A Survey of Behaviors, Beliefs, and Perceptions of COVID-19 in Rural Appalachian Ohio

Sanjay K. A. Jinka1; Jay P. Natarajan1; Matthew Kubina1; Jennifer A. Glover1; Julie Nam1; Sanaa Mansoor1; Charles Leahy1; Troy Kotsch1; Rebecca Fischbein1; Mike Appleman1

1Department of Family and Community Medicine, Northeast Ohio Medical University, Rootstown, OH

Corresponding Author: Sanjay Jinka, 4209 State Route 44, Rootstown, OH 44272, (800) 686-2511, sjinka@neomed.edu

Submitted May 25, 2022   Accepted March 15, 2023   Published August 7, 2023   https://doi.org/10.18061/ojph.v6i1.9054

ABSTRACT

Background: Preventing the spread of COVID-19 comes with many challenges. Considering the sociobehavioral effects of social distancing in rural communities specifically is incredibly important. No previous studies have been published about adherence to COVID-19 preventative measures and viewpoints on vaccination/other prevention measures in the rural Appalachian region of Ohio specifically. This present study will describe the results of a survey regarding perceptions of COVID-19 in rural communities.

Methods: A 20-question cross-sectional survey was administered over a 6-week period from February to April 2021. Survey distribution was completed via flyers with QR codes hung at 4 medical offices in Columbiana and Tuscarawas counties. The survey was adapted from the standardized FluTEST survey. Descriptive statistics and bivariate analyses were used for comparison.

Results: We had 23 respondents after removing incomplete/nonconsenting responses. Our data showed that contracting COVID-19 was associated with vaccine distrust. Females and those with health risk factors were found to be more cautious when compared to males and those without risk factors, respectively. Respondents under age 65 years were more likely to trust government health agencies. Those with emotional distress were more likely to take precautions in relation to the COVID-19 pandemic.

Conclusion: To prevent widening health inequalities in the particularly vulnerable population of Appalachia, further study with larger sample size should be conducted. This information can be used by health care providers to tailor patient education regarding COVID-19 vaccine administration, treatment, and prevention measures.

Keywords: COVID-19; Survey; FluTEST; Appalachia; Vaccine

INTRODUCTION

SARS-CoV-2, or as it is most known, COVID-19, presents itself on a wide spectrum from patients being asymptomatic to having pneumonia, acute respiratory distress syndrome, and more. These life-threatening complications necessitate an aggressive containment strategy. Community-wide containment and an emphasis on social distancing are proven to reduce asymptomatic and presymptomatic spread. However, compliance with social distancing comes with challenges including cooperation, alteration to individuals’ routine, mental health and/or financial burden, and passive monitoring.

These sociobehavioral effects of social distancing in rural communities specifically are important to consider. Generally speaking, rural communities face unique barriers to health care compared to that of metropolitan areas. For example, rural communities may have inadequate access to health care due to physician shortages and increased travel distance to hospitals, and decreased access to public transportation. This brief report will describe the results of a survey regarding perceptions of COVID-19 in rural communities. To date, no previous studies have been published about adherence to
COVID-19 preventative measures and viewpoints on vaccination/other COVID-19 prevention measures in the rural Appalachian region of Ohio specifically.

**METHODS**

**Setting and Design**

A 20-question cross-sectional survey employing Likert-scale style questions regarding preventative measures taken against COVID-19 adapted from the Flu Telephong Survey Template (FluTEST) was created. This was administered over a 6-week period from February to April 2021. The survey was distributed to patients of 4 medical offices located in the rural Appalachian Ohio counties of Columbiana and Tuscarawas.

**Participant Recruitment Process**

Physician offices were recruited via emails sent to physicians on a preceptor list provided by the Northeast Ohio Medical University Rural Medicine Education Program. A flyer with a QR code was hung in each office waiting room. The QR code linked to an online survey, which each participant was able to complete on their personal electronic device.

**Procedures**

Only adults with capacity to take the survey were included in the survey and this was screened for with an introductory question along with a certification of informed consent. Following initial flyer placement, reminder emails were sent to participating offices every 3 weeks (twice in the 6-week period overall) to verify ongoing placement. After the 6-week period was completed, the survey flyers were removed from each location and the survey was closed.

**Measures/Outcomes**

Anonymous respondent demographics including residing county, age, gender identity, level of education, ethnicity, race, chosen risk factors, and COVID-19 infection status were gathered in the survey. Health risk factors were defined as having a history of diabetes, heart disease, cancer, COPD, asthma, rheumatoid arthritis, tobacco use, or alcohol abuse. In addition, the Likert-scale style questions were adapted from the FluTEST template. Scoring in the Likert scale consisted of answers ranging from definitely, probably, and neither nor, followed by a conditional term and its opposite (ie, true and false or agree and disagree).

