Differences in Preventive Behaviors of COVID-19 Between Urban and Rural Residents: Lessons learned from A Cross-sectional Study in China

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Received: date; Accepted: date; Published: date

Abstract: Purpose: The purpose of this study is to examine the differences in preventive behaviors of COVID-19 between urban and rural residents, as well as identify the factors that might contribute to such differences. Methods: Our online survey study included 1,591 participants from 31 provinces of China with 87% urban and 13% rural residents, which is geographically representative. We performed multiple linear regressions and path analysis to examine the relationship between rural status and behavioral intention, attitude, subjective norms, information appraisal, knowledge, variety of information source use, and preventive behaviors against COVID-19. Findings: Compared to urban residents, rural residents were less likely to perform preventive behaviors, more likely to hold a negative attitude toward the effectiveness of performing preventive behaviors, and having lower levels of information appraisal skills. We identified information appraisal as a significant factor that might contribute to the rural/urban differences in preventive behaviors against COVID-19 through attitude, subjective norms, and intention. We found no rural/urban difference in behavioral intention, subjective norms, knowledge about preventive behaviors, or the variety of interpersonal/media source use. Conclusions: As the first wave of the pandemic inundated in urban areas, the current media coverage about COVID-19 prevention may not fully satisfy the specific needs of rural populations. Thus, rural residents might not be strongly motivated to engage in a thoughtful process of information appraisal and adopt the appropriate preventive measures. Tailoring health messages to meet rural populations’ unique needs can be an effective strategy to promote preventive health behaviors against COVID-19.

Keywords: COVID-19; rural-urban health disparities; critical heath literacy; information appraisal; theory of reasoned action; structural equation modeling

1. Introduction

Studies documented that rural populations are facing health disparities due to multiple barriers such as lack of health care resources (e.g., transportation, health insurance, providers, and facilities), geographic distance, and lower socioeconomic status [1, 2]. Compared to urban residents, rural residents have higher rates of morbidity and mortality from various diseases including cancer and cardiovascular disease [3-5]. Rural populations also engage in healthier behaviors less than urban populations. For example, children living in rural areas consume less fruit and vegetable than their urban peers [6]; rural residents were less likely to wear sunscreen to prevent skin cancer than urban residents [7]; and women living in rural locations were less likely to receive mammography and...
Papanicolau (Pap) smear screening to prevent cervical and breast cancer than their urban counterparts [8].

Rural residents are still encountering health disparity regarding infectious disease prevention and treatment. For instance, deaths from infectious diseases decreased by 18% in the United States between 1980 and 2014; however, rural counties did not experience the same improvements as their urban counterparts [9]. Similarly, in China, the levels of knowledge and awareness of the human immunodeficiency virus (HIV), tuberculosis (TB) and hepatitis B virus (HBV) are still low among rural residents [10]. Moreover, unique challenges (e.g., resource constraints and staff shortages in healthcare) are affecting rural areas to detect, respond, prevent, and control infectious disease outbreaks [11, 12].

COVID-19 is a current infectious disease outbreak causing a global public health crisis. The first case of COVID-19 was reported to the World Health Organization (WHO) on December 31, 2019 from Wuhan, China and the outbreak was declared a Public Health Emergency of International Concern on January 30, 2020 [13]. As of May 2020, there were more than 4.2 million confirmed cases worldwide [14]. People with underlying medical conditions including those with chronic diseases such as lung, kidney, heart, and diabetes might be at higher risk for severe illness from COVID-19 [15]. Public health researchers are concerned that rural communities might experience worse situation related to the COVID-19 pandemic (e.g., greater mortality rates) than their urban and suburban counterparts due to the existing rural/urban health disparities [16-19]. For example, the higher rates of chronic diseases and less physical exercises impose higher risks of severe illness on rural cases [20]. Also, existing research documented that the escalation of COVID-19 spread is highly related to the transportation of people with no to mild symptoms—namely, those are unaware about the infection [21]. Therefore, health professionals recommend staying at home, social distancing, wearing facemasks, and frequent hand washing as effective containment measures. The promotion of these preventive behaviors is essential to slow down the spread of the virus during the outbreak [18, 22].

The purpose of this study is to examine the differences in preventive behaviors of COVID-19 between urban and rural residents, as well as identify the factors that might contribute to such discrepancies.

