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## Using the Health Belief Model to Assess the Health Seeking Behaviors Associated with COVID-19

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### Abstract

Baltimore City residents, those who reside in the epicenter of the Freddie Gray aftermath, represent vulnerable populations at-risk for negative consequences associated with the COVID-19 pandemic. The pandemic, and social injustice has impacted at-risk populations, and how they experience their health. The aim of this quantitative, correlational study was to investigate whether there is a relationship between Baltimore City individuals' health-seeking behaviors, the independent variable, and the dependent variable, COVID-19 implementation, and engagement. Rosenstock's Health Belief Model posits that an individual's perception of a threat informs the decision to comply with recommended health guidelines [1]. The methodology included a convenient sample including 148 participants who were majority female and African American. The survey consisted of a demographic portion and the COVID-19 Health Belief and Prevention Tool. The results of the Pearson's  $r$  product-moment correlation revealed that there was a positive and statistically significant relationship between health-seeking behaviors and implementation and engagement in COVID-19 healthcare strategies. The impact is that nurses and healthcare professionals should continue to conduct studies regarding health-seeking behaviors among at-risk and vulnerable populations, and community-based strategies.

**Keywords:** Community-based strategies; COVID-19; Engagement; Health-seeking behaviors; Implementation

### Introduction

On March 11, 2020, COVID-19 was declared a pandemic. Since the first confirmed diagnosis of COVID-19 in the United States, cases have continuously grown to more than 27 million cases and almost 500,000 deaths [2]. In Maryland, to date, there have been 368,977 confirmed cases with 7,503 deaths [2]. Among these cases in Maryland, like most of the United States, communities of color and low socioeconomic status were some of the most susceptible populations and have suffered high incidence and mortality rates of COVID-19. At least 105,087 of COVID-19 cases have been African Americans/Black residents in Maryland [3]. Baltimore City alone has a large minority population, including 61.3% African American/Black, 2.76% Hispanic, and 2.57% Asian [4]. Very little research exists on the cooperation and adherence of individuals living in low-income and disadvantaged neighborhoods.

This paper includes the background of the problem related to health-seeking behaviors and perceptions regarding COVID-19. The problem statement arose from an awareness of a prevailing gap in the literature, which fueled the desire to examine the relationship between individuals' health-seeking behaviors and their implementation and engagement in COVID-19 specific strategies. This report provides the study's background, theoretical foundation, sample, data collection, data analysis, limitations, and recommendation of this study.

## Background

The residents of the zip codes served are approximately 80% African American [5], which solely increases the likelihood of contracting and succumbing to Covid-19. Their potential increase of exposure may come from employment areas, which includes failure to be provided appropriate personal protective equipment, use of public transportation, the number of members in the household, and the neighborhoods in which they reside. The neighborhood alone determines a great deal about predicted health outcomes. Consequently, of the zip codes serviced, the Coppin State University health center cares for residents in the zip codes with the highest number of coronavirus cases in the state. Baltimore City is ranked within the top four for COVID-19 rates within the state of Maryland.

The Centers for Disease Control (CDC) [6] and Prevention's primary prevention strategy has included public health strategies including education [6]. Because of the COVID-19 pandemic, city and state health officials implemented public health mitigation guidelines including education, handwashing, mask wearing, physical and social distancing. In addition, guidelines such as quarantine protocols, isolation, and contact tracing were instituted to assist in slowing the transmission of COVID-19 [7], however, these strategies are essentially not new epidemiological procedures [8]. Beyond those, supplemental strategies included the successful integration of the COVID-19 vaccines that were implemented in Baltimore City in January 2021; however, health seeking behaviors associated with vaccinations remained low. As the number of COVID-19 mutations, infections, and death evolve, it became increasingly evident that all healthcare strategies must be implemented to address health-seeking behaviors.

Over the past decade, a plethora of studies assessed factors associated with the intention to receive specific vaccines. In general, key determinants of vaccine acceptance or refusal included risk perceptions of diseases, concerns regarding vaccine safety, perceived need and usefulness of vaccines, past experiences with health services, emotions, routine ways of thinking, information sources, distrust in institutions and health care providers, social networks, and social norms as well as different sociodemographic characteristics (e.g., age, gender, revenue, level of education) [9-11]. High prevalence and positivity rates and new, fast-spreading variants of COVID-19 were attributed to not adhering to mitigation strategies or complying with symptom monitoring and contact tracing. Limited knowledge existed on the health-seeking behaviors and perceptions regarding these instituted guidelines.

