Trust of Cancer Information Sources Varies by Perceptions of Social Media Health Mis- and Disinformation and Race and Ethnicity among Adults in the United States: Cross-Sectional Study

Jim Stimpson, Sungchul Park, Sandi L. Pruitt, Alexander N. Ortega

Submitted to: JMIR Cancer
on: October 31, 2023

Table of Contents

Trust of Cancer Information Sources Varies by Perceptions of Social Media Health Mis- and Disinformation and Race and Ethnicity among Adults in the United States: Cross-Sectional Study

Jim Stimpson[1] PhD; Sungchul Park[2]; Sandi L. Pruitt[1]; Alexander N. Ortega[3]

[1]University of Texas Southwestern Medical Center Dallas US
[2]Korea University Seol KR
[3]University of Hawai?i at M?noa Honolulu US

Corresponding Author:
Jim Stimpson PhD
University of Texas Southwestern Medical Center
5323 Harry Hines Blvd
Dallas
US

Abstract

Background: Mis and disinformation on social media have become widespread which can lead to a lack of trust in health information sources, and, in turn, lead to negative health outcomes. Moreover, the effect of mis-disinformation on trust of information sources may vary by racial and ethnic minoritized populations.

Objective: We evaluated how trust in multiple sources of cancer information varied by perceptions of health mis and disinformation on social media and race/ethnicity using recently released nationally representative data with new measures on health information seeking.

Methods: Data from the 2022 Health Information National Trends Survey 6 (HINTS 6) were analyzed using multivariable linear probability models. The outcome variable measured the trust in cancer information from different sources. The predictor variables were perceptions about the amount of false or misleading health information on social media and race and ethnicity.

Results: Participants who perceived a lot of health mis-disinformation, relative to those who perceived a little or none, were 13 (95% CI = -19, -7), 17 (95% CI = -24, -11), 11 (95% CI = -18, -4), and 12 (95% CI = -18, -6) percentage points less likely to trust government health agencies, family or friends, charitable organizations, and religious organizations and leaders, respectively. There were several statistically significant interaction effects between the amount of perceived mis- and disinformation and race and ethnicity.

Conclusions: Certain sources of cancer information may need enhanced support from the threat of mis and disinformation such as government health agencies, charitable organizations, religious organizations and leader, and family or friends. Moreover, interventions may benefit from focusing on and partnering with racial and ethnically minoritized populations that are more likely to have low trust of certain cancer information sources associated with mis and disinformation on social media. Clinical Trial: Not applicable

(JMIR Preprints 31/10/2023:54162)
DOI: https://doi.org/10.2196/preprints.54162

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?
- Please make my preprint PDF available to anyone at any time (recommended).
- Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
- Only make the preprint title and abstract visible.
- ✓ **No, I do not wish to publish my submitted manuscript as a preprint.**

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?
- ✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**

Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v

Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

Trust of Cancer Information Sources Varies by Perceptions of Social Media Health Mis- and Disinformation and Race and Ethnicity among Adults in the United States: Cross-Sectional Study

Running title: Social media mis- and disinformation and trust

Jim P. Stimpson, PhD[1,2], Sungchul Park, PhD[3], Sandi L. Pruitt, PhD[1,2], Alexander N. Ortega, PhD[4]

[1] University of Texas Southwestern Medical Center, Peter O'Donnell Jr. School of Public Health, Dallas, Texas, USA

[2] Harold C. Simmons Comprehensive Cancer Center, University of Texas Southwestern Medical Center, Dallas, TX, USA

[3] Korea University, Department of Health Policy and Management, Seoul, Republic of Korea

[4] University of Hawai‘i at Mānoa, Thompson School of Social Work and Public Health, Honolulu, Hawaii, USA

Corresponding author: Jim P. Stimpson. Mailing address: 5323 Harry Hines Blvd, Dallas, TX 75390.

Email address: james.stimpson@utsouthwestern.edu

References: 30
Tables: 4
Figures: 0
Text Word Count: 3046
Abstract Word Count: 450

ABSTRACT

Background: Mis and disinformation on social media have become widespread which can lead to a lack of trust in health information sources, and, in turn, lead to negative health outcomes. Moreover, the effect of mis-disinformation on trust of information sources may vary by racial and ethnic minoritized populations.

Objective: We evaluated how trust in multiple sources of cancer information varied by perceptions of health mis and disinformation on social media and race and ethnicity.

Methods: Cross-sectional, nationally representative survey data of non-institutionalized adults in the United States from the 2022 Health Information National Trends Survey 6 (HINTS 6) were analyzed (N=4,137). The dependent variable measured the level of trust in cancer information sources. The independent variables were perceptions about health mis-and disinformation on social media and race and ethnicity. Multivariable logistic regression models were adjusted for survey weight and design, age, birth gender, race and ethnicity, marital status, urban/rural designation, education, employment status, feelings about household income, frequency of social media visits, personal and family history of cancer. We also tested the interaction effect between perceptions of social media health mis- and disinformation and participants' self-reported race and ethnicity.

