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# Use of traditional medicine and control of hypertension in 12 African countries

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## ABSTRACT

**Background** Use of traditional medicine (TM) is widespread in sub-Saharan Africa as a treatment option for a wide range of disease. We aimed to describe main characteristics of TM users and estimate the association of TM use with control of hypertension.

**Methods** We used data on 2128 hypertensive patients of a cross-sectional study (convenience sampling), who attended cardiology departments of 12 sub-Saharan African countries (Benin, Cameroon, Congo, Democratic Republic of the Congo, Gabon, Guinea, Côte d'Ivoire, Mauritania, Mozambique, Niger, Senegal, Togo). To model association of TM use with odds of uncontrolled, severe and complicated hypertension, we used multivariable mixed logistic regressions, and to model the association with blood pressure (systolic (SBP) and diastolic (DBP)) we used mixed linear models. All models were adjusted for age, sex, wealth, adherence to hypertension conventional treatment and country (random effect).

**Results** A total of 512 (24%) participants reported using TM, varying across countries from 10% in the Congo to 48% in Guinea. TM users were more likely to be men, living in rural area, poorly adhere to prescribed medication (frequently due to its cost). Use of TM was associated with a 3.87 (95% CI 1.52 to 6.22)/1.75 (0.34 to 3.16) mm Hg higher SBP/DBP compared with no use; and with greater odds of severe hypertension (OR=1.34; 95% CI 1.04 to 1.74) and of any hypertension complication (OR=1.27; 95% CI 1.01 to 1.60), mainly driven by renal complication (OR=1.57; 95% CI 1.07 to 2.29) after adjustment for measured confounders.

**Conclusions** The use of TM was associated with higher blood pressure, more severe hypertension and more complications in Sub-Saharan African countries. The widespread use of TM needs to be acknowledged and worked out to integrate TM safely within the conventional healthcare.

## INTRODUCTION

Hypertension is extremely common with 1.278 billion people (34% of men, 32% of women) aged 30–79 years worldwide estimated to have hypertension in 2019, with

## WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Few existing studies suggest patients with hypertension who use traditional medicine (TM) are more likely to be older, male, low socioeconomic status and reside in rural area, but results differ according to country and setting.

## WHAT THIS STUDY ADDS

⇒ In this large cross-sectional study on 12 sub-Saharan African countries, self-reported use of TM in patients with hypertension was common and varied drastically from 10% (Congo) to 48% (Guinea).  
⇒ TM users were more likely to be male, with poor treatment adherence, and to report missing treatment because of its cost, and to have severe hypertension (OR=1.34; 95% CI 1.04 to 1.74) and complications of hypertension (OR=1.27; 95% CI 1.01 to 1.60).

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE AND/OR POLICY

⇒ The widespread use of TM in patients with hypertension needs to be acknowledged and worked out to integrate it safely within the conventional healthcare.

1 billion of them living in low-income and middle-income countries.<sup>1,2</sup> The rise in incidence of hypertension since 1990 has been particularly striking in sub-Saharan Africa, where it is still predominantly undiagnosed (52% of women, 66% of men), uncontrolled and not treated, with only 13% of women and 9% of men estimated to have controlled hypertension in sub-Saharan Africa.<sup>2</sup> When uncontrolled, hypertension can have an array of complications, including stroke, ischaemic heart disease, kidney and heart failure.<sup>1,3</sup>

Use of traditional medicine (TM) is widespread in sub-Saharan Africa as a treatment option for a wide range of disease,<sup>4</sup> including



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for the management of hypertension.<sup>5–7</sup> TM encompasses different types of healthcare practices.<sup>8</sup> According to a recent systematic review, in sub-Saharan Africa, the most common form is biological-based (use of medicinal herbs and plants, homeopathy), followed by faith-based (prayer, spirituality), and mind–body therapies (eg, massage, meditation).<sup>4</sup> There is a growing interest in evaluating the potential beneficial role of TM use in the management of chronic diseases, as it has been recognised as a potential solution in contexts of limited access to essential health services. The WHO has developed a strategy paper with objectives of integrating TM in national healthcare systems, fostering its access and rational use, but also expanding the knowledge base on its safety, efficacy and quality.<sup>8</sup>

Little is known on the profile of users of TM with hypertension. Studies in patients with hypertension from Nigeria (three studies),<sup>9–11</sup> Ghana,<sup>12</sup> Ethiopia,<sup>13</sup> Uganda<sup>14</sup> and South Africa<sup>15 16</sup> report a prevalence of use, alone or in combination with ‘modern’ medicine, between 20% and 68% (mean 27%). A synthesis of these studies of modest sample size (the largest being n=500) is that users were more likely to be older, male, low income level, less educated and reside in rural area, although the results differ according to country and setting. More importantly, there has been little work on the actual efficacy of TM in the management and control of hypertension.