**Statistical Analysis**

Descriptive statistics including frequencies and means were conducted. Bivariate analyses between variables of interest and demographic factors were examined with chi-square tests. Analyses were performed using Stata MP 13 software.

**Institutional Review Board**

This study was approved by the Northeast Ohio Medical University institutional review board (#20-019).

**RESULTS**

**Demographics**

Twenty-three respondents were included in the analysis after removing incomplete responses and nonconsenting responses (16 respondents). Incomplete responses were defined as those that did not respond to all 20 of the questions that were provided in the survey. Respondents were majority female (74%), under age 65 years (83%), college educated (74%), without health risk factors (61%), and without prior COVID-19 infection (83%) (Table 1).

**Perception on Vaccines**

Those who had not contracted COVID-19 previously were significantly (p < 0.05) more likely to get vaccinated (76% vs 33%) and believe the vaccine was safe (84% vs 0%) when compared to those who had contracted the illness.

<table>
<thead>
<tr>
<th>Demographic</th>
<th>(n=23)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6 (26%)</td>
</tr>
<tr>
<td>Female</td>
<td>17 (74%)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;65 years</td>
<td>19 (83%)</td>
</tr>
<tr>
<td>≥65 years</td>
<td>4 (17%)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
</tr>
<tr>
<td>Up to high school education</td>
<td>6 (26%)</td>
</tr>
<tr>
<td>Post-high school education</td>
<td>17 (74%)</td>
</tr>
<tr>
<td><strong>Health risk factors</strong></td>
<td></td>
</tr>
<tr>
<td>No health risk factors</td>
<td>14 (61%)</td>
</tr>
<tr>
<td>1 or more health risk factors</td>
<td>9 (39%)</td>
</tr>
<tr>
<td><strong>Prior COVID-19 infection</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4 (17%)</td>
</tr>
<tr>
<td>No</td>
<td>19 (83%)</td>
</tr>
</tbody>
</table>
Perceptions by Sex

Compared to males, female respondents were significantly (p < 0.05) more likely to keep away from crowded places (87.5% vs 33%), strongly agree that “catching COVID-19 would cause difficulties for the people important to [them]” (50% vs 0%), and strongly believe everyone should thoroughly and regularly wash their hands when compared to males (87.5% vs 40%) (Figure 1).

Perceptions of Those with Health Risk Factors

Compared to those without health risk factors, those with risk factors were significantly (p < 0.05) more likely to strongly agree “people who are important to you think you should thoroughly and regularly wash your hands” (75% vs 8.3%). These individuals were also significantly (p < 0.05) less likely to report feeling in control of contracting the virus compared to those with no risk factors (50% vs 14%).

Trust in Public Agencies

Those who were under the age of 65 years were significantly (p < 0.05) more likely to trust government health agencies to provide accurate information compared to those who were age 65 years and over (76% vs 50%).

Mental Health

When thinking about the pandemic in the past month 81.8%, 76.2%, 81.8%, and 100% of respondents reported feeling tense, upset, worried, or annoyed, respectively. Feeling worried or tense was significantly (p < 0.05) associated with not having enough prescription medication at home to last 7 days.

Respondents that reported feeling tense, upset, or worried were significantly (p < 0.05) more likely to cancel or postpone a social event than those who did not report these feelings. The majority of tense/worried respondents reported canceling/postponing events (55.6%, 55.6%, and 62.5%, respectively) compared to 0% of those who did not report these feelings.

Respondents that reported feeling tense, upset, or worried were significantly (p < 0.05) more likely to keep away from crowded places, with 88.9% of tense/worried respondents reporting this behavior compared to 0% of those who did not report these feelings.

Respondents that reported feeling tense, upset, or worried, were significantly (p < 0.05) more likely to believe in thoroughly and regularly washing hands, with 88.2% of tense/worried respondents reporting this behavior compared to 0% of respondents without these feelings.

Respondents that reported feeling tense, upset, or worried were significantly (p < 0.05) more likely to use hand sanitizer more often than before the COVID-19 pandemic, with 94.4% of tense/worried respondents reporting this behavior compared to 50% of respondents without these feelings.

DISCUSSION

Our survey is the first to investigate perceptions of COVID-19 in a rural Appalachian Ohio community. Despite low sample size, we uncovered important information to be examined in future research.
Our study found respondents who already contracted COVID-19 were significantly (p < 0.05) less likely to get vaccinated (76% vs 33%) or believe the vaccine was safe (0% vs 84%). This finding suggests those who contracted and survived COVID-19 doubt the need for the vaccine, but further study is necessary to understand if this relationship still exists now that the vaccine is more widely available.

