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Short communication

Deaf adults at higher risk for severe illness: COVID-19 information preference and perceived health consequences

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\textbf{A R T I C L E I N F O}

Article history:
Received 4 November 2020
Received in revised form 14 February 2021
Accepted 15 March 2021

Keywords:
Deafness
COVID-19
Risk communication
Health disparities
Disabilities

\textbf{A B S T R A C T}

Objectives: This study explores deaf and hard of hearing (DHH) individuals' preferred sources of information for COVID-19 and their perceptions of developing severe illness from COVID-19 given underlying medical conditions.

Methods: A national online bilingual American Sign Language/English survey was conducted from April 17 to May 1, 2020. Weighted sample of 474 DHH adults living in the United States. Multivariate logistic regression analyses were conducted to examine independent associations of sociodemographic variables and health indicators with perceived COVID-19 health consequences.

Results: About 44% of the medical condition sample used the Internet (English-based text) first for COVID-19 information, followed by TV (24%). Only 1% selected healthcare provider as the go-to source; the remainder got information from family or friends. Perceived health consequences increased with age (adjusted OR = 1.04; CI 95% = 1.02, 1.06). At-risk respondents who self-identified as persons of color were nearly three times more likely to believe that their health will be severely affected by COVID-19 compared to respondents who self-identified as white (adjusted OR = 2.94; CI 95% = 1.20, 7.18).

Conclusions: Perception of COVID-19 health consequences vary among DHH adults at higher risk for severe illness.

Practice implications: Information delivery methods must be flexible and comprehensive to meet the diverse community's needs, especially during the COVID-19 pandemic.

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1. Introduction

As a pandemic, COVID-19 continues to exert devastating health effects on the U.S. population [1]. Deaf and hard of hearing (DHH) American Sign Language (ASL) speakers comprise a group of approximately 500,000 individuals [2], some of whom often encounter communication, language, information and healthcare barriers [3,4], as well as healthcare disparities including lower knowledge, healthcare utilization, and health literacy [5–10]. Even with a shared language (ASL), these individuals vary on how they identify themselves (e.g., Deaf, deaf, hard of hearing); we use the convention of “deaf and hard of hearing” in this article. Among DHH people who use ASL as their primary language and are less fluent in English, the isolation of public information to mostly English-based information sources places this marginalized DHH community at higher risk for misinformation and COVID-19 infection [11,12]. A recent U.S. study showed that DHH people are diverse for preferences in accessing health information sources; DHH adults who self-reported ASL as their primary language preferred YouTube and social media for health information, while a lower percentage went to a doctor first for health information [13]. Those who cited the Internet as their first go-to source tended to be white, educated, and/or younger.

Variations in health information-seeking behaviors are likely determined by factors including socio-demographics (age, income, and education attainment) [6,14,15], DHH-specific characteristics (e.g. language and communication preferences) [13,16], and information delivery methods [17]. Disparities in access to health information among DHH people from underserved subgroups

https://doi.org/10.1016/j.pec.2021.03.020
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(e.g., primary ASL speakers, low education) appear to be exacerbated by the COVID-19 pandemic [12,18,19]. These may include ongoing communication difficulties with healthcare providers, reductions in incidental and informal learning regarding COVID-19, and inadequate accessible COVID-related information in public health messaging and on the Internet [20–22]. Consequently, examining how DHH people, especially those considered at high risk for infection, seek COVID-19-related information merits urgent research attention to assist with patient education and communication planning. The authors hypothesized that DHH people seeking COVID-19 information would, in line with prior evidence, use online information predominately and exhibit lower preference for utilizing health care providers in this manner, and that perceived health consequences of COVID-19 infection would be relatively low, given disparities in information access.

2. Methods

2.1. Study design

The survey methodology is published elsewhere [23]. Briefly, following institutional review board approval, research staff recruited DHH ASL speakers through social media and email invitations between April 17, 2020, and May 1, 2020. Only those who use ASL and were born DHH or became DHH before 13 years old were included because this group was identified as a medically underserved group. Even though all participants can communicate in ASL, participants varied on how they identified themselves (i.e., culturally deaf, deaf, or hard of hearing). For this reason, we use “DHH” to include all of these identifications in our sample. After the participant viewed the study information in ASL and English online, the participant was directed to a page where they could choose to provide consent to voluntarily participate or decline. The COVID-19 survey included demographics, medical conditions, and the following items that were used for the purpose of this study:

- Information source: “When you looked for COVID-19 information for the first time, where did you go first?” with response options of friend, family, provider, Internet, TV, and newspapers.
- Perceived risk of acquiring or having severe illness from COVID-19: “If you get infected with the coronavirus or already had this, how serious do you think the negative health consequences will be or was for you?” with response options of “not serious at all,” “little serious,” “somewhat serious,” “serious,” and “very serious”.

