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Online health information seeking, medical care beliefs and timeliness of medical check-ups among African Americans

Ornella Hills*, Dhavan Shah

University of Wisconsin-Madison, School of Journalism and Mass Communication, 5115 Vilas Hall, 821 University Avenue, Madison, WI 53705, United States

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ABSTRACT

Objective: This study aims to investigate the relationship among different types of internet sources for health, medical check-up beliefs and the timeliness of annual medical check-ups among African Americans, accounting for both health TV usage and health service use.
Methods: Hierarchical linear regression analysis was conducted on data from 1734 African Americans surveyed in the 2013 Consumer Health Multimedia Audience Research Systems national pharmaceutical study of 19,420 U.S. adults.
Results: The results indicate a positive association between seeking health information on medical websites ($\beta = 0.052$, $p = 0.04$) and consumer-driven health sites ($\beta = 0.066$, $p < 0.01$), and the timeliness of check-ups among African Americans, an association not found in relation to mainstream or news-related sites. Health TV program use was not associated with timeliness of medical check-ups. Medical check-up belief is positively associated with seeking health info on consumer-driven health sites ($\beta = 0.072$, $p < 0.01$) but not on medical sites or on TV.
Conclusion: Seeking information on health-specific websites was associated with more timely check-ups in African Americans and more positive preventative medical care belief, even after controlling for traditional barriers, such as poor provider relationship.
Practice Implications: Health specific websites may provide an avenue for intervention to improve preventative care use in African Americans.

1. Introduction

Heart disease, diabetes and cancer are among the top 5 leading causes of death among African Americans in 2017 and studies continue to report low adherence to screening guidelines for these and other chronic illnesses for African Americans [1–4]. Periodic medical exams, such as annual medical check-ups are critical in preventing these overdue screenings, detecting medical concerns early and treating emerging ailments. Yet barriers to medical care service use, such as inaccessibility, negative beliefs and attitudes, lagging literacy, physician distrust and systematic prejudice, continue to limit African American's ability to take full advantage of the health care system [5–10]. This study investigates whether utilizing the internet for health or medical information relates to preventative care use and might help overcome barriers.

1.1. Internet use for health among african americans

Despite studies reporting positive attitudes towards internet use for health among African Americans, poor internet access and low eHealth literacy continue to present barriers [1,11–13]. Only 73 % of Blacks in a 2013 study reported using online social networks; in 2015, only 78 % reported using the internet in general [14,15]. In addition, other studies report 60 % of older, lower income African Americans having no internet access at home [13]. Healthy People 2020 aims to increase the proportion of health info-seekers reporting easy access to information online [16]. We aim to add to the evidence suggesting internet access and use could increase timely preventative medical care and help reduce the chronic disease burden among African Americans [17,18].

1.2. Conceptual model

Though studies have investigated the effect of the internet on medical care service use, health behaviors and health outcomes, few studies have made inroads into the mechanisms driving these effects. To address this, we draw upon the Orientation-Stimulus-Outcomes Orientation-Response Model (O1-S-O2-R) to conceptualize the impact

* Corresponding author.
E-mail addresses: ohills@wisc.edu (O. Hills), Dshah@wisc.edu (D. Shah).

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of online health information seeking on the timeliness of medical check-ups. The O1-S-O2-R model, proven effective in other efforts to explain behavioral outcomes relating to political communications and the internet [19,20], has seldom been used to explain preventative health beliefs.

The model stipulates that various factors known to impact medical care service use and online health information seeking such as, socio-demographics and health insurance, act as *orientation variables,* (O_1). Orientations shape exposure to health information on media platforms, the *stimuli* (S). Studies have found that females and higher income individuals are more likely to seek health information online while Blacks are more likely to seek health information from television programs [21].

The health information from media then influences an individual's attitude or behavior, the *outcomes orientation variable* (O_2). In this study, it is one's "medical check-up beliefs." This effect on medical check-up beliefs is then thought to subsequently impact the predicted behavior, the *response variable* (R), a timely medical check-up (see Fig. 1).

The information and messages found on media platforms may: i) support check-ups and other preventative health behaviors, or ii) address specific health concerns and treatment plans. Individuals have access to online chats, social support networks, health blogs and medical websites such as WebMD, all of which provide new means of health information discovery. Furthermore, websites like WebMD and health-related TV programs such as Doctor Oz are filled with heuristics that, according to various message effects theories should encourage users to engage with the health care system and conduct healthy behaviors [22–24]. Some studies indicate that active engagement in online settings is more appealing to health-oriented individuals compared to passive TV viewing [25]. In addition, affordances such as, voice recognition and digital assistants (e.g. "Siri") have the potential to narrow information gaps as they can increase the accessibility of health information to low-literacy and low-income African Americans [26]. These sources may allow African Americans to overcome distrust and poor patient-provider relationships blocking the path to health care [18,27].

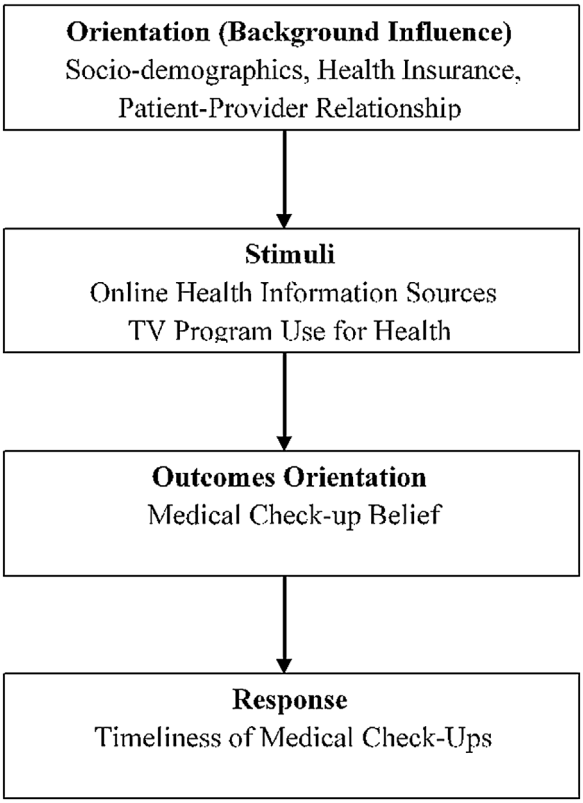

Fig. 1. Conceptual Framework based on the Orientation-Stimulus-Outcomes Orientation-Response Model for the Impact of Online Health Information Seeking on the timeliness of Medical check-Ups.