2. Theoretical Framework

Research on social and behavioral sciences provides insights for effective responses to the COVID-19 pandemic [23]. Theory of Reasoned Action (TRA) proposes that an individual’s preventive behavior is a function of his or her intention to perform it, which is determined by an individual’s attitude and subjective norms towards a particular behavior [24, 25]. According to TRA, attitude comprises beliefs, values, and knowledge; subjective norms refer to the person’s perceptions about what important people want he or she to do with regard to the preventive behavior [24].

Use of health information is crucial to personal and public health outcomes because it helps individuals accumulate knowledge and adopt healthier behavioral patterns [26]. Overwhelmed with information regarding COVID-19, it is challenging for individuals to evaluate the quality of related news and official recommendations [27]. Information appraisal refers to the critical analysis of health-related information, which is an important component of critical health literacy [28, 29]. Information appraisal reflects the skills to apply health information to individual circumstances and process what a specific health behavior means in people’s “own world” [30, 31].

Guided by TRA and the concepts of health information source use and critical health literacy, we examined the rural/urban differences in COVID-19 preventive behaviors, intention, attitude, subjective norms, knowledge, information source use, and information appraisal. We proposed a hypothesized path model testing the direct and indirect effects of rural status on preventive behaviors through intention, attitude, and subjective norms. We also examined the factors (i.e. knowledge, information source use, and information appraisal) that might contribute to the differences in preventive behaviors of COVID-19 between urban and rural residents.

3. Methods
3.1. Procedure and participants

Data were drawn from a larger study designed to examine public risk communication combating COVID-19 in China. The online survey was conducted between January 31 and February 4, 2020, when the COVID-19 began to spread nationally in China. We used SoJump to recruit participants (http://www.sojump.com). SoJump is one of the largest online survey providers in China that has over 2.6 million registered users with diverse social demographic characteristics [32, 33]. SoJump used its internal record about its registered users to identify potential participants who were eligible for this study. SoJump then sent out study invitations to a randomly selected subset of the registered users. To be eligible for this study, participants had to be 16 years or older, living in mainland China (excluding Macau and Hong Kong), and literate in Chinese. The Institutional Review Board at XXX University [removed for peer-review] approved the data collection protocol.

Invalid responses were dropped because they met at least one of the following two priori criteria: (1) repetitive submission using the same IP address or (2) failure any of the three attention checkers. The final sample included 1,591 valid participants (50% male) from 31 provincial-level administrative units of China with 1,381 (87%) urban and 210 (13%) rural residents, which is geographically representative. Participants’ ages ranged from 16 to 71 years (\(M = 31, SD = 9\)). For more details about the demographic characteristics see (XXX, 2020) [removed for peer-review].

3.2. Measures

3.2.1. Rural-Urban Residence

Participants self-reported their current geographic locations among six administrative categories: provincial-level municipalities, sub-provincial cities, prefecture-level cities, county-level cities, township-level divisions, and administrative villages. These administrative types of cities and towns have evolved over years since 1950s in response to national economic and social policies [34]. The first four categories are considered “urban” settlement [34]. We dichotomized the geographic location variable into two categories: urban (i.e. provincial-level municipalities, sub-provincial cities, prefecture-level cities, and county-level cities) and rural (i.e. township-level divisions and administrative villages).

3.2.2. Preventive Behaviors

We selected eight types of preventive behaviors from the COVID-19 prevention guidebook provided by WHO [35] and the Chinese Centers for Disease Control and Prevention [36]. Such behaviors included (1) wearing a mask when going out, (2) staying home as much as possible, (3) avoiding party gathering, (4) washing hands frequently, (5) avoiding public transportation, (6) trying to eat healthy and well-balanced meals, (7) getting plenty of sleep, and (8) exercising regularly. The aforementioned behaviors were measured with eight statements on a five-point Likert scale (1 = completely disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = completely agree). We calculated mean scores for these eight items, of which higher scores represented more engagement in preventive behaviors.

3.2.3. Sociodemographic

Sociodemographic variables included age, sex, household monthly income in RMB (1 RMB = 0.14 US dollar) (0, \(\leq 1k\), 1k to \(\leq 3k\), 3k to \(\leq 5k\), 5k to \(\leq 8k\), 8k to \(\leq 10k\), 10k to \(\leq 15k\), 15k to \(\leq 20k\), 20k to \(\leq 50k\), above 50k), and education (elementary school, middle school, high school, professional school, associate degree, bachelor degree, master’s degree, and doctoral degree).

