The Deaf Community's Experiences Navigating COVID-19 Pandemic Information

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ABSTRACT

Background: Users of American Sign Language (ASL) who are deaf often face barriers receiving health information, contributing to significant gaps in health knowledge and health literacy. To reduce the spread of coronavirus disease 2019 (COVID-19) and its risk to the public, the government and health care providers have encouraged social distancing, use of face masks, hand hygiene, and quarantines. Unfortunately, COVID-19 information has rarely been available in ASL, which puts the deaf community at a disadvantage for accessing reliable COVID-19 information. **Objective:** This study's primary objective was to compare COVID-19–related information access between participants who are deaf and participants who are hearing. **Methods:** The study included 104 adults who are deaf and 74 adults who are hearing who had participated in a prior health literacy study. Surveys were conducted between April and July 2020 via video conference, smartphone apps, or phone calls. COVID-19 data were linked with preexisting data on demographic and health literacy data as measured by the Newest Vital Sign (NVS) and the ASL-NVS. **Key Results:** Neither group of participants differed in their ability to identify COVID-19 symptoms. Adults who are deaf were 4.7 times more likely to report difficulty accessing COVID-19 information ($p = .011$), yet reported using more preventive strategies overall. Simultaneously, adults who are deaf had 60% lower odds of staying home and calling their doctor versus seeking health care immediately or doing something else compared with participants who are hearing if they suspected that they had COVID-19 ($p = .020$). **Conclusions:** Additional education on recommended COVID-19 management and guidance on accessible health care navigation strategies are needed for the deaf community and health care providers. Public health officials should ensure that public service announcements are accessible to all audiences and should connect with trusted agents within the deaf community to help disseminate health information online in ASL through their social media channels. **[*HLRP: Health Literacy Research and Practice*. 2021;5(2):e162-e170.]**

Plain Language Summary: Compared to participants who are hearing, a higher portion of participants who are deaf reported challenges with accessing, understanding, and trusting COVID-19 information. Although respondents who are deaf had similar knowledge of symptoms compared to participants who are hearing, they used more prevention strategies and were more likely to plan immediate care for suspected symptoms. Improved guidance on COVID-19 management and health care navigation accessible to the deaf community is needed.

The arrival of the novel coronavirus disease 2019 (COVID-19) to the United States in early 2020 disrupted large sectors of the country. Despite the large number of government and public health announcements related to COVID-19, access to relevant information was inconsistently and unevenly disseminated, placing certain groups in greater jeopardy (Abuelgasim et al., 2020; Piller et al., 2020). One particular group, American Sign Language (ASL) users who are deaf, due to its linguistic isolation (McKee, Paasche-Orlow et al., 2015), struggled to attain information about COVID-19 (Murray, 2020). People who are deaf often face barriers receiving health information, contributing to significant gaps in health knowledge with disparities in preventive health (McKee, Barnett et al., 2011; Tamaskar et al., 2000; Wollin & Elder, 2003), sexual and reproduc-

tive health (Bat-Chava et al., 2005; Heiman et al., 2015; Horner-Johnson et al., 2020; Sawyer et al., 1996), cardiovascular disease (Margellos-Anast et al., 2006; McKee, Schlehofer et al., 2011), and cancer (Berman et al., 2013; Zazove et al., 2009).

The American Medical Association (Weiss, 2007) and U.S. Department of Health and Human Services (2010) recommend that health materials be written at a fifth to sixth grade reading level, yet the average reading level for medical information on common internal medicine diagnoses on the internet often exceeds a tenth-grade level (Cotugna et al., 2005; Hutchinson et al., 2016). Specifically, COVID-19 information online ranges between 8.8 and 20.1 grade reading levels (Szmuda et al., 2020), creating further challenges for the average adult who is deaf, who reads English at the fifth to sixth grade level (McKee, Paasche-Orlow et al., 2015; Singleton et al., 2004; Traxler, 2000; Zazove et al., 2013). Adults who are deaf are more likely to have inadequate health literacy (McKee, Paasche-Orlow et al., 2015), which is the ability to find, understand, evaluate, and use health information and services needed to make appropriate health decisions (Coleman et al., 2008; Ratzan & Parker, 2006). These challenges may complicate the deaf community's ability to access and/or comprehend COVID-19 information, even if written or captioned.

