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## COVID-19 and the Impact on Rural and Black Church Congregants: Results of the C-M-C Project

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# COVID-19 and the impact on rural and black church Congregants: Results of the C-M-C project

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## Abstract

The COVID-19 pandemic has had devastating effects on Black and rural populations with a mortality rate among Blacks three times that of Whites and both rural and Black populations experiencing limited access to COVID-19 resources. The primary purpose of this study was to explore the health, financial, and psychological impact of COVID-19 among rural White Appalachian and Black nonrural central Kentucky church congregants. Secondly we sought to examine the association between sociodemographics and behaviors, attitudes, and beliefs regarding COVID-19 and intent to vaccinate. We used a cross sectional survey design developed with the constructs of the Health Belief and Theory of Planned Behavior models. The majority of the 942 respondents were  $\geq 36$  years. A total of 54% were from central Kentucky, while 47.5% were from Appalachia. Among all participants, the pandemic worsened anxiety and depression and delayed access to medical care. There were no associations between sociodemographics and practicing COVID-19 prevention behaviors. Appalachian region was associated with financial burden and delay in medical care ( $p = 0.03$ ). Appalachian respondents had lower perceived benefit and attitude for COVID-19 prevention behaviors ( $p = 0.004$  and  $< 0.001$ , respectively). Among all respondents, the perceived risk of contracting COVID was high (54%), yet 33.2% indicated unlikelihood to receive the COVID-19 vaccine if offered. The COVID-19 pandemic had a differential impact on White rural and Black nonrural populations. Nurses and public health officials should assess knowledge and explore patient's attitudes regarding COVID-19 prevention behaviors, as well as advocate for public health resources to reduce the differential impact of COVID-19 on these at-risk populations.

## KEYWORDS

COVID-19, Health Belief Model, health equity, Theory of Planned Behavior

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## 1 | INTRODUCTION

Epidemiological data documents the disproportionate impact of the COVID-19 pandemic on racial ethnic minority and rural populations (Karim & Chen, 2021; Millett et al., 2020; Price-Haywood et al., 2020). Blacks account for 22% of positive cases and 32.9% of COVID-19 associated hospitalizations, despite accounting for only 13% of the United States (U.S.) population (Stokes et al., 2020). These national statistics are echoed in Kentucky (KY) with Blacks representing 9.5% of positive cases and 10.4% of deaths while accounting for only 8.5% of the state's population (United States Census Bureau, 2019; United States Department of Agriculture, 2020).

Data from early in the pandemic indicated that rural communities were protected from COVID-19 spread. However, as the pandemic continued, the number of cases in rural areas grew rapidly from 3.6% on April 1, 2020 to 14.2% on November 2, 2020 (United States Department of Agriculture, 2020). Rural residents from all race/ethnicities experience some of the same predisposing risk factors as Black Americans overall. Among Blacks, cardiovascular disease, diabetes, and chronic lung disease are some of the most common underlying conditions associated with COVID-19 mortality; these conditions are present in 31.3%, 40.7%, and 18.9% of patients hospitalized for COVID-19, respectively (COVID-NET, 2020; Stokes et al., 2020). Similar to the Black population, data indicates that rural-dwelling Americans have higher burden of pre-existing conditions including obesity, diabetes, and cancer that is partially attributed to their experiencing lower life expectancy (Singh et al., 2017). Moreover, rural-dwelling residents and Blacks experience longstanding social vulnerability, such as high unemployment, limited public transportation, limited access to healthcare, and overall poor pandemic preparedness that predisposes these two populations to increased risk of COVID-19 infection and mortality (Henning-Smith et al., 2021; Peters, 2020). While the relative contribution of predisposing risk factors is unknown, the complex interplay between chronic health conditions and societal factors place these two populations at increased risk for COVID-19 exposure, infection, and mortality.

