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Factors affecting adherence to lifestyle modification among patients with hypertension at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2019

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Abstract

Introduction: Adherence to lifestyle modification in addition to medication adherence is very important in preventing complications. Nevertheless, lifestyle modification guidelines are not widely followed by patients with hypertension. The objective of the study was to explore the predictors of compliance with lifestyle modification among patients with hypertension at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2019.

Method: A descriptive cross-sectional study design was used. A total of 384 patients with hypertension were included in this study. A systematic sampling method was used to select study participants. The data were collected through an interview method by using a structured questionnaire. The data were entered and analyzed using SPSS. Each variable was summarized using summary statistics. To measure the association between lifestyle modification and its predictors, a bivariate and multivariate logistic regression model was used. P-value < 0.05, odds ratio (OR), and 95% confidence interval (CI) were used to determine statistical significance, direction, and strength of association.

Results: Two hundred six (53.6%) patients with hypertension had poor adherence to the recommended lifestyle modification. Male patients with hypertension were more adherent to lifestyle modification compared with female patients (adjusted OR (AOR) = 0.60, 95% CI: 0.39–0.92). The rate of poor adherence was 1.86 times higher among patients with hypertension diagnosis of <5 years compared with patients with hypertension diagnosis of $\geqslant 5$ years(AOR = 1.86, 95% CI: 1.19–2.89). Patients who were adherent to their medication were 2.13 times to have poor adherence to lifestyle modification compared with medication non-adherent patients (AOR = 2.13, 95% CI: 1.38–3.27).

Conclusion: High proportions of patients with hypertension were non-adherent to lifestyle modification. Sex, age, duration of the disease, and medication adherence were significantly associated with lifestyle modification adherence. Close follow-up of female patients, the elderly, and patients with a short duration of hypertension is recommended.

Keywords

Hypertension, lifestyle modification, adherence, factors affecting

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Introduction

Hypertension is among the main risk factors for diseases of the cardiovascular system and its complication. It is a major cause of morbidity, disability, and premature death around the globe. It pauses a major burden worldwide and results in more than 10 million deaths each year throughout the world.[1–3]

Globally, estimates revealed that over 25% of the adult population had hypertension in 2000 and its burden is projected to increase to 29% by the year 2025. The burden of

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hypertension is currently higher in developed countries, but the impact will be greater in developing countries mainly due to their large population, a change in lifestyle, and sedentary life. Indeed, estimates indicate that up to three-fourths of the world's population with hypertension will be in developing countries by the year 2025.[4,5] A systematic review of the prevalence of hypertension in Ethiopia showed that the prevalence of hypertension among the Ethiopian population was 19.6%.[6]

Compliance with the recommended healthy way of life remains one of the cornerstones of the management of hypertension at all levels of the disease course. This includes the patient's ability to adapt the dietary modification (Dietary Approaches to Stop Hypertension (DASH)), adopt a diet with low sodium, and perform regular exercise, restrict alcohol intake, and cessation of smoking. The practice of a healthy way of life can control blood pressure (BP) without causing any aftereffects, enhances antihypertensive drug efficacy, can improve overall cardiovascular health, and decreases total cardiovascular risk. Patients with hypertension, therefore, are expected to comply with these healthy ways of life to lessen the impact caused by the disease.[7–9]

A study done in Ghana on the role of lifestyle modification for the control of hypertension and its complication found increased physical activity, abstaining from alcohol and smoking, increased intake of fruits and vegetables, and reduced intake of carbohydrates, meat, and fat have a positive influence on BP control and hence reduce the risk of its complication.[10]

A study conducted at MizanTepi University Teaching hospital found that 57 (33.3%) of patients practiced recommended lifestyle modifications. Age greater than 65 years, having no source of information, duration of diagnosis of hypertension, having no formal educations, poor knowledge, and negative attitudes were independent predictors of lifestyle modifications.[11]

Another study from Dessie, Ethiopia, indicated that the overall adherence to recommended lifestyle modifications was 23.6%. The independent predictors were marital status, educational level, monthly income, having co-morbidities, knowledge, and self-efficacy.[12]

Adherence to lifestyle modification in addition to medication adherence is very important in preventing complications. Nevertheless, lifestyle modification guidelines are not widely followed by patients with hypertension. Therefore, the study aimed to assess the predictors of compliance with lifestyle modification among patients with hypertension in Addis Ababa, Ethiopia.