We found that women were significantly more likely than men to take precautionary measures (hand washing and keeping away from crowded places). This could be explained by our finding that women were significantly more likely to believe contracting COVID-19 would cause difficulties to people important to them. This may suggest women are more empathetic than men to the needs of their family and therefore might take the pandemic more seriously. This has been supported in previous studies that find women more empathetic than men as a result of contextual factors and traditional gender roles, but further study regarding differences in COVID-19 related practices between sex is necessary.7,8

Our study also identified feeling stressed or tense was significantly associated with not having enough prescription medications at home to last 7 days. Further, those with health risk factors were significantly more likely than their counterparts to feel people close to them should wash their hands and that they were not in control of contracting the virus. This suggests rural residents, particularly those with health risk factors, are mindful about their unique challenges regarding COVID-19. Given limited access to healthcare in rural communities this caution and desire to plan is encouraging.9

We further discovered that patients under the age of 65 years were significantly more likely to trust government health agencies when compared to older respondents. This age-related distrust has been reported previously and may be due to older individuals having more healthcare contact and potentially more negative experiences from now outdated government medical advice.10

Social isolation has been associated with poor outcomes in terms of mental and physical health.11 Our study revealed individuals who voluntarily engage in precautionary social isolation practices, like canceling an event or keeping away from crowded places, may experience emotional distress. In an isolated and already vulnerable rural community this may exacerbate underlying mental health problems.

Our study is not without multiple limitations. The main limitation is the small sample size and convenience sampling which reduces generalizability and therefore limits generalizability. The small sample size is likely due to the low number of doctors’ offices (4) that agreed to distribute our survey. Additionally, the administration of the survey was primarily digital, potentially alienating respondents without a phone or those with limited technical com-

PUBLIC HEALTH IMPLICATIONS

Little has been published on the perceptions of COVID-19 in Appalachian Ohio. This present survey identifies key differences in this population’s perceptions when stratified by sex, age, presence of health risk factors, previous COVID-19 infection status, and mental health status. Namely, women, those with health risk factors, and those with emotional distress related to the pandemic were found to be more cautious than their counterparts.

The importance of this investigation lies in the predominance of rural communities within Ohio. Out of 88 total counties in Ohio, 65 counties have over 90% of their area classified as rural.12 The Rural Health Information Hub estimates that around 2.3 million citizens live in rural Ohio, a region characterized by lower physician to patient ratios compared to more metropolitan areas.13,14 Given that all our responses were recorded electronically, there is a high level of suspicion that we were unable to evaluate the perspective of Amish populations who are heavily concentrated in rural areas. Due to the lack of technology and media consumption in this population, we believe that their perceptions of the pandemic may differ from other Ohioans. This study has elucidated the importance of physicians acting as liaisons between governmental agencies such as the CDC and the patients whom they serve. Since our results suggest that elderly rural Ohioans continue to maintain a distrust in the government’s pandemic protocols, further studies must delve deeper into the physician patient relationship to determine potential methods of reassuring patients of their safety. The resulting information can be used by health care providers to tailor patient education regarding COVID-19.

ACKNOWLEDGMENTS

The authors thank the doctors who were agreeable to allowing distribution of the survey in their offices.

Disclosures. The authors have no financial disclosures. None of the authors have received funding for this manuscript.

REFERENCES


13. Rural Health Information Hub. Social determinants of health for rural Ohio [Internet]. Rural Health Information Hub; 2022 [cited 2023 Feb 15]. https://www.ruralhealthinfo.org/states/ohio

APPENDIX COVID-19 Rural Survey

Q1 Which Ohio county do you currently reside in? (Selections were provided for each of Ohio’s 88 counties)
- 18-24 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65 years or above

Q2 How old are you? 
- Male
- Female
- Transgender Male/Female-to-Male
- Transgender Female/Male-to-Female
- Other
- Choose not to say

Q3 What is your gender identity?
- White
- Black or African American
- Other Pacific Islander
- Native Hawaiian
- Asian
- American Indian/Alaska Native
- Choose not to say

Q4 What is the highest degree or level of education that you have completed?
- No degree
- Less than a high school diploma
- High school diploma or GED
- Some college but no degree
- Associates degree (AA or AS)
- Bachelor’s degree (BA, BS, or BBA)
- Master’s degree (MA, MS, MEng)
- Professional degree (MD, DDS, JD)
- Doctorate degree (PhD, EdD)

Q5 What is your ethnicity?
- Hispanic or Latino
- NOT Hispanic or Latino
- Choose not to say

Q6 What is your race? Select all that apply.
- American Indian/Alaska Native
- Asian
- Native Hawaiian
- Other Pacific Islander
- Black or African American
- White
- Choose not to say

Q7 Do you have any health risk factors? Please click all that apply.
- Diabetes
- Heart disease
- Cancer
- COPD
- Asthma
- Rheumatoid arthritis
- Tobacco use
- Alcohol abuse
- Other

Q8 As far as you know, have you had COVID-19 since February 2020?
- Definitely yes. I was tested positive.
- Probably yes. I was tested positive.
- Not sure
- Probably no
- Definitely no. I was not tested

Q9 Please indicate how much you agree with the statements below.
- The health effects of COVID-19 are usually more severe for people who are 65 years old or more.
- The health effects of COVID-19 are usually more severe for people who already have a serious medical condition.