There are limited population level data regarding the impact of COVID-19 on the personal lives of rural and Black populations and the social influences affecting their decisions to adopt COVID-19 prevention behaviors. The purpose of this project was to explore the health, financial, and psychological impact of COVID-19 among White rural Appalachians and Black nonrural central KY church congregants and to examine the association of sociodemographics (e.g., age, geographic area) with behaviors, attitudes and beliefs regarding COVID-19 and intent to vaccinate.

## 2 | METHODS

We used a cross-sectional survey design and sought to recruit a sample that represented the geographical diversity of our population of interest. To achieve this aim, we recruited churches comprised of

predominantly Black congregants in a nonrural central KY region and churches in the rural Appalachian region of KY with predominantly White congregants. To reach the congregants, we invited pastors to participate and then recruit their congregants to complete the electronic survey. We included both small and large congregations. To increase survey response among the smaller congregations in Appalachia, we invited fifteen churches in Appalachia and ten in central KY. Due to the COVID-19 pandemic, the churches were not meeting in person. Therefore, we contacted pastors by email and phone to engage them in participating. All invited churches agreed to participate. Due to a robust survey response, we closed the survey after recruiting nine central KY churches and 15 Appalachian churches. The University of Kentucky Office of Research Integrity approved the study. The IRB deemed the protocol minimal risk and it received expedited review. Due to the anonymity of the data, the IRB did not require signed informed consent. The beginning of the survey included a cover letter that explained the voluntariness of survey completion and provided the study coordinator and principle investigator's contact information for participant questions. Data were collected between May and September 2020.

### 2.1 | Survey development

We used the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB) to guide survey development. The HBM postulates that individuals will engage in health behavior change predicated on their belief that engaging in the behavior will reduce the threat of a negative condition. For example, engaging in COVID prevention behaviors—social distancing, using face coverings, and handwashing. Key HBM constructs include: perceived susceptibility, perceived threat, perceived severity, perceived barriers; perceived benefits, cues to action, intent, and self-efficacy (Skinner & Champion, 2015). The TPB postulates that an individual's intention to engage in health behavior is influenced by behavioral norms, subjective norms, and perceived behavioral control (Ajzen, 1991). Behavioral norms or attitudes toward behavior indicates a person's favorable or unfavorable appraisal of the behavior of interest. Subjective norm refers to whether most people in a person's social circle approve or disapprove of the behavior. Perceived behavioral control refers to the evaluation of a person's ability to engage in the intended behavior. The TPB has been applied to a wide range of health behaviors, including exploring the impact of COVID-19 on behavior change (Ammar et al., 2020; Chan et al., 2020; Han et al., 2020). Additionally, we used items from the National Institutes of Health All of Us COPE Survey to assess COVID-19 prevention behaviors (e.g., social distancing, handwashing, mask wearing, and staying at home (Harris, 2020)

The participant survey included 60 items and required approximately 20 min to complete. Demographic data assessed gender, sexual orientation, age as a categorical variable, insurance status, marital status, etc. We assessed medical and psychological history by providing a list of common medical conditions with a follow-up

question that assessed changes in the medical condition during COVID-19 (e.g., same, worse, improved). Nine yes/no response items assessed exposure to COVID-19 and the impact of COVID-19 on access to medical care. Seven items assessed the financial impact of COVID-19 (e.g., loss of income, difficulty paying rent, utilities) with a binary response followed by a 5-point Likert style response to assess level of impact that ranged from none of the time to very much of the time. COVID-19 prevention behaviors practiced during the “Stay at Home” mandate were assessed with ten 4-point Likert questions (none of the day; all of the days; none of the time; or frequently). The HBM subscales (21 items) were assessed with 4-point Likert scale (ranging from strongly agree to strongly disagree). The TPB (11 items) were assessed with a 4-point Likert scale (ranging from strongly agree to strongly disagree). For the analysis, summary scores for each subscale were calculated that were the average of the responses for the statements under the subscale model. One dichotomous yes/no item assessed intent to adhere to COVID-19 prevention behaviors. We assessed spiritual impact with one item that assessed the association between religious beliefs and the ability to cope with COVID-19. Four additional items assessed mode of worship delivery (e.g., Facebook, Zoom) and frequency of attendance.