According to uses and gratifications theory, motivations for engagement with different online health platforms may vary across websites [27–29]. A user who seeks information from WebMD may have very different motivations compared to one using Weight Watchers or YouTube [30]. Users may seek health information on Facebook to connect with others who share similar experiences, but they may be less likely to seek information about symptoms or treatment. Social media may be more likely to shape preventative care beliefs, while sites, like WebMD less so. They may instead contain symptom-related information that prompt a check-up.

In addition, computer algorithms and other programming tools have increased the personal relevance of online information by tailoring content towards user preferences. Sites, such as Facebook and Weight Watchers with greater emphasis on preferences and community credibility, may increase users' motivation to process messages and the likelihood of attitude change [31]. This study will begin to answer these questions.

1.3. Internet use and preventative medical care

Emerging studies report that seeking health information online is associated with more frequent physician visits and an increased likelihood to report that sharing this information improved the patient-provider relationship [18,32]. Furthermore, Lee and Hornik [32] found that the positive effect between seeking health information online and frequent physician visits is stronger among individuals with low physician trust. Since historically, African Americans have reported low physician trust, seeking health information online could prove particularly salient [33]. Supporting this, Song et al. did find that internet use was a positive predictor for prostate cancer screening behavior among African Americans [13]. However, few other studies investigate these relationships among this group. Most studies utilize predominantly Caucasian samples and do not conduct race-specific analysis.

In addition, prior work focuses on predictors of seeking health information online [1,11,12] and gaps exist in theoretically grounded knowledge regarding the impact of digital media on health and medical behaviors among minority groups. Currently published research is limited to small sample sizes and specific geographic locations [1,13,27]. Therefore, the current study investigates the effect of online health information seeking on the timeliness of annual medical check-ups among 1734 African Americans, representatively sampled from the 50 U.S. states. We consider a range of online health information seeking by investigating various media sources in order to begin to understand a potential theoretical pathway driving behavioral effects.

We hypothesize:

- H1 & 2: African Americans who watch health television programs (H1) or who seek health information on health-specific online sources (H2) will hold more positive medical check-up beliefs compared to those who do not.
- H3 & 4: African Americans who watch health television programs (H3) or who seek health information on health-specific online sources (H4) will be more likely to report timely medical check-ups compared to those who do not.
- H5: African Americans who hold more positive medical check-up beliefs will be more likely to report timely medical check-ups.

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2. Methods

This study used survey data from the national 2013 Consumer Health Multimedia Audience Research Systems (MARS) OTC/DTC Pharmaceutical Study. 46,800 surveys were mailed to households located in the 50 U.S. States from January 2013 to April 2013. Households containing individuals with an illness or disease were oversampled. In addition, households with individuals in special living conditions (e.g., dormitories, correctional institutions, hospital wards, nursing homes, etc.) were excluded from the sample. The survey had a response rate of 42.8 % (19, 420 adults). Individuals who identified as Black or African American made up 8.9 % of the sample; all 1734 Black respondents were utilized for this analysis.

2.1. Measures

2.1.1. Demographic and background variables (O_1)

Demographic and other O1 background variables included: *gender* (male = 1, female = 2), *education* (M = 3.02, SD = 1.12), assessed as the "highest education level completed" (1 = less than high school, 2 = high school graduate, 3 = some college, 4 = college graduate, 5 = post-graduate study or degree), and *marital status* coded as 1 = single/never married, 2 = married, 3= divorced, 4 = separated, and 5 = widowed and. To measure age and income, instead of exact values, respondents selected one of 13 age ranges, from 18 to 20 to 75+ years old (median was 50–54 years old) and from 10 annual household income ranges before taxes (median was $30,000 to $39,000). Groups in both variables were consolidated to represent *age* and *household income* ranges consistent with prior research (see Appendix A for details).

Various health status and coverage variables were also included as O1 variables. *Self-reported health* (M = 3.10, SD = 0.89), which was measured using respondents' rating of their current health on a 5-point scale (5 = "excellent", 4 = "very good", 3 = "good", 2 = "fair", 1 = "poor") was also included as a control. *Patient-Provider Relationship* (M = 3.67 SD = 1.10) was assessed using a 5-point scale (5 = "excellent", 4 = "very good", 3 = "good", 2 = "fair", 1 = "poor") with respondents' rating from the following question, "Overall, how would you describe your relationship with your primary care physician?" A variable for *Health Insurance status* was created using respondents' selection of the type of health or medical insurance they currently possessed. The variable was re-coded as 3 = Private Insurance (for "private or self-pay insurance" and "employee or union provided insurance"), 2 = Public Insurance (for "Medicare", "Medicaid" and "Military or other Government employee insurance"), 1 = Other Insurance and 0 = No Insurance. Individuals who selected multiple types of insurance were categorized based on a hierarchy of Private, then Public, then Other and lastly, No insurance [34].

2.1.2. Stimuli - media use variables (S)

TV Program Use for Health was measured using a binomial item (1=Yes, 0=No) derived from respondents' indicating whether they watched different types of television programs in the last 7 days (e.g., Daytime Drama/Soaps, Devotional/Religious, Health, News, Reality, Sci-Fi/Fantasy, Situation Comedy, and Sports Event). Respondents were scored as 1 if they indicated they watched "Health" programs.

Online health information seeking was assessed using multiple online sources ranging from specific health websites such as WebMD to more general sites such as Google. Respondents selected, out of 23 sources, all sources used in the last 30 days "to obtain/research healthcare information." (1=Yes, 0=No for each source). Factor analysis was used to group the sources into four dimensions with 50.37 % of the variance explained and limited cross-loading (Table 1 shows the rotated factor matrix). The resulting online health information sources were: 1) *Mainstream General sites (M = 1.96, SD = 1.86)*: Amazon, Facebook, Google, Yahoo, Twitter and YouTube, *2) Medical sites (M = 0.36, SD = 0.84):* Mayo Clinic, WebMD, Medscape and WebMD Consumer Network, 3) *News-related sites (M = 0.41, SD*=0.72): MSN, Bing and CNN and *4) Consumer-driven health sites (M = 0.10, SD = 0.35):* Health.com, Everyday Health and Weight Watchers.

2.1.3. Attitudinal outcome - medical check-up belief (O_2)

Medical Check-up Belief (M = 4.28, SD = 1.24) was assessed using the question, "Please indicate how important getting regular medical check-ups or annual exams are to maintaining health." Respondents rated on a 5-point scale: 5 = "extremely important", 4 = "mostly important", 3 = "somewhat important", 2 = "slightly important" and 1 = "not at all important."