We aimed (1) to describe the proportion and characteristics of patients who use TM, and (2) estimate the association between TM use and blood pressure, (BP) and complications of hypertension in a pan-African study.

## METHODS

### Study design

The Evaluation of Hypertension in Sub-Saharan Africa study (EIGHT) is an observational, cross-sectional study conducted in outpatient consultations specialised in hypertension in cardiology departments of 29 medical centres from 17 cities across 12 sub-Saharan African countries between January 2014 and November 2015. The study design and sample size calculation have been described in details elsewhere.<sup>17–20</sup> It was designed by a multidisciplinary collaborative team of epidemiologists, cardiologists and pharmacists from Africa and France. Participants gave informed consent.

The sampling strategy was convenience sampling. In each participating hospital, patients with a hypertension diagnosis, aged 18 years or older were eligible to participate. Each patient received an information leaflet about the study. Further, the on-site physician presented and explained the study in the regional language to all patients meeting eligibility criteria and collected patient consent. Those who agreed to participate completed a standard questionnaire while waiting for their appointment. A total of 2198 adult hypertensive patients were enrolled during outpatient consultations, in the cardiology departments of the participating hospitals. The first

section of the questionnaire was completed by patients and collected data on demographic factors and medication details including self-reported adherence. The second section was completed by the physician during the consultation and provided data on patient socioeconomic status, treatment prescribed, BP values, complications and cardiovascular risk factors.

### Measurements

Seated BP was measured twice by physicians, at least 15 min apart; attention was paid to avoid caffeine and smoking within the 30 min before BP measurement. We took the mean of the two measurements for the description of systolic BP (SBP) and diastolic BP (DBP). Uncontrolled hypertension was defined by an SBP  $\geq$ 140 mm Hg and/or DBP  $\geq$ 90 mm Hg on any of the two measurements. Mild (SBP, 140–159 mm Hg OR DBP, 90–99 mm Hg), moderate (SBP, 160–179 mm Hg or DBP, 100–109 mm Hg) and severe hypertension (SBP,  $\geq$ 180 mm Hg or DBP  $\geq$ 110) mm Hg were defined according to the European Society of Cardiology guidelines.<sup>21</sup>

TM use was assessed by a simple question ‘Do you ever use traditional medicine as a treatment for your cardiovascular disease?’ with a yes/no answer.

Adherence to prescribed medication(s) was assessed by the eight items Medication Adherence Scale.<sup>22</sup> The scale scores from 0 to 8: high adherence was defined as a score of 8, and poor adherence as a score  $<$ 8. An additional item on the impact of patient financial situation on adherence was included with a yes/no answer: ‘Some medications are expensive. Did you ever skip taking your treatment for financial reasons?’.

The country income was obtained from the World Bank database (<http://data.worldbank.org/country>) and categorised into low-income and middle-income countries. Individual patient wealth categories were assessed by the physician and classified as low (patients who have difficulties to afford medical consultations), middle (patients who can manage paying medical consultations) and high (no difficulties to pay medical consultations).

Complications of hypertension were assessed in the physician questionnaire by the question ‘If the patient has hypertension, has he/she presented with complications?’ (yes/no). If yes, indicate if mild or severe for the following: Ocular, Renal, Cardiac, Cerebral.

### Statistical analysis

We report the proportion of TM use overall and in each country. We describe the main characteristics of the overall study participants according to use of TM, reporting p values of  $\chi^2$  for categorical variables or t-tests for continuous variables. Based on these univariable descriptive results, we then proceeded to explore the factors associated with TM use, by fitting multivariable mixed logistic regression models with a random effect for country to account for intra and intercountry variability.<sup>20</sup> The covariates considered were age, sex, living location (urban, rural), individual patient wealth, country income

level, treatment adherence, missing treatment for financial reason, number of treatments prescribed (0, 1, 2,  $\geq 3$ ), severity of hypertension, presence of complications of hypertension (renal, cerebral, cardiac, ocular). After fitting a model including all covariates, we did a 'backwards' selection by selecting a limited set of factors that showed stronger associations with TM use, and that did not have more than 5% of missing data.