Our study's primary objective was to compare COVID-19–related information access between deaf participants who used ASL and participants who can hear. The study's secondary objective was to compare COVID-19 knowledge (identification of accurate symptoms, preventive strategies, and planned health care navigation) between deaf participants who used ASL and participants who can hear.

METHOD

Sample

This study recruited participants who had agreed to be recontacted from an existing large-scale health literacy study examining health literacy and health information-seeking behaviors online (McKee et al., 2019). Participants were originally recruited from the community in two metropolitan and surrounding area sites. This allowed us to use previously collected information, including demographic items and health literacy level, based on the Newest Vital Sign (NVS) (Weiss et al., 2005) or the ASL version of the NVS (NVS-ASL) (McKee, Paasche-Orlow et al., 2015). The NVS assesses a person's health literacy with a score of 0 to 6 based on responses to questions necessitating the respondent understand and use a nutrition facts label. Information on NVS-ASL validation has been previously discussed (McKee et al., 2019). For this project, 506 of 600 participants from the large-scale study

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gave permission to be re-contacted via email. Participants who were hearing and those who were deaf were contacted simultaneously and invited to participate in a brief survey on COVID-19. Of those contacted, 178 participated in our study (a response rate of 35%).

Survey

The telephone survey initially had 11 multiple choice, Likert scale, and open-ended questions including COVID-19–related behaviors such as testing and prevention, knowledge, and access to information. Some questions were derived from the Kaiser Family Foundation's Coronavirus Poll (Hamel et al., 2020). The remaining questions were constructed and tested by the research team for flow and understandability. The survey was amended to add six questions related to risk perception, COVID-19 testing, and health care access beginning in May 2020, 1 month after data collection began, bringing the total number of questions to 17. The change was made to capture additional items as the COVID-19 pandemic evolved; however, these updated items are not included in the analyses for this article. The complete survey can be seen in **Figure A**. Questions that asked about techniques for COVID-19 prevention and identification of symptoms were open-ended to gain a true assessment of the respondent's knowledge about the topic.

The survey items were translated into ASL through an iterative and collaborative process by interviewers on the team (J.C., D.P., T.L.P.) who are native ASL signers. Once consensus on how to best translate the written question into ASL was reached, the ASL gloss (written form of ASL) was added to the English survey for consistency across interviewers, a process similar to what Margellos-Anast et al. (2005) had done.

Procedures

All participants were interviewed remotely through video conference, a smartphone app, or telephone or videophone between April and July 2020. Participants who are deaf were interviewed by ASL-fluent staff who are deaf, whereas people who can hear were interviewed by staff who are hearing. Participants were compensated for their time with a $20 debit or gift card. This study was approved by the University of Michigan and Rochester Institute of Technology Institutional Review Boards.

Analysis

Survey data were entered into a REDCap database linked to the participants' demographic and health literacy data from the prior study. As done in previous research, we defined those with an NVS score of less than 4 as having risk factors for inadequate health literacy, combining those with high likelihood for (0-1) or possibility of (2-3) limited health literacy, and those with a score between 4 and 6 as having adequate health literacy (Welch et al., 2011). Descriptive statistics were used to summarize the sample characteristics. The level of significance was set at $p < .05$.

The Centers for Disease Control and Prevention (CDC) guidelines were accessed at the time of analysis (in August 2020) to provide the categories into which to code the two open-ended questions (prevention techniques and COVID-19 symptoms). The guidelines on severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) prevention had been last updated on July 31, 2020 and the CDC's list of official symptoms had been last updated on May 13, 2020 (Centers for Disease Control and Prevention, 2020a; Centers for Disease Control and Prevention, 2020b). Any language about limiting social encounters was coded as staying home, 6 feet/no touching or hugging was coded as social distancing, and any mention of following CDC guidance or listening to the experts was coded as monitoring health symptoms. For coding symptom knowledge, any mention of chills/sweating/clammy skin/temperature was coded as fever, respiratory issues/chest pain as shortness of breath, and feeling tired or weak was coded as fatigue. Open-ended responses were translated into keywords by a consensus coding process, which was then coded into "yes/no" responses for each of the items listed on the CDC website**.**

The primary outcome was analyzed by comparing a positive response to having difficulty accessing information about COVID-19 between groups (deaf vs. hearing) with a chi-square test. Adjusted analysis using logistic regression was performed including covariates of group, race (white vs. person of color), age, health literacy, and study site. As a follow-up analysis to evaluate where the greatest difficulty in access may occur, specific challenges and sources of information were compared between deaf and hearing participants using chi-square tests. The average total number of challenges identified was compared between groups using an independent samples *t*-test.