2.1.4. Behavioral outcome - timeliness of medical check-ups (r)

Timeliness of Medical Check-ups was assessed using responses to, "Please indicate the last time you had an annual physical."

Table 1
Factor loadings for websites sources used in the last 30 days for health among African Americans.

	Components			
Internet Source for Health	1 Mainstream General Sites	2 Medical Sites	3 News-Related Sites	4 Consumer Driven Health Sites
Facebook	0.783	0.072	−0.003	0.028
YouTube	0.742	0.106	0.225	0.017
Google	0.720	0.139	0.207	0.034
Yahoo!	0.680	0.038	0.142	0.099
Twitter	0.554	−0.035	0.009	0.011
Amazon	0.517	0.185	0.219	0.049
WebMD Consumer Network	0.169	0.924	0.134	0.078
WebMD	0.175	0.886	0.138	0.083
Mayo Clinic	0.067	0.552	0.079	0.095
Medscape	−0.014	0.427	0.022	0.030
MSN	0.084	0.079	0.776	0.160
Bing	0.236	0.049	0.640	0.005
CNN.com	0.159	0.181	0.587	−0.003
Health.com	0.035	0.180	−0.016	0.715
Everyday Health	0.061	0.092	0.022	0.681
Weight Watchers	0.035	−0.011	0.100	0.536

Factor loadings greater than 0.4 are in bold. Consistent with prior work, varimax rotation was used for this analysis [53,54]. Because of substantial cross-loading, seven sources (not shown) were dropped from the resulting measures including AOL, Ask.com, LinkedIn, Hulu and Wikipedia.

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Respondents selected: "≤ 6 months ago" (42 %), ">6 months - 1 year" (28 %), ">1-2 years" (14 %), ">2-3 years" (4%), ">3-5 years" (2%), ">5 years" (2%) or "Never been" (8%). This variable was dichotomized to reflect "timely medical check-ups" as those physicals done 2 years ago or less (2) and "less timely medical check-ups" as those done more than 2 years ago (1). The 2-year cut-off point was chosen to more accurately distinguish between individuals who regularly, or at least occasionally, undergo check-ups and individuals who rarely undergo medical check-ups. In addition, the United States Preventative Task Force recommends components of annual physicals be conducted every 1–2 years, thus some subjects may only be prompted to undergo a physical within the last 2 years and would still be considered "timely" [35].

2.2. Analytic procedures

Cross tabulations and chi square were used to assess media and service usage patterns. To test hypotheses 1 and 2, hierarchical linear regression analysis was used to predict medical check-up beliefs using the orientation variables and media use variables (online health information seeking and TV health program viewing). The variables were grouped into blocks and added according to the O_1-S-O_2-R model. First, demographic and background variables (*O1*) were added (Block 1- age, gender, household income, education and marital status), then health service use variables were added (Block 2: health insurance status, patient-provider relationship), then media use for health variables (*S*) were added beginning with TV use and then internet use (Block 3: TV health program viewing and lastly, Block 4: mainstream general sites, medical sites, news-related sites, and consumer-driven health sites). To test hypotheses 3 through 4, the regression model was repeated to predict the timeliness of medical check-ups with medical check-up beliefs, *O2* added as Block 5, to test hypothesis 5. Note that all variables in each model are entered simultaneously in an OLS regression, and that the hierarchical label pertains to the entry of the blocks that allow insights into the application of the O_1-S-O_2-R model. All analysis was conducted using SPSS statistical software, V.23.

3. Results

71 % of African Americans in the sample accessed the internet in the last 30 days. Of these internet users, 49 % used the internet for health. However, 65 % of the total sample did not seek health information online in the last 30 days. 64 % of the sample of African Americans used mainstream general websites such as Google and Yahoo for online health information. 17 % used medical sites, 29 % used news-related sites and 8% used consumer-driven health sites. Chi square analysis (not shown) revealed that African Americans who sought health information on all four online site groups were more likely to have insurance and a higher education.

3.1. Media use and medical check-up beliefs

The regression analysis predicting medical check-up beliefs revealed that being older, female, being or having been married, having health insurance and having a good relationship with their physician was associated with African Americans reporting more positive medical check-up beliefs (Table 2). In addition, health TV program was a statistically significant predictor of medical check-up beliefs but only before adding online health information sources to the model. African Americans who reported watching health television programs held more positive medical check-up beliefs ($\beta = 0.052$, $p = 0.028$). However, after adding online health information sources to this model (specifically consumer-driven health sites), the effect of TV use was attenuated to non-significance ($\beta = 0.041$, $p = 0.082$), resulting in the rejection of hypothesis 1. Furthermore, the use of only consumer-driven health sites was positively associated with check-up belief ($\beta = 0.072$, $p < 0.01$), providing limited support, at least through one online health source, for hypothesis 2.

Table 2
Hierarchical regression analysis predicting the importance of medical check-ups.

	Block 1	Block 2	Block 3	Block 4
	β	β	β	β
Block 1: Socio-Demographic Variables				
Age[a]	0.137***	0.107***	0.106***	0.131***
Gender	0.117***	0.105***	0.104***	0.102***
Education	0.049	0.043	0.040	0.027
Marital Status	0.065*	0.052*	0.052*	0.053*
Household Income	0.031	0.018	0.020	0.020
Current Health Status	0.016	0.003	0.005	0.007
Block 2: Health Service Use Variables				
Health Insurance		0.124***	0.123***	0.120***
Patient-Provider Relationship		0.070**	0.069**	0.068**
Block 3: Media Use for Health Variables				
TV Program Use for Health			0.052*	0.041
Block 4: Media Use for Health Variables				
Mainstream General Sites				0.056
Medical Sites				−0.021
Consumer-Driven Health Sites				0.072**
News-Related Sites				0.003

*p< = 0.05, **p < 0.01, ***p < 0.001; hierarchical linear regression analysis results from four models with the variables added in blocks: Block 1 is the regression of only demographic variables (orientation) on the importance of medical check-ups to one's health (outcomes orientation variable from the O-S-O-R model), Block 2 includes the addition of health service use variables, Block 3 and 4, include the addition of the stimuli variables (TV and Internet use variables for health). These models exclude the 11 subjects that indicated supplemental insurance only. a. A transformed continuous variable for age was used in the regression analysis.