Q10 Because of COVID-19, in the past month how much have you...
- Reduced or increased the amount you go to school, college, university or work
- Reduced or increased use public transport
- Reduced or increased the amount you go into shops such as malls and grocery stores
- Reduced or increased the amount of hand washing

Q11 Because of COVID-19, in the past month have you...
- Canceled or postponed a social event such as meeting friends, eating out or going to a sports event
- Kept away from crowded places generally
- Cleaned or disinfected things you might touch (such as door knobs or hard surfaces), more often than usual
- Used sanitizing hand gel to clean your hands, more often than usual
- Tried to avoid people who have COVID-19
- Usually used gloves when out and about
- Usually used mask when out and about

Q12 For each of the following statement, please indicate whether you think they are: definitely true, probably true, not true nor false, probably false, or definitely false or if you’re not sure.
- Should reduce the number of people you meet
- Should thoroughly and regularly wash your hands
- Should clean or disinfect things that you might touch (such as door knobs or hard surfaces)

Q13 The next questions refer to people who are important to you, such as your family and/or friends. For each of the following statements please indicate whether you think they are: definitely true, probably true, not true nor false, probably false, or definitely false or if you’re not sure.
- People who are important to you think you should reduce the number of people you meet
- People who are important to you think you should thoroughly and regularly wash your hands
- People who are important to you think you should clean or disinfect things that you might touch (such as door knobs or hard surfaces).
Q14 For each of the following statements, please indicate how true you believe these statements to be.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Definitely True</th>
<th>Probably True</th>
<th>Neither True nor False</th>
<th>Probably False</th>
<th>Definitely False</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>If I don’t take any preventative action, then I am likely to catch COVID-19 in the next 6 months</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>I have little control over whether I will catch COVID-19</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>COVID-19 would be a serious illness for me</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>COVID-19 would be a mild illness for me</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>If I catch COVID-19, it will cause difficulties for people who are important to me</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

Q15 The next set of questions is regarding preparatory measures in the event of another potential quarantine. Please answer yes, no, or not sure for each one.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Not sure</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>You currently have enough food at home to last 14 days</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>You have tried to purposely catch COVID-19 to “get it over and done with”</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>You have discussed with a friend or family member what you could do if one of you caught COVID-19</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>You currently have enough prescription medication at home to last 7 days</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

Q16 Please indicate your answer to the question below.

<table>
<thead>
<tr>
<th>Question</th>
<th>Definitely yes</th>
<th>Probably yes</th>
<th>Might or might not</th>
<th>Probably no</th>
<th>Definitely no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you intend to take a COVID-19 vaccine when it comes out?</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

Q17 Select where you have received most of your information about COVID-19 in the last month.

- People I speak to day to day (ie, family, friends, colleagues)
- Health care professionals (ie, my doctor, GP, pharmacist, chemist, other health care professionals)
- Official helplines (ie, CDCINFO, etc)
- Official websites (ie https://www.cdc.gov, etc)
- Official departments and agencies (ie, local hospital, Department of Health, World Health Organization, etc)
- Search Engines (Google, Yahoo, Bing)
- Social Media (Facebook, Twitter, Instagram)
- News Websites (ie, Fox News, CNN, ABC, NBC, CBS)
- Newspapers
- Television News
- Radio News
- Other

Q18 In regards to this source you chose above indicate whether you think the following statements are: definitely true, probably true, neither true nor false, probably false, or definitely false or if you’re not sure.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Definitely True</th>
<th>Probably True</th>
<th>Neither True nor False</th>
<th>Probably False</th>
<th>Definitely False</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can be trusted</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Is accurate</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Tells the whole story</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Is biased or one-sided</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

Q19 Thinking about the CDC, Department of Health and Human Services, and other government health agencies please indicate if the following statements are definitely true, probably true, neither true nor false, probably false, or definitely false or if you’re not sure.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Definitely True</th>
<th>Probably True</th>
<th>Neither True nor False</th>
<th>Probably False</th>
<th>Definitely False</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can be trusted</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Is accurate</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Tells the whole story</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Is biased or one-sided</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

Q20 For each of the following please indicate whether you’ve felt that way when thinking about the pandemic in the past month. Your options are: Very much, moderately, somewhat, not at all, or if you’re not sure.

<table>
<thead>
<tr>
<th>Feeling</th>
<th>Very Much</th>
<th>Moderately</th>
<th>Somewhat</th>
<th>Not at all</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tense</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Upset</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Relaxed</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Worried</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Annoyed</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

End of Survey