Home remedy use and influenza vaccination among African American and white adults: An exploratory study

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ABSTRACT

Racial disparities in influenza vaccination persist between African American and White adults. It is critical to explore the reasons behind this disparity, which may be linked to the use of "folk" or home remedies for illness prevention and treatment. For this study, The GfK Group was contracted to conduct a nationally-representative survey (n = 819 African American and 838 White respondents). Respondents were asked about behaviors, attitudes, and risk perception related to the influenza vaccine, as well as frequency of home remedy use. Results were analyzed using adjusted logistic regression with 95% confidence intervals. In comparison to those who never use home remedies, those who use home remedies often or almost always were less likely to get vaccinated for influenza (respectively, OR = 0.70, CI 0.49, 0.99; OR = 0.27, CI 0.15, 0.49), less likely to be in favor of the vaccine (OR = 0.47, CI 0.33, 0.67; OR = 0.19, CI 0.10, 0.34), less likely to trust the vaccine (OR = 0.42, CI 0.29, 0.61; OR = 0.34, CI 0.20, 0.61), and more likely to perceive higher risk of vaccine side effects (OR = 1.79, CI 1.19, 2.68; OR = 4.00, CI 2.38, 6.73). These associations did not vary by race. Home remedy users may hold negative views toward the influenza vaccine, such that a combination of little trust in the vaccine process, and overestimation of risk associated with the vaccine itself, may contribute to vaccine refusal. Health care professionals can use these findings to tailor advice toward individuals with a preference for home remedy use to allay fears and correct misconceptions surrounding influenza and its vaccine.

1. Introduction

Influenza is a contagious respiratory illness that leads to nearly 750,000 hospitalizations annually (Thompson et al., 2004). Vaccination against the flu is a safe, cost-effective method to prevent excess morbidity and mortality related to this disease, yet only 37% of adults were vaccinated in the 2017–18 flu season (Centers for Disease Control (CDC), 2018). This remains far short of the Healthy People 2020 goal of 70% vaccination for all adults (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2010). Inadequate vaccination coverage limits the population's ability to establish herd immunity against the flu, increasing risk for its spread and subsequent health consequences.

While overall annual immunization rates for influenza have fluctuated in recent years, the vaccination rate for African American adults is consistently lower than White adults (32.3% vs. 40.2%, respectively in 2017–18) (Centers for Disease Control (CDC), 2018). Potential reasons for this disparity in flu vaccine uptake include racial differences in

risk perception (Cameron et al., 2009; Freimuth et al., 2017), trust (Chen et al., 2007; Quinn et al., 2016), and attitudes toward the vaccine (Lindley et al., 2006; Quinn et al., 2017). The role of cultural practices in vaccine disparities is understudied. This paper explores how attitudes toward flu vaccination and subsequent behavior may be influenced by non-traditional approaches to the prevention and treatment of illness, including the use of home remedies.

Complementary and alternative medicine (CAM) is an umbrella term that includes non-biomedical practices for the prevention and treatment of illness (National Center for Complementary and Integrative Health, 2011). Increasingly, the literature surrounding CAM focuses on treatments that have become widespread, including chiropractic care, acupuncture, naturopathy, meditation, and yoga. CAM therapies are often introduced as traditions practiced by ethnic minorities, termed "folk remedies," or "ethnomedicine," but as the broader population adopts these cultural traditions, they become a part of mainstream CAM (Pachter et al., 1998). While home remedies are technically included under the umbrella of CAM, they are not typically

captured in nationally representative surveys, which may minimize awareness of their use among racial and ethnic minorities.

Home remedies may be used in conjunction with traditional biomedicine, particularly in the case of illness that may be perceived as more severe (George et al., 2006). For other conditions, like the common cold, which is a "low-morbidity, high frequency" condition, home remedies may be used alone (Smitherman et al., 2005). Unfortunately, some individuals consider the flu to be a low-risk condition, similar to the common cold, which could support their use of home remedy preventive methods, as opposed to getting vaccinated against the flu (Freimuth et al., 2017; Quinn et al., 2016). Furthermore, the perceived risk of vaccine side effects from the vaccine may influence the choice to vaccinate (Freimuth et al., 2017). To assess the impact of home remedy use on health practices, including vaccination, it is critically important to understand how and why individuals utilize home remedies, and how their use may be associated with vaccine behavior, attitudes, and risk perception (Quandt et al., 2015).