2.2. Statistical analyses

Percentages were used to summarize the weighted sample characteristics. Data were weighted by gender and education according to U.S. population estimates of DHH adults who participated in the American Community Survey [24]. In the overall sample, multivariate logistic regression analyses were conducted to examine independent associations of sociodemographic variables and health indicators with perceived COVID-19 health consequences. Responses to the question about health consequences if infected with the coronavirus were dichotomized into high perceived risk (somewhat serious; serious; very serious) vs low perceived risk (not serious at all; a little serious) groups, and then entered as a binary outcome variable in logistic regression analyses. For the subsample analysis of the at-risk chronic medical condition group, frequencies were used to describe their preferred sources for COVID-19 information. A binary logistic regression was conducted on the relationship between sociodemographic variables as predictors and perceived health consequences as an outcome for the medical condition group. Because the breakdown of the racial/ethnic group within the medical condition sample was small, this group was dichotomized into white vs persons of color (POC) prior to entering as a variable in the logistic regression analysis. SPSS version 25.0 (IBM Corp., Armonk, NY) was used for all analyses.

3. Results

3.1. Predictors for perceived health consequences

According to Table 1, the weighted sample (N = 474) consisted of 54% female and 3% nonbinary adults. The mean age of this sample was 47 (SD = 16) and 26% of the respondents self-identified as POC. A majority of the sample self-rated their health as excellent or very good. Table 1 lists the percentages of DHH respondents who were told by their healthcare providers that they had a diagnosis of medical conditions. When these health indicators were entered in multivariable logistic regression analyses, health status and heart disease emerged as significant predictors for perceived health consequences associated with COVID-19 infection.

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Table 1

| Sample characteristics | Weighted frequencies | Multivariable OR (95% CI) |
|------------------------|----------------------|--------------------------|
| Age group (years)      |                      |                          |
| 18–34                  | 23.8                 | 1.00                     |
| 35–49                  | 32.4                 | 1.62 (0.91–2.87)         |
| 50–64                  | 26.5                 | 1.53 (0.85–2.75)         |
| 65–74                  | 12.3                 | 2.51 (1.18–5.33)         |
| 75+                    | 4.9                  | 12.91 (2.55–65.43)       |
| Gender identity        |                      |                          |
| Male                   | 42.8                 | 1.00                     |
| Female                 | 57.2                 | 0.60 (0.39–0.95)         |
| Non-binary             | 90.7                 | 1.00                     |
| Race/ethnicity         |                      |                          |
| White                  | 74.2                 | 1.00                     |
| Black                  | 4.4                  | 1.84 (0.63–5.41)         |
| Latinx                 | 14.2                 | 1.95 (1.02–3.73)         |
| Asian/Other            | 7.3                  | 1.07 (0.49–2.33)         |
| Education              |                      |                          |
| High school degree     | 37.0                 | 1.00                     |
| Some college           | 36.8                 | 1.14 (0.68–1.91)         |
| College degree         | 26.2                 | 0.97 (0.57–1.66)         |
| Health status          |                      |                          |
| Excellent/Very Good    | 57.1                 | 1.00                     |
| Good                   | 37.4                 | 4.54 (1.94–10.59)        |
| Fair/Poor              | 11.9                 | 1.72 (1.06–2.79)         |
| Liver/kidney problems  |                      |                          |
| No/Not Sure            | 90.7                 | 1.00                     |
| Yes                    | 9.3                  | 0.76 (0.35–1.69)         |
| Lung disease (including asthma) |        |                          |
| No/Not Sure            | 80.6                 | 1.00                     |
| Yes                    | 19.4                 | 1.41 (0.79–2.51)         |
| Diabetes               |                      |                          |
| No/Not Sure            | 83.1                 | 1.00                     |
| Yes                    | 16.9                 | 0.66 (0.36–1.20)         |
| Heart disease          |                      |                          |
| No/Not Sure            | 94.6                 | 1.00                     |
| Yes                    | 5.4                  | 15.10 (1.84–123.72)      |

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3.2. Seeking sources of COVID-19 information

3.2.1. Healthy sample

The healthy sample consisted of individuals who self-reported not having any of the underlying medical conditions known to be susceptible to the consequences of COVID-19 infection. About 32.2% preferred English-based text on the Internet for COVID-19 information and 18.3% preferred Internet sites that included ASL videos. About 22.5% of the healthy sample learned about COVID-19 for the first time through TV, and only 4.6% first learned about this through newspapers, magazines or other print sources. The remaining chose family (10.3%), friends (8.5%), and healthcare provider (3.6%) as their first source of information for COVID-19. When the demographic characteristics were regressed on perceived health consequences of COVID-19 infection as an outcome in this healthy subsample, none of the demographic characteristics emerged as significant predictors.