Results: Perception of a lot of health mis- and disinformation on social media, relative to perception of less than a lot, was associated with a lower likelihood of high levels of trusting cancer information from government health agencies (OR = .60; 95% CI = .47, .77), family or friends (OR = .56; 95% CI = .44, .71), charitable organizations (OR = .78; 95% CI = .63, .96), and religious organizations and leaders (OR = .64; 95% CI = .52, .79). Among White participants, those who perceived a lot of health misinformation and disinformation on social media were less likely to have high trust of cancer information from government health agencies (margin = 61%; 95% CI = 57-66%) and family or friends (margin = 49%; 95% CI = 43-55%) compared to those who perceived less than a lot of health mis- and disinformation on social media. Among Black participants, those who perceived a lot of health mis- and disinformation on social media were less likely to have high trust of cancer information from religious organizations and leaders (margin = 20%; 95% CI = 10-30%) compared to participants who perceived none/a little of health mis- and disinformation on social media.

Conclusions: Certain sources of cancer information may need enhanced support from the threat of mis and disinformation such as government health agencies, charitable organizations, religious organizations and leader, and family or friends. Moreover, interventions should partner with racial and ethnically minoritized populations that are more likely to have low trust of certain cancer information sources associated with mis and disinformation on social media.

Keywords: Cancer; United States; Cross-Sectional Study; Trust; Consumer Health Information; Misinformation; Disinformation; Race; Ethnicity

INTRODUCTION

Misinformation is unintentionally providing false or inaccurate information, while disinformation is intentionally spreading false or inaccurate information [1-3]. A recent systematic review found that more than 80% of adult social media users perceive some or a lot of false or misleading health information on social media, while nearly a fifth reported either none or a little [4]. Both mis- and disinformation have been linked to reductions in health-promoting behaviors. For example, people who perceive more misinformation in the media are associated with a lower likelihood to get vaccinated against COVID-19 and a greater likelihood of smoking more, and having poorer nutrition than people who perceive less misinformation in the media [5-11]. According to the Comprehensive Model of Information Seeking, misinformation may be associated with a lack of trust in health information sources, which can, in turn, lead to changes in health behaviors [12-13].

There is limited research on misinformation and trust with some mixed findings. Some cross-sectional studies have found that higher perceptions of misinformation are associated with lower trust of the media, while another study of multiple countries including the US did not find a relationship between perceptions of misinformation and trust of news media [14-19]. A gap in the literature is that these studies were not drawn from representative samples and only measured trust in media. Furthermore, the effects of misinformation may be more pronounced among individuals with co-morbidities, particularly cancer, that have complex clinical treatment plans and significant economic costs [20]. For example, cancer survivors are more likely to have a lot of trust of information from doctors compared to persons that have not been diagnosed with cancer [20]. Therefore, there is an evidence gap for the effects of social media mis- and disinformation on trusting different credible sources (e.g., scientists, doctors, government health agencies) of cancer information.

The effect of mis-disinformation on trust may also vary by different population groups. In some studies, racial and ethnic minoritized populations may be less likely to perceive false or misleading health information on social media and to trust non-credible information sources compared to non-Latino Whites [21-22]. The lack of trust may also extend to credible sources of cancer information because, for example, non-Latino Black people and Latinos have reported lower trust of doctors compared to non-Latino Whites [20, 23]. A study of 10-year trends in trust of cancer information found that, compared to non-Latino White participants, non-Latino Black participants were more likely to trust cancer information from media, government, charitable organizations, and religious organizations. In contrast, that same study found that Latino participants were less likely to trust cancer information from doctors compared to non-Latino Whites [24]. There may be differences within Latino populations in trust of cancer information. For example, Cuban Americans and Puerto Ricans were more than twice as likely to trust information about cancer from print media and religious organizations compared to Mexican Americans [25]. However, a recent study found that trust in cancer information from government health agencies and family or friends declined among non-Latino Black participants from 2018 to 2020 [26]. Given these mixed findings, there is a need to examine whether the effect of mis- and disinformation on trust of cancer information varies by racial and ethnic minoritized populations and therefore may be a mechanism to explain these variations and a possible target for interventions to improve trust of cancer information, at least from credible sources such as doctors and scientists [27].

Research Objective

Thus, the purpose of this study is to use recently released nationally representative data to estimate the association between perceptions of health information on social media and level of trust in multiple sources of information about cancer. We hypothesized that perception of a lot of health mis- and disinformation on social media would be associated with lower levels of trust in cancer information sources. By extension, this study evaluated the interaction effect between race and ethnicity of the participants and perceptions of social media health mis- and disinformation on trust of cancer information. We hypothesized that the association between perceptions of a lot of mis- and disinformation on social media and trust in cancer information sources would vary by race and ethnicity. The results of this research have implications for effective communication about cancer in public health education campaigns, especially for racial and ethnic minoritized populations.

