

DOES HOME REMEDY USE CONTRIBUTE TO MEDICATION NONADHERENCE AMONG BLACKS WITH HYPERTENSION?

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Background: Home remedies (HRs) are described as foods, herbs, and other household products used to manage chronic conditions. The objective of this study was to examine home remedy (HR) use among Blacks with hypertension and to determine if home remedy use is correlated with blood pressure and medication adherence.

Methods: Data for this cross-sectional study were obtained from the TRUST study conducted between 2006-2008. Medication adherence was measured using the Morisky Medication Adherence Scale, and HR use was self-reported. Multivariable associations were quantified using ordinal logistic regression.

Results: The study sample consisted of 788 Blacks with hypertension living in the southern region of the United States. HR use was associated with higher systolic (HR users 152.79, nonusers 149.53; $P=.004$) and diastolic blood pressure (HR users 84.10, nonusers 82.14 $P=.005$). Use of two or more HRs was associated with low adherence (OR: .55, CI: .36-.83, $P=.004$).

Conclusion: The use of HR and the number of HRs used may be associated with medication nonadherence, and higher systolic and diastolic blood pressure among Blacks with hypertension. Medication nonadherence is of critical importance for individuals with hypertension, and it is essential that health care providers be aware of health behaviors that may serve as barriers to medication adherence, such as use of home remedies. *Ethn Dis.* 2020;30(3):451-458; doi:10.18865/ed.30.3.451

Keywords: Home Remedies; Blacks; Hypertension; High Blood Pressure Medication Adherence

INTRODUCTION

Hypertension is a highly prevalent chronic condition; approximately 30% of adults in the United States have been diagnosed with the condition. Managing and achieving controlled hypertension can be a lifelong challenge requiring lifestyle modifications including diet, exercise, and often the addition of antihypertensive medications. Despite the effectiveness of antihypertensive medications, approximately half of all individuals prescribed antihypertensive medications are nonadherent, either not taking the medications as instructed or not taking the medications at all.¹ Patients who report low adherence or nonadherence are more likely to have uncontrolled hypertension, and are at an increased risk for poor health outcomes such as stroke, heart attack,

heart failure, and kidney disease.²

Despite evidence indicating the effectiveness of antihypertensive medications, psychosocial and behavioral factors such as fears of side effects, patient beliefs and attitudes, and mistrust in health care providers and the medical system are often barriers to medication adherence.³⁻⁵ Alternative treatments and practices are often used in response to fears and concerns about antihypertensive medications. Home remedies (HRs) are the alternative practice of using household items such as onions, garlic, and herbs to treat, mitigate, or manage a health condition. In the United States, HRs have traditionally been used for self-care and condition management, particularly in underserved communities, in response to inequitable care and due to mistrust in health care providers and the health care system.^{4,5} Data

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from the National Health Interview Survey (NHIS) found 78% of Blacks reported using a form of folklore medicine, which includes practices such as using HRs, while 49% used herbs as a medical treatment.⁶ Forster et al used data from the TRUST study to explore home remedy use and trust among Black and White adults.⁷ In this sample, White home remedies users reported the lowest trust scores, compared with White non-home remedies users, and Black home remedies users

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and non-users. Not reporting or underreporting the use of home remedies (HR) is a common practice among users, leaving health care providers unaware of patient practices in managing hypertension.^{8,9} Health care professionals typically advise patients against the use of home remedies as a treatment for hypertension, as the effectiveness of home remedies on reducing blood pressure has been demonstrated in few studies.¹⁰ To improve health outcomes, it is essential that health

care providers have a comprehensive understanding of the treatments and remedies being used by their patients.

Few studies have explored the use of home remedies among Blacks with hypertension. Quandt et al compared HR use among 62 Black and White adults in rural North Carolina.¹¹ All participants reported using at least one HR; the most commonly used HRs were vinegar, baking soda, lemon, salt, honey, Vaseline, and Epsom salts. The authors found that Black study participants were more likely to report using HRs to manage chronic conditions than White participants. Ryder et al conducted a study of 95 Blacks adults aged ≥ 60 years; among these participants, 30% reported using HRs in the past 12 months, and the participants reported using HRs such as vinegar, oatmeal, lemon juice, onions, honey, cinnamon, garlic, and echinacea.¹²

The majority of the studies examining home remedy use in the United States have focused on their use for managing a chronic condition; few studies have examined the impact of home remedy use on health behaviors. The objective of this study was to examine the use of HRs among Blacks with hypertension living in the southern region of the United States and to determine if the use of HRs was associated with poorer adherence to medication.