3.2.2. At-risk medical condition subsample

A separate analysis was conducted on a subsample of at-risk DHH respondents with underlying medical conditions. When asked about the go-to source for COVID-19 information, 11.1% of the medical condition sample selected healthcare provider, followed by 8.0% for newspaper/magazines/others, 6.1% friends, 5.2% family, 14.2% Internet (ASL videos), 23.9% TV, and 44.3% Internet (English-based text).

When demographics were regressed on perceived health consequences of coronavirus infection as an outcome in this medical subsample, age and race emerged as significant predictors. Perceived health consequences increased with age (adjusted OR = 1.04; CI 95% = 1.02, 1.06). At-risk respondents who self-identified as POC were nearly three times more likely to believe that their health will be severely affected by COVID-19 when compared to respondents who self-identified as white (adjusted OR = 2.94; CI 95% = 1.20, 7.18). Education and gender identity did not predict the person’s perception of having serious health consequences if infected with COVID-19 while having an underlying medical condition.

4. Discussion and conclusion

Our study is the first to explore perceptions of COVID-19 and its health consequences in the DHH community, a known underserved cultural and linguistic minority. With a respondent sample from multiple regions across the U.S., our results describe potential groups at higher risk for underestimating the potential health consequences of COVID-19. Consistent with prior data on those with chronic medical conditions, those who self-identified their health status as being poor or as having lung, kidney, or liver disease or diabetes were more likely to underestimate the adverse consequences of COVID-19 infection is concerning and consistent with prior data on people with chronic medical conditions [25]. However, those with heart disease were not likely to express concern about being ill with COVID-19.

Among those who self-identified as having one or more of a number of conditions placing people at higher risk for COVID-19 illness, DHH respondents who identified as POC indicated perceiving a higher risk for adverse consequences if they contracted COVID-19 when compared to their white counterparts. This may be due in part to increased recent attention spotlighting greater COVID-19 risks to Black communities [26]. This particular finding highlights the need to consider intersectional life experiences by regularly analyzing subgroups of people who identify as being part of multiple underserved communities (e.g., identifying as both POC and DHH). Reassuringly, respondents who were older were more likely to correctly identify themselves as higher risk [25,27]. Younger people (e.g. in their twenties) with co-morbidities were less likely to identify themselves as at-risk, and with potential influences on respondent behavior (such as mask use and social distancing). The misperception of their risks is consistent with a recent COVID-19 study with 475 DHH adults; this study reported a strong association of fewer years of education with ineffectiveness of physical distancing and misperception of asymptomatic individuals as not being contagious [12].

Delving further in DHH respondents’ experiences with accessing health information about COVID-19, very few reported using healthcare providers as dominant sources of information. In contrast, nearly 60% reported using internet resources, whether text-based in English or videos in ASL. This finding emphasizes the need to develop high-quality, timely information about COVID-19 via Internet-based avenues, while also pointing to the need for support and innovation to develop and implement stronger patient-physician relationships and accessibility for DHH patients; in other words, information development and delivery must be deployed along multiple avenues. These strategies should incorporate both English and ASL versions to increase their accessibility, regardless if they are web-based or comfort with using the computer, tablet, or phone to answer questions in ASL and English. Our demographic characteristics as listed may not adequately capture the full range of lived experiences among DHH people, although the diversity of preferences here generally fits the patterns noted in prior literature [12,13]. We are unable to extrapolate to DHH people under the age of 18.

4.1. Practice implications

Future research should entail developing and implementing DHH-inclusive COVID-mitigation strategies, which may gradually help diminish health disparities and advance health equity for DHH people in this unprecedented and challenging time. Information delivery methods must be flexible and comprehensive to meet the diverse community’s needs, especially during emergencies like the COVID-19 pandemic.

Funding source

This work was supported by National Institute on Deafness and Other Communication Disorders (NICDD) of the National Institutes of Health [R01DC014463-01A1 and R01DC014463-05S4 to Poorna Kushalnagar, PhD]. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

CRediT authorship contribution statement

Christopher J. Moreland: Conceptualization, Analysis, Writing - original draft, Writing - review & editing. Raylene Paludneviciene: Methodology, Writing - review & editing. Jung Hyun Park: Writing - review & editing. Michael McKeen: Analysis, Writing - review & editing. Poorna Kushalnagar: Conceptualization, Supervision, Software, Methodology, Investigation, Analysis, Writing - original draft, Writing - review & editing, Funding acquisition.
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