This study aimed to address the gaps in the research on how well contact tracing for COVID-19 is perceived by such communities and their willingness to comply with health care guidelines (i.e., self-isolation and quarantine). Being prepared was critical to CSU's readiness to prevent coronavirus spread and gain a further understanding of individuals' perceptions and experiences with contact tracing, quarantine, and isolation practices. During this unprecedented time, it was imperative to gain a deeper understanding of these practices in the Baltimore City area to inform other decision-making and policy development to maintain the health of individuals, families, and groups. This research study provided enough data to make recommendations for future practice and additional research efforts.

## Theoretical Framework

The Health Belief Model was used to guide this research study. The Health Belief Model posits that an individual's perception of a threat informs the decision to comply with recommended health guidelines [3]. This model is often used to predict behaviors that are later used to inform health and social policies. In this study, the Health Belief Model was used to determine the relationship between an individual's perceived risk and their associated health-seeking behaviors. This study assessed all factors related to an individual's readiness to comply with quarantine and isolation guidelines and the benefits of following the given guidelines.

## Methodology

Experimental manipulation was not required [12]. Included is an overview of the approach used to answer the research question and hypotheses and a description of the target population. In addition, data collection strategies and data analysis processes are presented in detail to facilitate replication of this study.

## Research Questions and Hypotheses

This study was an examination of individuals' health-seeking perceptions and behaviors as measured by the hypotheses.

**Research Question 1.** What is the relationship, if any, between individuals' health-seeking perception and behaviors and their implementation and engagement in COVID-19 specific healthcare strategies?

**Research Question 2.** What is the perception of COVID-19 prevention strategies, screening, mask/face covering, quarantine, isolation, hospitalization, and contact tracing?

**Research Hypothesis:** There is a positive and significant relationship between participants' health-seeking behaviors and their implementation and engagement in COVID-19 specific healthcare strategies.

**Null Hypothesis:** Ho. There is no relationship between participants' health-seeking behaviors and their implementation and engagement in COVID-19 specific healthcare strategies.

**Alternate Hypothesis:** H1. There is a negative relationship between participants' health-seeking behaviors and their implementation and engagement in COVID-19 specific healthcare strategies.

## Study Design

This study utilized a mixed-methods approach. A cross-sectional study design for the quantitative portion and phone interviews for the qualitative portion. This study's research protocol was reviewed and approved by Coppin State University's Institutional Review Board. A quantitative survey instrument was developed to examine whether there was a relationship between the participants' health-seeking behaviors, independent variable, and the dependent variable, COVID-19 implementation, and engagement.

## Instrumentation

A 48-question instrument was developed to explore participants' perceptions on COVID-19 and prevention strategies, screening, mask/face covering, quarantine, isolation, hospitalization, and contact tracing. Eight questions were developed as interview questions for the qualitative portion of the study. The initial survey and interview questions were developed then sent to four survey researchers for expert review. After expert review, the survey was modified based on experts' comments and edits, resulting in the final survey being 48 questions. Interview questions did not need any adjustments based on experts' comments. The survey instrument incorporated a demographic questionnaire and scales for each of the Health Belief Model constructs. It was intended to assess participants' perceived threats related to COVID-19, their willingness to adhere to quarantine and isolation guidelines, and their willingness to cooperate with contact tracing. SurveyMonkey, a web-based software system, was then used as the data collection tool for survey distribution.

## Sampling and Data Collection

This study used a non-probability, convenient sampling method to recruit participants. Study criteria required participants to reside in Baltimore and be at least 18 years of age or older. After receiving CSU Institutional Review Board (IRB) approval, an email message was disseminated to prospective participants using emails. Student liaisons and community organization leaders assisted in providing email listservs to recruit participants. At least 300 participants were recruited to take the survey, of which only 148 agreed to participate voluntarily. Qualitative interviews were conducted over the phone and recorded using Rev Call Recorder software. Interviews lasted, on average, 10 minutes. Questions consisted of perceptions on the threats of COVID-19 (susceptibility and severity), challenges (barriers), and the motivation and willingness to comply with COVID-19 prevention guidelines (benefits and cues to action).