We administered the electronic survey using Research Electronic Data Capture (REDCap) software. REDCap is a secure, web-based application designed exclusively to support data capture for research studies (Harris et al., 2009). Before launching the survey, we pilot tested it with ten community members from both regions to ensure that the items were acceptable and culturally appropriate. Community members provided feedback on the clarity of the survey, comprehensiveness, readability, flow, and cultural acceptability. The community members indicated that the survey was culturally acceptable and comprehensive, therefore no major edits were indicated. However, some questions were revised to increase item clarity, such as substituting coronavirus with the more familiar term COVID-19 and lowering the reading level to 5th grade. Each participant received a \$25 gift card from a national retail chain for their time.

We anticipated a survey response from 1000 participants. Inclusion criteria included age  $\geq 18$  years, church congregant or church leader/pastor from a church in Appalachia or a predominantly Black church in central KY. Participants were recruited by their church leaders using investigator-developed scripts and marketing materials (e.g., flyers, YouTube video and social media messages). The script included information about the purpose of the project and directions on how to access the link to the REDCAP survey. Pastors/church leaders conducted all recruitment efforts by provided the survey link to their members by showing the link during online live worship service, Facebook, posting on their church web page, or texting/emailing the link directly to the congregants. To link the individual survey to a specific church, we provided each Pastor/church leader with a church identification (ID) number and instructed the Pastor/church leader to provide the ID to the

congregants. Each church, regardless of congregation size, received a \$200 incentive for participating, plus an additional incentive for achieving a 50% or greater survey response of up to \$450 (based on their congregation size).

## 2.2 | Data analysis

Demographic characteristics were collected as categorical variables and are presented as frequencies and percentages. We used Cochran-Mantel-Haenszel  $\chi^2$  tests to assess the association between the effect of COVID-19 on respondents' receipt of medical care, chronic medical conditions, and willingness to receive a COVID-19 vaccine, controlling for geographical location. In situations when the validity of the  $\chi^2$  test was questionable, Fisher's exact tests were utilized (Agresti, 1992; Fisher & Van Belle, 1994). Cochran-Mantel-Haenszel  $\chi^2$  based on modified ridit scores were used to assess the association between financial difficulties, prevention practices/behaviors, and geographical location (Mantel, 1963). We treated the HBM and TPB subscales as continuous outcomes in the analysis. To account for the possibility of clustering due to study design, corresponding *p* values were obtained by fitting GEE-type marginal linear regression models testing for the differential effects of geographical locations on HBM and TPB subscales. Kauermann and Carroll (2001) bias-corrected standard errors were utilized to ensure valid inference. Statistical analyses were performed using SAS version 9.4 (SAS Institute, 2015), and tests were two-sided with statistical significance defined as  $p < 0.05$ .

## 3 | RESULTS

Nine hundred and forty-two congregants responded to the survey. Table 1 shows the distribution of demographic characteristics and the frequency of medical conditions. The majority of the sample were from central KY (54.1%) with 52.5% of them identifying as nonwhite, 50.1% identifying as Black, and 2.4% as Other. The remaining 47.5% were White. Nearly 60% of the sample were married, 73% were females and the majority (89%) was  $\geq 36$  years old. Most had at least some college education or more and 52.1% reported a yearly income of  $> \$50,000$ . Higher proportions of rural Appalachian congregants were married (73.8% vs. 47.8%); of lower income  $< \$50,000$  yearly (43.8% vs. 52.4%); had lower rates of employment (47% vs. 63%) and had lower levels of education ( $\leq 12$  years: 30% vs. 12%) compared with nonrural central KY congregants. A total of 264 (29.2%) of the respondents indicated that they were essential workers. The prevalence of chronic medical conditions among the sample was high, with almost half (49.8%) reporting hypertension, 22.4% reporting diabetes, and nearly 40% self-described as overweight or obese. Nearly 20% reported anxiety and 14.1% depression.

