frequency	COR (95% CI)	AOR (95% CI)
Age			
18–29	124 (16.8)	0.55 (0.29–1.02)	0.49 (0.23–1.06)
30–49	157 (2 1.3)	0.68 (0.4–1.16)	0.8 (0.44–1.48)
≥50	455 (61.8)	1	1
Marital status			
Married	452 (61.4)	1	1
Single	126 (17.1)	1.29 (0.68–2.45	1.41 (0.7–2.82)
Divorce	92 (12.5)	12.8 (7.59–21.6)	15.2 (8.2–28.3)
Widowed	66 (9)	1.42 (0.63–3.19)	1.79 (0.74–4.31)
Alcohol during the previous 12 months			
Yes	447 (60.7)	1.61 (1.05–2.48)	2.07 (1.22–3.51)
No	289 (39.3)	1	1
Eating fruits			
No	312 (42.4)	2.25 (1.49–3.38)	4.1 (2.37–7.08)
Yes	424 (57.6)	1	1
Consuming vegetables			
No	252 (34.2)	2.43 (1.62–3.65)	3.47 (2.02–5.96)
Yes	484 (65.3	1	1
Body mass index			
Normal weight	636 (86.4)	3.81 (0.5–28.8)	1.77 (0.21–14.7)
Overweight	71 (9.6)	0.26 (0.02–4.31)	0.26 (0.10–4.77)
Obesity	19 (2.6)	1	1
Knowledge of hypertension			
Poor	251 (34.1)	3.05 (2.02–4.59)	4.64 (2.75–7.83)
Good	485 (65.9)	1	1

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; COR, crude odds ratio.

In this study, participants who had consumed alcohol within the previous 12 months were 2.07 times more likely to have undiagnosed hypertension than their counterparts (AOR 95% CI: 1.22–3.51). This is in line with a study conducted in the Central African Republic.[14,26,28] This similarity could be due to the overall effect of alcohol consumption on the increased risk of hypertension. Findings also revealed that alcohol drinkers used less health care.[21,28] Another reason could be that chronic alcohol consumption leads to increased blood alcohol levels.[14]

In this study, participants who did not consume fruit were found 4.1 times more likely to have undiagnosed hypertension than their counterparts (AOR 95% CI: 2.37–7.08). This may be because when fruits are combined into one intake category, they play a significant role in the hypertension prevention.[32,34,35] Participants who did not eat vegetables were found 3.47 times more likely to have undiagnosed hypertension than their counterparts (AOR 95% CI:

2.02–5.96). This might be because eating vegetables is associated with a lower risk of hypertension.[32,34]

Participants who had poor knowledge of hypertension were 4.64 times more likely to be at high risk for undiagnosed hypertension (AOR 95% CI: 2.75–7.83). This might be because studies indicate that people with low knowledge of hypertensive disease visit health facilities less frequently and have lower rates of screening and diagnosis.[36,37]

6 | CONCLUSION AND RECOMMENDATIONS

Around one in six study participants had undiagnosed hypertension. Being divorced, drinking alcohol during the previous 12 months, not eating fruits or vegetables, and having poor knowledge of hypertension were significant determinants of undiagnosed hypertension.

Public health interventions aimed at them, such as providing adequate hypertension health information, frequent screening, and implementation of an appropriate intervention, particularly for particular factors, are important for reducing the burden of undiagnosed hypertension. The author recommends for researchers to address all obesogenic diets in their study because those diet may be the risk factors for undiagnosed hypertension.

7 | LIMITATIONS

The author unaddressed some obesogenic diets that can be the cause of undiagnosed hypertension. Mercury sphygmomanometer used to measure blood pressure might be a source of bias because of its inaccuracy and operator dependency.

AUTHOR CONTRIBUTIONS

Haftea Hagos Mekonen: Conceptualization; formal analysis; investigation; methodology; supervision; writing—original draft; writing—review and editing. **Tsegu Hailu Gebru**: Formal analysis; methodology; supervision; writing—review and editing. **Kbrom Gemechu Kiros**: Formal analysis; methodology; supervision; writing—review and editing. **Tesfay Gebreslassie Gebrehiwot**: Formal analysis; methodology; supervision; writing—review and editing. **Yohannes Ashebir Tesfamichael**: Formal analysis; methodology; supervision; writing—review and editing.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available within the article [and/or] its supplementary materials.

ETHICS STATEMENT

The study protocol was reviewed and approved by the ethical committee of Adigrat University Research and Community Service Directorate office (AGU/CMHS/2335/11). Information was collected after written informed consent from each participant. The respondents were informed that they had the right to refuse or discontinue participation at any time. Information was recorded anonymously and confidentiality and beneficence were assured throughout the study period. The study was performed according to the ethical principles of the Helsinki Declaration of Human Studie

TRANSPARENCY STATEMENT

The lead author Haftea Hagos Mekonen affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.