## Data Analysis

### Quantitative Analysis

Pearson's Correlation coefficient was calculated to answer the research questions for this study. Furthermore, multiple linear regression was conducted to establish explore potential relationships between the dependent variable (willingness to comply) and the different variables used in the study. All analyses were done using the Stata SE 16 statistical software package. The survey scale scores were grouped based on their factor scores. Factor scores have a mean equal to zero and a variance equal to one. Factor scores can be described as a standing or placement value in numerical terms. Factor score F was used as the dependent variable, cues to action, which assessed participants' willingness to comply. Age was calculated as a continuous variable.

For this study, internal consistency was assessed using Cronbach alpha analysis. Cronbach's alpha is a measure used to assess the reliability, or internal consistency, of a set of scale or test items. In other words, the reliability of any given measurement refers to the extent to which it is a consistent measure of a concept, and Cronbach's alpha is one way of measuring the strength of that consistency. The resulting Cronbach's alpha coefficient of reliability ranges from 0 to 1 in providing this overall assessment of a measure's reliability. If all the scale items are entirely independent of one another (i.e., are not correlated or share no covariance), then Cronbach's alpha = 0; and, if all the items have high covariances, then Cronbach's alpha will approach 1. In other words, the higher the Cronbach's alpha coefficient, the more the items have shared covariance and probably measure the same underlying concept. Although the standards for what makes a "good" Cronbach's alpha coefficient are entirely arbitrary and depend on the theoretical knowledge of the scale in question, many methodologists recommend a minimum Cronbach's alpha coefficient between 0.65 and 0.8 (or higher in many cases); Cronbach's alpha coefficients that are less than 0.5 are usually unacceptable [12].

## Qualitative Analysis

Only two participants agreed to participate in telephone interviews; thus, resulting in solely two accomplished qualitative interviews performed for this study. Before the interview, participants were read the informed consent document wherein each agreed to partake in the interview. Participants have been knowledgeable that the interview would be recorded utilizing Rev Call Recorder. Each participant was assigned a pseudonym to stay nameless during the recorded session. Interviews were transcribed utilizing the Rev Call Recorder software program. Later transcriptions were acquired and uploaded to the NVivo computer software program for coding. The Health Belief Model was used to develop themes primarily based on coding nodes from the transcribed interviews.

## Results

### Qualitative Results

One of the interview questions was, “Do you feel that you are at risk for COVID-19? Why or why not? Each participant responded with similar comments in which they felt they were more at risk due to reporting to work daily and having to interact with multiple people throughout their workday. Working will increase the chance of COVID-19 became an emerging theme. Participants strongly believed that, if following and complying with social isolation, quarantine, and other COVID-19 prevention guidelines, then they are willing to comply.

*I believe in all of that, strongly believe, and strongly support all of the mandates. If it is going to save my life and save the lives of my friends and family, then I'm all for it. I believe in all the guidelines, and I follow them.*

One participant explained the prevention steps in detail when asked about any steps taken to prevent COVID-19 (cues to action).

*I take all the steps. The social distancing, the six feet apart, no matter where I am, even when I go to visit my mom in the evening, and also as well as washing my hands, making sure the doorknobs, all of it is clean constantly, and wearing the mask to cover my nose and my mouth. I follow all the guidelines.*

Neither participant had ever tested positive for COVID-19 but did note that they get tested as much as possible due to their work environments and having elderly family members for whom they provide care.

### Quantitative Data Analysis

#### Reliability

The calculated Cronbach's alpha (reliability coefficient) by the HBM indicators component for this study are provided in (Table 1).

HBM indicators	Cronbach's alpha
Perceived Susceptibility: Beliefs about your risk for COVID-19	0.63
Perceived Severity: Beliefs about the seriousness or dangers of COVID-19	0.68
Perceived Barriers: Beliefs about COVID-19 testing	0.7
Self-Efficacy: Confidence in COVID-19 related health behaviors	0.75
Perceived Benefits (values or usefulness to complying): Beliefs about the benefits of following COVID-19 prevention guidelines	0.87
Cues to Action (willingness to comply): Willingness to follow COVID-19 prevention guidelines	0.88

**Table 1:** Health Belief Model Indicators Cronbach's Alpha.

The Cronbach's alpha for the perceived severity instrument is high (0.68), for perceived barriers instrument is high (0.70), for self-efficacy is high (0.75), for perceived benefits is high (0.87) and, willingness to comply is also high (0.88). However, our Cronbach's alpha for the perceived susceptibility instrument is moderate (0.63).