Method and materials

Study setting and period

This study was undertaken in the capital of Ethiopia, Addis Ababa. The capital Addis Ababa is located 2,500 meters above sea level at 9.03 N and 38.7E and is 540,000 square kilometers wide. Addis Ababa has a total of 608 health facilities. The study was conducted at Yekatit 12 Hospital Medical College which was established in 1923 G.C. It is among the six regional hospitals in the capital, Addis Ababa. The hospital provides service for more than 500,000 people living in its catchment area. The data were collected from May to June 2019.

Study design

An institutional-based descriptive cross-sectional study was conducted.

Criteria for inclusion and exclusion of the study subjects

Patients with hypertension who were on medication for at least 6 months and who consented to participate in the study were included. Patients with hypertension who were critically ill, mentally unstable, and who were 18 years and younger were excluded from the study.

Sample size

A single proportion formula was used to calculate the sample size for this study by assuming 50% for the proportion of adherence to lifestyle modification, a 5% marginal error tolerated, and a 95% confidence level (CL). Therefore, a total of 384 adult patients with hypertension who were on follow-up have participated in this study.

Sampling technique

The study subjects were selected by a systematic sampling technique. According to the hospital's registration book, on average 870 patients with hypertension were enrolled at the hospital within 1 month. Hence, by dividing the total number of patients attending the hospital in 1 month (870) with the total sample size (384), (N/n), the sampling interval (K) 2 was obtained. The first patient was selected at random and consecutive participants were selected every second patient. Participants were approached in the waiting rooms.

Data collection instrument and technique

A structured questionnaire involving socio-demographic characteristics, clinical characteristics, and lifestyle adherence relating to exercise, diet, smoking, and alcohol consumption was used. The questionnaire was prepared in English and translated into Amharic. To check for consistency, the Amharic version is again back-translated to English. Before data collection, the questionnaire was pretested on 19 (5%) patients with hypertension to check for understandability, clarity, and how much it addresses the objective of the study, and modification was considered accordingly.

Table 1. Socio-demographic characteristics of the study participants at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2019.

Variable	Category	Number	Percent
Sex	Male	172	44.8
	Female	212	55.2
Age (in years)	25–43	30	7.8
	44–62	212	55.2
	⩾63	142	37.0
Marital status	Single	180	46.9
	Married	204	53.1
Place of residence	Urban	366	95.3
	Rural	18	4.7
Education	No formal education	259	67.4
	Formal education	125	32.6
Work status	Employed	237	61.7
	Unemployed	147	38.3
Income (birr)	No regular income	144	37.5
	⩽2,000	157	40.9
	>2,000	83	21.6

Data processing and analysis

The data were entered and analyzed using SPSS. Each variable was summarized using summary statistics. To measure the association between lifestyle modification and its predictors, a bivariate and multivariate logistic regression model was used. P-value <0.05, OR, and 95% CI were used to determine statistical significance, direction, and strength of association.

Study variables

The level of lifestyle modification adherence was the dependent variable. Socio-demographic variables (*age, sex, marital status, residence, occupation, income, educational level*), clinical characteristics (*co-morbidity conditions, medications used, duration of treatment, time since diagnosis*), and behavioral characteristics (*alcohol use, smoking, exercise, diet*) are the independent variables.

Operational definitions

- Lifestyle modification: Complying with a healthy way of life. This includes weight control, restriction of alcohol consumption, engagement in physical activity, salt restriction, and cessation of smoking.
- Adherence to lifestyle modification: Patients with hypertension who were adherent to the recommended healthy behaviors (exercise regularly, have never smoked or ceased smoking, follow a recommended diet for hypertension, and moderated alcohol consumption).
- Good adherence: Patients who were adherent to all (four) of the recommended health way of life.
- Poor adherence: Patients who reported non-adherent to one or more of the four healthy behaviors.