METHODS

Data

This study used cross-sectional data from the Health Information National Trends Survey 6 (HINTS 6), which is a nationally representative survey of civilian, non-institutionalized adults 18 years of age and older living in the United States. HINTS provides data on adults' knowledge of cancer risk factors, attitudes towards cancer screening, and cancer prevention and screening behaviors. HINTS 6 employed a two-stage probability sample of residential addresses. Mail and online surveys were administered to household members from March 7 to November 8, 2022 with a response rate of 28.1%.[28] The data are publicly available and de-identified. Further details about the survey methodology and recruitment procedures are available from the HINTS 6 Methodology Report [28].

Given the study focus is perceptions of false or misleading health information on social media, persons that reported that they do not use social media were excluded. There were 4,710 cases with complete data on the dependent and independent variables. After using listwise deletion for 573 cases with missing data on the control variables, the final analytical sample consisted of 4,137 adult social media users.

Measures

Our dependent variables were measured by asking participants “In general, how much would you trust information about cancer from” each of the following sources: a doctor, family or friends, religious organizations and leaders, government health agencies, charitable organizations, and scientists. The response options were dichotomized into low levels of trust (not at all or a little) versus high levels of trust (some or a lot).

The primary independent variable was perceptions about health mis- and disinformation on social media, which was assessed by the following question: “How much of the health information that you see on social media do you think is false or misleading?”. HINTS had not measured perceptions about social media mis-and disinformation in prior iterations of the survey. However, this measure does not differentiate between people’s perceptions of misinformation versus disinformation. The original response categories were a lot, some, a little, none. We dichotomized this as less than a lot (some, a little, none) versus a lot. Race and ethnicity were self-reported by the participants into five categories: non-Latino “White,” “Black,” “Asian American,” and “Other,” and “Latino.”

Demographic control variables included age (18-34, 35-49, 50-64, 65+), sex (male, female), marital status (married/cohabiting, formerly married, never married), residence in a metropolitan versus nonmetropolitan county as designated by the United States Department of Agriculture in 2013, education (high school or less, some college, college degree or higher), full-time employment status, and feelings about household income (finding it very/difficult on present income, getting by on present income, living comfortably on present income). It should be noted that age is not collected as a continuous variable in HINTS which limits the age categories that can be analyzed. In addition, we controlled for frequency of visiting social media sites (never, monthly/weekly, daily) in the past 12 months, personal and family (first or second-degree biological relatives) history of cancer.

Statistical Analysis

All analyses accounted for survey weights and design using jackknife replicate weights for variance estimation. Statistical significance was set at alpha < .05. The descriptive statistics for the study sample were calculated as survey weighted percentages accompanied with the raw sample size for each variable. The bivariate relationship between level of trust in cancer information and perceptions of mis- and disinformation were calculated with cell percentages and adjusted Wald p-values. Then, multivariable logistic regression models were calculated for each dichotomous outcome. In addition to the main effect, we also tested the interaction effect between perceptions of health mis- and disinformation on social media and participants' self-reported race and ethnicity. To facilitate interpretation of the interaction effect, we calculated predicted marginal effects from the multivariable logistic regression models.

For this study, the primary focus was about perceptions of information on social media. Therefore, we conducted a sensitivity analysis in which we excluded 257 adults who had not visited a social media site in the past year or reported that they do not use social media (n = 3,880). After excluding these participants, the results were similar as shown in Appendix Table A1. In addition, we conducted a sensitivity analysis for an ordinal measurement of the dependent variables (a lot, some, a little, not at all) using ordered logit regression and we found that the results were replicated with this alternative measurement as shown in Appendix Table A2. Another sensitivity analysis included participants that do not use social media (n = 4,986). After including participants that do not use social media, the results were similar as shown in Appendix Table A3. In Appendix A4, we tested an alternative measurement of the independent variable in which perception of 'a lot' of social media mis-disinformation was compared with respondents that reported 'some' and 'none or a little.' For this sensitivity analysis, we combined 'none and a little' because only 108 participants chose 'none' for this measure. We replicated the main result using this alternative measurement of the independent variable.

Ethical Considerations

The University of Texas Southwestern Medical Center institutional review board determined that the study was exempt from review because it used publicly available data without personal identifiers.

RESULTS

Table 1 provides the survey weighted percentages for the study variables. Most participants in the survey reported high trust of cancer information from a doctor (95%), scientists (86%), and government health agencies (71%). About half reported high trust of cancer information from family or friends (54%) and charitable organizations (49%). About a quarter of participants reported high trust of cancer information from religious organizations and leaders (26%). When participants were asked about perceptions of false or misleading health information on social media, most reported less than a lot (63%) and 37% reported a lot.