### Descriptive Results

Based on demographic questionnaire results, most of the study participants identified as Black or African American. The second-largest participant group was identified as White. Most of the participants also identified as female. The demographic questionnaire was consistent with the United States Office of Management and Budget (OMB) demographic question requirements and recommendations. Additional socio-demographic questions were added as they were relevant to the research study, the COVID-19 pandemic (study topic), and the sample. All socio-demographic characteristics have been listed in (Table 2).

Variables	%
Race	
African American/Black	83.4
White	11
Gender	
Male	26.2
Female	73.8
Education	
Incomplete high school	5.5
High school diploma	22.8
Some college	29
Associates degree	6.2
Bachelor's degree	25.5
Graduate or professional degree	11
Income	
<25,000	29.7
25,000-34,999	22.1
35,000-49,999	16.6
50,000-74,999	15.9
75,000 or higher	15.9
Marital Status	
Single	60.7
Separated	4.1
Married	22.1
Divorced	3.4
Widowed	2.1
Cohabiting	7.6
Insurance Status	
Yes, Public	44.8
Yes, Private	47.6
No	7.6
Chronic disease	
Yes	75.9
No	24.1
Exposed to COVID-19	
Yes	28.3
No	71.7
Tested Positive for COVID-19	
Yes	11.7
No	88.3
Note: Data based on fully completed surveys	

**Table 2:** Socio-demographic Characteristics.

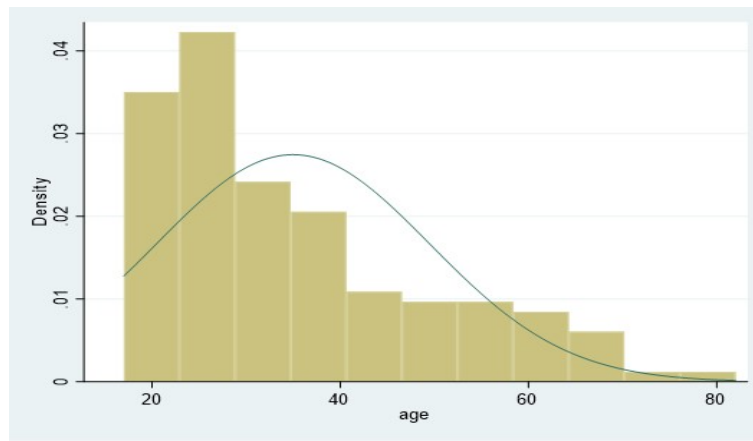
### Correlation and Regression

Several factors were noted in the linear regression analysis. As perceived severity, perceived benefits, and self-efficacy increased, participants' willingness to comply with COVID-19 screening guidelines also increased. Meanwhile, the analysis also showed that age played a significant factor in the level of compliance. As age increased, willingness to follow COVID-19 guidelines also increased. When comparing or assessing the role of race and ethnicity, we found that participants who identified as Black/African American were significantly more inclined to follow social isolation and prevention guidelines than their White counterparts. There is a difference between participants that tested positive COVID-19.