Ethical approval and permission to participate

Ethical approval and clearance were obtained from the Institution Review Committee of Universal Medical and Business College. Permission was also secured from Yekatit 12 Hospital Medical College before approaching the study subjects. The aim of the research was discussed to the study participants to get verbal consent before data collection. The patients were also told that they can terminate or refuse to take part in the study at any time. The data were recorded anonymously and confidentiality and privacy of the information were maintained throughout the study.

Result

Biographic characteristics of respondents

Three hundred eighty-four patients with hypertension who were attending Y12HMC were included in this study. Two hundred twelve (55.2%) of them were females and 172 (44.8%) were males. More than half (212 (55.2%)) of them were in the age category of 44–62 years and 125 (32.6%) of them attended formal education. One hundred forty-four (37.5%) of the respondents have no regular income and 366 (95.3%) of respondents were urban residents (see Table 1).

Medical characteristics of the participant

Out of the total 384 respondents, 213 (55.1%) were hypertensive for ⩾5 years and more than half of the respondents (229 (59.6%)) have co-morbid conditions. Only 50 (13.0%) of the patients take one or two antihypertensive medications and 197 (51.3%) were non-adherent to their medication (see Table 2).

Table 2. Clinical characteristics of the study participant at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2019.

Variable	Category	Number	Percent
Duration of hypertension	<5 years	171	44.5
	⩾5 years	213	55.5
Co-morbidity	No	155	40.4
	Yes	229	59.6
Number of drugs used	⩽2 drugs	334	87.0
	>2 drugs	50	13.0
Adhere to medication	Yes	187	48.7
	No	197	51.3

Table 3. Adherence to the recommended diet among hypertensive patients at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2019.

Variable	Never	Sometimes	Usually	Always
Included fruits, vegetables, grains, and beans in your diet	4 (1.0)	57 (14.8)	89 (23.2)	234 (60.9)
Limited consuming foods that contain high saturated fat	4 (1.0)	35 (9.1)	107 (27.9)	238 (62.0)
Limited consuming spicy foods	10 (2.6)	41 (10.7)	158 (41.1)	175 (45.6)
Limited consuming salt in your food	47 (12.2)	44 (11.5)	148 (38.5)	145 (37.8)

Table 4. Adherence to exercise among hypertensive patients at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2019.

Variable	Category	Number	Percent
Perform regular physical exercise	Yes	275	71.6
	No	109	28.4
Frequency of exercise in a week (n = 275)	<3 times	65	23.6
	⩾3 times	210	74.4
Duration of exercise per session (n = 275)	<30 min	127	46.2
	⩾30 min	148	53.8
Type of exercise performed (n = 275)	Walking	143	52.0
	Jogging	67	24.4
	Aerobics	45	16.4
	Cycling	20	7.2

Adherence to the recommended lifestyle modification

Adherence to the recommended diet. Around 234 (60.9%) respondents always incorporated grains, beans, vegetables, and fruits in their diet after diagnosed with hypertension, and 238 (62.0%) of the respondents did not consume a meal that is high in saturated fat. One hundred forty-five (37.8%) and 175 (45.6%) never consumed salty and spicy food, respectively (see Table 3).

Adherence to exercise. Of the total of 384 patients with hypertension, 275 (71.6%) of them said that they perform regular physical exercise. From those who perform regular physical exercise, 210 (74.4%) and 148 (53.8%) carry out physical activity ⩾3 days a week and for ⩾30 min on each occasion, respectively. It was found that walking was the common (143 (52.0%)) type of exercise undertaken by the patients (see Table 4).

Smoking cessation. Out of 384 respondents, 96 (25.0%) of them ever smoked a cigarette and 16 (16.7%) of them are still smokers (see Table 5).

Moderation of alcohol. The majority of the patients with hypertension (327 (85.2%)) moderated their alcohol intake (never had ⩾6 and ⩾8 drinks of alcohol on one occasion for females and males, respectively) (Figure 1).

Overall adherence to recommended lifestyle

Two hundred six (53.6%) patients with hypertension had poor compliance to the recommended lifestyle modification. Most of the respondents (237 (61.7%)) were adherent to the recommended diet for hypertension while 254 (66.1%) were not adherent to the recommended physical exercise. Only 16 (4.2%) of them were smokers and 57 (14.8%) did not moderate their alcohol intake (see Figure 2 & Table 6).

