Validation of the Group-Based Medical Mistrust Scale Among Urban Black Men

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BACKGROUND: Socioculturally relevant measures of medical mistrust are needed to better address health disparities, especially among Black men, a group with lower life expectancy and higher death rates compared to other race/gender groups.

OBJECTIVES: The study aim was to investigate the psychometric properties of the Group-Based Medical Mistrust Scale (GBMMS) in a Black male sample.

DESIGN: Data were collected as part of a randomized controlled trial testing educational strategies to support Black men's decisions about prostate cancer screening.

PARTICIPANTS: Participants included 201 Black men ages 40–75 years recruited in New York City during 2006–2007.

MAIN MEASURES: The primary measures included: race-based medical mistrust, health care participation, avoidance of health care, perceived access to health care, health care satisfaction, racial identity, residential racial segregation, attitudes towards prostate cancer screening, and past prostate cancer screening behavior.

KEY RESULTS: An exploratory factor analysis suggested a three-factor structure. Confirmatory factor analysis supported the three-factor model. Internal consistency was high for the total GBMMS and the three sub-scales: Suspicion, Discrimination, and Lack of Support. Construct validity was supported by: significant positive correlations between GBMMS and avoidance of health care and racial identity as well as significant negative correlations with health care access, health care satisfaction, and attitudes about prostate cancer screening. ANOVA showed that the GBMMS was associated with greater residential racial segregation. Higher total GBMMS scores were associated with not visiting a physician in the last year and not having a regular physician.

CONCLUSIONS: The present findings provide strong additional evidence that the GBMMS is a valid and reliable measure that may be used among urban Black men.

KEY WORDS: medical mistrust; black men; psychometrics.
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INTRODUCTION

There is growing evidence that systems-level medical mistrust is a barrier to health care participation and adherence to recommended health behaviors. Systems-level mistrust characterizes attitudes toward collective groups and organizations including medical institutions (e.g., hospitals) and the medical profession (e.g., doctors).[1] Investigators have reported that reduced trust in health care institutions or doctors is associated with lack of a recent physician visit and fewer visits,[2,3] less willingness to seek medical care,[4] non-adherence to medical recommendations,[5] lower medication adherence,[6] and more negative health-related attitudes.[7]

Reports of greater systems mistrust among Blacks[7–10] as well as widespread reports of discriminatory experiences in health care[11,12] was the impetus for the development of the Group-Based Medical Mistrust Scale (GBMMS).[13] Although several measures of health care-related trust have been developed,[14–16] the GBMMS is distinguished by its focus on health care provided in the social context of racism and discrimination.

The GBMMS was originally validated in a sample of Black and Latina women. Results showed that mistrust scores were higher among women who never had a mammogram and women with a significant lapse since their last mammogram,[13] with similar findings reported by Cronan and colleagues.[17] Higher GBMMS scores have also been related to not seeing a doctor for migraine care[18] and lower likelihood of seeking mental health services.[19]

The importance of using validated instruments to measure attitudes and perceptions is widely recognized, with the majority of measures psychometrically validated among both men and women. Due to the potential for variation in scale validity and reliability by gender[20,21] and because the GBMMS has only previously been validated among women, we set out to investigate

the scale's psychometric properties among an urban sample of Black men. A focus on this population is important because Black men have the lowest life expectancy and highest mortality rate compared to other race/gender groups.[22–24] As one example, Black men are at greater risk of developing and dying from prostate cancer (PCa) than any other racial/ethnic group.[25] Due to this disproportionate burden of disease among Black men, we set out to understand whether medical mistrust influences their health care access, attitudes, and participation, informed by prior research on medical mistrust.[2–4,7,15,26] Based on the GBMMS' focus on race as a social group categorization that influences trust, we also examined the GBMMS' association with racial identity and racial segregation.