Factor Score F (willingness to comply)	Coefficient	Std. Error	t	P>t	95%	Conf. Interval
Factor Score A (perceived Susceptibility)	0.093	0.099	0.94	0.351	-0.103	0.288
Factor Score B (perceived severity)	0.235*	0.107	2.2	0.03	0.023	0.447
Factor Score C (perceived barriers)	-0.099	0.104	-0.96	0.34	-0.305	0.106
Factor Score D (Self-efficacy)	0.195*	0.092	2.12	0.037	0.012	0.377
Factor Score E (perceived benefits)	0.374*	0.095	3.95	0	0.186	0.561
Age	0.022*	0.007	3.07	0.003	0.008	0.036
<b>Gender</b>						
Male	0.000 (base)					
Female	0.228	0.161	1.41	0.161	-0.092	0.548
<b>Race</b>						
Black/African American	0.407*	0.202	2.01	0.047	0.006	0.808
White	0.000 (base)					
Other	-0.101	0.353	-0.29	0.775	-0.801	0.599
<b>Hispanic</b>						
Yes	0.000 (base)					
No	0.223	0.291	0.77	0.445	-354	0.8
<b>Marital Status</b>						
Single	0.00 (base)					
Married	-0.275	0.196	-1.41	0.163	-0.664	0.113
Separated	-0.185	0.331	-0.56	0.578	-0.841	0.471
Widowed	-0.397	0.501	-0.79	0.43	-1.391	0.597
Divorced	-0.308	0.376	-0.82	0.414	-1.054	0.438
Cohabiting	0.001	0.267	0	0.998	-0.53	0.531
<b>Education Level</b>						
Less than high school diploma	0.000 (base)					
High school diploma	0.489	0.375	1.3	0.195	-0.255	1.233
Some college, no degree	0.698	0.363	1.92	0.057	-0.022	1.418
Associates degree	0.647	0.436	1.48	0.141	-0.218	1.512
Bachelor's degree	0.493	0.377	1.3	0.193	-0.253	1.24
Graduate or professional degree	0.499	0.402	1.24	0.216	-0.297	1.296
<b>Household Income</b>						
Less than 25,000	0.000 (base)					
25,000-34,999	-0.054	0.198	-0.27	0.787	-0.447	0.34
35,000-49,999	-0.162	0.207	-0.78	0.437	-0.572	0.249
50,000-74,999	0.077	0.236	0.33	0.743	-0.39	0.545
75,000 or higher	-0.147	0.268	-0.55	0.584	-0.678	0.384
<b>Health Insurance</b>						
No	(base)					
Yes, public	-0.258	0.268	-0.96	0.338	-0.791	0.274
Yes, private	0.063	0.257	0.25	0.806	-0.446	0.573
<b>Chronic Health Condition</b>						
Yes	0.000 (base)					
No	0.137	0.206	0.66	0.509	-0.272	0.546
<b>Exposed to COVID-19</b>						
Yes	0.000 (base)					
No	0.256	0.16	1.6	0.112	-0.061	0.574
<b>Positive for COVID-19</b>						
Yes	0.000 (base)					
No	-0.150*	0.693	-2.87	0.005	-3.364	-0.613
cons	-1.988	0.693	-2.87	0.005	-3.364	-0.613

Note: \* Denotes significant Level of significance = P < 0.05

**Table 3:** Multiple Linear Regression Table.



**Figure 1:** Histogram of Age. Note:  $M = 34.97143$ ,  $SD = 14.53002$ .

### Pearson's Correlation

The Pearson's correlation between beliefs about the seriousness or dangers of COVID-19 (Perceived Severity) and willingness to follow COVID-19 prevention guidelines (Cues to Action: willingness to comply) is positive ( $r = +0.4079$ ) and is statistically significant ( $p < 0.001$ ).

The Pearson's correlation between beliefs about COVID-19 testing (Perceived Barriers) and willingness to follow COVID-19 prevention guidelines (Cues to Action: Willingness to comply) is negative ( $r = -0.2318$ ) and is statistically significant ( $p = 0.006$ ).

The Pearson's correlation between confidence in COVID-19 related health behaviors (Self-Efficacy) and willingness to follow COVID-19 prevention guidelines (Cues to Action: Willingness to comply) is positive ( $r = +0.4032$ ) and is statistically significant ( $p < 0.001$ ).

The Pearson's correlation between values or usefulness to complying: Beliefs about the benefits of following COVID-19 prevention guidelines (Perceived Benefits) and willingness to follow COVID-19 prevention guidelines (Cues to Action: willingness to comply) is positive ( $r = +0.5879$ ) and is statistically significant ( $p < 0.001$ ).

### Limitations

Limitations of the study are taken into consideration. Behaviors of compliance and beliefs about risk could also be influenced by various variables outside of the study's scope. Attitudes and behaviors likely changed as the COVID-19 pandemic progressed. As more information became available about COVID-19 and the threat of the virus heightened, compliance with guidelines and acceptance of the virus most likely increased. This limitation could influence the outcome of the data. It would have been sufficient to have collected data several times and at pre-determined intervals to evaluate the changes in beliefs about COVID-19 and compliance with guidelines at given times during the pandemic.