3.3. Potential Mediation Variables

3.3.1. Behavioral Intention
We assessed participants’ intention to adopt preventive behaviors (“After knowing about the COVID-19 pandemic situation, I intend to take preventive behaviors.”) on a 5-point Likert scale from completely disagree to completely agree (M = 4.21, SD = 0.63).

3.3.2. Attitude

We also measured participants’ attitude about the effectiveness of performing preventive behaviors (i.e., “performing preventive behaviors might not effectively prevent getting the virus”) on a 5-point Likert scale from completely disagree to completely agree. Responses were coded reversely so that the higher score indicated a more positive attitude (M = 3.68, SD = 1.03).

3.3.3. Subjective norms

We assessed subjective norms using eight items on a 5-point Likert scale (Cronbach’s alpha = 0.84). One example item was: How prepared do your family or friends expect you to be for this pandemic? The options ranged from 1 (not at all) to 5 (a lot). We calculated the mean score of these eight items as our variable for subjective norms (M = 3.68, SD = 0.64).

3.3.4. Knowledge about preventive behaviors

Knowledge about preventive behaviors was assessed using a statement (“I do not know what to do for preventive behaviors”) on a 5-point Likert scale from completely disagree to completely agree. After the reverse coding, the higher score indicated higher knowledge (M = 4.00, SD = 0.80).

3.3.5. Variety of interpersonal information source

Participants were asked how frequently (on a 5-point Likert scale from never to very often) they used each of the six interpersonal sources and eleven media sources for information about COVID-19. The interpersonal sources included (1) family members, (2) friends, (3) colleagues/classmates, (4) health professionals, (5) community workers, and (6) others. For each source, we dichotomized those who chose “often” and “always” as frequent users (coded as 1) and the rest as non-frequent users (coded as 0). The sum score of the interpersonal sources was calculated to represent the level of interpersonal source variety (M = 1.93, SD = 1.33).

3.3.6. Variety of media information source

The media sources included (1) newspapers/magazines, (2) TV, (3) radio, (4) cellphone text messages, (5) web portals (e.g., www.163.com, www.tencent.com), (6) social media (e.g., weibo, wechat), (7) news websites (e.g., China Daily, Toutiao), (8) video-sharing social networking service (e.g., TikTok, Pear Video), (9) online Q&A platforms (e.g., Zhihu), (10) search engines (e.g., Baidu), and (11) online learning platform (e.g., Xuexi Qiangguo). Similarly, we recoded the items and the sum score of the media sources was calculated to represent the level of media source variety (M = 5.57, SD = 2.21).

3.3.7. Information appraisal

We examined how people process COVID-19 information using six items on a 5-point Likert scale (Cronbach’s alpha = 0.70). These items were adapted from earlier research [37, 38]. Example items included “I tried to relate the information to my own personal experiences” and “I did not spend much time thinking about the information” (coded reversely). We calculated a mean score for these six items. Higher score indicated a higher level of appraisal skills related to COVID-19 information they received from various sources (M = 3.93, SD = 0.57).

4. Data Analysis

We performed multiple linear regressions, controlling for demographic characteristics (i.e., age, sex, education, and income), to examine the relationship between rural status and preventive
behaviors. We also investigated the rural/urban differences in the following seven variables: (1) behavioral intention, (2) attitude, (3) subjective norms, (4) preventive behavior knowledge, (5) interpersonal source variety, (6) media source variety, and (7) information appraisal.

We then performed path analysis to test the indirect effects of rural status on preventive behaviors through the above seven potential mediators. We treated rural status as an exogenous variable and added the demographic control variables into the path model as exogenous variables. When evaluating how well a specific model fits the data, we used the following model fit indices: the model Chi-square value ($\chi^2$), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the standardized root mean squared residual (SRMR). The model is considered a “good fit” when the $\chi^2$ p-value > 0.05, RMSEA < 0.06, CFI > 0.95, TLI > 0.95, and SRMR < 0.05 [39]. We used Stata 16 for data analysis and set the significance level at $\alpha = 0.05$.