METHODS

Recruitment and Procedures

Participants were 201 Black men recruited during 2006–2007 in New York City (NYC). The sample among which these analyses were conducted was from a randomized controlled trial (RCT) that tested educational strategies to support Black men's decisions about PCa screening. Men were recruited through advertisements in local NYC newspapers including both mainstream papers and those targeting the Black community. Men responding to these advertisements were screened for eligibility by telephone. To be eligible, men had to: (1) self-identify as African-American or Black; (2) be between the ages of 40–75 years; (3) have no history of PCa diagnosis; (4) report no PSA test or no DRE in the past 6 months; (5) be fluent in English; and (6) have a working telephone number and address.

If eligible, the study was described further and men were invited to attend a data collection session. A Black research coordinator was present at all sessions to describe the study goals and procedures, confirm eligibility, and obtain consent. Men were asked to complete a self-administered questionnaire and were paid $50 at the time of data collection. In total, 300 men contacted study staff and were screened for eligibility. Of these, 7.3% (N=22) were ineligible, 4.7% (N=14) refused to participate, 17.3% (N=52) agreed to participate but were never scheduled or were "no-shows," and 70.7% (N=212) attended the data collection session. Of these 212 participants, 5.2% (N=11) were dropped from analyses due to problems with consent or literacy. This resulted in 201 men who were included in these analyses. This study was approved by the Institutional Review Board at Mount Sinai School of Medicine.

Measures

Sociodemographic Variables. All participants were asked questions regarding age, education, income, marital status, employment status, health insurance status, and family history of PCa.

Race-based Medical Mistrust. The GBMMS is a 12-item scale developed to measure race-based medical mistrust: the suspicion of mainstream health care systems and professionals and the treatment provided to individuals of the respondent's ethnic or racial group.[13] The GBMMS has demonstrated strong validity and reliability in previous studies (α=0.87–0.88).[13,17–19,27] Previous psychometric work identified three sub-scales: (1) Lack of Support from doctors and health care workers; (2) Discrimination and group disparities in health care; and (3) Suspicion of doctors, health care workers, and medicine. In this study, the wording of the scale was adapted to be specific to 'Black people' (see Table 1) instead of 'people of my ethnic group.' Response options ranged from 1 to 5 (strongly disagree to strongly agree). In this sample, the mean score for the total GBMMS was 2.5 (SD: 0.67), and scores ranged from 1.0–4.18 (potential range: 1.0–5.0). The scale was normally distributed and demonstrated strong reliability (α: 0.87).

Health Care Access and Participation. *Health care participation* was assessed using two separate items: (1) whether they have a regular primary doctor or provider that they usually go to when sick or in need of health care (yes; no); (2) and the date of their last physical examination (coded as 'having a physical examination within the past year' vs. 'having your last physical examination more than a year ago').

Avoidance of health care was measured using the four-item Avoids Contact with Health Care Scale,[28] demonstrating good reliability (α=0.73). *Perceived access to health care* was measured using the ten-item Perceived Access to Health Services Scale.[29] Consistent with published studies,[29] the reliability was very high (α=0.87). See Table 2 for more information about these continuous measures. *Health care satisfaction* was measured using a single item assessing agreement with the statement: "Overall, I am satisfied with the health care I receive," with four response options ranging from strongly disagree to strongly agree.

Prostate Cancer Screening. *Past prostate cancer screening* was assessed by asking whether participants had ever received a PSA test or DRE in the past (assessed using separate items and dummy variable coded). Although there is insufficient evidence currently to recommend population-based screening for prostate cancer among average-risk men,[30] these variables were included because Black men are at greater risk of developing and dying from prostate cancer compared to any other racial/ethnic group.[23]

Eight items were used to assess *attitudes towards PSA tests and DRE* separately and participants' evaluations of screening using specific adjectives (worthwhile, worrying, reassuring, embarrassing, wise, healthy, unpleasant, important).[31,32] Cronbach's alpha was strong for both measures (α=0.81).