Table 1: Unadjusted sample size and survey weighted percentages for study variables, HINTS 6, 2022, N = 4,137

	Raw N	**Weighted %**
Outcome Variables		
In general, how much would you trust information about cancer from a doctor?		
Low	200	5%
High	3,937	95%
In general, how much would you trust information about cancer from scientists?		
Low	525	14%
High	3,612	86%
In general, how much would you trust information about cancer from government health agencies?		
Low	1,077	29%
High	3,060	71%
In general, how much would you trust information about cancer from family or friends?		
Low	1,874	46%
High	2,263	54%
In general, how much would you trust information about cancer from charitable organizations?		
Low	2,050	51%
High	2,087	49%
In general, how much would you trust information about cancer from religious organizations and leaders?		
Low	3,034	74%
High	1,103	26%
Independent Variables		
How much of the health information that you see on social media do you think is false or misleading?		
< A lot	2,643	63%
A lot	1,494	37%
Race and Ethnicity		
Non-Latino White	2,381	61%
Non-Latino Black	643	11%
Latino	734	17%
Non-Latino Asian American	230	6%
Non-Latino Other	149	5%
Age Group		
18-34	771	29%
35-49	1,012	29%

50-64	1,222	27%
65+	1,132	15%
Birth Gender		
Male	1,586	48%
Female	2,551	52%
Marital Status		
Married/Cohabiting	2,290	57%
Formerly Married	994	10%
Never Married	853	33%
USDA 2013 Rural/Urban Designation		
Nonmetropolitan	512	12%
Metropolitan	3,625	88%
Education		
High school or less	812	25%
Some college	1,185	39%
College graduate or higher	2,140	36%
Work Full Time (past 30 days)		
No	1,878	40%
Yes	2,259	60%
Feelings About Household Income		
Finding it very/difficult on present income	811	19%
Getting by on present income	1,505	36%
Living comfortably on present income	1,821	45%
Frequency of social media site visits		
Never	257	6%
Monthly / Weekly	1,119	25%
Daily	2,761	70%
Personal history of cancer		
No	3,593	91%
Yes	544	9%
Family history of cancer		
No	1,259	35%
Yes	2,878	65%

Table 2 provides the bivariable relationship between the outcome variables and the independent variable. There was not a statistically significant relationship between perception of mis- and disinformation and trust of cancer information from doctors (p = .927) or scientists (p = .846). However, there was a statistically significant bivariable relationship between perception of mis- and disinformation and trust of cancer information from government health agencies (p < .001), family or friends (p < .001), charitable organizations (p = .007), and religious organizations and leaders (p < .001). About a quarter of participants (24%) that perceived a lot of mis-disinformation on social media had a high level of trust of government health agencies. Nearly half of participants (47%) that perceived less than a lot of mis-disinformation on social media had a high level of trust of government health agencies. Only 17% participants that perceived a lot of mis-disinformation on social media had a high level of trust of family or friends. In contrast, 37% of participants that perceived less than a lot of mis-disinformation on social media had a high level of trust of family or friends. Only 16% of participants that perceived a lot of mis-disinformation on social media had a high level of trust of charitable organizations. A third of participants (33%) that perceived less than a lot of mis-disinformation on social media had a high level of trust of charitable organizations. Finally, only 7% of participants that perceived a lot of mis-disinformation on social media had a high level of trust of religious organizations and leaders. Nearly 1 in 5 participants (19%) that perceived less than a lot of mis-disinformation on social media had a high level of trust of religious organizations and leaders.

Table 2: Survey weighted, unadjusted bivariable relationship between trust of cancer information source (low vs. high) and perception of health mis- and disinformation on social media (< a lot vs. a lot), HINTS 6, 2022, n = 4,137

	Trust of Cancer Information Source											
	Doctor		**Scientists**		**Government Health Agencies**		**Family or Friends**		**Charitable Organizations**		**Religious Organizations & Leaders**	
Perception of amount of health information on social media that is false or misleading	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
< A lot, %	3	60	9	54	16	47	26	37	31	33	45	19
A lot, %	2	35	5	32	13	24	20	17	20	16	29	7
p-value	.927		.846		<.001		< .001		.007		< .001	

Note: P-value is calculated with an adjusted Wald chi-square test.

Table 3 provides the multivariable odds ratios and 95% confidence intervals calculated from logistic regression. Perception of a lot of health mis- and disinformation on social media, relative to perception of less than a lot, was associated with a lower likelihood of high levels of trusting cancer information from government health agencies (OR = .60; 95% CI = .47, .77), family or friends (OR = .56; 95% CI = .44, .71), charitable organizations (OR = .78; 95% CI = .63, .96), and religious organizations and leaders (OR = .64; 95% CI = .52, .79).There was not a statistically significant association between perception of social media health mis-and disinformation and level of trust in cancer information from doctors (OR = .95; 95% CI = .45, 2.01) or scientists (OR = .98; 95% CI = .72, 1.33).

Table 3: Multivariable odds ratios and 95% confidence intervals for perceptions of social media health mis- and disinformation and trust of cancer information sources, HINTS 6, 2022, N = 4,137

	Trust of Cancer Information Source											
	Doctor		**Scientists**		**Government Health Agencies**		**Family or Friends**		**Charitable Organizations**		**Religious Organizations & Leaders**	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Perception of amount of health information on social media that is false or misleading												
< A lot (ref)												
A lot	.95	.45, 2.01	.98	.72, 1.33	.60	.47, .77	.56	.44, .71	.78	.63, .96	.64	.52, .79

Note: OR=Odds Ratio; CI = Confidence Interval. Logistic regression models were adjusted for survey weight and design, age, birth gender, marital status, urban/rural designation, race and ethnicity, education, employment status, feelings about household income, frequency of social media visits, personal and family history of cancer.