5. Results

As shown in Table 1, older respondents reported more engagement in preventive behaviors, greater intention, more positive attitude toward the effectiveness of performing preventive behaviors, and a greater variety of interpersonal source use. Higher education was associated with increased knowledge about preventive behaviors, greater variety of interpersonal source use, and higher information appraisal. Respondents with higher income reported more preventive behaviors, positive attitude, knowledge, and information appraisal. Controlling for sociodemographic variables, compared to urban residents, rural residents were less likely to perform preventive behaviors, hold a positive attitude, and have lower levels of information appraisal skills. We found no rural/urban difference in behavioral intention, subjective norms, knowledge, or variety of interpersonal/media source use.

Table 1. Regression coefficients of rural/urban differences, controlling for sociodemographics.

<table>
<thead>
<tr>
<th></th>
<th>Rural status</th>
<th>Age</th>
<th>Sex</th>
<th>Education</th>
<th>Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preventive behaviors</td>
<td>-0.07*</td>
<td>0.01**</td>
<td>0.03</td>
<td>0.02</td>
<td>0.01*</td>
</tr>
<tr>
<td>Behavioral intention</td>
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<td>0.01**</td>
<td>0.01</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td>Attitude</td>
<td>-0.18*</td>
<td>0.01**</td>
<td>0.02</td>
<td>-0.03</td>
<td>0.03*</td>
</tr>
<tr>
<td>Subjective norms</td>
<td>-0.02</td>
<td>-0.00</td>
<td>0.04</td>
<td>0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Knowledge</td>
<td>-0.06</td>
<td>-0.00</td>
<td>0.00</td>
<td>0.07**</td>
<td>0.04**</td>
</tr>
<tr>
<td>Interpersonal source variety</td>
<td>0.05</td>
<td>0.01*</td>
<td>0.03</td>
<td>0.13**</td>
<td>0.03</td>
</tr>
<tr>
<td>Media source variety</td>
<td>-0.03</td>
<td>-0.00</td>
<td>0.10</td>
<td>-0.01</td>
<td>-0.04</td>
</tr>
<tr>
<td>Information appraisal</td>
<td>-0.10*</td>
<td>0.00</td>
<td>0.04</td>
<td>0.05**</td>
<td>0.02*</td>
</tr>
</tbody>
</table>

Note. *indicates p < .05; **indicates p < .01.

Among the other potential mediators (i.e., preventive behavior knowledge, interpersonal source variety, media source variety, and information appraisal), we only found significant rural/urban difference in information appraisal. Therefore, we added information appraisal as the mediator between rural status and behavior, intention, attitude, and subjective norms. Our model exhibited good fit: $\chi^2(10) = 17.45$, $p = 0.065$, RMSEA = 0.022, CFI = 0.992, TLI = 0.973, SRMR = 0.015. About 20% of the variance in preventive behaviors can be explained/predicted by our model ($R^2 = 0.20$).

5.1. Direct Effect

As shown in the Figure 1 and Table 2, there was a direct effect of rural status on information appraisal ($b = -0.10$, $p = 0.028$), as well as direct effects of information appraisal on attitude ($b = 0.45$, $p < .001$), subjective norms ($b = 0.29$, $p < .001$), intention ($b = 0.27$, $p < .001$), and preventive behaviors ($b = 0.13$, $p < .001$). The direct effects of intention ($b = 0.08$, $p < .001$), attitude ($b = 0.05$, $p < .001$), subjective norms ($b = 0.11$, $p < .001$), and information appraisal ($b = 0.13$, $p < .001$) on preventive behaviors were also significant. In addition, there were direct effects of attitude ($b = 0.05$, $p < .001$) and subjective norms ($b = 0.24$, $p < .001$) on intention.
Figure 1. Path model diagram.

Table 2. Path analysis results.