Race-Related Experience. *Racial identity* was measured using the eight-item Centrality sub-scale[33] of the Multidimensional Inventory of Black Identity (α=0.76). *Residential racial segregation* was measured by creating a variable for each participant based on the proportion of one's census tract that is Black, based on US Census data, consistent with previous research studies.[34–36] The proportion Black was categorized as 'Low' (0.0–0.33), 'Moderate' (0.34–0.66), or 'High' (0.67–1.0). The distribution of racial segregation varied: 56.3% of the participants were categorized as living in a census tract with a low proportion Black, 23.1% were categorized as living in a census tract with a moderate proportion Black, and 20.6% were categorized as living in a census tract with a high proportion Black.

Statistical Analyses

In investigating the validity of the GBMMS scale, we conducted an exploratory factor analysis in SAS (using a principal

Table 1. Descriptive Statistics for Group-Based Medical Mistrust Scale (GBMMS) Items and Results of the Exploratory Factor Analysis (n=201)

Scale item	Mean (SD)	Median	Factor 1: Suspicion	Factor 2: Discrimination	Factor 3: Lack of support
5. Black people cannot trust doctors and health care workers	1.86 (0.77)	2.00	0.942	–	–
6. Black people should be suspicious of modern medicine	2.08 (1.02)	2.00	0.883	–	–
4. Black people should be suspicious of information from doctors and health care workers	2.03 (0.93)	2.00	0.812	–	–
3. Black people should not confide in doctors and health care workers because it will be used against them	1.88 (0.84)	2.00	0.768	–	–
7. Doctors and health care workers treat Black people like guinea pigs	2.36 (1.08)	2.00	0.599	–	–
8. Black people receive the same medical care from doctors and health care workers as people from other groups	3.15 (1.18)	3.00	–	0.876	–
10. Black people are treated the same as people of other groups by doctors and health care workers	3.04 (1.13)	3.00	–	0.845	–
11. In most hospitals, people of different ethnic groups receive the same kind of care	3.04 (1.07)	3.00	–	0.829	–
2. Doctors have the best interests of Black people in mind	2.99 (0.94)	3.00	–	–	0.850
1. Doctors and health care workers sometimes hide information from Black people	2.68 (1.18)	3.00	–	–	0.777
12. I have personally been treated poorly or unfairly by doctors or health care workers because of my ethnicity	2.45 (1.13)	2.00	–	–	0.457
Inter-factor correlations between GBMMS sub-scales					
Factor 1 (Suspicion)			1.00	0.308	0.368
Factor 2 (Discrimination)			0.308	1.00	0.473
Factor 3 (Lack of support)			0.368	0.473	1.00

components analysis with a Promax rotation) to determine if the overall scale conformed to the three dimensions of medical mistrust from prior research. A confirmatory factor analysis using LISREL was then used to assess the fit of the proposed theoretical model to the data.[37] To reduce the number of parameters to be estimated, within each of the three dimensions, scale items were randomly split into 'clusters' typically consisting of two or more items.[38]

Because there was a small amount (1.71%) of missing data on the GBMMS, Full Information Maximum Likelihood parameter estimation was employed. Under conditions of missing data, LISREL reports two indicators of model fit to the data: (1) the chi-square test of the goodness of fit and (2) the root mean square error of approximation (RMSEA). Although the chi-square test has the undesirable property of being dependent on sample size, it is one of the most commonly used measures of overall fit,[39] and the RMSEA is a measure of the discrepancy due to approximation between the sample estimate of the variance/covariance matrix and the population variance/covariance matrix. The RMSEA should be non-significant,[37]

Table 2. Information about Continuously Measured Study Variables

Measure	Response format	Example	Mean (SD)	Observed range	Theoretical range
GBMMS	1 (Strongly disagree) to 5 (strongly agree)	Doctors and health care workers sometimes hide information from Black people	2.50 (0.67)	1.0–4.18	1.0–5.0
Avoidance of health care	1 (Strongly disagree) to 5 (strongly agree)	When I'm sick, I try to cure myself rather than go to the doctor	2.60 (0.91)	1.0–4.5	1.0–5.0
Perceived access to health care	1 (Strongly disagree) to 4 (strongly agree)	I am able to get medical care whenever I need it	2.94 (0.59)	1.2–4.0	1.0–4.0
Health care satisfaction	1 (Strongly disagree) to 4 (strongly agree)	Overall, I am satisfied with the health care I receive	3.01 (0.76)	1.0–4.0	1.0–4.0
DRE attitudes	1 (Strongly disagree) to 5 (strongly agree)	Do you think that getting a DRE would be worrying	4.01 (0.60)	2.0–5.0	1.0–5.0
PSA attitudes	1 (Strongly disagree) to 5 (strongly agree)	Do you think that getting a PSA would be important	4.24 (0.54)	2.13–5.0	1.0–5.0
Racial identity	1 (Strongly disagree) to 4 (strongly agree)	Being Black is an important reflection of who I am	2.92 (0.51)	1.75–4.0	1.0–4.0