**TABLE 1** Frequency of demographic characteristics, medical conditions, and prevention behaviors ( $N = 942$ )

Demographic variables	Values	<i>n</i>	%
Gender	Female	669	73.03
	Male	247	26.97
Age	Less than 36	105	11.43
	36–55	308	33.51
	56–65	242	26.33
	66 and above	264	28.73
Race	White	435	47.49
	Black/African American	459	50.11
	Other	22	2.40
Geographic location	Central Kentucky	510	54.14
	Appalachian	432	45.86
Education	≤Some high school	33	3.61
	High school graduate	157	17.18
	Some college	318	34.79
	College graduate	206	22.79
	Graduate degree	200	21.88
Income	Less than 25,000	148	16.99
	25,000–50,000	269	30.88
	More than 50,000	454	52.12
Marital status	Single	144	15.74
	Married	548	59.89
	Separated, divorced, or widowed	223	24.37
Medical conditions	No medical condition	186	19.75
	Diabetes	211	22.40
	High blood pressure	470	49.89
	Heart disease	71	7.54
	Respiratory conditions	126	13.36
	Overweight/obesity	373	39.60
	Kidney disease	29	3.08
	Cancer	28	2.97
	Depression	133	14.12
	Anxiety	188	19.96
	Other	70	7.43
	Intention to practice prevention behaviors	Yes	829
No		13	1.54

**TABLE 1** (Continued)

Demographic variables	Values	<i>n</i>	%
Willingness to get the vaccination	Unlikely	313	33.23
	Likely	370	39.28
	Unsure	207	21.97

### 3.1 | Impact on finances

Table 2 demonstrates the impact of the pandemic on finances, medical conditions, and access to medical care. The majority (83.9%) did not face any financial difficulties. However, 37 (3.9%) of the respondents reported difficulty with rent; 33 (3.5%) reported difficulty with affording food, and 29 (3.0%) difficulty buying medications. There was a statistically significant association between financial difficulties and the respondents' geographic location ( $p = 0.03$ ) with respondents from central KY reporting more difficulties than those in Appalachia.

### 3.2 | Impact on medical conditions

Nearly half (45.7%) of the respondents faced some delay in obtaining medical care during the pandemic. There was a statistically significant association ( $p = 0.003$ ) between delay in medical care and congregant's geographical location, with the majority affected in the Appalachian region. Among the respondents reporting diabetes ( $n = 211$ ); 25.2% indicated worsening during the pandemic. Almost half (45.0%) of the respondents who reported obesity experienced weight gain. Weight gain occurred evenly regardless of geographic location (see Table 2).

### 3.3 | Mental health impact

Of those with depression ( $n = 129$ ) and anxiety ( $n = 186$ ), depression worsened for 50.4% and anxiety worsened for 58.0% of the respondents. Although not statistically significant ( $p = 0.18$  and  $0.89$ , respectively), the majority who experienced worse depression (67.6% vs. 32.3%) and anxiety (59.2% vs. 40.7%) were from the Appalachian region. Income and educational status were significantly associated with the effect of COVID-19 on anxiety, adjusted for other sociodemographic factors. The impact of COVID-19 on the deterioration of medical and psychological conditions was not significantly associated with the participant's geographic location.

### 3.4 | Spiritual impact

Not shown in the tables, the majority of respondents believed that their spiritual beliefs helped them cope with the COVID-19 pandemic.

**TABLE 2** Impact of COVID-19 on adult church congregants' finances, receipt of medical care and chronic medical conditions by geographical location (N = 942)