METHODS

TRUST Study Sample

Data for this cross-sectional study were obtained from the 2006 – 2008 TRUST study, a subproject within

the Alabama Collaboration for Cardiovascular Equality (ACCE) project, funded by the National Heart, Lung, and Blood Institute. The TRUST study examined social and behavioral factors including trust, self-efficacy, and medication adherence in a sample of Black and White adults with hypertension. Participants were recruited from and received primary care from Cooper Green Mercy Hospital, a safety-net hospital located in Birmingham, Alabama. A description of the TRUST study was provided in previous studies.^{13,14}

TRUST Study Data

Data were collected by three certified study personnel via computer-assisted, in-person interviews and medical chart abstraction at the Cooper Green Mercy Hospital. Interviewers were trained by the University of Alabama at Birmingham (UAB) Minority Health Research Center. Medical records were used to ascertain cardiovascular disease (CVD) risk factors, diagnosis of CVD, and end-stage organ damage. Approximately 5% of medical records were dually abstracted with $>95\%$ reliability and validity agreement (inter-rater reliability).

Inclusion/Exclusion Criteria

Participants were eligible for the study if they were Black, aged ≥ 19 years, self-reported not being pregnant, had a primary diagnosis of hypertension and received primary care from Cooper Green Mercy Hospital. Participants were deemed ineligible for the study if they were unable to provide informed consent and if they did not respond to questions regarding medication adherence and use of HRs.

Morisky Medication Adherence Scale

Medication adherence was measured using an adapted version of the Morisky Medication Adherence Scale.¹⁵ This scale consists of the following 4 questions: 1) Do you ever forget to take your medicine? 2) Are you careless at times about taking your medications? 3) When you feel better do you sometimes stop taking your medicine? and 4) Sometimes if you feel worse when you take the medicine do you stop taking it? Each response item of the Morisky scale has a dichotomous (yes/no) option that adds 0 and 1 point respectively. The Morisky Scale ranges from 0 to 4, with a lower score indicating worse adherence and a higher score indicating higher adherence to medications. We modified the scoring of the Morisky Scale by combining the two lowest adherence categories (0 and 1) and the two middle adherence categories (2 and 3) due to low cell counts in the low adherence category. The scale was reverse coded; thus, higher scores indicated greater adherence. This approach for combining the adherence categories has been used in a previous study.¹³ The Morisky Scale was originally validated in a sample of 400 patients with hypertension, of which 91% were Black, and was shown to be predictive for cardiovascular events.^{16,17}

Home Remedy Use

Study participants self-reported use of HRs. For the TRUST study, we included the following two survey items to gain greater insights regarding HR use: 1) Besides prescription medicines, do

you use anything else to treat your high blood pressure? (Yes/No) 2) What HR do you use?¹⁸ Response options included vinegar, garlic, tea, mustard, vitamins, combinations, and others. The selection of home remedies was based upon the home remedies reported in the Brown and Segal article,¹⁸ and additional items were added based on knowledge from the research team. To obtain a measure of the number of HRs used, we summed the number of HRs reported by each study participant. The HR measures developed for the TRUST study were not validated in this sample.

Covariates

To assess the socioeconomic status of the study participants in the TRUST study, we used surveys to collect self-reported data about income, education, and difficulty paying for medical care, and demographic data such as sex, race, and age. The survey also included behavioral and cultural questions about medication self-efficacy and trust.^{19,20} Trust in health care providers was assessed using the Hall General Trust Scale, scores range from 11 to 54 with a higher score indicating greater trust.²⁰ The Hall General Trust Scale has a Cronbach alpha of .89. We included three measures of blood pressure: systolic blood pressure; diastolic blood pressure; and mean arterial pressure. Blood pressure was documented as the average of two or more properly measured, seated blood pressure readings during office visits. The present study was conducted prior to the American Heart Association 2017 update to the hypertension guidelines.^{21,22} Controlled

hypertension was defined as systolic blood pressure <120 mm Hg and diastolic blood pressure <80 mm Hg.

Statistical Analysis

The characteristics of the study sample and examination into the factors associated with HR use were obtained using cross-tabs for continuous variables and chi-square for the categorical variables. We used ordinal logistic regression to examine the association between medication adherence and use of HRs, adjusted for sex, age, trust, income, education, self-efficacy, hypertension control. The Brant test was used to verify that the Proportional Odds Assumption was not violated, which was indicated by obtaining a non-significant P-value. The association of mean arterial pressure with medication adherence and blood pressure was assessed using linear regression and adjusted for sex, age, general trust, income, education, medication adherence self-efficacy, and medication adherence. Statistical analysis was conducted using STATA version 14 (StataCorp, College Station, TX). The TRUST study was approved by IRBs at the University of Alabama at Birmingham and Cooper Green Mercy Hospital. The present study was approved by the IRB at the University of Massachusetts Medical School and the IRB at Penn State College of Medicine.

