Barriers to emergency department usage during the COVID-19 pandemic

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Abstract

Objective: The objective of this study was to determine the public’s likelihood of being willing to use an emergency department (ED) for urgent/emergent illness during the coronavirus disease 2019 (COVID-19) pandemic.

Methods: An institutional review board–approved, cross-sectional survey of a non-probability sample from Amazon Mechanical Turk was administered May 24–25, 2020. Change in self-reported willingness to use an ED before and during the pandemic (primary outcome) was assessed via McNemar’s test; COVID-19 knowledge and perceptions were secondary outcomes.

Results: There were 855 survey participants (466 [54.5%] male; 699 [81.8%] White; median age 39). Proportion reporting likelihood to use the ED pre-pandemic (71% [604/855]) decreased significantly during the pandemic (49% [417/855]; P < 0.001); those unlikely to visit the ED increased significantly during the pandemic (41% [347/855] vs 22% [417/855], P < 0.001). Participants were unlikely to use the ED during the pandemic if they were unlikely to use it pre-pandemic (adjusted odds ratio, 4.55; 95% confidence interval, 3.09–6.7) or correctly answered more COVID-19 knowledge questions (adjusted odds ratio, 1.37; 95% confidence interval, 1.17–1.60). Furthermore, 23.4% (n = 200) of respondents believed the pandemic was not a serious threat to society. Respondents with higher COVID-19 knowledge scores were more likely to view the pandemic as serious (odds ratio, 1.57; 95% confidence interval, 1.36–1.82).

Conclusions: This survey study investigated the public’s willingness to use the ED during the COVID-19 pandemic. Only 49% of survey respondents were willing to visit the ED during a pandemic if they felt ill compared with 71% before the pandemic.
INTRODUCTION

1.1 Background

Aggressive mitigation strategies were implemented nationally to decrease transmission of the severe acute respiratory syndrome coronavirus 2 (coronavirus disease 2019 [COVID-19]) virus in the United States. Along with reports of hospitals operating at capacity, the U.S. Centers for Disease Control and Prevention (CDC) reported that emergency department (ED) visits nationwide decreased by 42% during the early part of the pandemic. Simultaneously, there were decreases in acute ischemic stroke imaging, hospitalizations for common acute presentations to the ED (acute myocardial infarction, heart failure, chronic obstructive pulmonary disease, and pneumonia), and emergency medical services–reported cardiac arrests. These decreases are in contrast to CDC reports of increases in COVID-19 and non-COVID-19 excess mortality. Whether excess deaths were caused by deferred care, a lack of non-COVID-19 hospital capacity, underreporting of out-of-hospital COVID-19 cases, or other mechanisms remains to be determined.

1.2 Importance

The American College of Emergency Physicians conducted a national survey of the public’s concerns around seeking medical care during the pandemic. The results revealed that people are avoiding emergency or urgent medical care to avoid hospital exposure. What remains unknown are what factors may be associated with increased comfort with ED usage during a pandemic.

1.3 Goals of this investigation

To inform actions that EDs might take to encourage and reassure patients in need of care during a pandemic, we sought to survey the general public regarding their perspectives and willingness to use the ED during a pandemic.

METHODS

2.1 Study setting and population

A cross-sectional survey was distributed to participants on Amazon Mechanical Turk (MTurk, https://www.mturk.com) between May 24 and 25, 2020. This study was deemed to be exempt from review by the institutional review board at Mass General Brigham in Boston, MA.

MTurk is an online labor marketplace where individuals anonymously complete tasks and in return receive a nominal fee for the completion of tasks (in this case, $1). Behavioral experiments using MTurk survey data are considered reliable sources for high-quality survey data. MTurk is increasingly used to study healthcare questions.

Participants were recruited from MTurk to complete a 42-question survey. Inclusion criteria were adults ≥18 years of age residing in the United States. Respondents reporting working in health care were excluded to prevent biased results. We attempted to oversample the older MTurk population with the goal of obtaining 35% of respondents ≥55-years of age to better match national ED usage patterns.

2.2 Survey instrument

The survey (Supporting Information) included demographic questions, health insurance status (yes/no), and number of ED visits in the previous 3 months. Survey respondents rated their likelihood to visit an ED (extremely likely to extremely unlikely) if they needed urgent/emergency medical attention before, and then during, the COVID-19 pandemic. They were asked to select from lists of potential pre-pandemic and during pandemic barriers to visiting an ED. This list included non-financial barriers devised based on the 5-category framework of Penchansky and Thomas: affordability, acceptability, availability, accessibility, and accommodation. Respondents ranked a list of potential actions in order of which would lead to increased comfort visiting an ED during the pandemic. Finally, respondents were asked about their impression and knowledge of the COVID-19 pandemic. Knowledge questions related to epidemiological data and mitigation strategies used to treat COVID-19 for hospitalized patients, whereas impression questions were adapted from Pew Research Center items related to public perception of COVID-19 and accounted for a total of 8 possible points.