Using data from African American and White adults, this study is the first to examine home remedies in conjunction with flu immunization. In general, African Americans are more likely to use home remedies than other racial and ethnic groups (Quandt et al., 2015). With this in mind, this study aims to explore racial differences in home remedy use, and how home remedy use may be associated with the choice to get the flu vaccine, vaccine risk perception, attitudes toward the vaccine, and trust in the vaccine or vaccine process.

2. Methods

We contracted with GfK Research Group to recruit 800 African American and 800 White US non-institutionalized adults from its KnowledgePanel, a probability-based web panel representative of the US (Quinn et al., 2017). This survey was developed as part of a larger mixed-methods investigation of racial disparities in influenza vaccination. While survey methods and the questionnaire have been described in detail previously, this analysis is the first to use the full set of items related to home remedy use (Quinn et al., 2017). Questions for home remedy use were developed based on themes that emerged from focus groups and participant interviews that occurred prior to questionnaire-development (Quinn et al., 2017). Additionally, all survey items were pre-tested with cognitive interviews ($n = 16$) to test the reliability and validity of novel items. GfK also conducted an independent pilot test of survey items before activating the survey. The survey was open to participants from March 27 to April 4, 2015. Panelists were contacted via email with invitations to complete the survey and received reminders every three days until the task was completed. In exchange, participants received an incentive equivalent to $5. The procedures for this study were reviewed and approved by the Institutional Review Board at the University of Maryland, College Park.

2.1. Outcome variables: behavior, attitudes, and trust in the vaccine

Vaccine behavior was measured dichotomously (yes/no), based on participant response to the questions, "Did you get the flu vaccine this season?" Perceived disease risk, perceived risk of vaccine side effects, and trust in the vaccine process were assessed as multi-item scales, with slight modification in working for each group: those who were vaccinated, those were unvaccinated but intended to vaccinate, and those with no intent to vaccinate. We calculated the mean of each scale, as described in a previous publication for this data (Quinn et al., 2017). For each outcome, we examined the frequency of the means and coded the top 20–25% as "high" (outcome = 1) (i.e., high perceived vaccine risk, high trust in the vaccine, high trust in the vaccine process). Cut-off scores were calculated for each multi-item scale, based on behavior or intention to vaccinate.

Attitudes toward the vaccine ("In general, how much do you favor or oppose the flu vaccine") and trust in the vaccine itself ("Overall, how much do you trust the flu vaccine") were each assessed using a 5-point Likert scale. This scale included a "neutral" option for flu vaccine attitudes, which was combined with the strongly or moderately oppose options (combined to form an "oppose" category), while moderately or strongly favor options were combined to form a "favor" category. To ensure appropriateness of this coding scheme, the "neutral" option was also coded as a separate category from the favor/oppose categories. Because results of the subsequent multinomial regression were similar to those of binomial, the dichotomous coding scheme was retained. Trust in the vaccine itself was also coded as a dichotomous outcome, combining "not at all," "a little," and "some" responses as low trust, and combining "a good deal" and "completely" categories as high trust.

2.2. Exposure variable: home remedy use

To quantitatively examine themes that emerged from focus groups in the original study, the following questions were asked: "I grew up using home remedies," "I started using home remedies as an adult," "Using home remedies is an important part of my family tradition," "My family used home remedies because we could not access a doctor," "I try to avoid going to the doctor by trying home remedies first," and "I use home remedies instead of vaccines to prevent the flu." All responses were provided on a 4-point Likert scale (does not describe, describes somewhat, describes well, and describes very well). The "describes well" and "very well" categories were combined in all analyses.

In the main analyses, home remedy use was assessed by responses to the questions, "how often do you use any type of home remedies," which were defined as "what people do to prevent or treat illness on their own, without consulting their doctor or getting a prescription." Participants were informed that this definition did not include over-the-counter medications. Participants answered on a 4-point Likert scale (never, sometimes, often, almost always).

Finally, respondents answered two questions regarding home remedy use in relation to going to a doctor and getting the flu vaccine ("I try to avoid going to the doctor by trying home remedies first" and "I use home remedies instead of vaccines to prevent the flu"). Respondents indicated how well each of these statements described them (does not describe, describes somewhat, describes well, describes very well). For these two variables, the "does not describe" and "describes somewhat" were combined to form one category (event = 0), while the "describes well" and "very well" categories were combined to form another (event = 1). To examine beliefs surrounding the mechanism of the vaccine, respondents were asked whether "the flu vaccine helps stimulate a natural immune response." Answers were dichotomous, and coded as such (yes or no).