For the secondary outcome, knowledge on COVID-19 disease and prevention was assessed by comparing the identification of correct symptoms associated with disease, prevention strategies being used, and planned health care navigation in the presence of suspected COVID-19 symptoms. Chi-square tests were used to compare deaf and hearing participants' report of prevention strategies and planned health care navigation. Independent sample *t*-tests compared the mean number of preventive strategies being used as well as the number of correctly identified COVID-19 symptoms between groups. Chi-square test was used to evaluate planned health care navigation. Variables identified as significant in preliminary analy-

ses were then included in logistic regression models. In addition, we evaluated interactions between group and each of the covariates; however, as no significant results were found, no interactions are present in any of the final models. All analyses were performed using Stata 15.1.

RESULTS

A total of 178 adults, including 104 ASL users who are deaf and 74 people who are hearing (see **Table 1** for group demographics) completed the survey. Analyses revealed participants who are deaf were more likely to be older (p = .005), white (p = .014), and Hispanic (p = .006) when compared to participants who are hearing. The deaf and hearing groups did not differ based on gender (p = .651), income (p = .188), or education (p = .556). Participants who are deaf were more likely than participants who are hearing to have risk factors for inadequate health literacy (61% vs. 23.0%, p < .001).

COVID-19 Information Access and Sources Used

Twenty percent of participants who are deaf reported having difficulty accessing information regarding COVID-19, which was significantly higher than participants who are hearing (5.5%; p = .005). When controlling for race, age, and health literacy, participants who are deaf had 4.6 times higher odds of reporting difficulty in accessing COVID-19–related information than participants who are hearing (p = .013) (**Table 2**). When asked about specific challenges in getting information about COVID-19 (**Table 3**), participants who are deaf were more likely to report trouble accessing (see/watch/hear) information compared to participants who are hearing (26% vs. 2.7%; p < .001), more likely to find the information scary (76.9% vs. 27.0%; p < .001), and more likely to mistrust the information (61.5% vs. 41.9%; p = .010). However, both groups of participants equally found COVID-19 information *difficult to understand* (26% vs. 19%; p = .27). Overall, of the five specific barriers queried, respondents who are deaf reported more COVID-19 information challenges than respondents who are hearing (mean [standard deviation] = 2.5 (1.5) vs. 1.2 (1.1); p < .001). Regarding information source, participants who are deaf were more likely to report getting their information from television/news (86% vs. 54%; p < .001) and social media (90% vs. 57%; p < .001) than their peers who are hearing.

COVID-19 Knowledge and Behavior

Respondents were able to correctly identify, on average, 3.3 (SD = 1.2) COVID-19 symptoms, which was not different between people who are deaf and people who are hearing (p = .76). Respondents who are deaf mentioned using more preventive strategies (mean = 3.3, SD = 1.1) than respondents who are hearing (mean = 2.9, SD = 1.2) (p = .008). Specifically, respondents who are deaf were more likely to report hand hygiene (71% vs. 50%; p = .005) and cleaning and disinfecting (37% vs. 18%; p = .006) (**Table 4**).

When asked what someone should do when they exhibit symptoms suspected to be related to a COVID-19 infection, participants who are deaf were less likely to say they would stay home and call their provider over seeking health care immediately or doing something else compared with participants who are hearing (47% vs. 57%; p = .003). When controlling for race, age, study site, and health literacy, deaf participants were 60% less likely to report that they would stay home (**Table 5**). People of color were also less likely to report a plan of staying home and calling a provider, regardless of hearing status.

DISCUSSION

Adults who are deaf were 4.6 times more likely to report difficulty accessing COVID-19 information than adults who are hearing. Specifically, the participants who are deaf described COVID-19 information as not being available in their language (36.6%), being scary (76.9%), and hard to understand (26%). More than one-half (61.5%) of ASL signers who are deaf often did not trust COVID-19 information. Despite these challenges, people who are deaf were largely able to identify COVID-19 symptoms and preventive measures.