To answer our second aim, we assessed the association between TM use and BP using mixed linear regression models where SBP and DBP were the outcomes. The association of TM use with uncontrolled hypertension, severe hypertension and presence of hypertension complications were assessed by mixed logistic regression models. All models included the following covariates, as they were associated with uncontrolled hypertension and its complications: age, sex, treatment adherence (high, poor), patient wealth index (low, medium, high) and a random effect for country.

All analyses were performed using R V.4.0.3 (2020-10-10) and the level of significance was set at  $p < 0.05$ .

### Patients and public involvement

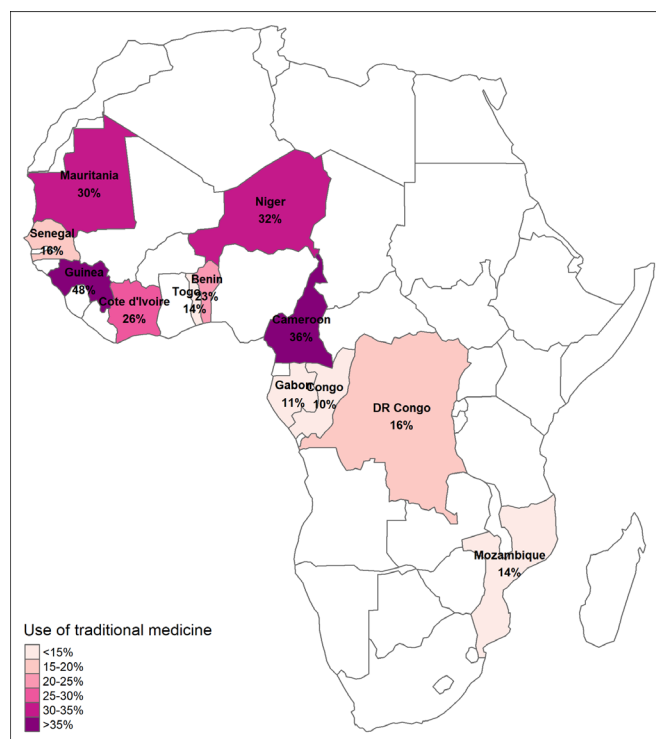
It was not possible to involve patients or the public in the design, or conduct, or reporting, or dissemination plans of our research.

### RESULTS

Out of 2198 patients with hypertension included in the EIGHT study, 2128 participants had data on TM use. Of them, 512 (24%) reported using TM, and this percentage varied drastically across countries from 10% in the Congo to 48% in Guinea (figure 1,  $p$  value for difference  $< 0.001$ ).

Participants characteristics according to use of TM, and unadjusted t-tests and  $\chi^2$  are presented in table 1. Those reporting using TM were on average slightly older ( $59 \pm 11$  years) than non-users ( $58 \pm 12$  years,  $p$  value for difference = 0.05), more likely to be male, live in a rural area, to have poor treatment adherence and to report missing treatment because it is too expensive than those not reporting TM use. No striking difference was observed regarding country level income or individual wealth index, time of diagnostic of hypertension, CVD risk factors and lifestyle (table 1, unadjusted t-tests and  $\chi^2$ ). After selection and mutual adjustment (online supplemental figure), TM users were more likely to be male, with poor treatment adherence, reporting missing treatment because it is too expensive, and presenting any complication of hypertension.

As seen on figure 2, the use of TM was associated with greater odds of uncontrolled hypertension, independent of age, sex, treatment adherence, wealth and country (OR 1.30; 95% CI 0.99 to 1.70), although not statistically significant at the conventional level ( $p = 0.06$ ). The same association was observed with severe hypertension (OR 1.34; 95% CI 1.04 to 1.74), and for any complication of



**Figure 1** Proportion of self-reported use of traditional medicine in patients with hypertension across the 12 African countries included in the EIGHT study. EIGHT, Evaluation of Hypertension in Sub-Saharan Africa.

hypertension (cerebral, renal, ocular, cardiac; OR 1.27; 95% CI 1.01 to 1.60), particularly renal complication (OR 1.57; 95% CI 1.07 to 2.29). In multivariable linear regression, use of TM was associated with a 3.87 (95% CI 1.5 to 6.22) mm Hg higher SBP and 1.75 (95% CI 0.34 to 3.16) mm Hg higher DBP compared with no use. Further adjustment for lifestyle and CVD risk factors reduced the sample size due to missing data on these variables, and did not modify the direction or magnitude of the associations between TM and hypertension outcome variables.