Conditions	Full sample		Central KY N = 510		Appalachia N = 432		p Value
	N	%	N	%	N	%	
Financial impact							0.035
Rent	37	3.93	28	75.68	9	24.32	
Gas	9	0.96	4	44.44	5	55.56	
Food	33	3.50	22	66.67	11	33.33	
Medications	29	3.08	12	41.38	17	58.62	
Housing instability	6	0.64	3	50.00	3	50.00	
None	791	83.97	415	52.47	376	47.53	
Delay in medical care							0.003
Yes	431	45.75	210	48.72	221	51.28	
No	500	53.08	292	58.40	208	41.60	
Medical conditions							
Diabetes							0.068
Worsened	53	25.24	21	39.62	32	60.38	
Not worsened	157	74.76	85	54.14	72	45.86	
High blood pressure							0.417
Blood pressure higher	66	14.16	40	60.61	26	39.39	
Blood pressure same	400	85.84	221	55.25	179	44.75	
Heart disease							0.667
Heart disease worse	7	10.14	3	42.86	4	57.14	
Heart disease same	62	89.86	18	29.03	44	70.97	
Respiratory conditions							0.255
Breathing worse	23	18.40	11	47.83	12	52.17	
Breathing same	102	81.40	62	60.78	40	39.22	
Overweight/obesity							0.582
Gained weight	167	45.26	82	49.10	85	50.90	
Weight same	202	54.74	105	51.98	97	48.02	
Cancer							1.000 <sup>a</sup>
Cancer treatments were interrupted	3	11.11	1	33.33	2	66.6	
Cancer treatments were not interrupted	24	88.89	10	41.67	14	58.33	
Depression							0.181
Worse	65	50.39	21	32.31	44	67.69	
Depression same	64	49.61	28	43.75	36	56.25	
Anxiety							0.891
Worse	108	58.06	44	40.74	64	59.26	
Anxiety same	78	41.94	31	39.74	47	60.26	

Most (88.8%) reported that their church had provided an alternative form of worship. If the respondent's church provided online worship opportunities during the COVID-19 pandemic, among those who engaged ( $n = 421$ ), most engaged in worship once or twice weekly. At the time the survey was completed, the majority of the respondents (55.7%) reported that their churches had not resumed in-person service.

### 3.5 | Prevention behaviors

The majority (86%) of the respondents indicated agreement or strong agreement that prevention practices (e.g., handwashing, face coverings, and staying at home) can lower the chances of COVID-19 infection. Nearly all (98.5%) indicated intent to practice prevention behaviors.

**TABLE 3** Comparison of geographical location to Health Belief Model (HBM) Subscales and Theory of Planned Behavior (TPB) Subscales

Subscale	Geographic location	N	Mean	SD	p Value
Health Belief Model Subscales					
Perceived susceptibility	Central KY	458	2.48	0.53	0.397
	Appalachia	405	2.51	0.53	
Perceived severity	Central KY	458	2.30	0.72	0.593
	Appalachia	403	2.25	0.72	
Perceived threat	Central KY	458	5.91	2.65	0.991
	Appalachia	403	5.85	2.70	
Perceived benefit	Central KY	457	3.64	0.55	0.004
	Appalachia	405	3.39	0.63	
Perceived barriers	Central KY	457	1.89	0.57	0.776
	Appalachia	405	1.94	0.57	
Self-efficacy	Central KY	457	3.34	0.59	0.251
	Appalachia	406	3.27	0.51	
Cues to action	Central KY	457	2.84	0.66	0.203
	Appalachia	404	2.74	0.68	
Theory of Planned Behavior Subscales					
Behavioral norms	Central KY	451	3.31	0.33	<0.001
	Appalachia	400	2.84	0.32	
Subjective norms	Central KY	451	2.64	0.53	0.105
	Appalachia	400	2.55	0.44	
Behavioral control	Central KY	451	3.39	0.56	0.305
	Appalachia	400	3.31	0.54	

### 3.6 | Health belief and TPB models

There was a high prevalence of worry among the sample indicating a high-perceived susceptibility to and severity of COVID-19. A total of 54% of the respondents indicated they often worry about personally contracting COVID-19 and 70% indicated they often worry about their family contracting COVID-19. Nearly 41% indicated worry regarding spreading COVID-19 to others; nearly 25% responded that they would likely die if infected; and 34% responded that their family member would likely die if they were infected. Thirty-one percent indicated the belief that if they contracted COVID-19, it "was meant to be". Among the sample, 33.2% indicated they were unlikely to obtain the COVID-19 vaccine once it became available.