2.3. Covariates

Covariates included education, race, gender, and income. For education, responses were categorized into four categories (less than high school, high school graduate, some college, college graduate). Responses for race included non-Hispanic white and non-Hispanic black, while gender included male or female. Finally, income was coded as, annually, less than $20,000, $20,000–39,999, $40,000–84,999, and $85,000 or greater.

2.4. Analysis

All analyses were conducted using SAS v9.4 (Cary, NC). Sample weights were used for all analyses to ensure representativeness of the population, as the study over-sampled African Americans. Descriptive statistics were calculated for all demographic and home remedy use variables. Differences in home remedy use between races were assessed using chi-squared analyses for all seven items in the home remedy portion of the questionnaire.

To test whether those who practice home remedies are more or less

likely to get the flu vaccine, and if there is an association between home remedy use and risk perception, attitudes, or trust in the vaccine or its process, logistic regression models were fit for each of the following outcomes: vaccine behavior, perceived vaccine risk, attitudes toward the vaccine, trust in the vaccine, and trust in the vaccine process. All models controlled for education, gender, and income. In separate models, interaction terms between home remedy use and race were added to test for effect modification by race.

Finally, in a sensitivity analysis, we fit logistic regression models, controlling for covariates, for three outcomes: (Thompson et al., 2004) to determine if those who practiced home remedy use were more or less likely to believe that the flu vaccine stimulates the immune response, (Centers for Disease Control (CDC), 2018) try home remedies before going to the doctor, or (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2010) use home remedies instead of getting the flu vaccine. Interaction terms between home remedy use and race were added to test for effect modification by race in separate models. For both main and sensitivity analyses, models stratified by race were refit if interaction terms were significant.

3. Results

A total of 838 white and 819 African American respondents completed the survey, with response rates of 63.1% among white panelists, and 51.2% of African American panelists. After eliminating those with incomplete data on the outcome or exposure variables, 1643 remained in the final analytic sample. Table 1 provides demographic information for the analytic sample, as well as results of chi-squared analyses for all seven items in the home remedy portion of the questionnaire. In comparison to Whites, a higher proportion of African Americans reported ("describes well/very well") that they grew up using home remedies (43.0 vs. 20.1%; $\chi^2 = 115.1$), that home remedy use was a family tradition (32.3 vs. 13.3%; $\chi^2 = 104.03$), that they used home remedies because they had no access to a doctor (21.0 vs. 8.6%; $\chi^2 = 87.55$), and that they used home remedies in lieu of getting vaccinated against influenza (14.3 vs. 8.4%; $\chi^2 = 35.06$).

Results of logistic regression can be found in Table 2. In comparison to those who report never using home remedies, the odds of getting the flu vaccine decreased as home remedy use increased, such that those reporting "almost always" use had 73% (OR = 0.27; CI 0.15, 0.49) lower odds of having gotten the vaccine. Similarly, compared to those who never use home remedies, those in the "almost always" category were more likely to perceive the vaccine risk as high (OR: 4.00; CI 2.38, 6.73), less likely to support the vaccine (OR = 0.19; CI 0.10, 0.34), less likely to trust the vaccine process (OR = 0.43; CI 0.23, 0.78), and less likely to trust the vaccine itself (OR = 0.34; CI 0.20, 0.61). Interaction terms testing the association between race and home remedy use were generally not significant, with the exception of perceived risk of vaccine side effects (interaction = 0.63, $p < 0.05$). Results of stratified models indicate that white respondents who responded that they "often" or "almost always" use home remedies had 1.78 (CI 1.14, 2.78) and 4.61 (CI 2.58, 8.25) times higher odds, respectively, of perceiving risk of vaccine side effects to be high, compared to those who never used home remedies. There was no significant association between home remedy use and risk perception of disease or vaccine side effects among African Americans.

Results of the sensitivity analysis (Table 3) indicate that those who reported using home remedies "almost always" had lower odds of believing the flu vaccine stimulates natural immunity (OR = 0.53; CI 0.31, 0.86). Across all home remedy use categories, they had higher odds of trying home remedies before going to see a doctor and using home remedies instead of getting the flu vaccine. In comparison to those who never use home remedies, the odds of either of these outcomes appear to increase with increasing home remedy use, such that "sometimes" users have 2.36 (1.32, 4.21) times higher odds of using home remedies instead of the flu vaccine, while "often" and "almost

Table 1
Sample characteristics on demographics and home remedy use.