3.2. Impact of orientations, media and beliefs on check-up behavior

The regression analysis predicting timeliness of medical check-ups among African Americans revealed that older individuals, females, individuals with higher income, those with insurance and those with good relationships with their providers were more likely to report a timely check-up. Education, marital status and self-reported health status was not associated with timely check-ups. TV program use for health ($\beta = 0.26$, $p = 0.65$) was not significantly associated with timeliness of check-ups, leading to the rejection of hypothesis 3. However, we did find that seeking health information on medical ($\beta = 0.052$, $p = 0.04$) and consumer-driven health sites ($\beta = 0.066$, $p < 0.01$) was positively associated with timeliness of check-ups, but that this relationship did not hold for mainstream general sites ($\beta = 0.001$, $p = 0.98$) or news-related sites ($\beta = 0.013$, $p = 0.63$). Thus, we found support for hypothesis 4 (see Table 3).

Adding medical check-up belief to the model revealed that check-up belief was significantly associated with the timeliness of check-ups (Table 3), with individuals reporting higher importance of annual exams also reporting more timely check-ups ($\beta = 0.600$, $p < 0.001$). Therefore, hypothesis 5 received support. With beliefs in the model, seeking health info on medical sites remained statistically significant ($\beta = 0.064$, $p < 0.01$). However, the effect of using consumer-driven health sites was attenuated ($\beta = 0.066$, $p = 0.26$).

4. Discussion and conclusion

4.1. Discussion

Few studies have confirmed positive effects of seeking health information online among African Americans [13]. This study demonstrates that seeking health information from certain kinds

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Table 3
Hierarchical regression analysis predicting timeliness of medical check-ups.

	Block 1	Block 2		Block 3	Block 4	Block 5
	β	β		β	β	β
Block 1: Socio-Demographic Variables						
Age	0.090***	0.051*	0.051*		0.064*	−0.014
Gender	0.083**	0.068**	0.068**		0.064**	0.002
Education	0.043	0.032	0.030		0.018	0.001
Marital Status	0.047	0.029	0.029		0.025	−0.007
Household Income	0.068*	0.050	0.051		0.045	0.033
Current Health Status	0.023	0.007	0.008		0.009	0.004
Block 2: Health Service Use Variables						
Health Insurance		0.190***	0.189***		0.186***	0.114***
Patient-Provider Relationship		0.075**	0.074**		0.075**	0.034
Block 3: Media Use for Health Variables						
TV Program Use for Health			0.026		0.011	−0.014
Block 4: Media Use for Health Variables						
Mainstream General Sites					0.001	−0.033
Medical Sites					0.052*	0.064**
Consumer-Driven Health Sites					0.066**	0.022
News-Related Sites					0.013	0.011
Block 5: Mediator for Check-Ups						
Medical Check-up Belief						0.600***

*p< = 0.05, **p < 0.01, ***p < 0.001; hierarchical linear regression analysis results from four models with the variables added in blocks: Block 1 is the regression of only demographic variables (orientation) on timeliness of medical check-ups (dependent/response variable from the O-S-O-R model), Block 2 includes the addition of health service use variables, Block 3 and 4, include the addition of the stimuli variables (TV and Internet use variables for health) and Block 5 includes the addition of the outcomes orientation variable, medical check-up belief. Subjects indicating supplemental insurance only (n = 11) were excluded from these models as this classification was unclear.

of online sources is positively associated with timeliness of check-ups and with positive medical check-up beliefs among a national sample of African Americans. This supported hypotheses 2 and 4 and is consistent with previous research in predominantly Caucasian samples, indicating that online health info-seekers are more likely to utilize preventative health care services [17,32,36].

4.1.1. TV program use for health, check-up beliefs and behavior

Consistent with prior research, 23 % of our respondents reported using the television for health [21,37]. In the full OLS models in our study, we found that African Americans who use TV programs for health were no more likely to report annual exams as important for health nor were they any more likely to undergo an annual exam on time. Given these findings, though television use may be high among minority populations, it may not be an effective method for conveying preventative health information. Encouraging online health info-seeking on health-specific websites may be a more effective target for interventions. This cautionary conclusion shares some commonality with Im and Huh (2017), who found that televised media use was related to low medication adherence and inaccuracy in medical care beliefs [38]. Therefore, interventionists should take caution when using TV for health behavior interventions as it may not only neglect to change preventative medical care usage behaviors but could lead to adverse effects. Further study is needed to explore the implications of health TV use in the digital age on health behavior change.

4.1.2. Online health info-seeking impacts preventative beliefs and behaviors

Our analysis shows that seeking health information on health-specific websites (medical websites and to a lesser degree consumer-driven health sites) was associated with timeliness of medical check-ups. Seeking health information on mainstream websites and on News-related websites was not significantly associated with timeliness of check-ups. This is not surprising as these websites do not typically contain health-specific messages and contain few heuristics that would drive individuals to medical care. As uses and gratifications theory stipulates, mainstream sites, like Facebook or Twitter may be more crucial for finding emotional support while medical sites may be used for accessing symptom related information. While African Americans may use information sent through Facebook for health, this may occur too infrequently to impact medical care behaviors. Further studies should elucidate the relative impact of these sites on behavior.

It should be noted that African American men were more likely to seek health information from News-related sites while women were more likely to seek health information from consumer-driven health sites, like Weight Watchers. However, we found no statistically significant gender differences in online health information seeking via medical and mainstream general sites. Gender differences in online health info-seeking is consistent with prior research [39,40]. Yet these studies often do not investigate differences across web sources, an analysis we show here, critical in unpacking the differential effects of online health information-seeking on behavior.

4.1.3. An O-S-O-R model for media use on beliefs and behavior

In this study, we also proposed a theoretical framework (the O_1-S-O_2-R model) for the effect of online health info-seeking on reported medical check-up beliefs and timeliness of medical check-ups. We did not directly test this mediation model and thus cannot confirm that beliefs mediate the effects of media variables on this behavioral outcome, nor can we make claims about effects. However, our regression analysis results do suggest that this model may be beneficial in understanding the impact of media use on beliefs and behaviors, at least for consumer-driven health website use. In contrast, seeking health information from medical sites was not associated with check-up beliefs *(O_2)*, rather, it was only linked to check-up behavior *(R)*.

One potential explanation for this finding is that there may be different operational pathways for the impact of online health information seeking based on the sources used. Since, this study examines cross-sectional data, we cannot confirm temporality. Instead of media use impacting beliefs and behavior, it is plausible that, holding more positive medical check-up beliefs drives African Americans to immerse themselves in health-specific media, such as consumer-driven health sites, and to undergo a timely medical check-up.

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Furthermore, African Americans seeking health info on medical sites, like WebMD, could also be doing so post-visit for purposes of investigating a treatment plan or symptom. In this case, info-seeking is less likely to be associated with preventative beliefs but rather with processing information encountered in the clinical visit. Prior work has found associations between low physician trust and online health information seeking post-visit [41]. Given that African Americans tend to have low trust in physicians [33], this may be plausible for this group. Future research should utilize longitudinal analysis and other techniques to investigate these potential mediational pathways for the impact of different health media use on behaviors. Testing these relationships using panel data would be a first step in agreeing on a temporal order of these factors and the applicability of the O_1-S-O_2-R model.