Table 3 presents the comparison of HBM and TPB constructs between geographic locations. Respondents from central KY had significantly a higher score for perceived benefit of COVID-19 prevention practices ( $p = 0.004$ ). However, none of the other HBM subscales reached statistical significance. The TPB constructs indicated a significantly lower mean score for Appalachian respondents for behavioral norms compared with respondents from the central KY region ( $p < 0.001$ ). There were no significant differences in mean scores for subjective norms and perceived behavioral control subscales between respondents in central KY and those in Appalachia ( $p = 0.105$  and  $p = 0.305$ , respectively).

## 4 | DISCUSSION

Results of this cross-sectional survey study comprised of primarily White church congregants from rural Appalachia and Black congregants from a central Kentucky nonrural region reveals significant health and psychological impacts of the COVID-19 pandemic, yet high vaccine hesitancy. Moreover, there were significant associations of sociodemographics and health status with differential financial impact, delay in medical care, and perceived benefit and behavioral norms regarding COVID-19 prevention behaviors.

Our findings of delay in medical care during the pandemic is consistent with those of others (Czeisler et al., 2020). Data indicate that routine preventive care such as cancer screenings as well as acute care for life threatening events have decreased during the pandemic (Cancino et al., 2020; Lange et al., 2020). Medical care delays may be a factor of patient avoidance of healthcare due to fear of COVID-19 exposure or from the medical system postponing appointments. Nevertheless, given the results of a recent analysis that projects a reduction in U.S. life expectancy in 2020 by 1.13 years and an estimated reduction 3 to 4 times that for the Black and Latino populations than that of Whites, it is of paramount importance that the matter of medical care delays is addressed (Andrasfay & Goldman, 2021). Medical delays among populations predisposed to healthcare inequities could have profound negative health effects. Given the persistent higher overall morbidity and mortality among Blacks and the higher chronic illness prevalence as well as the slower



rate of improvement in mortality data in Appalachia (Singh et al., 2017), efforts to increase confidence regarding routine and acute medical care are urgently needed to avoid a subsequent increase in morbidity and mortality.

Of great concern is that despite finding high susceptibility regarding contracting COVID-19 among the overall sample, respondents indicated vaccine hesitancy and fatalistic beliefs. Concerns regarding vaccine hesitancy have been documented globally (Barello et al., 2020; Freeman et al., 2020). Additionally, the finding of equal hesitancy between both groups was inconsistent with those researchers who have documented a higher degree of hesitancy among communities of color (Freeman et al., 2020; Gramlich & Funk, 2020). Our findings are likely due to the similarity of our two populations in some respect, given that both populations share some degree of marginalization, limited access to healthcare, and medical mistrust. However, previous research has shown that people who have vaccine-specific concerns are more receptive to receiving information that allays their concerns than those with general concerns. Therefore, trusting relationships with healthcare providers and educational dialogue that addresses safety concerns will likely increase vaccine uptake among those who are hesitant (Bunch, 2021). Community outreach that includes education and targeted messaging regarding vaccine safety as well as community-based vaccine administration are necessary to increase vaccine uptake.

There was a high level of worry regarding contracting COVID-19 among the sample. We expected central KY Black congregants to report a higher perception of COVID-19 risk than White congregants, thus our findings of no association among socio-demographics and perceived susceptibility and severity to COVID-19 was surprising given the high COVID-19 mortality among Blacks. However, these findings are consistent with those of others (Bailey et al., 2020) and raises serious concerns regarding public health messaging regarding risk. Public health officials should ensure appropriate messaging to high-risk populations. Previous research suggests that vaccine knowledge and perceived severity of COVID-19 were predictors of intent to vaccinate (Ruiz & Bell, 2021). Given high levels of worry about COVID-19 related mortality among our sample, increasing knowledge may result in improved intent to vaccinate. Additionally, we found a high degree of religious fatalism among our sample. Fatalism, which is defined as the belief in a lack of personal power or control over destiny, has been previously associated with Appalachian residents and may negatively impact health behaviors (Potter et al., 2019; Royse & Dignan, 2011). Higher fatalistic beliefs have been to be associated with lower rates of vaccine uptake of HPV vaccine among Appalachians and may be a factor with the COVID vaccine (Vanderpool et al., 2015).