with values that lie between 0.00 and 0.05 indicating an excellent fit of the model.

Construct validity was further assessed using a convergent validity strategy by examining the association between GBMMS and variables hypothesized to be either positively or negatively associated with the construct of medical mistrust. Internal consistency reliability was assessed using standardized Cronbach's alpha for all measures. Analyses were conducted using SAS (version 9.1) with the exception of the LISREL.

RESULTS

Sample Characteristics

All the men in the sample identified as Black and the mean age of the sample was 49.8 years (range: 40–72 years). More information about sample characteristics is in Table 3.

Factor Analysis of GBMMS

An exploratory factor analysis showed that, similar to previous work, a three-factor structure fit the data well with the exception of one item: "Doctors and health care workers do not take the medical complaints of Black people seriously." Our previous work suggested that this item would have loaded on Factor 1 (the Suspicion sub-scale), but split its loadings between Factors 2 (Discrimination) and 3 (Lack of Support) here. We detected this problem in exploratory analyses and dropped the item from subsequent analyses. The rotated factor pattern loadings and inter-factor correlations are presented in Table 1.

A confirmatory factor analysis using LISREL further supported the three-factor model [chi-square=10.9 (p=0.45) and RMSEA=0.00 (90% CI: 0.0–0.07) (p=0.80)], indicating that the data fit the model extremely well (see Table 4 for the factor loadings and inter-factor correlations).

Table 3. Sample Characteristics, New York City 2006–2007 (N=201)

	N (%)[a]
Age	
<49 years	100 (49.7%)
≥49 years	101 (50.3%)
Income	
≤$39,999	125 (65.5%)
>$39,000	66 (34.5%)
Education	
<Associate's degree[b]	119 (59.8%)
≥Associate's degree	80 (40.2%)
Marital status	
Married or marriage equivalent	53 (26.5%)
Single	147 (73.5%)
Employment status	
Currently employed full or part-time	98 (49.0%)
Not currently employed	46 (23.0%)
Retired	19 (9.5%)
Other	37 (18.5%)
Health insurance coverage	
Medicaid or Medicare	121 (60.5%)
Employer-provided insurance	45 (22.5%)
No insurance or pay out-of-pocket	19 (11.5%)
Other (e.g., student or on disability)	11 (5.5%)
Racial segregation	
Low proportion Black	113 (56.3%)
Moderate proportion Black	47 (23.1%)
High proportion Black	41 (20.6%)

[a]*Columns may not add up to 100% due to missing data*
[b]*An Associate's Degree is an academic degree awarded by community colleges, junior colleges, 4-year universities, business colleges, and some bachelor's degree-granting colleges/universities upon completion of a course of study usually lasting 2 years*

Reliability

Internal consistency was high for the total GBMMS (α=0.87) and the three sub-scales: Suspicion (α=0.89); Discrimination (α=0.83); Lack of Support (α=0.65). We also calculated split-half reliability by examining the correlation between odd and even numbered items and found two halves to be highly correlated (r=0.78; p<0.0001).

Construct Validity

To ease interpretation for these analyses, we calculated total GBMMS scores by calculating the mean of their responses across individual items.