### DISCUSSION

This is the first cross-country study that describes the proportion of TM use, the profile of users, and health status associated with TM in patients with hypertension in 12 sub-Saharan African countries. We observed large differences across countries with proportion lower than 15% in Congo, Gabon or Togo to greater than 35% in Cameroon and Guinea. Factors associated with TM use were male sex, older age, having low treatment adherence and more likely to miss treatment due to expensive price. Moreover, those using TM presented worse markers of severe hypertension and complications of hypertension.

The overall proportion (24%) shows that self-reported use of TM is common in patients with diagnosed hypertension, and matches the literature with a mean prevalence of published studies in sub-Saharan Africa of 27%.<sup>4</sup> However, in the study centres in Congo, Gabon, Mozambique, Togo, Senegal and DRC this proportion was lower than the lowest

**Table 1** Characteristics of patients with hypertension included in the EIGHT study, according to their use of traditional medicine

	Use of traditional medicine		P value*	Missing N
	No	Yes		
N	1616	512		
Age (mean (SD))	57.99 (11.97)	59.18 (11.19)	0.05	0
Male sex (n (%))	598 (37.0)	244 (47.7)	<0.001	0
Hypertension (n (%))			0.05	12
Controlled	382 (23.8)	101 (19.8)		
Mild	474 (29.5)	154 (30.3)		
Moderate	416 (25.9)	122 (24.0)		
Severe	335 (20.8)	132 (25.9)		
Systolic blood pressure (mean (SD))	148.07 (23.29)	152.03 (24.48)	0.001	12
Diastolic blood pressure (mean (SD))	87.99 (14.05)	89.32 (14.96)	0.07	15
Time since hypertension diagnostic (n (%))			0.41	44
<1 year	240 (15.2)	77 (15.3)		
1–5 years	820 (51.9)	280 (55.7)		
6–9 years	231 (14.6)	65 (12.9)		
>10 years	290 (18.3)	81 (16.1)		
Low-income country (n (%))	748 (46.3)	232 (45.3)	0.74	0
Individual wealth index (n (%))			0.22	52
High	536 (33.8)	152 (30.9)		
Middle	769 (48.5)	261 (53.0)		
Low	279 (17.6)	79 (16.1)		
Place of residence (n (%))			0.001	40
Rural	88 (5.6)	52 (10.3)		
Semirural	226 (14.3)	68 (13.5)		
Urban	1271 (80.2)	383 (76.1)		
No of treatments for hypertension (mean (SD))	1.95 (0.92)	1.86 (0.90)	0.05	0
Type of treatment				0
Calcium inhibitor (n (%))	910 (58.0)	261 (53.5)	0.09	
Diuretic (n (%))	878 (56.0)	253 (51.8)	0.12	
Converting enzyme inhibitor (n (%))	710 (45.3)	241 (49.4)	0.12	
Betablocker (n (%))	351 (22.4)	100 (20.5)	0.42	
Angiotensin II antagonist (n (%))	240 (15.3)	75 (15.4)	1.00	
Central antihypertensive (n (%))	57 (3.6)	21 (4.3)	0.59	
Vasodilator (n (%))	23 (1.5)	8 (1.6)	0.95	
Poor treatment adherence (n (%))	1007 (62.3)	379 (74.0)	<0.001	0
Reported missing treatment because of its cost (n (%))	381 (24.1)	168 (33.3)	<0.001	40
Number of complications of hypertension (n (%))			0.001	93
0	894 (57.9)	245 (49.9)		
1	511 (33.1)	191 (38.9)		
2	119 (7.7)	39 (7.9)		
3 or more	20 (1.3)	16 (3.3)		
Type of complications (n (%))				93
Renal	104 (6.7)	50 (10.2)	0.02	
Cardiac	407 (26.4)	152 (31.0)	0.05	
Cerebral	133 (8.6)	62 (12.6)	0.01	
Ocular	162 (10.5)	48 (9.8)	0.71	
Cardiovascular disease risk factors (n (%))				545
Current tobacco smoking	56 (4.5)	21 (6.2)	0.24	