<table>
<thead>
<tr>
<th></th>
<th>Independent variable</th>
<th>b</th>
<th>SE</th>
<th>95% CI</th>
<th>p</th>
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<td>Preventive behaviors</td>
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<td>0.03</td>
<td>-0.10, 0.02</td>
<td>0.178</td>
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<tr>
<td></td>
<td>Attitude</td>
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<td>0.01</td>
<td>0.03, 0.07</td>
<td>&lt;.001**</td>
</tr>
<tr>
<td></td>
<td>Intention</td>
<td>0.08</td>
<td>0.02</td>
<td>0.05, 0.11</td>
<td>&lt;.001**</td>
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<td></td>
<td>Subjective norms</td>
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<td>0.02</td>
<td>0.08, 0.14</td>
<td>&lt;.001**</td>
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<td></td>
<td>Information appraisal</td>
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<td>0.02</td>
<td>0.10, 0.17</td>
<td>&lt;.001**</td>
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<tr>
<td>Intention</td>
<td>Attitude</td>
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<td>0.01</td>
<td>0.02, 0.08</td>
<td>&lt;.001**</td>
</tr>
<tr>
<td></td>
<td>Subjective norms</td>
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<td>0.02</td>
<td>0.19, 0.28</td>
<td>&lt;.001**</td>
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<td></td>
<td>Information appraisal</td>
<td>0.27</td>
<td>0.03</td>
<td>0.22, 0.32</td>
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<td>-0.29, 0.02</td>
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<td>0.04</td>
<td>0.36, 0.53</td>
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<td>Subject norms</td>
<td>Information appraisal</td>
<td>0.29</td>
<td>0.03</td>
<td>0.23, 0.34</td>
<td>&lt;.001**</td>
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<td>0.05</td>
<td>-0.19, -0.01</td>
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### Indirect effect

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<th>Subjective norms</th>
<th>Information appraisal</th>
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<tr>
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<td>0.01</td>
<td>0.07, 0.10</td>
<td>&lt;.001**</td>
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### Total effect

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<th>Subjective norms</th>
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<td>Intention</td>
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<td>Intention</td>
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<td>0.02</td>
<td>-0.08, -0.01</td>
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<tr>
<td>Attitude</td>
<td>0.05</td>
<td>0.01</td>
<td>0.02, 0.08</td>
<td>&lt;.001**</td>
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<tr>
<td>Subjective norms</td>
<td>0.24</td>
<td>0.02</td>
<td>0.19, 0.28</td>
<td>&lt;.001**</td>
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<tr>
<td>Attitude</td>
<td>-0.18</td>
<td>0.08</td>
<td>-0.34, -0.02</td>
<td>0.026*</td>
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<tr>
<td>Information appraisal</td>
<td>0.45</td>
<td>0.04</td>
<td>0.36, 0.53</td>
<td>&lt;.001**</td>
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<tr>
<td>Subjective norms</td>
<td>-0.03</td>
<td>0.01</td>
<td>-0.05, -0.00</td>
<td>0.031*</td>
<td></td>
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<tr>
<td>Information appraisal</td>
<td>0.29</td>
<td>0.03</td>
<td>0.23, 0.34</td>
<td>&lt;.001**</td>
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*Note.* $b =$ regression coefficient; SE = standard error; CI = confidence interval; * indicates $p < .05$; ** indicates $p < .01$.

#### 5.2. Indirect effect

Although the direct effect was non-significant, the indirect effects of rural status on preventive behaviors through information appraisal, attitude, subjective norms, and intention were significant.
behaviors in enhancing information appraisal, increase motivation to process, and intention were also significant.

5.3. Total effect

The total effects of rural status (b = -0.07, p = 0.029), attitude (b = 0.06, p < .001), intention (b = 0.08, p < .001), subjective norms (b = 0.13, p < .001), and information appraisal (b = 0.22, p < .001) on preventive behaviors were all significant. The total effects of rural status on intention (b = -0.04, p = 0.012), attitude (b = -0.18, p = 0.026), subjective norms (b = -0.03, p = 0.031), and information appraisal (b = -0.10, p = 0.028) were all significant as well.

6. Discussion

We explored the mechanism underlying the urban-rural differences in COVID-19 preventive behaviors. As we found, rural residents were less likely to engage in preventive behaviors, reported less positive attitude toward the effectiveness of performing preventive behaviors, and had lower levels of information appraisal skills. These findings were consistent with previous studies unveiling rural/urban health disparities in other preventive behaviors, such as wearing sunscreen [7] and receiving preventive care services including cancer screening [8] and influenza vaccinations [40]. Similarly, prior studies found that rural women were more likely to have a negative attitude about breast cancer and possess less positive attitude toward mammography screening compared to their urban counterparts [41,42]. We did not find rural/urban differences in knowledge about preventive behaviors or interpersonal/media source variety.