RESULTS

Table 1 describes home remedy use among the participants in the TRUST Study, N=788. Approximately 28% of our sample reported

the use of home remedies. The most commonly used HRs were vinegar (19%), garlic (12%) and mustard (6%). Within the study sample, 12% reported using at least one HR and 14% reported using two or more.

Characteristics of the Sample by HR Use

In Table 2, we describe the characteristics of the study participants who used HRs compared with participants who did not use HRs. The study participants included 788 Blacks with an average age of 54 years. The majority of the study participants were women (71%), and more than half (68%) attended some college or had a college degree. Most (94%) participants were low-income, with the study group having an average annual household income of <\$25,000. Twenty-three percent had controlled hypertension and 41% self-reported high adherence to medication. The average systolic blood pressure was 148.27mm Hg, diastolic blood pressure was 81.39mm Hg, and mean arterial blood pressure was 103.69 mm Hg.

HR users had higher systolic, dia-

stolic, and mean arterial pressure than participants who reported they did not use HRs. Self-reported low adherence was 21% among HR users compared to 12% among those who did not use HRs (P=.004). We did not detect a statistically significant relationship between home remedies use and controlled hypertension, age, trust in physicians, sex, income or education.

Medication Adherence and HR Use

In Table 3, we present the adjusted models examining the association between HR use and medication adherence. Higher self-reported medication adherence was statistically associated with the use of two or more home remedies, age, having a college education, and trust in physicians. Specifically, we found that the use of 2 or more home remedies reduced the odds of being in a higher adherence (OR: .55, 95% CI .36-.83, P=.004). Similarly having uncontrolled hypertension reduced the odds of being in the high adherence category by 2% (OR=.98, CI: .70-1.36, P=.908). For each 1-level increase in adher-

ence age increased the odds of being in the highest adherence category by 2% (1.02, CI: 1.01-10.4, P=.001) and lastly, having a college degree increased the odds of being in the highest adherence category by 87% (OR: 1.87, CI: 1.06-3.30, P=.030).

DISCUSSION

Approximately one-third of the participants in the present study reported home remedy use, which is similar to the prevalence of home remedy in other studies examining home remedy use. Participants with hypertension in the TRUST study reported use of vinegar, garlics, mustards, and teas as home remedies. Individuals reporting the use of 2 or more home remedies were more likely to report poorer adherence to medication than participants who did not use home remedies. We also found higher systolic, diastolic, and mean arterial blood pressure among home remedy users. The findings of this study advance the understanding of the association between home remedy use and medication-taking behaviors and provide insights to the impact on blood pressure.

Our findings are consistent with the studies examining HR use among Blacks. A study conducted by Brown et al among 300 Blacks and Whites in northern and central Florida found that Blacks were more likely to use HRs and more likely to report non-compliance to medications than White study participants.²³ Krousel-Wood et al assessed HR use among 2,180 Blacks and Whites with high blood pressure in southeastern Loui-

Table 1. Home remedy use among TRUST study participants (N=788)

| | |
|------------------------------------|-------------|
| Home remedy use, n(%) | |
| Yes | 219 (27.86) |
| Type of home remedies used, n(%) | |
| Vinegar | 153 (19.42) |
| Garlic | 91 (11.55) |
| Mustard | 45 (5.71) |
| Teas | 37 (4.70) |
| Vitamins | 21 (2.66) |
| Lemon | 8 (1.02) |
| Honey | 7 (0.89) |
| Number of home remedies used, n(%) | |
| 0 | 578 (73.35) |
| 1 | 96 (12.18) |
| 2 or more | 114 (14.47) |