The survey contained 3 quality assurance questions to ensure meaningful responses. Respondents not appropriately responding to these questions were excluded from analyses.

2.3 Primary and secondary outcomes

The primary outcome was comparison between individuals’ self-reported willingness to use an ED before versus during the COVID-19 pandemic. We hypothesized that there would be a decrease in participants’ willingness to use an ED during the pandemic. Secondary outcomes were self-reported factors associated with...
willingness to use an ED during the pandemic and the association between knowledge of COVID-19 and pandemic severity perception.

2.4 | Statistical analysis

Survey items were coded as continuous, ordinal, or categorical variables in accordance with their survey presentation. The 5-point Likert scale used to assess likeliness to visit an ED before and during the pandemic was collapsed into a nominal variable with 3 levels (likely, neutral, unlikely). Respondents’ perceptions of the pandemic were dichotomized (severe, non-severe) and coded as non-severe if respondents indicated that they believed society was overreacting to the pandemic, that they were not worried about the pandemic, or that they did not believe the pandemic was a threat to society.29,30 In addition, survey respondents were given a score for “knowledge of COVID-19,” which was the summation of 1 point for each question answered correctly of 8 possible points. Finally, rank-order scores for the question regarding actions to increase ED comfort were created by assigning points to each rank with a better rank corresponding with a higher point total (ie, rank 1 receives 9 points, rank 2 receives 8 points, and so forth).

Demographics were assessed with descriptive statistics. The McNemar test was used to assess the change in likelihood of visiting the ED before versus during the pandemic. A multivariable multinomial regression model was constructed that assessed the association of self-reported likeliness to visit an ED during the pandemic when compared with a respondent’s reported likeliness to visit an ED before the pandemic, adjusting for age, race, sex, income, education, health insurance status, pandemic severity perception, and knowledge of COVID-19. There are ≈209 million U.S. adults aged ≥18 years. To achieve a 95% confidence interval (CI) with a ±3% margin of error, a sample size of 1067 respondents was desired, calculated using the following formula: N = (z score)² × StdDev × (1−StdDev) / (margin of error)². When we were unable to recruit the full number of respondents in the older age brackets, 3 sensitivity analyses were conducted to ensure integrity of the results. For these analyses, age was transformed into a dichotomous categorical variable (< 55 or ≥55 years). For the first 2 sensitivity analyses, the association between age and before/during COVID-19 likeliness of visiting an ED, and age and pandemic severity perception, were assessed with binomial logistic regression. The third sensitivity analysis used the substituted dichotomized age variable in the multivariable multinomial regression model. The final estimated margin of error based on the recruited sample of 855 respondents was ±3%–4% with a 95% CI. An α level of 0.05 was used to determine statistical significance for all tests. Study reporting conforms to Strengthening the Reporting of Observational Studies in Epidemiology guidelines.31 All statistical analyses were conducted using Jamovi is the manufacture version 1.2.14.0 (Sydney, Australia).

3 | RESULTS

3.1 | Population characteristics

The 855 respondents included were primarily men (54.5%, n = 466) and White (81.8%, n = 699), with a median age of 39 years (interquartile range [IQR], 31–53) (Table 1). Most respondents had health insurance (88.1%, n = 753), with a median of 2 (interquartile range, 1–4) visits to any doctor within the previous 12 months. Respondents obtained COVID-19-related information primarily through the internet (45.9%, n = 389) or television (30.2%, n = 256). Facebook (31.0%, n = 263) and Twitter (22.4%, n = 190) were the most frequently cited social media resources for COVID-19.

3.2 | Likeliness to visit an ED

More respondents reported feeling likely to use the ED if they felt ill and needed urgent/emergency medical attention before the pandemic versus during the pandemic (71% [95% CI, 67%–74%] versus 49% [95% CI, 45%–52%], respectively). Furthermore, more respondents reported feeling unlikely to use the ED during the pandemic vs before the pandemic (41% [95% CI, 37%–44%] vs 23% [95% CI, 20%–26%], respectively) (χ² = 109.9, P < 0.001, McNemar test). In the multinomial regression model (Table 2), respondents were more unlikely to use the ED during the pandemic (compared with likely) if they were unlikely to visit the ED before the pandemic (adjusted odds ratio [OR], 4.55; 95% CI, 3.09–6.70), female (adjusted OR, 2.03; 95% CI, 1.48–2.79), or answered more COVID-19 knowledge questions correctly (adjusted OR, 1.37; 95% CI, 1.17–1.60). No other predictor variables, including pandemic severity perception, were significant predictors.