Health Care Access and Participation. Construct validity was supported by the negative correlations between the total GBMMS score and *health care access* (p<0.0001; r=−0.431). All three of the GBMMS sub-scales were also significantly negatively correlated with health care access (Suspicion: p<0.0001; r=−0.294; Discrimination: p<0.0001; r=−0.287; Lack of Support: p<0.0001; r=−0.473). The total GBMMS score and the three subscales were positively correlated with *avoidance of health care* (total score: p<0.0001; r=0.344; Suspicion: p<0.0001; r=0.267; Discrimination: p=0.0004; r=0.246; Lack of Support: p<0.0001; r=0.323). *Health care satisfaction* was negatively correlated with the total GBMMS and Suspicion (p=0.01; r=−0.175), Discrimination (p=0.007; r=−0.191) and Lack of Support (p=0.002; r=−0.222). Of note, while statistically significant, these correlations were relatively weak to moderate in strength.

Results from ANOVA showed that there was a marginally significant difference in total GBMMS scores between men with a *regular primary care provider and those without*, [F(1,199)=3.69, p=0.056]. Men without a regular primary medical provider had higher overall GBMMS mistrust scores (mean=2.66) compared with men with a regular medical provider (mean=2.45). However, analysis of sub-scales revealed only Lack of Support scores differed between men with a regular medical provider and those without [2.62 vs. 2.97 respectively; F(1,199)=7.14, p=0.008]. In addition, men who had a *physician visit in the previous year* had lower overall GBMMS scores (mean=2.36) than those reporting no visit (mean=2.73) [F(1,196)=14.36, p=0.0002]. All sub-scales were also significantly associated with this variable, demonstrating associations of similar magnitudes (data not shown).

Prostate Cancer Screening. Further evidence of construct validity was provided by the negative correlations between GBMMS and *attitudes about PCa screening*, for both DRE and PSA test (p=0.02; r=−0.218 and r=−0.157, respectively). The Suspicion sub-scale was also significantly negatively correlated with both attitudes towards DRE (p=0.005; r=−0.198) and attitudes towards PSA tests (p=0.018; r=−0.167), while the Lack of Support sub-scale was significantly negatively correlated with attitudes towards DRE (p=0.004; r=−0.203) and attitudes towards PSA tests (p=0.09; r=−0.118). While statistically significant, these correlations were relatively weak to moderate in strength. There was a non-significant association between total

Table 4. Results of the Factor Loading Matrix for the Confirmatory Factor Analysis for the Group-Based Medical Mistrust Scale (GBMMS) (n=201)

Scale item	Factor 1: Suspicion	Factor 2: Discrimination	Factor 3: Lack of support
Suspicion cluster 1 (items 3,4,5)	0.83	–	–
Suspicion cluster 2 (items 6,7)	0.94	–	–
Disparities cluster 1 (item 8)	–	0.76	–
Disparities cluster 2 (item 10)	–	0.89	–
Disparities cluster 3 (item 11)	–	0.77	–
Lack of support cluster 1 (items 1, 12)	–	–	0.82
Lack of support cluster 2 (item 2)	–	–	0.53
Inter-factor correlations between GBMMS sub-scales			
Factor 1 (Suspicion)	1.00	–	–
Factor 2 (Discrimination)	0.41	1.00	–
Factor 3 (Lack of support)	0.62	0.71	1.00
Global goodness of fit statistics			
Chi-square (p-value)	RMSEA	90% CI, RMSEA	P-value for test of close fit
10.90 (p=0.45)	0.0	(0.0; 0.07)	P=0.80

GBMMS and ever having been screened for prostate cancer in the past {DRE: [F(1,199)=0.80, p=0.37]; PSA: [F(1,198)=0.41, p=0.52]}. However, the Lack of Support sub-scale was significantly associated with ever having a DRE [F(1,199)=4.54, p=0.03]; mean score of 2.60 for 'Ever screened' and 2.86 for 'Never screened.' Accounting for awareness of PCa screening controversies did not change the nature of these associations.

Race-related Experience. Construct validity was also supported by positive correlations between total GBMMS and *racial identity* (p=0.005; r=0.195). Both the Discrimination and Lack of Support sub-scales were significantly positively (though relatively weakly) correlated with racial identity (Discrimination: p<0.0001; r=0.297; Lack of Support: p=0.004; r=0.201).