4.1.4. Limitations

Some scholars caution against eHealth interventions for African Americans with low income and education as internet utilization is low [1,13,40]. Low literacy and internet unfamiliarity may impair ability to process media messages [11,18,24]. We were unable to assess literacy and internet familiarity. Second, data from this study relied on self-reported time of annual exams and is subject to recall bias. However, our aim was to attain a good approximation of those who regularly undergo check-ups; this seemed successful as the majority (64 %) of individuals who were "less timely" reported never having had a check-up or having had one more than 5 years ago. In addition, participants who are more likely to respond (42.8 % response rate) to mailed surveys are more likely to be of higher literacy and education. Over 60 % of the African Americans in this sample had at least some college education. 76 % of the sample was female and almost 60 % reported a household income of $39,999 or less. Our findings may only reflect the patterns and behaviors among college educated, literate but lower income African Americans and do not generalize to other racial and ethnic groups. Given the historical racial inequity and oppression faced among minorities in the health care setting, differences will exist for the mechanistic drivers of medical behaviors due to media for African Americans [5,9,32,33].

Furthermore, ethnic differences will exist among African Americans. One important limitation of this study is our inability to segment within the African American population to assess the ethnic nuances that define the Black experience in the US. This includes African Americans that identify with the immigrant narrative as well as those who identify with both native and foreign-born Blacks [42]. Roughly 10 % of Blacks in the US are of African or Caribbean descent [43]. Multiple studies indicate that the offline social interactions that define these lived experiences for ethnic subgroups of Blacks in the US have significant and different implications for physical and mental health [44–47]. However, very few studies have examined whether these ethnic and nativity differences affect online social spaces, despite research indicating that foreign-born populations utilize unique online social spaces, such as Whats App, Viber and WeChat [48–50]. Online health information seeking and their subsequent impact on preventative health may look very different for these groups of Black Americans. It is critical that future research also assess the impact of ethnic differences in online health info-seeking among the Black population in the US to truly understand what drives preventative health [51,52].

Despite these limitations, this study's strengths lie in the large sample size (1734) and the multiple online sources assessed while accounting for cognitive, socio-demographic and physician relationship variables.

4.2. Conclusion

Our study demonstrates that, independent of one's relationship with their physician and their medical care beliefs, seeking health information on medical sites is associated with a medical check-up within the last two years among African Americans. In addition, seeking health information on consumer-driven health websites was associated with more positive medical check-up beliefs. Medical check-up beliefs, in turn, was linked to timeliness of medical checkups, suggesting a mediated relationship. We add to the body of evidence demonstrating that online health information, especially medical sites, could be a powerful intervention tool for African Americans [13,18,32].

4.3. Practical implications

African Americans and other under-represented groups report low preventative screening rates and often exhibit doctor avoidance [3,6]. Annual check-ups allow providers to address medical concerns early and to encourage preventative care. We show here that digital media for health could promote timely medical check-ups and potentially help reduce mortality due to chronic illnesses among African Americans.

However, African Americans continue to report low internet use for health [13,40]. In addition, not all health media use impacts behavior; rather the use of *health-specific* websites, and less so TV use, drives African Americans' preventative beliefs and behaviors. Thus, interventions increasing eHealth literacy and the use of health-specific websites may provide practitioners with more fruitful avenues for change. Furthermore, subgroups of African Americans (males, those with low income and low education) are more likely to avoid physicians [6] and report lower eHealth literacy [11,13]. These groups were also less likely to use medical sites in our study and thus, may not receive the benefits of online health info-seeking. Public health professionals should find ways to bridge the information gap for these groups. Health TV use, medical sites and consumer-driven sites had different relationships on beliefs and behaviors. Unpacking how different sub-groups value and use different media sources (online and TV) for health is critical in developing effective interventions and in evaluating digital interventions for health improvement of under-served groups. We urge scholars to address the nuanced nature of online web-sources in investigating impacts on health behavior as this will ultimately drive the development of customized and targeted tools to reduce morbidity among Black Americans and improve their preventative health.

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CRediT authorship contribution statement

Ornella Hills: Conceptualization, Methodology, Validation, Formal analysis, Visualization, Writing - original draft, Writing - review & editing. **Dhavan Shah:** Conceptualization, Methodology, Validation, Supervision, Writing - review & editing.

Declaration of Competing Interest

The authors have no relevant conflict of interests to disclose

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Appendix A

See Tables A1 and A2.

Table A1
Characteristics of African American users and non-users of the Internet for health.

	Overall		Online Health Information seeking			
			No		Yes	
	(N = 1734)		(N = 1126)		(N = 608)	
	N	%	N	%[a]	N	%[a]
Socio-demographic Variables						
Age*** (χ2 = 76.9)						
18 - 24	71	4	42	59	29	41
25 - 34	191	11	94	49	97	51
35 - 44	282	16	150	53	132	47
45 - 54	394	23	248	63	146	37
55 - 64	448	26	317	71	131	29
65 - 74	250	14	200	80	50	20
75 and older	98	6	75	77	23	23
Gender (χ2 = 0.107)						
Male	410	24	269	66	141	34
Female	1324	76	857	65	467	35
Education*** (χ2 = 133.4)						
Less than high school	138	8	122	88	16	12
High School Graduate	448	26	354	79	94	21
Some college	596	34	377	63	219	37
College graduate	348	20	180	52	168	48
Post graduate study or degree	204	12	93	46	111	54
Marital Status***(χ2 = 32.0)						
Married	610	35	376	62	234	38
Single/Never Married	561	32	359	64	202	36
Divorced	312	18	191	61	121	39
Separated	74	4	53	72	21	28
Widowed	177	10	147	83	30	17
Household Income** (χ2 = 11.7)						
Less than $20,000	506	29	385	76	121	24
$20,000 - $29,999	227	13	151	66	76	34
$30,000 - $39,999	259	15	169	65	90	35
$40,000 - $49,999	159	9	96	60	63	40
$50,000 - $74,999	309	18	187	61	122	39
$75,000 - $99,999	132	8	68	51	64	49
$100,000 and greater	142	8	70	49	72	51