We identified information appraisal as a significant factor that might contribute to the rural/urban differences in preventive behaviors through the mediation of attitude, subjective norms, and intention. Rural residents reported lower levels of information appraisal skills than their urban counterparts. In other words, rural residents were less likely to evaluate the relevance or salience of the information. Next, the poor information appraisal skill was associated with lower likelihood of holding a positive attitude about preventive behaviors, lower intention to adopt recommended behaviors, and lower level of subject norms, which lead to less engagement in preventive behaviors among rural residents. Similarly, a previous study found that those who paid more attention to H1N1 news were more likely to adopt preventive behaviors to protect themselves from influenza infection [43].

Tailoring health messages to meet a person’s individual needs might be an effective strategy to promote preventive health behaviors against COVID-19 among rural audiences. Tailored health communication has been used to enhance information appraisal, increase motivation to process information, and promote behavioral change [44]. Rural residents have a strong sense of community and resilience [45,46]. Therefore, calling upon rural residents’ sense of community and highlighting how their actions can protect their neighbors and local economy could be another effective messaging strategy to promote preventive behaviors against COVID-19 in rural areas [18]. Moreover, previous studies indicated that rural residents are more likely to rely on nurse practitioners and local health departments as usual sources of health information compared to their urban counterparts [26,47]. These two sources would be pivotal to disseminate reliable information about COVID-19 in rural areas.

Additionally, we found that compared to people with older age, younger individuals reported fewer preventive behaviors, lower intention to do so, and they were less likely to hold a positive attitude to behavioral change. This might relate to the rumor that older people are the only ones at risk for COVID-19. The fact is that older adults and people with existing medical conditions are at higher risk of getting the virus, but anyone can become sick [48]. Fake news and misinformation on social media is a problem prevailing in rural China during this pandemic [21]. Similarly, misinformation is a challenge to preventive medicine and public health in the United States [49]. We
also found that lower income or and education were associated with lower levels of behavioral performance, positive attitude, and knowledge related to COVID-19 preventive behaviors. Previous studies found that vulnerable populations are more likely to use and trust health information from social media where information accuracy and quality are questionable [50, 51]. Public health efforts should be made to help the public better identify the rumors and misinformation related to COVID-19 pandemic. For example, creating easy-to-understand messages through the official social media accounts of government and health organizations can be an effective strategy to reach the rural communities.

Although the regression analysis did not indicate significant rural/urban differences in intention or subjective norms, our path model demonstrated that the total effects of attitude, subjective norms and intention on preventive behaviors were significant. Our path model results confirmed the framework of TRA, where attitude, subjective norms, and intention predict behaviors [24, 25]. To curb the pandemic, it is important to increase people’s positive attitude toward preventive behaviors (e.g., social distancing, hand washing, and facemask wearing) and raise their normative beliefs that the preventive measure is a must-do to protect other community members.

7. Limitations

The cross-sectional design of the study mitigates our ability to infer causal relationships. Studies conducted data collection at multiple time points of the pandemic could yield different results. Although the administrative divisions are commonly used to classify rural and urban status, there is lack of a unified approach to urban and rural classifications due to the rapid urbanization in China. Different classification could produce different results. Our list of media sources is inclusive but not exhaustive. The landscape of media industry is unique in China, thereby our findings related to information source likely do not generalize to other countries.

8. Conclusion

Our study contributes to a body of evidence not only identifying the rural/urban differences preventive behaviors against COVID-19 but also demonstrating that information appraisal is an important component associated with such urgent rural/urban health disparity during this pandemic. As the first wave of the pandemic inundated in urban areas, the needs of rural populations are likely to be underrepresented in media. The ignorance and lack of awareness imposed greater risks of COVID-19 on rural communities. Public health efforts should be made to tailor COVID-19 information targeting rural populations.

Author Contributions: Conceptualization, M.D. Methodology, M.D. Validation, M.D., M.M.-K., and E.P. Formal analysis, M.D. Investigation, M.D. Resources, M.D. Writing—original draft preparation, M.D. Writing—review and editing, M.M.-K. and E.P. Visualization, M.D. Supervision, M.M.-K. and E.P. Project administration, M.D., M.M.-K., and E.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Major Program of National Fund of Philosophy and Social Science of China, 19ZDA325

Acknowledgments: None.

Conflicts of Interest: The authors declare no conflict of interest.

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