Continued

**Table 1** Continued

	Use of traditional medicine		P value*	Missing N
	No	Yes		
Diabetes	208 (16.7)	69 (20.5)	0.12	
Hypercholesterolaemia	255 (20.4)	55 (16.4)	0.11	
Hypertriglyceridaemia	60 (4.8)	23 (6.8)	0.18	
Obesity	251 (20.1)	75 (22.3)	0.42	
Sedentary lifestyle	494 (39.6)	129 (38.4)	0.73	

\*P value is for t-test (continuous) or  $\chi^2$  (categorical variables).

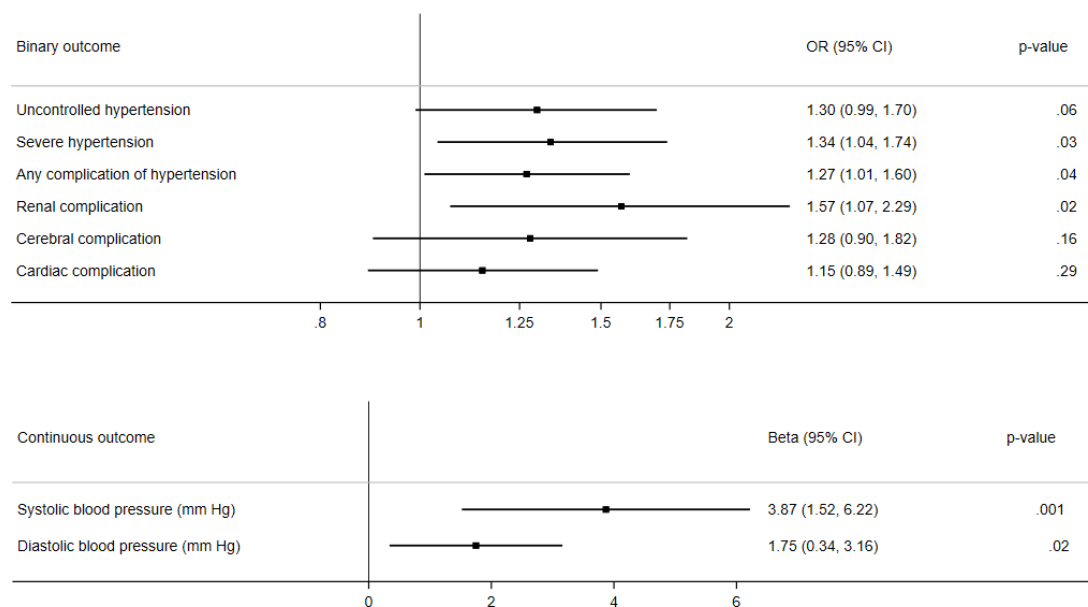
prevalence reported in the literature of 20%. To the best of our knowledge, no data on TM use have been published in hypertensive patients in any of the countries included in our study, making our results novel.

Regarding the sociodemographic factors associated with the use of TM (first objective of our study), some of our results are in line with most published studies, that found that patients with hypertension who are male, older and reside in rural area are more likely to be TM users.<sup>9 10 12 13</sup> However, some studies<sup>12 13</sup> found that they tended to be of low income level, which was not the case in this study. We found very little evidence of difference in TM use reported by individual wealth or country income. Despite the fact that ‘missing treatment because it is too expensive’ was strongly associated with TM use, as it was in other studies such as in Ghana,<sup>23</sup> it appears to not be directly linked to patient’s wealth. Rather, the answer to the question on missing treatment may reflect a perception of the treatment price, attributing a lower priority to its purchase, or the hassle that it represents to get the medicine from the hospital or the pharmacy. Poor treatment adherence

was strongly associated with TM use, in line with a South African study that showed that non-compliant hypertensive patients were more likely to seek complementary medicine.<sup>15</sup> An implication of this is that, beyond advocating for regulation, accessibility and affordability of drugs for chronic diseases in all the communities, efforts should be made by healthcare professionals to communicate on the importance of treatment adherence to patients, and have open discussion on the use of TM.<sup>24</sup>