Table 4 provides the predicted marginal effects, interpreted as percentage points, calculated from the multivariable logistic regression adjusted interaction effects between perceptions of health mis-and disinformation on social media and participant’s self-reported race and ethnicity. There was not a statistically significant interaction effect between perception of mis- and disinformation, race and ethnicity, and trust of cancer information from doctors or scientists. Among White participants, those who perceived a lot of health misinformation and disinformation on social media were less likely to have high trust of cancer information from government health agencies (61%; 95% CI = 57-66%) and family or friends (49%; 95% CI = 43-55%) compared to those who perceived less than a lot of health mis- and disinformation on social media. Among Black participants, those who perceived a lot of health mis- and disinformation on social media were less likely to have high trust of cancer information from religious organizations and leaders (20%; 95% CI = 10-30%) compared to participants who perceived less than a lot of health mis- and disinformation on social media.

Table 4: Multivariable adjusted percentage points for trusting cancer information by source and the interaction effect between race and ethnicity and perceptions of health mis- and disinformation on social media, HINTS 6, 2022, N = 4,137

		Trust of Cancer Information Source								
		Doctor			Scientists			Government Health Agencies		
	Perception of false or misleading health information	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI
Non-Latino	< A lot	96	93	98	86	83	90	74	71	78

White										
	A lot	95	93	97	85	82	89	61	57	66
Non-Latino Black	< A lot	96	94	99	80	71	88	75	66	84
	A lot	96	92	101	86	76	95	71	60	83
Latino	< A lot	93	89	98	87	83	92	77	68	85
	A lot	96	92	100	87	82	95	72	63	82
Non-Latino Asian American	< A lot	89	61	117	90	82	98	77	58	96
	A lot	99	93	105	93	80	104	86	68	103
Non-Latino Other	< A lot	96	84	107	89	78	100	82	72	92
	A lot	85	70	99	86	70	101	56	36	77
		Trust of Cancer Information Source								
		Family or Friends			Charitable Organizations			Religious Organizations & Leaders		
		%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI
Non-Latino White	< A lot	62	57	68	51	46	56	23	20	26
	A lot	49	43	55	43	38	49	19	15	22
Non-Latino Black	< A lot	62	53	71	57	50	64	49	40	57
	A lot	47	33	61	58	44	73	20	10	30
Latino	< A lot	48	39	56	50	42	58	40	28	51
Non-Latino Asian American	A lot	37	28	47	57	46	68	29	17	40
Non-Latino Asian American	< A lot	54	41	67	44	30	58	26	12	40
	A lot	32	14	50	34	9	59	23	4	42
Non-Latino Other	< A lot	68	53	82	58	38	77	33	16	50
	A lot	46	26	67	28	14	42	13	2	24

Note: CI = confidence interval. Predicted marginal effects were calculated from multivariable logistic regression models that were adjusted for survey weight and design, age, birth gender, marital status, urban/rural designation, education, employment status, feelings about household income, frequency of social media visits, personal and family history of cancer.

DISCUSSION

We found that trust in cancer information from doctors or scientists does not vary based on perceptions of health mis- and disinformation on social media. This suggests that people view doctors and scientists as credible sources of cancer information. However, we found that perception of a lot of mis- and disinformation was associated with reduced levels of trust in cancer information from family or friends, government health agencies, charitable organizations, and religious organizations and leaders. This finding supports other studies that found that mis- and disinformation is associated with reductions in trust in media but extends this prior literature by finding an impact on trust in other sources of cancer information [14-19]. Moreover, this finding is consistent with the Comprehensive Model of Information Seeking that identifies trust as a mechanism linking mis- and disinformation to health behaviors [12-13].

There were notable variations in the relationship between trust of cancer information sources, perceptions of false or misleading health information, and race and ethnicity. For instance, we found that Black participants who perceived a lot of health mis- and disinformation on social media were less likely to have high trust of cancer information from religious organizations and leaders compared to Black participants who perceived less than a lot of health mis-disinformation on social media. Another contribution of our study is that White participants who perceived a lot of health misinformation and disinformation on social media were less likely to have high trust of cancer information from government health agencies and family or friends compared to White participants who perceived less than a lot of health misinformation and disinformation on social media. There have been mixed findings on trust in cancer information sources by race and ethnicity in the recent literature with one study finding higher trust among Black participants for several sources of cancer information compared to White participants and lower trust in doctors among Latino participants compared to White participants [21-25]. However, another study found that trust in cancer information from government health agencies and family or friends declined among Black participants after the COVID-19 pandemic [26]. Our study adds to this literature by identifying that the effect of mis- and disinformation on trusting information sources may vary by racial and ethnic minoritized populations.