	Overall		Online Health Information seeking			
			No		Yes	
	(N = 1734)		(N = 1126)		(N = 608)	
	N	%	N	%[a]	N	%[a]
Media Use Variables						
Internet Use in last 30 days*** (χ2 = 383.7)						
Non-Users	504	29	504	100	0	0
Internet Users	1230	71	622	51	608	50
TV Program Use for Health** (χ2 = 10.7)						
Non-Viewers	1333	77	893	67	440	33
Health TV Program Viewers	401	23	233	58	168	42
Health Service Use Variables						
Health Insurance Status[b]*** (χ2 = 45.0)						
No Insurance	323	19	236	73	87	27
Other Insurance	43	2	30	70	13	30
Public Insurance	550	32	394	72	156	28
Private Insurance	807	47	457	57	350	43
Self-Reported Health (χ2 = 8.5)						
Poor	45	3	32	71	13	29
Fair	370	21	252	68	118	32
Good	773	45	512	66	261	34
Very Good	451	26	269	60	182	40
Excellent	95	6	61	64	34	36

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Table A1 (*Continued*)

	Overall		Online Health Information seeking			
			No		Yes	
Patient-Provider Relationship** ($\chi2 = 14.7$)						
Poor	81	5	45	56	36	44
Fair	170	10	94	55	76	45
Good	420	24	266	63	154	37
Very Good	625	36	428	69	197	32
Excellent	438	25	293	67	145	33
Medical Check-up Belief - 'Check-up Importance'** ($\chi2 = 11.7$)						
Not Important	133	8	105	79	28	21
Slightly Important	93	5	62	58	38	35
Somewhat Important	81	5	52	64	29	36
Mostly Important	273	16	142	52	131	48
Extremely Important	1154	67	769	67	385	33
Timeliness of Medical Check-Ups*** ($\chi2 = 33.2$)						
Less Timely	1465	84	926	63	538	37
Timely	270	16	200	74	70	26

*p< = 0.05, **p < 0.01, ***p < 0.001, a. percentages reflect row percentages. b. Excludes 11 individuals who indicated supplemental insurance only.

Table A2
Bivariate Correlations Between the Variables in the O1-S-O2-R Model (N = 1734) The values shown are Pearson's r correlation coefficients. Those with p-values < 0.05 are bolded.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Orientations															
1. Age	1.00	**−0.05**	**−0.11**	**0.07**	−0.01	**−0.08**	**0.10**	**0.23**	0.02	**−0.45**	**−0.17**	−0.04	**−0.15**	**0.13**	**0.08**
2. Gender	**−0.05**	1.00	0.04	**−0.24**	**−0.11**	−0.04	0.00	**0.08**	0.03	0.02	0.03	0.05	**−0.06**	**0.09**	**0.06**
3. Education	**−0.11**	0.04	1.00	**0.07**	**0.38**	**0.19**	**0.10**	−0.01	**0.03**	**0.29**	**0.21**	**0.05**	**0.24**	**0.06**	**0.07**
4. Marital Status	**0.07**	**−0.24**	**0.07**	1.00	**0.24**	0.03	**0.10**	**0.06**	−0.02	−0.03	**0.05**	0.02	**0.05**	**0.06**	**0.05**
5. Household Income	−0.01	**−0.11**	**0.38**	0.24	1.00	**0.16**	**0.13**	0.03	−0.03	**0.14**	**0.17**	0.01	**0.18**	**0.05**	**0.09**
6. Current Health Status	**−0.08**	−0.04	**0.19**	0.03	**0.16**	1.00	**0.05**	**0.11**	**−0.05**	**0.11**	**0.07**	−0.03	**0.12**	0.02	0.03
7. Health Insurance	**0.10**	0.00	**0.10**	**0.10**	**0.13**	**0.05**	1.00	**0.10**	0.01	0.02	**0.05**	0.02	**0.05**	**0.15**	**0.22**
8. Patient-Provider Relationship	**0.23**	**0.08**	−0.01	**0.06**	0.03	**0.11**	**0.10**	1.00	0.03	**−0.15**	**−0.05**	0.03	**−0.07**	0.12	**0.12**
Media Use															
9. TV Program Use for Health	0.02	0.03	0.03	−0.02	−0.03	**−0.05**	0.01	0.03	1.00	−0.01	**0.07**	**0.17**	0.04	**0.06**	0.03
10. Mainstream General Sites	**−0.45**	0.02	**0.29**	−0.03	**0.14**	**0.11**	0.02	**−0.15**	−0.01	1.00	**0.31**	**0.14**	**0.42**	0.01	0.01
11. Medical Sites	**−0.17**	0.03	**0.21**	**0.05**	**0.17**	**0.07**	**0.05**	**−0.05**	**0.07**	**0.31**	1.00	**0.24**	**0.31**	0.01	**0.08**
12. Consumer-Driven Health Sites	**−0.04**	**0.05**	**0.05**	0.02	0.01	−0.03	0.02	0.03	**0.17**	**0.14**	**0.24**	1.00	**0.15**	**0.09**	**0.09**
13. News-Related Sites	**−0.15**	**−0.06**	**0.24**	**0.05**	**0.18**	**0.12**	**0.05**	**−0.07**	0.04	**0.42**	**0.31**	**0.15**	1.00	0.02	0.04
Outcomes															
14. Medical Check-up Belief	**0.13**	**0.09**	**0.06**	**0.06**	**0.05**	0.02	**0.15**	**0.12**	**0.06**	0.01	0.01	**0.09**	0.02	1.00	**0.62**
15. Timeliness of Medical Check-Ups	**0.08**	**0.06**	**0.07**	**0.05**	**0.09**	0.03	**0.22**	**0.12**	0.03	0.01	**0.08**	**0.09**	0.04	**0.62**	1.00

The values shown are Pearson's r correlation coefficients. Those with p-values < 0.05 are bolded.