Table 5. Cigarette smoking history of hypertensive patients attending Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2019.

Variable	Category	Number	Percent
Ever smoked cigarette	Yes	96	25.0
	No	288	75.0
Currently smoker (n = 96)	Yes	16	16.7
	No	80	83.3
Tried to quit smoking (n = 96)	Yes	92	95.8
	No	4	4.2

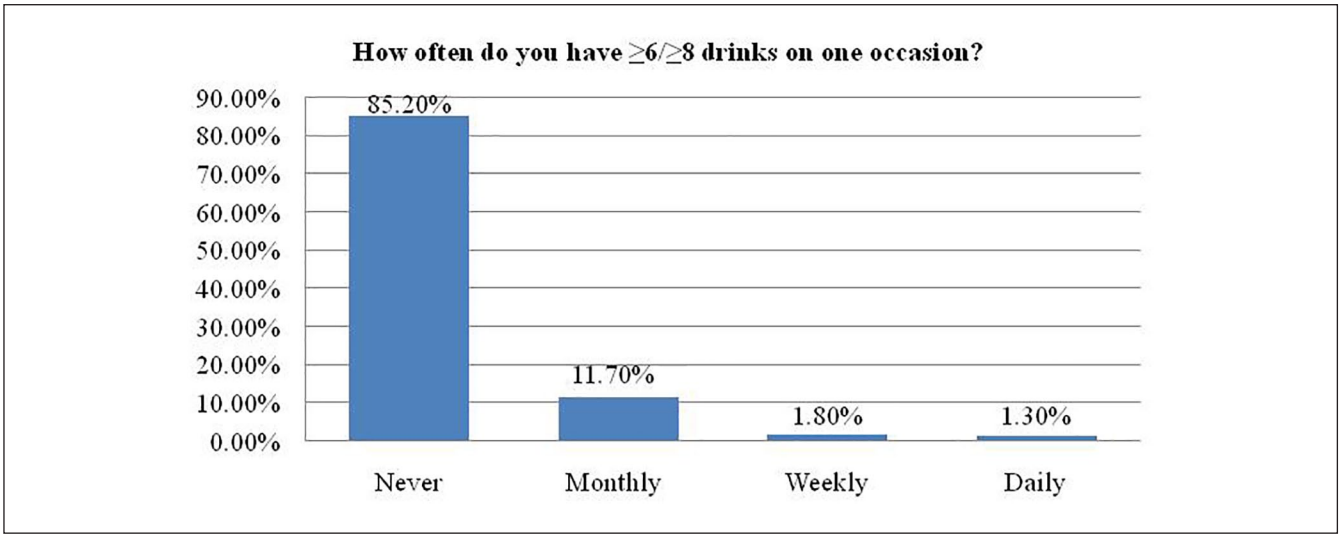

Figure 1. Alcohol drinking history of patients with hypertension, Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2019.

Factors affecting adherence to lifestyle modification

To determine predictors of lifestyle modification, a logistic regression model was carried. Those variables with a P-value ⩽ 0.2 on bivariate regression were taken to multivariate regression.

Sex, age, duration of the disease, and medication adherence were associated with lifestyle to a significant level with a P-value < 0.05. Male patients were more likely to have good adherence to the recommended lifestyle modification compared with female patients with hypertension (adjusted odds ratio (AOR) = 0.60, 95% confidence interval (CI): 0.39–0.92). Similarly, patients with hypertension in the age category of 25–43 years were more likely to have good adherence to the recommended lifestyle modification compared with older patients (>62 years) (AOR = 0.36, 95% CI: 0.14–0.91).

Patients with hypertension whose diagnosis of <5 years were 1.86 times more likely to be non-adherent to lifestyle modification than patients with hypertension diagnosis of ⩾5 years (AOR = 1.86, 95% CI: 1.19–2.89). Likewise, patients with hypertension who were adherent to their medication were 2.13 times less adherent to lifestyle modification than those who were not compliant with their medication (AOR = 2.13, 95% CI: 1.38–3.27) (see Table 7).