The COVID-19 pandemic came with an explosion of health information from government-based entities, which are usually viewed as sources of trustworthy and reliable information. Unfortunately, for the deaf community, the information on these platforms were often not accessible in ASL or from a source of trusted agents or entities that have consistently demonstrated caring for the needs of the deaf community and have established a relationship with them (Brogan & Smith, 2009). Further, an ideal trust agent is someone the community can identify with, thus encouraging trust in the source and willingness to change behavior (Kramer et al., 2001). In response to the pandemic and the need for accessible information, medical professionals who are deaf and sign-fluent began to provide information in ASL online and via social media on COVID-19. The Association of Medical Professionals with Hearing Losses (2020) created a COVID-19 Resource List of trusted sources of information, listing other deaf-run organizations providing COVID-19 information in ASL. This was especially important when there was a gap in the provision of ASL interpreters for COVID-19–related public service announcements, requiring lawsuits to bring some entities into compliance (Campbell 2020; Via y Rada, 2020).

TABLE 1

Respondent Characteristics by Group

Characteristic	Deaf ($N = 104$)	Hearing ($N = 74$)	p Value (χ^2)
	n (%)		
Age, M (SD)	44.1 (15.5)	36.9 (17.8)	.005[a]
Site			.011
Site 1 (Rochester, NY)	39 (37.5)	42 (56.8)	
Site 2 (Flint, MI)	65 (62.5)	32 (43.2)	
Gender			.651
Female	64 (61.5)	48 (64.9)	
Male	40 (38.5)	26 (35.1)	
Race/ethnicity[b]			.014
White	88 (85.4)	52 (71.2)	
Hispanic	10 (9.6)	0 (0)	.006
Black	7 (6.8)	16 (21.9)	
Asian, Indian American, Biracial	8 (7.8)	5 (6.9)	
Income[b]			.188
<$20,000	27 (29)	19 (31.1)	
$20,000-$50,000	34 (36.6)	14 (23)	
$51,000-$75,000	16 (17.2)	10 (16.4)	
>$75,000	16 (17.2)	18 (29.5)	
Education			.556
HS diploma or GED or less	28 (26.9)	20 (27)	
College 1-3 years	31 (29.8)	17 (23)	
College 4 years or more	45 (43.3)	37 (50)	

Note. GED = general educational development; HS = high school.
[a]t-test. [b]Some participants did not answer all questions, so total sum numbers and percentages may not match.

TABLE 2

Logistic Regression for Trouble Accessing COVID-19 Information

Characteristic	Odds Ratio [95% CI]	p Value
Group		
Hearing	Reference	
Deaf	4.64 [1.38, 15.54]	.013
Newest Vital Sign		
Adequate	Reference	
At risk	4.36 [1.21, 15.77]	.025
People of color	2.11 [0.71, 6.25]	.179
Age	1 [0.97, 1.04]	.960
Site		
Site 1 (Rochester, NY)	Reference	
Site 2 (Flint, MI)	0.09 [0.02, 0.35]	<.001

Note. CI = confidence interval.

The internet provides a large and varied source of health information, which brings the challenge of discerning which information is accurate, a skill already noted to be underdeveloped in the deaf community (Fajardo et al., 2004; McEwen & Anton-Culver, 1988). This is important because as seen in previous publications and supported by our study, people who are deaf are more likely to learn health information from their peers, including through interactions online, and through web-based sources rather than from their family or health care providers (McKee, Schlehofer et al., 2011; Valentine & Skelton, 2009). Public health officials need to regularly provide ASL access in public service announcements and informational websites; this needs to be supplemented by engaging with trust agents on social media as influencers driving access to reliable information.

As illustrated in previous studies (McKee, Paasche-Orlow et al., 2015), participants in this study who are deaf were more likely to have risk factors for inadequate health literacy than participants who are hearing. Although participants who are deaf did not differ from their peers who are hearing in regard to basic COVID-19 knowledge, they did vary with regard to health care navigation plans, with respondents who are deaf being less likely to stay home over immediately seeking health care in the event of developing COVID-19 symptoms. This is in line with past findings that people who are deaf are almost twice as likely to seek care at an emergency department (McKee, Winters et al., 2015). This might be partially due to emergency departments typically having structures in place to obtain sign language interpreters and due to the fact that it can be difficult for people who are deaf to navigate primary care or urgent care for equitable health services.