References

[1] S. Cogbill, B. Francis, V.L. Thompson, Sanders, factors affecting African American men's use of online colorectal cancer education, J. Cancer Educ. 29 (2014) 25–29, doi:http://dx.doi.org/10.1007/s13187-013-0532-7.
[2] K. Nelson, K. Norris, C.M. Mangione, Disparities in the diagnosis and pharmacologic treatment of high serum cholesterol by race and ethnicity: data from the third national health and nutrition examination survey, Arch. Intern. Med. 162 (2002) 929–935, doi:http://dx.doi.org/10.1001/archinte.162.8.929.
[3] American Cancer Society, Cancer Facts & Figures for African Americans 2016-2018., American Cancer Society, 2016. http://www.cancer.org/acs/groups/content/@editorial/documents/document/acspc-047403.pdf.
[4] M. Heron, Deaths: leading causes for 2017, Vital Stat. Rep. 68 (2019) 77.
[5] B.R. Kennedy, C.C. Mathis, A.K. Woods, African Americans and their distrust of the health care system: healthcare for diverse populations, J. Cult. Divers. 14 (2007) 56–60.
[6] Yiu Ming Chan, C. Laster, Evaluation of healthcare avoidance behavior using the healthcare national trends survey, Am. J. Health Stud. 30 (2015) 34–42.
[7] S.J. Flowers Benton, D.F. Edwards, W.G. Gunn, P. Izard, A. Kaseroff, R.S. Ramos, T. Dickson, O. Hills, C. Daniel, B. Harris, C. Gleason, The influence of the doctor-patient relationship on willingness of African Americans to discuss memory loss with health care professionals, Alzheimer's & Dementia 10 (2014) P726, doi:http://dx.doi.org/10.1016/j.jalz.2014.05.1350.
[8] T.-C. Yang, S.A. Matthews, R.T. Anderson, Prostate cancer screening and health care system distrust in Philadelphia, J. Aging Health 25 (2013) 737–757, doi:http://dx.doi.org/10.1177/0898264313490199.
[9] Y.L. Cuffee, J.L. Hargraves, M. Rosal, B.A. Briesacher, A. Schoenthaler, S. Person, S. Hullett, J. Allison, Reported racial discrimination, trust in physicians, and medication adherence among inner-city African Americans with hypertension, Am. J. Public Health 103 (2013) e55–e62, doi:http://dx.doi.org/10.2105/AJPH.2013.301554.
[10] C.M. Pettey, J.C. McSweeney, K.E. Stewart, M.A. Cleves, E.T. Price, S. Heo, E. Souder, African americans' perceptions of adherence to medications and lifestyle changes prescribed to treat hypertension, Sage Open 6 (2016), doi:http://dx.doi.org/10.1177/2158244015623595 10.1177/2158244015623595.
[11] V. McCleary-Jones, C. Scheideman-Miller Jr., A. Dorn James, B. Johnson, M. Overall, K. Dwyer, Health information technology use and health literacy among community-dwelling African Americans, ABNF J. 24 (2013) 10–16.
[12] S.J. Mitchell, L. Godoy, K. Shabazz, I.B. Horn, Internet and mobile technology use among urban African American parents: survey study of a clinical population, J. Med. Internet Res. 16 (2014) e9, doi:http://dx.doi.org/10.2196/jmir.2673.
[13] H. Song, E.M. Cramer, S. McRoy, Information gathering and technology use among low-income minority men at risk for prostate cancer, Am. J. Mens Health 9 (2015) 235–246, doi:http://dx.doi.org/10.1177/1557988314539502.
[14] A. Smith, African Americans and Technology Use, Pew Research Center: Internet, Science & Tech., 2014. (Accessed August 16, 2016) http://www.pewinternet.org/2014/01/06/african-americans-and-technology-use/.
[15] A. Perrin, M. Duggan, Americans' Internet Access: 2000-2015, Pew Research Center: Internet, Science & Tech., 2015. (Accessed August 16, 2016) http://www.pewinternet.org/2015/06/26/americans-internet-access-2000-2015/.
[16] The United States Department of Health and Human Service (USDHH), Health Communication and Health Information Technology | Healthy People 2020, (n. d.). https://www.healthypeople.gov/2020/topics-objectives/topic/health-

Please cite this article in press as: O. Hills, D. Shah, Online health information seeking, medical care beliefs and timeliness of medical check-ups among African Americans, Patient Educ Couns (2020), https://doi.org/10.1016/j.pec.2020.06.006