	Overall	African American	White
Overall n (%)	1643	809 (49.2)	834 (51.8)
Education			
< High school	121	74 (61.2)	47 (38.8)
High school graduate	512	250 (48.8)	262 (51.2)
Some college	489	271 (55.4)	218 (44.6)
Bachelor's degree or higher	521	214 (41.1)	307 (58.9)
Gender			
Female	860	447 (52.0)	413 (48.0)
Male	783	362 (46.2)	421 (53.8)
Income (annual)			
< $20,000	326	227 (69.6)	99 (30.4)
$20,000–39,999	333	191 (57.4)	142 (42.6)
$40,000–84,999	535	250 (46.7)	285 (53.3)
$85,000 or above	449	141 (31.4)	308 (68.6)
Home remedy use			
Never	489 (29.98)	223 (27.88)	266 (32.01)
Sometimes	881 (54.02)	435 (54.38)	446 (53.67)
Often	177 (10.85)	91 (11.38)	86 (10.35)
Almost always	84 (5.15)	51 (6.38)	33 (3.97)
Grew up using home remedies			
Describes well/very well	508 (31.36)	341 (43.00)	167 (20.19)
Describes somewhat	605 (37.35)	269 (33.92)	336 (40.63)
Does not describe	507 (31.30)	183 (23.08)	324 (39.18)
Began home remedy use as adult			
Describes well/very well	286 (17.73)	173 (22.00)	113 (13.70)
Describes somewhat	496 (30.75)	217 (27.54)	279 (33.82)
Does not describe	831 (51.52)	398 (50.51)	433 (52.48)
HR use is family tradition			
Describes well/very well	366 (22.59)	256 (32.28)	110 (13.30)
Describes somewhat	449 (27.72)	226 (28.50)	223 (26.96)
Does not describe	805 (49.69)	311 (39.22)	494 (59.73)
HR use because no access to doctor			
Describes well/very well	237 (14.67)	166 (21.03)	71 (8.60)
Describes somewhat	291 (18.02)	176 (22.31)	115 (13.92)
Does not describe	1087 (67.31)	447 (56.65)	640 (77.48)
Avoid doctor by trying HR first			
Describes well/very well	358 (22.13)	194 (24.49)	164 (19.85)
Describes somewhat	465 (28.74)	216 (27.27)	249 (30.15)
Does not describe	795 (49.13)	382 (48.23)	413 (50.00)
Use HR instead of vaccines to prevent flu			
Describes well/very well	202 (12.52)	133 (14.32)	69 (8.36)
Describes somewhat	240 (14.87)	132 (16.73)	108 (13.09)
Does not describe	1172 (72.61)	524 (66.41)	648 (78.55)

HR = home remedy

always" users have 10.97 (5.80, 20.73) and 64.75 (30.86, 131.72) times higher odds, respectively. There were no significant interactions for any sensitivity analyses.

4. Discussion

This study is the first to examine home remedies in conjunction with influenza vaccination, and the results of this study indicate that home remedy use is associated with vaccination behavior, risk perception, attitudes, and trust in the vaccine and vaccine process. Furthermore, these associations appear to follow a linear trend by degree of home remedy use, such that increasing frequency of home remedy use was associated with lower odds of getting vaccinated against influenza, higher odds of perceiving high risk associated with the vaccine, more negative attitudes toward the vaccine, and lower trust in the vaccine and vaccine process. While we generally did not find racial/ethnic differences in these practices, there was an overall difference in home remedy utilization between racial groups, with a higher proportion of African Americans reporting that they grew up using home remedies such as herbal remedies, teas, and raw onions placed in the room

Table 2

Adjusted odds ratios for home remedy use and behavior, risk perception, attitudes, and trust.

Home remedy use	Vaccination behavior	Perceived disease risk (high)	Perceived vaccine risk (high)	Positive attitude toward vaccine	Trust vaccine process	Trust vaccine itself
Never use	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Sometimes	1.27 (1.02, 1.59)	0.88 (0.66, 1.18)	0.98 (0.74, 1.31)	1.14 (0.90, 1.43)	1.08 (0.86, 1.36)	0.85 (0.68, 1.06)
Often	0.70 (0.49, 0.99)	1.49 (0.98, 2.27)	1.79 (1.19, 2.68)	0.47 (0.33, 0.67)	0.60 (0.41, 0.89)	0.42 (0.29, 0.61)
Almost always	0.27 (0.15, 0.49)	0.92 (0.48, 1.77)	4.00 (2.38, 6.73)	0.19 (0.10, 0.34)	0.43 (0.23, 0.78)	0.34 (0.20, 0.61)

Controlling for education, gender, income, and race/ethnicity.