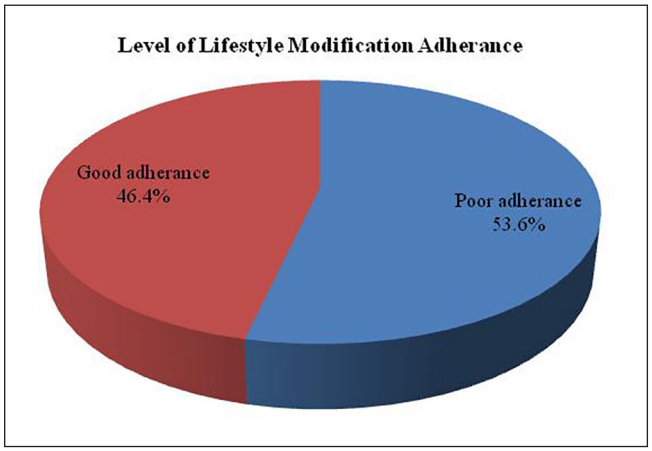

Figure 2. Compliance to the lifestyle modification among patients with hypertension, Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2019.

Discussion

This study investigated adherence to lifestyle modification and associated factors among patients with hypertension. In this study, the level of good adherence to the recommended lifestyle modification among patients with hypertension was found to be 46.4%. Sex, age, duration of the disease, and

Table 6. Adherence to the recommended lifestyle modification of the study participant at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2019.

Variable	Category	Number	Percent
Adhere to the recommended diet	Adhereant	237	61.7
	Non-adherant	147	38.3
Adhere to recommended exercise	Adhereant	130	33.9
	Non-adherant	254	66.1
Smoking cessation	Ceased	368	95.8
	Not ceased	16	4.2
Alcohol moderation	Moderated	327	85.2
	Not moderated	57	14.8

Table 7. Factors Affecting Adherence to Lifestyle Modification among Hypertensive Patient in Yekatit 12 Medical College Hospital, Addis Ababa, Ethiopia 2019.

Characteristics		Lifestyle adherence		COR (95% CI)	AOR (95% CI)	P-value
		Poor (N, %)	Good (N, %)			
Sex	Male	107 (51.9)	65 (36.5)	**0.53 (0.35, 0.80)**	**0.60 (0.39, 0.92)**	**0.019***
	Female	99 (48.1)	113 (63.5)	1	**1**	
Age	25–43	22 (10.7)	8 (4.5)	0.43 (0.18, 1.03)	**0.36 (0.14, 0.91)**	**0.031***
	44–62	107 (51.9)	105 (59.0)	1.16 (0.76, 1.78)	0.91 (0.56, 1.43)	0.680
	>62	77 (37.4)	65 (36.5)	1	1	
Marital status	Single	105 (51.0)	75 (42.1)	0.70 (0.47, 1.05)	0.78 (0.50, 1.21)	0.261
	Married	101 (49.0)	103 (57.9)	1	1	
Duration of the disease	<5 years	76 (36.9)	95 (53.4)	1.96 (1.30, 2.95)	**1.86 (1.19, 2.89)**	**0.006***
	⩾5 years	130 (63.1)	83 (46.6)	1	1	
Medication adherence	Yes	80 (38.8)	107 (60.1)	2.37 (1.57, 3.59)	**2.13 (1.38, 3.27)**	**0.001***
	No	126 (61.2)	71 (39.9)	1	1	

COR: crude odds ratio; CI: confidence interval; AOR: adjusted odds ratio. *Factors are significant; Values in bold are significant.

medication adherence were significantly associated with lifestyle modification adherence.

Compliance with lifestyle modification (exercise, diet, moderation of alcohol consumption, and smoking cessation) in this study was only 46.4%. This finding was higher than the study conducted in the southern part of Ethiopia, Korea, and Jordan where compliance with the recommended lifestyle was 27.3%, 35.5%, and 23%, respectively.[9,13,14] The higher level of adherence in this study compared with other studies in Ethiopia may be due to the higher health literacy level in Addis Ababa as patients are exposed to more information than in the rural part of Ethiopia. This report showed that a sedentary lifestyle was still high in developing countries like Ethiopia which increased the burden of chronic diseases like hypertension.