communication-and-health-information-technology/objectives?topicId=18 (accessed August 16, 2016).
[17] C.-J. Lee, Does the internet displace health professionals? J. Health Commun. 13 (2008) 450–464, doi:http://dx.doi.org/10.1080/10810730802198839.
[18] M.S. Birru, R.A. Steinman, Online health information and low-literacy African Americans, J. Med. Internet Res. 6 (2004), doi:http://dx.doi.org/10.2196/jmir.6.3.e26.
[19] J. Cho, D.V. Shah, J.M. McLeod, D.M. McLeod, R.M. Scholl, M.R. Gotlieb, Campaigns, reflection, and deliberation: advancing an O-S-R-O-R Model of communication effects, Commun. Theory 19 (2009) 66–88, doi:http://dx.doi.org/10.1111/j.1468-2885.2008.01333.x.
[20] J. Peter, P.M. Valkenburg, Adolescents' exposure to sexually explicit online material and recreational attitudes toward sex, J. Commun. 56 (2006) 639–660, doi:http://dx.doi.org/10.1111/j.1460-2466.2006.00313.x.
[21] D. Smith, Health care consumer's use and trust of health information sources, J. Commun. Healthc. 4 (2011) 200–210, doi:http://dx.doi.org/10.1179/1753807611Y.0000000010.
[22] R. Garcia-Retamero, E.T. Cokely, Effective communication of risks to young adults: using message framing and visual aids to increase condom use and STD screening, J. Exp. Psychol. Appl. 17 (2011) 270–287, doi:http://dx.doi.org/10.1037/a0023677.
[23] Y. Hu, S.S. Sundar, Effects of online health sources on credibility and behavioral intentions, Communic. Res. (2009), doi:http://dx.doi.org/10.1177/0093650209351512.
[24] T.L. Webb, F.F. Sniehotta, S. Michie, Using theories of behaviour change to inform interventions for addictive behaviours, Addiction 105 (2010) 1879–1892, doi:http://dx.doi.org/10.1111/j.1360-0443.2010.03028.x.
[25] M.J. Dutta-Bergman, Primary sources of health information: comparisons in the domain of health attitudes, health cognitions, and health behaviors, Health Commun. 16 (2004) 273–288.
[26] M. Boyd, N. Wilson, Just ask Siri? a pilot study comparing smartphone digital assistants and laptop Google searches for smoking cessation advice, PLoS One 13 (2018)e0194811.
[27] S.F. Wallington, The internet as an emerging patient education tool among african american men with prostate Cancer: an exploratory study, Am. J. Mens Health (2) (2007) 106–121, doi:http://dx.doi.org/10.1177/1557988306296156.
[28] Y. Chi, D. He, S. Han, J. Jiang, What sources to rely on: laypeople's source selection in online health information seeking, ACM (2018) 233–236.
[29] S.A. Rains, Perceptions of traditional information sources and use of the world wide web to seek health information: findings from the health information national trends survey, J. Health Commun. 12 (2007) 667–680, doi:http://dx.doi.org/10.1080/10810730701619992.
[30] K.C. Madathil, A.J. Rivera-Rodriguez, J.S. Greenstein, A.K. Gramopadhye, Healthcare information on YouTube: a systematic review, Health Informatics J. 21 (2014) 173–194, doi:http://dx.doi.org/10.1177/1460458213512220.
[31] R.E. Petty, J.T. Cacioppo, The elaboration likelihood model of persuasion, Communication and Persuasion, Springer, 1986, pp. 1–24.
[32] C. Lee, R.C. Hornik, Physician trust moderates the internet use and physician visit relationship, J. Health Commun. 14 (2009) 70–76, doi:http://dx.doi.org/10.1080/10810730802592262.
[33] A.A. Sewell, Disaggregating ethnoracial disparities in physician trust, Soc. Sci. Res. 54 (2015) 1–20, doi:http://dx.doi.org/10.1016/j.ssresearch.2015.06.020.
[34] S.H. Kataoka, L. Zhang, K.B. Wells, Unmet need for mental health care among U. S. children: variation by ethnicity and insurance status, Am. J. Psychiatry 159 (2002) 1548–1555.
[35] H.E. Bloomfield, T.J. Wilt, Evidence brief: role of the annual comprehensive physical examination in the asymptomatic adult, VA Evidence Synthesis Program Evidence Briefs, Department of Veterans Affairs (US), Washington (DC), 2011. (Accessed February 13, 2020) http://www.ncbi.nlm.nih.gov/books/NBK82767/.
[36] C.-C. Chen, T. Yamada, J. Smith, An evaluation of healthcare information on the internet: the case of colorectal cancer prevention, Int. J. Environ. Res. Public Health 11 (2014) 1058–1075, doi:http://dx.doi.org/10.3390/ijerph110101058.
[37] P.M. Risica, K.M. Gans, S. Kumanyika, U. Kirtania, T.M. Lasater, SisterTalk: final results of a culturally tailored cable television delivered weight control program for Black women, Int. J. Behav. Nutr. Phys. Act. 10 (2013) 141, doi:http://dx.doi.org/10.1186/1479-5868-10-141.
[38] H. Im, J. Huh, Does health information in mass media help or hurt patients? Investigation of potential negative influence of mass media health information on patients' beliefs and medication regimen adherence, J. Health Commun. 22 (2017) 214–222, doi:http://dx.doi.org/10.1080/10810730.2016.1261970.
[39] S. Bidmon, R. Terlutter, Gender differences in searching for health information on the internet and the virtual patient-physician relationship in Germany: exploratory results on how men and women differ and why, J. Med. Internet Res. 17 (2015), doi:http://dx.doi.org/10.2196/jmir.4127.
[40] A. Prestin, S.N. Vieux, W.-Y.S. Chou, Is online health activity alive and well or flatlining? Findings from 10 years of the health information national trends survey, ResearchGate. 20 (2015) 1–9, doi:http://dx.doi.org/10.1080/10810730.2015.1018590.
[41] N. Li, S. Orrange, R.L. Kravitz, R.A. Bell, Reasons for and predictors of patients' online health information seeking following a medical appointment, Fam. Pract. 31 (2014) 550–556, doi:http://dx.doi.org/10.1093/fampra/cmu034.
[42] Y. Shaw-Taylor, S.A. Tuch, The other African Americans: Contemporary African And Caribbean Immigrants In The United States, Rowman & Littlefield, 2007.
[43] M. Anderson, G. Lopez, Key Facts about Black Immigrants in the U.S., (2018) . (accessed April 23, 2020) https://www.pewresearch.org/fact-tank/2018/01/24/key-facts-about-black-immigrants-in-the-u-s/.
[44] C.L. Erving, Ethnic and nativity differences in the social support-physical health association among black Americans, J Immigrant Minority Health. 20 (2018) 124–139, doi:http://dx.doi.org/10.1007/s10903-016-0492-1.
[45] C.L. Erving, O. Hills, Neighborhood social integration and psychological well-being among African Americans and Afro-Caribbeans, Race Soc. Probl. 11 (2019) 133–148, doi:http://dx.doi.org/10.1007/s12552-019-09258-z.
[46] R.J. Taylor, I. Forsythe-Brown, K.D. Lincoln, L.M. Chatters, Extended family support networks of Caribbean black adults in the United States, J. Fam. Issues (2015), doi:http://dx.doi.org/10.1177/0192513X15573868.
[47] R.J. Taylor, I. Forsythe-Brown, H.O. Taylor, L.M. Chatters, Patterns of emotional social support and negative interactions among African American and black Caribbean extended families, J Afr Am St. 18 (2014) 147–163, doi:http://dx.doi.org/10.1007/s12111-013-9258-1.
[48] E. Sa, R. Leung, The enabling role of social media for Chinese immigrants' health: a pilot study, J. Nurs. Care 5 (2016), doi:http://dx.doi.org/10.4172/2167-1168.1000356.
[49] R. Dekker, G. Engbersen, J. Klaver, H. Vonk, Smart refugees: how Syrian asylum migrants use social media information in migration decision-making, Soc. Media + Soc. 4 (2018)205630511876443, doi:http://dx.doi.org/10.1177/2056305118764439.
[50] R. Dekker, G. Engbersen, How social media transform migrant networks and facilitate migration, Glob. Netw. 14 (2014) 401–418, doi:http://dx.doi.org/10.1111/glob.12040.
[51] D.M. Griffith, J.L. Johnson, R. Zhang, H.W. Neighbors, J.S. Jackson, Ethnicity, nativity, and the health of American Blacks, J. Health Care Poor Underserved 22 (2011) 142–156, doi:http://dx.doi.org/10.1353/hpu.2011.0011.
[52] T.G. Hamilton, R.A. Hummer, Immigration and the health of U.S. black adults: does country of origin matter? Soc. Sci. Med. 73 (2011) 1551–1560, doi:http://dx.doi.org/10.1016/j.socscimed.2011.07.026.
[53] A. Costello, J. Osborne, Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis, Practic. Assess. Res. Evaluat. 10 (2019), doi:http://dx.doi.org/10.7275/jyj1-4868.
[54] B. Wellman, A.Q. Haasen, J. Witte, K. Hampton, Does the internet increase, decrease, or supplement social capital?: social networks, participation, and community commitment, Am. Behav. Sci. 45 (2001) 436–455, doi:http://dx.doi.org/10.1177/00027640121957286.

Please cite this article in press as: O. Hills, D. Shah, Online health information seeking, medical care beliefs and timeliness of medical check-ups among African Americans, Patient Educ Couns (2020), https://doi.org/10.1016/j.pec.2020.06.006