Table 2. Overall characteristics of the 788 Blacks with hypertension in the TRUST Study, and characteristic by home remedy use status, 2006-2008

| | Overall | Home Remedies Users | Non-Users of Home Remedies | P |
|--|----------------|---------------------|----------------------------|------|
| Medication adherence, n (%) ^a | | | | .004 |
| Low adherence | 112 (14.36) | 46 (21.10) | 66 (11.76) | |
| Moderate adherence | 349 (44.80) | 91 (41.74) | 258 (45.99) | |
| High adherence | 318 (40.82) | 81 (37.16) | 237 (42.25) | |
| Systolic blood pressure, mean (SD) ^b | 148.27 (18.81) | 152.79 (21.15) | 149.53 (19.58) | .004 |
| Diastolic blood pressure, mean (SD) ^b | 81.39 (11.78) | 84.10 (12.13) | 82.14 (11.93) | .005 |
| Mean arterial pressure, mean (SD) | 103.69 (12.88) | 107.00 (14.02) | 104.61 (13.28) | .002 |
| Controlled hypertension, n(%) | | | | .140 |
| No | 603 (76.82) | 176 (80.37) | 427 (75.44) | |
| Yes | 182 (23.18) | 43 (19.63) | 139 (24.56) | |
| Age, mean (SD) | 53.76 (9.93) | 53.32 (9.46) | 53.64 (9.79) | .563 |
| Trust in physicians, mean (SD) ^c | 39.25 (7.96) | 38.86 (7.91) | 39.15 (7.96) | .519 |
| Sex, n(%) | | | | .505 |
| Male | 229 (29.13) | 60 (27.40) | 169 (29.81) | |
| Female | 557 (70.87) | 159 (72.60) | 398 (70.19) | |
| Annual household income <\$25,000, n(%) | | | | .516 |
| No | 46 (6.30) | 11 (5.37) | 35 (6.67) | |
| Yes | 684 (93.70) | 194 (94.63) | 490 (93.33) | |
| Education, n(%) | | | | .590 |
| Less than HS | 136 (17.30) | 34 (15.53) | 102 (17.99) | |
| HS | 114 (14.38) | 37 (16.89) | 76 (13.40) | |
| Some college | 461 (58.65) | 127 (57.99) | 334 (58.91) | |
| College degree | 76 (9.67) | 21 (9.59) | 55 (9.70) | |

a. Medication adherence was measured using the Morisky Medication Adherence Scale

b. Hypertension control was defined as having systolic blood pressure <120 and diastolic blood pressure <80.

c. Trust was measured using the Hall General Trust Scale, which ranges from 11 to 55 with a higher score indicating greater trust.

Hypertension control was defined as having systolic blood pressure <120 and diastolic blood pressure <80.

Inconsistencies in the number of participants reporting using home remedies and the number of home remedies used are attributed to missing responses.

siana.²⁴ Their study found that 30.5% of Blacks reported the use of complementary and alternative medicines (CAMs), with CAM use defined as using fish oil, fiber, L-arginine, coenzyme Q10, garlic, and snakeroot, ie, many are items that are used as home remedies. Within this study group, 18.4% of Blacks reported low antihypertensive medication use and Blacks using CAMs were more likely to report low adherence to antihypertensive medications. The authors posited that the Black participants in the study were using CAMs as alternatives to their antihyperten-

sive medications. These findings suggest that the use of HRs may be a barrier to achieving hypertension control and to adhering to medical management of their condition.

Conversely, in a study by Tilburt et al of 183 Blacks with hypertension in Baltimore, Maryland, 21% reported using HRs to manage blood pressure.²⁵ The authors found home remedy use was associated with greater medication and dietary adherence, suggesting that HR use was a marker of positive self-care. From the findings of this study, we might infer that empowered HR users were more like-

ly to monitor and engage in positive self-care behaviors as a complement to conventional medications when faced with perceived barriers. However, reporting of home remedy use was lower compared with our sample, and the authors acknowledge that there may have been underreporting of home remedy use due to stigma.

Strengths/Limitations

Our findings add to the scholarly work exploring home remedy use among individuals with hypertension; our results highlight a potential linkage between home remedy use

Table 3. Multivariable model of the association between reported home remedy use and better medication adherence among the 788 Black participants of the TRUST Study, 2006-2008

| | OR | 95% CI | P |
|--|------|-----------|-------|
| Home remedies count (ref: None used) | | | |
| 1 | 1.10 | .71-1.73 | .655 |
| 2 or more | .55 | .36-.83 | .004 |
| Age | 1.02 | 1.01-1.04 | .001 |
| Sex (ref: male) | | | |
| Female | .79 | .58-1.79 | .143 |
| Education (ref: less than HS) | | | |
| HS | .73 | .45-1.22 | .235 |
| Some college | 1.28 | .87-1.88 | .209 |
| College | 1.87 | 1.06-3.30 | .030 |
| Annual household income (less than \$25,000) | | | |
| ≥\$25,000 | .99 | .55-1.79 | .981 |
| Trust in physicians ^a | 1.05 | 1.03-1.07 | <.001 |
| Controlled hypertension | .98 | .70-1.36 | .908 |

a. Trust was measured using the Hall General Trust Scale, which ranges from 11 to 55 with a higher score indicating greater trust. These data reflect the cumulative odds ratios obtained from ordinal logistic regression.

and health behaviors among individuals with hypertension. Additionally, our findings provide insights to the association between trust as a social factor and home remedy use. Lastly, we included mean arterial blood pressure as an additional measure of blood pressure, which has rarely been included in similar studies.