Analysis of variance showed that the total GBMMS was associated with greater *residential racial segregation*, [F(2,198)=3.55, p=0.03] such that those participants in census tracts with a high proportion of Blacks had higher GBMMS scores than those in tracts with a moderate proportion (low=2.53; moderate=2.28; high=2.62). Only the Lack of Support sub-scale was significantly associated with residential segregation [low=2.77; moderate=2.29; high=2.91; F(1,198)=8.21, p<0.001].

DISCUSSION

The goal of this paper was to investigate the psychometric properties of the GBMMS in a sample of urban Black men. Results of the confirmatory factor analysis showed that the three-factor structure from previous work fit the data well with the exception of one item that was dropped from subsequent analyses. There were no other differences in the psychometric properties of the GBMMS in this validation compared to the previous validation among women. The reliability of the total GBMMS and its sub-scales remained strongly consistent with previous reports.[13,17–19]

The GBMMS demonstrated robust construct validity. The total GBMMS was significantly associated with health care access, avoidance, and satisfaction. In addition, men reporting no physical examination in a year or longer had higher GBMMS scores than those who reported having an exam within the past year. All of the GBMMS sub-scales were also significantly related to most of these variables. These results support the conceptual underpinnings of medical mistrust such that those with greater mistrust are less likely to be engaged in routine care, with important implications for health promotion and disease prevention.

We examined GBMMS in relation to PCa screening, a complex area given some of the clinical uncertainty and controversy that exists, potentially warranting mistrust. Although the GBMMS was negatively related to favorable attitudes about PCa tests, it was not strongly associated with reports of past PCa screening (with the exception of the Lack of Support sub-scale). These results could suggest that while mistrust is associated with lower health care involvement and more negative attitudes, it may not be a marker of total evasion of care. Lack of an association with screening could also relate to the fact that there are not national recommendations for population-level PCa screening.[30] These findings should also be considered in light of the fact that analyses were conducted among a sample who agreed to be in an educational PCa intervention study and may have been more likely to be screened and be more educated than men in a more representative community sample. Future studies should investigate these associations, particularly in light of recent controversy over PCa screening.

We also examined the relationship between the GBMMS and indicators of race-related experience. We found that total GBMMS was associated with Black racial identity such that greater mistrust was expressed by those reporting a stronger identification with their racial group. Although no research has examined the association between racial identity and health care mistrust, other studies have examined the relationship between racial identity and global cultural mistrust, and have found cultural mistrust to be strongly and positively correlated with Black racial identity.[40,41]

The total GBMMS was associated with residential racial segregation such that participants in census tracts with a high proportion of Blacks had higher GBMMS scores than those in tracts with a lower proportion. While no studies have examined this association, the possibility that medical mistrust is a consequence of segregation is raised by a small but growing literature outlining the role of residential segregation as a fundamental social determinant of health that limits access to quality health care.[42–44] It is possible that Blacks who live in highly segregated areas experience poorer medical treatment, which contributes to a deep-rooted lack of confidence in health care systems to provide appropriate care for Black people.

Limitations should be acknowledged. Findings are based on cross-sectional data that can only reveal associations at one point in time. Few studies have examined mistrust longitudinally.[45] Such work will be necessary to understand whether mistrust is stable and has the same influence on attitudes and

behaviors over time. Although the study adhered to strict eligibility criteria in terms of race, residence, and PCa screening history, it is based on a non-probability sample and external validity may be limited. For example, our recruitment strategy may have resulted in selection of a non-representative sample, with men having high levels of mistrust potentially less likely to enroll. However, this would have biased our findings towards the null, which may in part explain some of the relatively weak correlations and associations we found among this sample.

These results provide evidence that the GBMMS is a valid, reliable, and appropriate for measuring medical mistrust among urban, Black men. Future research should validate the measure among large, diverse populations and investigate whether medical mistrust is associated with other health behaviors and outcomes, particularly those in which racial/ethnic disparities exist.

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