Limitations

We were able to replicate the findings of the study using several different sensitivity analyses as shown in the appendices. However, the results should be interpreted within the constraints of the cross-sectional data. First, this study cannot be used to determine the causal relationship between perceptions of mis- and disinformation and trust in social institutions. Second, the 2022 wave of the HINTS survey was the first time that the public’s perceptions of mis- and disinformation were measured. If this measure is collected in subsequent iterations of HINTS, then analyses may be able to detect changes in the association between mis-disinformation and trust in information sources over time. We note that perceptions of mis- and disinformation may not be an accurate measure of objective exposure to social media mis- and disinformation. Further, this measure does not differentiate between people’s perceptions of misinformation versus disinformation. Another limitation is that the focus of this study was on social media mis- and disinformation rather than all media such as traditional television and print, and therefore the results should be interpreted for this specific form of media. Finally, this study is focused on trust about cancer information and the findings might not apply to trust of other types of health information. By extension, levels of trust for government information may differ between federal and state government health agencies which was not differentiated in our study [29-30].

CONCLUSION

Certain sources of cancer information may need enhanced support from the threat of mis and disinformation such as government health agencies, charitable organizations, religious organizations and leader, and family or friends. Moreover, there were notable variations in the relationship between trust of cancer information sources (government health agencies, family or friends, religious organizations, and leaders), perceptions of false or misleading health information, and race and ethnicity. One positive finding is that perceptions of mis- and disinformation were not associated with levels of trust in credible sources of cancer information such as doctors or scientists overall or by race and ethnicity. In prior work, researchers have suggested that interventions should be focused on improving trust in science [1]. Although bolstering trust in science or doctors is important, our findings indicate that other sources of cancer information may be more susceptible to the threat of mis and disinformation. Moreover, interventions should partner with racial and ethnically minoritized populations that are more likely to have low trust of certain cancer information sources associated with mis- and disinformation on social media.

APPENDIX

Table A1: Multivariable logistic regression models for trusting cancer information by source among social media users in the past year, HINTS 6, 2022, N = 3,880

	Trust of Cancer Information Source											
	Doctor		**Scientists**		**Government Health Agencies**		**Family or Friends**		**Charitable Organizations**		**Religious Organizations & Leaders**	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Perception of amount of health information on social media that is false or misleading												
< A lot (ref)												
A lot	.84	.49, 1.44	1.06	.75, 1.49	.61	.48, .76	.55	.44, .70	.78	.62, .97	.65	.52, .80

Note: OR=Odds Ratio; CI = Confidence Interval. This logistic regression analysis excluded 257 adult social media users who had not visited a social media site in the past year.

Table A2: Multivariable ordered logit regression models for ordinal measurement of trusting cancer information by source, HINTS 6, 2022, N = 4,137

	Trust of Cancer Information Source											
	Doctor		**Scientists**		**Government Health Agencies**		**Family or Friends**		**Charitable Organizations**		**Religious Organizations & Leaders**	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Perception of amount of health information on social media that is false or misleading												
< A lot (ref)												
A lot	.89	.64, 1.23	1.07	.86, 1.34	.71	.55, .91	.56	.45, .72	.73	.58, .92	.56	.46, .67

Note: OR=Odds Ratio; CI = Confidence Interval. This ordered logit regression analysis used an alternative measurement of the outcome variable coded as A lot, Some, A little, Not at All.

Table A3: Multivariable logistic regression models for trusting cancer information by source among all survey participants, HINTS 6, 2022, N = 4,986

	Trust of Cancer Information Source											
	Doctor		**Scientists**		**Government Health Agencies**		**Family or Friends**		**Charitable Organizations**		**Religious Organizations & Leaders**	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Perception of amount of health information on social media that is false or misleading												
< A lot (ref)												
A lot	1.17	.72, 1.89	.94	.70, 1.27	.69	.53, .88	.63	.52, .76	.73	.58, .92	.72	.55, .93

Note: OR=Odds Ratio; CI = Confidence Interval. This logistic regression analysis included participants that do not use social media.

Table A4: Multivariable logistic regression models for trusting cancer information by source, HINTS 6, 2022, N = 4,137

	Trust of Cancer Information Source											
	Doctor		**Scientists**		**Government Health Agencies**		**Family or Friends**		**Charitable Organizations**		**Religious Organizations & Leaders**	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Perception of amount of health information on social media that is false or misleading												
None / A little (ref)												
Some	1.56	.84, 2.91	.95	.61, 1.48	.84	.61, 1.17	.82	.63, 1.07	.75	.57, .99	.78	.54, 1.11
A lot	1.27	.59, 2.71	.95	.62, 1.42	.53	.38, .73	.49	.38, .63	.64	.47, .86	.53	.39, .72

Note: OR=Odds Ratio; CI = Confidence Interval. In this logistic regression analysis, we tested an alternative measurement of the independent variable in which perception of ‘a lot’ of social media mis-disinformation was compared with respondents that reported ‘some’ and ‘none or a little.’ For this sensitivity analysis, we combined ‘none and a little’ because only 108 participants chose ‘none’ for this measure.