3.3 | Pandemic severity perception

Of the respondents, >72% (n = 623) were very confident or somewhat confident that hospitals and medical centers are able to handle the medical needs of people who are seriously ill during the pandemic. A total of 23.4% (n = 200) of respondents did not believe the pandemic was serious.

3.4 | Pandemic severity perception and COVID-19-related knowledge

Those who believed the pandemic is less severe were more likely to not know that severe acute respiratory syndrome coronavirus 2 is the virus that causes COVID-19 (72.5% vs 80%; P = 0.05) and did not know the definition of case fatality rate (66% vs 77%; P < 0.0001). This group was also less likely to think asymptomatic carriers were contagious (78.5% vs 91.1%; P < 0.0001) and were less likely to know the
TABLE 1  Characteristics of survey respondents on Amazon Mechanical Turk (N = 855)

| Characteristic                  | n (%) or Median (IQR) |
|--------------------------------|-----------------------|
| Gender                         |                       |
| Male                           | 466 (54.5)            |
| Female                         | 382 (44.7)            |
| Nonbinary                      | 7 (0.01)              |
| Age, y                         | 39 (31–53)            |
| Race/Ethnicity                 |                       |
| Non-Hispanic White             | 699 (81.8)            |
| Non-Hispanic Black             | 50 (5.8)              |
| Hispanic                       | 40 (4.7)              |
| Asian                          | 48 (5.6)              |
| Other                          | 18 (2.1)              |
| Household income               |                       |
| Less than $15,000              | 61 (7.1)              |
| $15,000–$25,000                | 89 (10.4)             |
| $26,000–$40,000                | 147 (17.2)            |
| $41,000–$59,000                | 153 (17.9)            |
| $60,000–$89,000                | 197 (23)              |
| Greater than $90,000           | 208 (24.3)            |
| Highest education              |                       |
| No high school education       | 0 (0)                 |
| Grades 9–11                    | 9 (1.1)               |
| Grade 12 or GED                | 89 (10.4)             |
| College 1–3 years              | 232 (27.1)            |
| College 4 years or more        | 371 (43.4)            |
| Graduate or professional degree| 154 (18)              |
| Region                         |                       |
| Northeast                      | 167 (19.5)            |
| Midwest                        | 197 (23)              |
| South                          | 332 (38.8)            |
| West                           | 158 (18.5)            |
| Unknown                        | 1 (0.1)               |
| Health insurance               |                       |
| Yes                            | 753 (88.1)            |
| No                             | 102 (11.9)            |
| Number of doctor visits past 12 months | 2 (1–4) |

Note that the GED is the high school equivalency diploma. IQR, interquartile range; GED, general education development; ED, emergency department.

reason behind social distancing (91% vs 98%; P < 0.0001) or the distance that is recommended to social distance (90% vs 97%; P < 0.0001). Finally, higher scores on the composite "knowledge of COVID-19" were associated with viewing the pandemic as serious (OR, 1.57; 95% CI, 1.36–1.82).

TABLE 2  Predictors of reporting willingness to visit the emergency department during the pandemic as "unlikely"

| Predictor variable               | Odds ratio | 95% Confidence interval |
|---------------------------------|------------|-------------------------|
| Age                             | 0.99       | 0.98–1.0                |
| Gender                          |            |                         |
| Male                            | Reference  | –                       |
| Female                          | 2.1        | 1.5–2.9                 |
| Income                          |            |                         |
| Less than or equal to $15,000   | 0.97       | 0.47–2.0                |
| $15,000–$25,000                 | 0.94       | 0.50–1.7                |
| $26,000–$40,000                 | 1.3        | 0.80–2.2                |
| $41,000–$59,000                 | –          | 0.80–1.4                |
| $60,000–$89,000                 | 0.80       | 0.50–1.3                |
| Greater than or equal to $90,000| Reference  | –                       |
| Education                       |            |                         |
| Grades 9–11                     | 1.1        | 0.20–5.4                |
| Grade 12 or GED                 | 0.80       | 0.40–1.5                |
| College 1–3 years               | 1.3        | 0.80–2.1                |
| College 4 years or more         | 0.80       | 0.50–1.2                |
| Graduate or professional degree | Reference  | –                       |
| Insurance                       |            |                         |
| Yes                             | 1.0        | 0.60–1.7                |
| No                              | Reference  | –                       |
| Race/Ethnicity                  |            |                         |
| Black                           | 1.1        | 0.50–2.1                |
| Hispanic                        | 0.80       | 0.40–1.7                |
| Asian                           | 0.60       | 0.30–1.3                |
| Other                           | 0.95       | 0.30–2.8                |
| White                           | Reference  | –                       |
| Pandemic severity perception    |            |                         |
| Severe                          | Reference  | –                       |
| Not severe                      | 0.98       | 0.67–1.4                |
| Knowledge of COVID-19           | 1.4        | 1.2–1.6                 |
| ED comfort before COVID-19      |            |                         |
| Neutral versus likely           | 1.9        | 0.90–3.8                |
| Unlikely versus likely          | 4.8        | 3.3–7.2                 |