Data was collected by utilizing a 48-question survey. The more questions asked, the more likely respondents will not spend adequate time answering the questions thoughtfully or may not complete the survey in its entirety. This approach to the survey can affect the quality and reliability of the data collected. Besides, self-reporting was the measure utilized to collect data. Honesty was encouraged or expected from the participants, but it was not guaranteed.

The participants' ages ranged from 18 to 85 and older. There was not a representation of young adults. The Centers for Disease Control and Prevention [6] reported adults aged 30-50 experienced significantly high hospitalization rates related to COVID-19 than any other age group. This age group's high hospitalization could directly result from noncompliance with COVID-19 guidelines, such as quarantine. Although limitations exist, the study presents interesting phenomena related to beliefs and compliance related to COVID-19.

### Recommendations for Continued/Future Research

This study contributes to the evolving body of research related to COVID-19. The study results revealed that older adults tend to acknowledge their risk to COVID-19 and are likely to comply with guidelines to prevent illness or exposure. As the COVID-19 pandemic continues to unfold, it is crucial to take all necessary steps to improve the community's knowledge related to COVID-19 and promote the benefits of compliance to COVID-19 guidelines. This study supports the use of older adults as role models for other age groups as it relates to compliance. Other age groups may trust the image of the older adult, which may foster compliance. We are now faced with new caveats to this pandemic, the COVID-19 vaccination dilemma. Thus, the provision of current information continuously will be vital in the coming months as we attempt to control the virus's spread and return to a form of normalcy. Further research encompassing participants representing a broader range of ages may prove to be beneficial.

An evaluative research study to assess the efficacy and inclusion of vaccination efforts in predominantly Black or minority communities throughout Baltimore and the state of Maryland may be warranted. To complement this evaluation, it may be necessary to create and implement an assessment of the best practices regarding disseminating COVID-19 educational information within the community. Further studies may be aimed at educational interventions to increase knowledge and awareness about COVID-19 mitigation strategies, viral strands, and vaccines.

While historic mistrust in medicine, clinical trials, and vaccinations exist among African Americans, an ethnographic, phenomenological, or a grounded theory research study is also recommended to understand individuals' perceptions related explicitly to the COVID-19 vaccine.

## Conclusion

This study about the relationship between individuals' health-seeking perception and behaviors and their implementation and engagement in COVID-19 specific healthcare strategies revealed that the theoretical assumptions associated with health-seeking perception and behaviors and COVID-19 specific healthcare strategies is not easily understood. This study also explored the perception of COVID-19 prevention strategies, screening, mask/face covering, quarantine, isolation, hospitalization, and contact tracing.

Findings from this study found a positive and statistically significant relationship between health beliefs about the seriousness or dangers of COVID-19 (Perceived Severity) and willingness to follow COVID-19 prevention guidelines (Cues to Action: Willingness to comply).

There was a negative relationship between health beliefs about COVID-19 testing (Perceived Barriers) and willingness to follow COVID-19 prevention guidelines (Cues to Action: Willingness to comply). There was a positive and statistically significant relationship between confidence in COVID-19-related health behaviors (Self-Efficacy) and willingness to follow COVID-19 prevention guidelines (Cues to Action: Willingness to comply). There was a positive and statistically significant relationship between values or usefulness to complying, beliefs about the benefits of following COVID-19 prevention guidelines (Perceived Benefits) and willingness to follow COVID-19 prevention guidelines (Cues to Action: Willingness to comply).

Results from this study show that, individuals are engaged in health-seeking behaviors and COVID-19 prevention strategies. This suggests that education and policies that support health-seeking behaviors and COVID-19 prevention strategies could positively impact individuals and healthcare outcomes. More studies are recommended regarding health-seeking behaviors specifically related to COVID-19, adherence to COVID-19 health-seeking behaviors, and best practices on how to integrate these practices within the community. Coppin State University is more than prepared to assist in any or all these recommended efforts to improve healthcare outcomes aimed at sustainable solutions that address COVID-19 education, adherence, prevention, control, and community-based strategies.

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