REFERENCES

1. Office of the U.S. Surgeon General. Confronting Health Misinformation: The U.S. Surgeon General's Advisory on Building a Healthy Information Environment. July 14, 2021. https://www.hhs.gov/surgeongeneral/priorities/health-misinformation/index.html
2. Southwell BG, Brennen JS, Paquin R, Boudewyns V, Zeng J. Defining and measuring scientific misinformation. The ANNALS of the American Academy of Political and Social Science. 2022 Mar;700(1):98-111. https://doi.org/10.1177/00027162221084709
3. Aïmeur E, Amri S, Brassard G. Fake news, disinformation and misinformation in social media: a review. Soc Netw Anal Min. 2023;13(1):30. doi: 10.1007/s13278-023-01028-5. Epub 2023 Feb 9. PMID: 36789378; PMCID: PMC9910783.
4. Suarez-Lledo V, Alvarez-Galvez J. Prevalence of Health Misinformation on Social Media: Systematic Review. J Med Internet Res. 2021 Jan 20;23(1):e17187. doi: 10.2196/17187. PMID: 33470931; PMCID: PMC7857950.
5. Nan X, Wang Y, Thier K. Why do people believe health misinformation and who is at risk? A systematic review of individual differences in susceptibility to health misinformation. Soc Sci Med. 2022 Dec;314:115398. doi: 10.1016/j.socscimed.2022.115398. Epub 2022 Oct 21. PMID: 36327631.
6. Park S, Massey PM, Stimpson JP. Primary Source of Information About COVID-19 as a Determinant of Perception of COVID-19 Severity and Vaccine Uptake : Source of Information and COVID-19. J Gen Intern Med. 2021 Oct;36(10):3088-3095. doi: 10.1007/s11606-021-07080-1. Epub 2021 Aug 10. PMID: 34378115; PMCID: PMC8354304.
7. Perlis RH, Lunz Trujillo K, Green J, et al. Misinformation, Trust, and Use of Ivermectin and Hydroxychloroquine for COVID-19. JAMA Health Forum. 2023;4(9):e233257. doi:10.1001/jamahealthforum.2023.3257
8. Janmohamed K, Walter N, Sangngam N, Hampsher S, Nyhan K, De Choudhury M, Kumar N. Interventions to Mitigate Vaping Misinformation: A Meta-Analysis. J Health Commun. 2022 Feb 1;27(2):84-92. doi: 10.1080/10810730.2022.2044941. Epub 2022 Feb 27. PMID: 35220901.
9. Morgan JC, Cappella JN. The Effect of Repetition on the Perceived Truth of Tobacco-Related Health Misinformation Among U.S. Adults. J Health Commun. 2023 Mar 4;28(3):182-189. doi: 10.1080/10810730.2023.2192013. Epub 2023 Mar 20. PMID: 36938585.
10. Nguyen V, Testa L, Smith AL, Ellis LA, Dunn AG, Braithwaite J, Sarkies M. Unravelling the truth: Examining the evidence for health-related claims made by naturopathic influencers on social media - a retrospective analysis. Health Promot Perspect. 2022 Dec 31;12(4):372-380. doi: 10.34172/hpp.2022.49. PMID: 36852198; PMCID: PMC9958238.
11. Diekman C, Ryan CD, Oliver TL. Misinformation and Disinformation in Food Science and Nutrition: Impact on Practice. J Nutr. 2023 Jan;153(1):3-9. doi: 10.1016/j.tjnut.2022.10.001. Epub 2022 Dec 22. PMID: 36913465.
12. Lalazaryan A, Zare-Farashbandi F. A review of models and theories of health information seeking behavior. International Journal of Health System and Disaster Management. 2014 Oct 1;2(4):193-203. doi: 10.4103/2347-9019.144371
13. Johnson JD, Meischke H. A comprehensive model of cancer-related information seeking applied to magazines. Human Communication Research. 1993 Mar 1;19(3):343-67.
14. Ognyanova K, Lazer D, Robertson RE, Wilson C. Misinformation in action: Fake news exposure is linked to lower trust in media, higher trust in government when your side is in power. Harvard Kennedy School Misinformation Review. 2020 Jun 2.
15. Boulianne S, Humprecht E. Perceived Exposure to Misinformation and Trust in Institutions in Four Countries Before and During a Pandemic. International Journal of Communication. 2023 Feb 26;17:24.
16. Lee SJ, Lee CJ, Hwang H. The impact of COVID-19 misinformation and trust in institutions on preventive behaviors. Health Educ Res. 2023 Jan 20;38(1):95-105. doi: 10.1093/her/cyac038.

Erratum in: Health Educ Res. 2023 Feb 09. PMID: 36564938.