Table 3

Adjusted odds ratios from sensitivity analysis for home remedy use and beliefs and behaviors.

Home remedy use	Believe flu vaccine stimulates immune system	Try HR before going to doctor	Use HR instead of flu vaccine
Never use	1.0 (Ref)	1.0 (Ref)	1.0 (Ref)
Sometimes	1.35 (1.05, 1.72)	8.70 (5.09, 14.88)	2.36 (1.32, 4.21)
Often	0.94 (0.64, 1.37)	35.65 (19.67, 64.61)	10.97 (5.80, 20.73)
Almost always	0.52 (0.31, 0.86)	102.27 (48.90, 213.85)	64.75 (30.86, 131.72)

Controlling for education, gender, income, and race/ethnicity; HR = home remedy.

(Hilyard et al., 2015); that their use was part of traditional family practice; and that they do not have access to a doctor. These differences are consistent with the literature describing the evolution of home remedy use in African Americans, which likely grew out of necessity due to widespread poverty, lack of access to physicians, discrimination by health care providers, and a long-standing mistrust of providers (Byrd and Clayton, 2000).

The literature suggests that home remedy use among Whites is rising, though the reasons for their use may differ from those of African Americans, with reports that White American generally feel that CAM therapies better conform to their life philosophy and values than traditional biomedicine (Astin, 1998; Clarke et al., 2015). Indeed, in the regression models, Whites who used home remedies were more likely to have a college degree or higher, while there was no association between education and home remedy use among African Americans (results not presented). Despite differing reasons for home remedy use, for those who use them, behaviors, risk perception, attitudes, and trust surrounding the flu vaccine may be similar, as suggested by the results of this study. Future research should further examine the association between home remedy use and vaccine behavior, as well as develop nuanced health communication strategies to ensure individuals feel that their cultural beliefs are being respected when seeking medical advice.

Leventhal's Common-Sense Model of Self-Regulation (CSM) explains the individual's perception and management of illness in terms of their own belief and understanding of how illness occurs (Leventhal et al., 2016). The individual identifies a treatment or cure for their illness based on their beliefs surrounding the disease process. Using this model as a guide, those influenced by a Western biomedical model will likely make decisions about treatment differently from those using a different framework or belief system for health and illness. Furthermore, cultural practices are not static, but change over time as cultural beliefs surrounding illness evolve (Quandt et al., 2015; Arcury et al., 2006; Hekler et al., 2008). While the scientific evidence surrounding the use of some home remedies may not be supportive of their use, home remedy use is rising across many sociodemographic groups, including those who are white and highly educated, and can be strongly associated with health care practice and belief (Clarke et al., 2015; Su and Li, 2011). Thus, it is critical that health care providers evolve health communication strategies to take cultural practices into consideration when counseling patients regarding flu vaccination. For African Americans, who may use home remedies as a result of intergenerational family tradition, it is critical to counsel them on the importance of vaccination, while being respectful of cultural beliefs and practices. Addressing concerns about the perceived risk of vaccine side effects and the potential benefits of

the vaccine, compared to CAM home remedies, is necessary to shift more toward annual seasonal flu vaccination. Overall, this study indicates that the use of home remedies are associated with influenza vaccine related health care beliefs and practices. It is critical to not only consider these beliefs and practices when counseling patients on preventive care, but also to consider the reasons why individuals may choose to use home remedies.

This study should be viewed in light of its limitations and strengths. Specifically, as a cross-sectional study, we are unable to establish temporality between home remedy use and our outcomes. However, given that the survey was administered within relatively close proximity to when individuals would have been vaccinated against influenza, we are confident that home remedy use frequency was part of respondent practice prior to vaccine administration. Moreover, results of sensitivity analyses support the associations between frequency of home remedy use and behavior, risk perception, attitudes and trust in the vaccine and vaccine process. Another limitation is that all items were self-reported. Given the close temporal proximity between survey and vaccine, recall bias is unlikely, but responses provided are subjective, and some variation may exist between respondents on Likert scale responses (e.g., different perceptions on "often" vs. "almost always"). One strength of this study is that it is nationally-representative of non-Hispanic white and black individuals, with a relatively large sample size.

5. Conclusion

Overall, this study indicates that the use of home remedies are associated with influenza vaccine related health care beliefs and practices. It is critical to not only consider these beliefs and practices when counseling patients on preventive care, but also to consider the reasons why individuals may choose to use home remedies.

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