Adherence to the recommended diet has created successful results in reducing hypertension. This finding showed compliance with diet to be explained by feeding low in salt, fat, and spicy foods, as well as more vegetables, fruits, beans, and grains. The prevalence of compliance with diet in this study was 61.7%. This is high compared with a study done in Saudi Arabia where only 11.8% were adherent to diet but slightly lower than a study from Addis Ababa where 64.7% of the patients did not comply with the recommended diet.[15,16] This indicated that significant numbers of patients with hypertension were not following the recommended diet for controlling BP and hence this may hasten the incidence of cardiovascular risk arising from uncontrolled BP.

Physical inactivity increases the incidence and prevalence of obesity, hypertension, and cardiovascular diseases. In this study, exercise-related adherence was 33.9%. The finding of this study was less than the study done in Kenya where adherence to recommended exercise was 67% and greater than a study done in Saudi Arabia where adherence to recommended exercise was 20.1%.[15,17] The lower adherence to exercise may be due to overloaded working conditions, lower health literacy level, and poor living conditions.

Smoking is a risk factor for developing cardiovascular diseases and death from uncontrolled hypertension. A high proportion (95.8%) of respondents in this study had stopped smoking. The finding of this study was greater than another study from eastern Ethiopia and is in line with a study done in Kenya where patients with hypertension who were nonsmokers or ceased smoking were 81.5% and 90.5%.[17,18]

Alcohol consumption has a direct connection with the development of hypertension and its cardiovascular complications. In this study,85.2% of patients with hypertension restricted their alcohol consumption. The finding of this study was lesser than a study from Zimbabwe where patients with hypertension who moderated their alcohol intake were 91.4% but higher than a study done in Kenya where the proportion of patients who moderated their alcohol intake were 49.5%.[18,19]

This study found that males and younger patients were more likely to have good adherence to the recommended lifestyle modification when compared with female and older patients (62 years). The result of this study was comparable with a study conducted in Zimbabwe and Southwest Ethiopia where female patients and older patients were less compliant with dietary modification.[19,20] This may be due to a high burden of work and responsibility on females at home which may increase their likelihood of forgetting and hence nonadherence to lifestyle modification. Older age patients may be less physically active which may result in a more sedentary lifestyle.

Patients with hypertension whose diagnosis of <5 years and who were adherent to their medication were approximately two times less adherent to lifestyle modification than those patients with hypertension diagnosis $\geqslant 5$ years and those who were not adherent to their medication. This could be due to those who have had it for <5 years did not see the condition as life-threatening as compared with those patients with hypertension diagnosis of $\geqslant 5$ years who might still follow strict lifestyle modification due to increased risk of complication with duration. In the case of medication adherence, those patients who were adherent to their medication might not be experiencing any symptoms or complications due to medication adherence of the disease which might make them negligent to their lifestyle modification.

Limitation of the study

This was a cross-sectional study and assessed cause and effect simultaneously. Hence, causal links could not be established due to the lack of temporal connection. The findings of this study are based on a relatively small number of patients. Hence, the results presented here should be interpreted with caution.

Conclusion

It was found that a high proportion (53.6%) of patients with hypertension were poorly adherent to their lifestyle modification. Sex, age, duration of the disease, and medication adherence were significantly associated with lifestyle modification adherence. Therefore, the hospital should formulate strategies and intervene to suit them to scale up their compliance to the recommended lifestyle modification.

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Author contributions

The authors of this research contributed to the analysis of the data, drafting or revising the manuscript, gave last consent of the version to be published, and consent to be responsible for all aspects of this research work.

Data accessibility

The finding of this research was taken out of the data collected and analyzed based on the stated methods. The data supporting this result will be offered at any time upon demand.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

Ethical approval for this study was obtained from INSTITUTIONAL REVIEW BOARD of Universal Medical and Business College (APPROVAL NUMBER- UMBC 02453/19).

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Informed consent

Verbal informed consent was obtained from all subjects before the study. As the majority of study participants were not able to read and write, the Institutional Review Board of Universal Medical and Business College (UMBC) waived requirement of written informed consent and approved a verbal informed consent to be considered in this particular situation (UMBC Ref -UMBC 02453/19).

Permission for publication

Permission to publish is not valid for this article since there are no individual data like images or videos.

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Supplemental material

Supplemental material for this article is available online.

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