Further, people of color, regardless if deaf or hearing, were less likely to plan on staying home over seeking health care immediately for any suspected COVID-19 symptoms. These people shoulder higher burdens of COVID-19 complications than the general population, with higher rates of cases, hospitalizations, and deaths (Abel & McQueen, 2020; Abuelgasim et al., 2020; Dowling & Kelly, 2020; Pareek et al., 2020; Yancy, 2020). Systemic inequities as a result of the COVID-19 pandemic are creating additional challenges to obtaining quality

TABLE 3

COVID-19 Information Access Challenges by Group

Deaf and Hearing Groups	Deaf ($N = 104$)	Hearing ($N = 74$)	p Value (χ^2)
	n (%)		
Information is difficult for me to access (see, watch, or hear)	27 (26)	2 (2.7)	<.001[a]
Information is not available in my language	37 (36.6)	0 (0)	<.001[a]
Information is hard to understand	27 (26)	14 (18.9)	.271
Information is too scary	80 (76.9)	20 (27)	<.001
I don't trust the information	64 (61.5)	31 (41.9)	.010
Other	23 (22.1)	22 (29.7)	.249
None	4 (3.9)	26 (35.1)	<.001
Mean (*SD*)	2.5 (1.5)	1.2 (1.1)	<.001[b]

Note. COVID-19 = coronavirus disease 2019.
[a]*t*-test. [b]Exact test.

TABLE 4

COVID-19 Prevention Strategies Mentioned by Group

Strategy	Deaf ($N = 104$)	Hearing ($N = 74$)	p Value (χ^2)
	n (%)		
Stay home	63 (61.2)	50 (67.6)	.382
Social distance	73 (70.9)	45 (60.8)	.161
Wear mask	88 (85.4)	61 (82.4)	.589
Hand hygiene	73 (70.9)	37 (50)	.005
Cleaning/disinfecting	38 (36.9)	13 (17.8)	.006
Wear gloves	12 (11.7)	8 (11)	.887
Cover cough/sneeze	1 (1)	0 (0)	-
Monitor health daily	6 (5.8)	6 (8.2)	.535
Mean (*SD*)	3.3 (1.1)	2.9 (1.2)	.008[a]

Note. COVID-19 = coronavirus disease 2019.
[a]*t*-test.

TABLE 5

Logistic Regression for a Plan for Staying Home and Calling a Provider (Versus Seeking Immediate Care) in the Event of COVID-19 Symptoms

Characteristic	Odds Ratio [95% CI]	p Value
Group		
Hearing	Reference	
Deaf	0.40 [0.19, 0.87]	.020
Newest Vital Sign		
Adequate	Reference	
At risk	0.45 [0.18, 1.15]	.096
People of color	0.27 [0.11, 0.63]	.003
Age	1.02 [0.99, 1.05]	.061
Site		
Site 1 (Rochester, NY)	Reference	
Site 2 (Flint, MI)	4.94 [1.98, 12.35]	.003

Note. CI = confidence interval; COVID-19 = coronavirus disease 2019.

health care for racial/ethnic minority groups and those with limited health literacy (Gray et al., 2020).

When groups who have risk factors for low health literacy are inundated with constantly changing data and messages, it can cause conflicting health-related communication, resulting in people with hearing difficulty to use fewer preventive strategies as a result of a gap in communication (Ipsen et al., 2021). Interestingly, we did not find that with our sample, as the participants who are deaf reported more COVID-19 prevention strategies compared to their peers who are hearing. One possibility for the difference is that our study focused on ASL signers who are deaf and administered the survey in their language of ASL.

STUDY LIMITATIONS

Several important limitations need to be considered. In addition to the potential for respondent bias, responses are self-reported subjective measures of COVID-19–related experiences, knowledge, and information-seeking behaviors. The small sample size limits generalizability and the variables we could control for in our models. However, given our primary outcome of information-seeking behavior, the ubiquity of COVID-19 information, and availability of online sources, we deemed this an acceptable limitation in our analyses. Given the novelty of COVID-19 and the importance of capturing patients' experiences accurately, we examined several distinct but important dependent variables. We did not directly evaluate the accuracy or comprehensiveness of information presented to adults who are deaf and who are hearing. Concor-

dance of messaging across different information sources was not a part of this study; platforms typically not accessible to deaf participants (e.g., radio) were not included as an option in our survey. Further, although participants who are hearing and participants who are deaf were contacted simultaneously, our study is limited by the challenges of quarantine orders caused by COVID-19, making it difficult for the research team to obtain contact information stored on-site for some participants until later in the study period. This contributed to a difference in the timing of some surveys, which is an important consideration for a cross-sectional study on a rapidly evolving COVID-19 experience. Despite these limitations, our study provides insight on how the deaf community has been navigating this pandemic.