Because hypertension is usually asymptomatic for many years, health seeking is lower and long-term treatments can be perceived as a useless burden if one is apparently in good health. We lacked information on psychosocial and behavioural variables, such as belief, to better understand the reasons of use of TM. Psychosocial variables, such as belief that hypertension is due to supernatural causes, or positive perception of traditional healers, have been shown to be very important determinants of TM use.<sup>10 14</sup>

The use of TM needs to be recognised, especially in countries where it is common. It has been acknowledged as providing healthcare in the context of limited access



**Figure 2** Multivariable associations of use of traditional medicine with hypertension-related outcomes. all estimates are adjusted for age, sex, treatment adherence, patient wealth index (low, medium, high), with a random effect for country. for binary outcomes (top panel), estimates are ORs from multivariable logistic mixed regression models. for continuous outcomes (bottom panel), betas were estimated by multivariable linear mixed regression models.

to health services, in particular in the rural and most deprived areas in some countries.<sup>25</sup> However, the results of our second objective show that TM users presented worse hypertension profile and complications, independent of age, sex, country, wealth and treatment adherence. The cross-sectional design of our study is a great limitation that does not allow to disentangle the temporal sequence, therefore no causal conclusion can be made. One explanation may be that people who use TM wait longer before seeking conventional treatment, therefore, presenting with complicated forms of hypertension with worse prognosis. However, the duration of hypertension since its diagnosis did not differ between the patients who used and did not use TM. Our study suffers from a referral bias since it was conducted in cardiology departments of major cities in sub-Saharan countries. Indeed, people prefer TM over conventional care because of lengthy procedures and fear of being diagnosed of a serious disease<sup>4</sup>, so TM users are likely under-represented in our study. On the contrary, those people who manage to control hypertension with TM may simply never go to a cardiology consultation and therefore would not be included in this study. Another explanation can be that using TM gives a false sense of protection, in particular faith/spiritual based medicine, and that people present to the consultation with worse symptoms. Finally, another likely phenomenon that occurs is that people who have worse symptoms and complications try also using TM as a complement of modern treatment, which they deem insufficient.

Therefore, despite the multiple potential interpretations of our results, the worse health profile of patients with hypertension using TM warrants caution when promoting TM use. It is fundamental to promote an open dialogue about TM between patients and physicians: destigmatise the reporting of the use of TM to the physician, discuss possible interactions with treatment, differentiating spiritual-based from plant-based for which some research may suggest mild efficacy.<sup>26</sup>

Our study presents strengths including its large sample size (over 2000 patients), the multicentre design from 29 medical centres in 17 cities from 12 countries, the strong and structured collaborative multidisciplinary network and active involvement of local cardiologists in the design and data collection and analysis. However, we need to acknowledge several important limitations. First, the cross-sectional design does not allow to draw causal conclusions on the effect of TM on hypertension control. The negative association that we observe is not likely to represent an intrinsic deleterious effect of TM, but rather the use of TM may be a consequence of various factors that led to a worse hypertension profile. Second, our main exposure of interest, use of TM, was assessed with only one self-reported question. It did not include information on exposure duration of TM, whether it was prior or posterior to the diagnostic of hypertension. Moreover, it would have been very useful to have detail on the type of TM (medicinal herbs, potions, prayers, incantations, meditation, other modalities) and on drivers of use of

TM such as low cost, greater accessibility, trust and confidence in traditional healers. Moreover, it has been shown that it is common for patients to hide use of TM to their healthcare providers,<sup>4</sup> and we did not have this data available. This means that because the study questionnaire was filled when visiting the hospital, self-report of TM use may have been underreported and the prevalence of use is likely underestimated.

To conclude, we find that on average one-quarter of patients with hypertension in 12 sub-Saharan countries report using TM, with large variations across countries. Users were more likely to have overall worse markers of BP and associated complications of hypertension. The widespread use of TM needs to be acknowledged and worked out to integrate TM safely within the conventional healthcare.

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analysis; Responsible for data collection: IBD, KEK, IAT, DMB, BF, MH, MSI, AK, SGK-K, SK, CKK, LMK, CN, EL, JLT, JBM, ASA, RN, AD, JMD. CL conducted the data analysis; CL, XJ, MAn, MA and BG interpreted the results; CL and MAn drafted the manuscript; All authors critically revised and approved the final manuscript. In online supplemental appendix, we present a reflexivity statement on international partnership between high-income and low-income and/or middle-income countries.

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