The study is a cross-sectional analysis; thus, we are unable to make claims about causality. The TRUST study was conducted at a safety-net hospital in the South; our study findings may not be reflective of the experiences in other regions or in other health care settings. We hypothesized that there may be regional variations in the reporting of home remedy use; this hypothesis was supported in scholarly literature. Boyd et al conducted a national study to examine home remedy use among Blacks across the United States. Study data were obtained from the National Survey on Black Americans. In this study, participants living in the south-

ern region of the United States reported higher use of home remedies than individuals living in other regions of the United States.²⁶ The TRUST study was conducted over a decade ago; there have been notable societal and cultural changes, as well as changes in accessing health care system and health insurance that may have contributed to differences in the reporting of medication adherence or home remedy use. The psychosocial and behavioral survey instruments used for the study were self-reported by the participants and may increase the likelihood of recall bias and errors in recall of behaviors. Measures such as HR use and medication nonadherence may be underreported due to social desirability; however, for many of these constructs, this information is best ascertained from patient self-report using validated measures such as the measures included in the present study. The home remedy measure for the present study, was a combination of a home rem-

edies scale that had previously been used in the Black community and additional items created specifically for this study to address specific types of home remedies used. The additional questions were not validated in other samples of Blacks with hypertension or in this sample of study participants. Lastly, we were unable to determine if participants were not taking their medication as instructed and the cause of nonadherence (ie, was nonadherence due to forgetfulness, challenges affording medication, or changes in quantity or frequency of doses).

Implications

Our findings contribute to the growing body of literature examining the social and behavioral correlates of medication nonadherence among Blacks with hypertension. There is a growing need to explore the use of home remedies and traditional remedies in communities that historically have been underserved by

the health care system. To effectively reduce uncontrolled blood pressure, providers should be aware of all treatments and remedies used to manage hypertension, including the use of HRs. Medication adherence can be improved by providing patients with recommendations and tools to facilitate adherence, simplifying medication routine, patient education, and providing access to medication at a reduced cost.²⁷ Addressing the use of HRs in a culturally sensitive manner, specifically the limitations of their effectiveness on improving blood pressure and involving the patient in a discussion about their preferences for managing hypertension, may be more effective in reducing blood pressure.

CONCLUSION

The findings of this study highlight an important connection between the use of HRs and medication adherence among Blacks. In our study, participants who used HRs also reported low adherence to medications, and adherence decreased as the number of HRs increased. The findings also revealed an association between trust and adherence to medication. Longitudinal studies are needed to establish causal associations among these variables. An understanding of HR use and how they are used may facilitate discussions about their use, and potentially enhance communication about between patients and providers.

ACKNOWLEDGMENTS

We would like to acknowledge Ms. Sara Anne Gochnauer for her assistance in providing data for the introduction of this article.

This research was funded by a Dissertation Grant from Agency for Healthcare

Research and Quality (R36 HS020755-01), and the TRUST study was funded by a grant from the National Heart, Lung, and Blood Institute (U01 HL079171-01). Support was also provided by the Center for Health Equality and Intervention Research (CHEIR) at the University of Massachusetts Medical School, funded by the National Institute on Minority Health and Health Disparities (1P60MD006912). The project described was supported by the National Center for Advancing Translational Sciences, Grant KL2 TR002015 and Grant UL1 TR002014. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

CONFLICT OF INTEREST

No conflicts of interest to report.

AUTHOR CONTRIBUTIONS

Research concept and design: Cuffee, Rosal, Hargraves, Briesacher, Hullett; Acquisition of data: Akuley; Data analysis and interpretation: Cuffee, Rosal, Briesacher, Altwatban, Allison; Manuscript draft: Cuffee, Hargraves, Akuley, Hullett, Allison; Statistical expertise: Cuffee, Briesacher, Altwatban, Allison; Administrative: Rosal, Akuley, Altwatban, Hullett; Supervision: Cuffee, Hargraves

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