17. Islam MS, Mahmud R, Ahmed B. Trust in government during COVID-19 pandemic in Bangladesh: an analysis of social media users' perception of misinformation and knowledge about government measures. International Journal of Public Administration. 2023 Jun 11;46(8):570-86. doi: 10.1080/01900692.2021.2004605
18. Santirocchi A, Spataro P, Alessi F, Rossi-Arnaud C, Cestari V. Trust in science and belief in misinformation mediate the effects of political orientation on vaccine hesitancy and intention to be vaccinated. Acta Psychol (Amst). 2023 Jul;237:103945. doi: 10.1016/j.actpsy.2023.103945. Epub 2023 May 19. PMID: 37210865.
19. Hameleers M, Brosius A, de Vreese CH. Whom to trust? Media exposure patterns of citizens with perceptions of misinformation and disinformation related to the news media. European journal of communication. 2022 Jun;37(3):237-68. https://doi.org/10.1177/02673231211072667
20. Williams JS, Fong-Gurzinsky J, Nagavally S, Walker RJ, Asan O, Ozieh MN, Egede LE. Preferences in trust regarding the provision of cancer information among adults. J Natl Med Assoc. 2021 Aug;113(4):457-464. doi: 10.1016/j.jnma.2021.03.003. Epub 2021 Apr 1. PMID: 33814180; PMCID: PMC8380638.
21. Wheldon CW, Carroll KT, Moser RP. Trust in Health Information Sources among Underserved and Vulnerable Populations in the U.S. J Health Care Poor Underserved. 2020;31(3):1471-1487. doi: 10.1353/hpu.2020.0106. PMID: 33416706.
22. Alcalá HE, Sharif MZ, Morey BN. Misplaced Trust: Racial Differences in Use of Tobacco Products and Trust in Sources of Tobacco Health Information. Nicotine Tob Res. 2017 Oct 1;19(10):1199-1208. doi: 10.1093/ntr/ntx080. PMID: 28387825; PMCID: PMC6580933.
23. Richardson A, Allen JA, Xiao H, Vallone D. Effects of race/ethnicity and socioeconomic status on health information-seeking, confidence, and trust. J Health Care Poor Underserved. 2012 Nov;23(4):1477-93. doi: 10.1353/hpu.2012.0181. PMID: 23698662.
24. Fareed N, Swoboda CM, Jonnalagadda P, Walker DM, Huerta TR. Differences Between Races in Health Information Seeking and Trust Over Time: Evidence From a Cross-Sectional, Pooled Analyses of HINTS Data. Am J Health Promot. 2021 Jan;35(1):84-92. doi: 10.1177/0890117120934609. Epub 2020 Jun 26. PMID: 32588638.
25. Camacho-Rivera M, Gonzalez CJ, Morency JA, Blake KD, Calixte R. Heterogeneity in Trust of Cancer Information among Hispanic Adults in the United States: An Analysis of the Health Information National Trends Survey. Cancer Epidemiol Biomarkers Prev. 2020 Jul;29(7):1348-1356. doi: 10.1158/1055-9965.EPI-19-1375. PMID: 32611616.
26. Baeker Bispo J, Douyon A, Ashad-Bishop K, Balise R, Kobetz E. How Trust in Cancer Information Has Changed in the Era of COVID-19: Patterns by Race and Ethnicity. J Health Commun. 2023 Mar 4;28(3):131-143. doi: 10.1080/10810730.2022.2117439. Epub 2023 Mar 16. PMID: 36927415; PMCID: PMC10132996.
27. Stimpson JP, Ortega AN. Social media users' perceptions about health mis- and disinformation on social media. Health Affairs Scholar. 2023 Oct 12;1(4):1-6. https://doi.org/10.1093/haschl/qxad050
28. National Cancer Institute. Health Information National Trends Survey 6 (HINTS 6) Methodology Report. April 2023. https://hints.cancer.gov/data/methodology-reports.aspx
29. Li H, Chen B, Chen Z, Chen L, Zhang D, Wen M, Li J, Li Y, Han X, Su D. Trust in COVID-19 Information from Different Media Types and Its Association with Preventive Measures Adoption in the U.S. J Health Commun. 2023 Oct 3;28(10):633-647. doi: 10.1080/10810730.2023.2245373. Epub 2023 Sep 4. PMID: 37665096.
30. Li H, Chen B, Chen Z, Shi L, Su D. Americans' Trust in COVID-19 Information from Governmental Sources in the Trump Era: Individuals' Adoption of Preventive Measures, and Health Implications. Health Commun. 2022 Nov;37(12):1552-1561. doi: 10.1080/10410236.2022.2074776. Epub 2022 May 19. PMID: 35587035.

Acknowledgements

This research was supported by the National Institute on Minority Health and Health Disparities (NIMHD) under award number R01MD018727. The content is solely the responsibility of the authors and does not necessarily represent the official views of NIMHD. The funders had no role in study design, data analysis, decision to publish, or preparation of the manuscript.

Data Availability

The data underlying the results presented in the study are publicly available from the National Cancer Institute at this web address: https://hints.cancer.gov/.

Author Contributions

All authors contributed to the study conception and design. Data analysis was performed by Jim Stimpson. The first draft of the manuscript was written by Jim Stimpson. All authors contributed to subsequent drafts of the manuscript. All authors read and approved the final version of the manuscript.

Conflicts of Interest

Jim Stimpson and Sungchul Park and Alexander Ortega have no relevant financial or non-financial conflicts of interest to disclose. Unrelated to this work, Sandi Pruitt receives consulting fees from Pfizer.