CONCLUSION

People who are deaf reported challenges in obtaining and understanding COVID-19 information. Fortunately, they demonstrated knowledge about COVID-19 symptoms and prevention comparable to their peers who are hearing. In summary, these findings show that efforts in ensuring publicly available health information during COVID-19 have reached and educated the deaf community in terms of risk mitigation and COVID-19 symptom recognition. Additional education on recommended COVID-19 management and guidance on equitable health care navigation strategies are needed for the deaf community and health care providers, respectively. The health care system needs to support patients who are deaf in accessing primary care. Public health officials should ensure that public service announcements are accessible and should also consider reaching out to trust agents in the deaf community to help disseminate health information online in ASL through their social media channels.

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COVID-19 Survey

1. Please tell me briefly about what is happening in the world right now.

2. At the present time, what actions have you taken to prevent exposure to the coronavirus?

3. Have you had the coronavirus?
   a. Yes, I have it now (go to #5)
   b. I had it and have recovered (go to #5)
   c. No, I haven't
   d. No, I haven't and I haven't been tested
   e. Don't know
   f. Refused/missing

4. How much do you feel you are at risk for getting the coronavirus?[1]
   a. Extremely
   b. High
   c. Moderately
   d. Slightly
   e. Not at all

5. Have you been around anyone that you live with or work with that has had coronavirus?
   a. Yes
   b. No (go to #7)
   c. Don't know
   d. Refused/missing

6. How do you think you were exposed?

7. Have you gotten testing? [1]
   a. Yes (go to #9)
   b. No

8. If you haven't gotten tested, why not? [1]
   a. Didn't need a test: I don't have it
   b. Didn't need a test: I probably had it already
   c. Didn't need a test: I don't see the point
   d. Test was unavailable
   e. Healthcare provider would not approve testing
   f. Cost/insurance would not cover
   g. Information about testing not accessible (I don't know how to access testing)
   h. Site had no ASL interpreters
   i. Too afraid to go due to pandemic
   j. Tests don't work anyway/not accurate
   k. Other _____

9. If you *have* been tested, what was your experience like? [1]

10. Are you experiencing any challenges to obtaining healthcare (in person or via telemedicine? [1]
    a. Yes (go to #11)
    b. No (go to #12)

11. If so, what? [1]

12. In general, what are the symptoms of coronavirus?

13. As far as you know, if someone thinks they are having symptoms of coronavirus, what should they do?
    a. Stay home and call a doctor or medical provider
    b. Seek health care immediately at an emergency room or urgent care facility
    c. Don't know
    d. Something else (only if volunteered by respondent):

14. What new challenges have you faced since coronavirus reached your community? Please check all that apply.
    a. I am having trouble getting food
    b. I am having trouble getting my medicines
    c. I feel isolated from family and friends
    d. I feel sick but don't know where to go for help
    e. Lost income from a job or business
    f. Been unable to get cleaning supplies or hand sanitizer
    g. Had someone harass, bully, or hurt you or a family member because of coronavirus
    h. Other:
    i. Don't know
    j. I have not faced any new challenges
    k. Refused/missing

15. Have you had trouble getting access to information about the coronavirus?
    a. Yes
    b. No
    c. Don't know
    d. Refused/missing

16. What challenges have you had getting information about coronavirus? Please check all that apply.
    a. The information is difficult for me to access (see/watch/hear)
    b. The information is not available in my language
    c. The information is hard to understand
    d. The information is too scary
    e. I don't trust the information
    f. Other:
    g. Don't know
    h. Refused/missing
    i. None

17. Since the new coronavirus pandemic, what are the main sources you have used to learn about the new coronavirus? Please choose all that apply.
    a. TV/news
    b. Internet
    c. Social media (e.g., Facebook/Twitter/Instagram)
    d. Newspaper or magazines
    e. Other:
    f. None of the above

Note. [1]These questions were not included in the original survey; they were added later.

Figure A. Coronavirus disease 2019 survey.