There are multiple historical and current factors likely associated with vaccine hesitancy among Blacks, such as medical and scientific atrocities (Gramlich & Funk, 2020). Current factors include the perceived politicization of the vaccine and the speed of vaccine development (Kreps et al., 2020; Warren et al., 2020). To overcome vaccine hesitancy, public health practitioners must consider cultural factors when working with these populations and identify

cross-sector collaborators to attend to emotional responses, ensure public trust and provide consistent science-based messaging regarding COVID-19 prevention practices, vaccine safety, and effectiveness.

The HBM and TPB models indicate that rural Appalachian congregants believed that public health recommendations were of low benefit and that they were less likely to be socially influenced to adopt COVID-19 prevention behaviors. These findings indicate the need for more COVID-19 resources to rural communities and the need for targeted messaging to convey culturally-adapted information. Perceptions of lack of benefit of COVID-19 prevention practices may also suggest a lower acceptance of evidence-based policy implementation. Moreover, given the prolonged duration of the pandemic, these perceptions may be attributed to dampened emotional responses and politicization of the pandemic (Chou & Budenz, 2020).

Anxiety and depression were high among the sample and particularly high among the Appalachian respondents. Our findings of the association of mental health symptoms and socioeconomic status is consistent with others (Silvernale et al., 2019; Zimmerman & Katon, 2005) and further suggest a disproportionate burden among individuals already overburdened by life stressors, such as poverty, lower resources, and a public health crisis (Ettman et al., 2020). These findings suggest a larger-scale psychological distress that is exacerbated by the pandemic and speaks to the need for adequate mental health services.

Given the economic consequences of the pandemic, we were surprised that very few (~30) of the sample reported a financial impact. However, there was a differential impact with Black nonrural respondents reporting greater difficulty with meeting basic needs. According to the U.S. Census data, Black families have significantly lower household income than Whites, earning 70 cents per every dollar earned by Whites (Semega et al., 2018). Moreover, COVID-19 related economic data indicate that during the pandemic, people of color faced more housing instability, food insecurity, and difficulty meeting basic needs (Gould & Wilson, 2020; Greene & McCargo, 2020). Therefore, our findings likely reflect the persistent economic vulnerability experienced by Blacks amplified by the economic toll of the pandemic.

Our results add to the literature regarding the impact of COVID-19 among these two at-risk populations, yet the study is not without limitations. Electronic survey administration allowed us to reach a large sample during a global pandemic. Although a strength, this method limited the response to individuals who had access to electronics. Given the demographic of the central KY churches, our respondents likely demonstrated those with access to computers and wireless internet. We attempted to control this limitation by providing paper surveys upon request. Another limitation was the cross-sectional design with no follow-up. Therefore the results do not account for changes in responses and behaviors that may have occurred at different time points throughout the pandemic. Additionally, the anonymous delivery could have resulted in repeated responses from a participant. However, we attempted to limit this threat by emphasizing the instructions to complete the survey only

once. Last, the generalizability of our results are limited to church congregants and may not reflect the behaviors and beliefs of the public. Future researchers should use a repeated measures design to access for change in attitudes and behaviors over time. Additionally, obtaining responses from individuals from a nonchurch, diverse background will increase the generalizability.

In conclusion, our study found that rural Appalachian White and nonrural Black congregants experienced differential impact of the pandemic. However, the two congregant groups reported different perceptions regarding the COVID-19 prevention restrictions. These findings have important implications regarding the need for proactive public health responses to mitigate the effects of the pandemic among high-risk populations. However, to reach the participants, the prevention and health promotion messaging must be science-based and culturally adapted.

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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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