Estimates represent the log odds of willing to go to during the COVID-19 pandemic as unlikely versus likely. COVID-19, coronavirus disease 2019; ED, emergency department; GED, general education development.
3.5 | Self-reported barriers to ED usage

Before the pandemic, the most frequently cited barrier of 1322 selected responses was affordability of health care (24.2%, n = 320) (Table 3). The pandemic changed self-reported barriers to ED usage, with the most frequently cited barrier of 1693 responses as concern about personal exposure to COVID-19 (27.6%, n = 468) (Table 3).

3.6 | Factors associated with increased comfort to use an ED during the pandemic

Table 4 provides the overall rank-ordered list of steps respondents said would increase their comfort in going to the ED. The most frequently chosen factor was telemedicine screening to determine necessity of an in-person visit (20.1%, n = 172). The overall top-ranked factor associated with increased comfort was orienting chairs >6 feet apart in the waiting room.

3.7 | Sensitivity analyses

The sensitivity analyses revealed no significant differences between dichotomized age groups and the primary outcome and did not significantly change the results of the regression model.

4 | LIMITATIONS

Limitations are noted with this study. MTurk is a non-probability sample of U.S. adults, and although existing studies suggest that MTurk results are generalizable for the purposes of behavioral research,12–16 at least one study suggests that MTurk workers are not generalizable to health status and behaviors.32 Participants in this survey had a median age of 39, which is younger than the group of highest ED users nationally.26 However, the sensitivity analyses address this latter concern and suggest potential generalizability with regard to age-related perceptions. In addition, the sample population was predominantly White with college degrees, which does not fully represent the race, ethnic, and educational demographics of the United States.

5 | DISCUSSION

Survey results demonstrate that U.S. adults reduced their willingness to use the ED during the pandemic. Furthermore, respondents who perceived the pandemic as “severe” were less likely to be willing to use the ED compared with respondents who believed the pandemic was not severe, although on the order of ≈10%. Survey respondents who scored higher on COVID-19 knowledge questions were both more likely to view the pandemic as severe and to report being

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**Table 3** Barriers to emergency department usage before and during the COVID-19 pandemic

| Before the COVID-19 pandemic, what barriers, if any, would prevent you from going to the emergency department if needed? Select as many as apply. | N | Proportion of respondents (%) |
|---|---|---|
| Health care too costly/worried about the cost of care (affordability) | 320 | 24.2 |
| I did not face barriers that prevented me from going to the emergency department | 317 | 24.0 |
| Wait time at the emergency department is often too long (accommodation) | 217 | 16.4 |
| Have no transportation to travel to the emergency department (accessibility) | 146 | 11.0 |
| No health insurance (affordability) | 91 | 6.9 |
| Takes too long to travel to the emergency department (availability) | 57 | 4.3 |
| No emergency facilities that provide trustworthy and quality care (acceptability) | 47 | 3.6 |
| No emergency facilities in neighborhoods that are safe (acceptability) | 36 | 2.7 |
| No time to go to the emergency department (accessibility) | 34 | 2.6 |
| Other (please list) | 32 | 2.4 |
| Did not know where to find an emergency department (availability) | 23 | 1.7 |
| Could not find an emergency department that spoke my language (accommodation) | 2 | 0.2 |
| Currently, what barriers, if any, would prevent you from going to the emergency department if needed? Select as many as apply. | N | Proportion of the 1,322 barriers identified by participants (%) |
| Concern about personal exposure to COVID-19 | 468 | 27.6 |
| Health care too costly/worried about the cost of care (affordability) | 281 | 16.6 |
| I want to help “flatten the curve” by not using the ED | 195 | 11.5 |
| Wait time at the emergency department is often too long (accommodation) | 166 | 9.8 |
| I did not face barriers that prevented me from going to the emergency department | 153 | 9.0 |

(Continues)
TABLE 3  (Continued)

| Current reason, what barriers, if any, would prevent you from going to the emergency department if needed? Select as many as apply. | Proportion of the 1,322 barriers identified by participants (%) |
|---|---|
| Other issue related to COVID-19 (please describe) | 92 | 5.4 |
| No health insurance (affordability) | 81 | 4.8 |
| No emergency facilities that provide trustworthy and quality care (acceptability) | 55 | 3.2 |
| No emergency facilities in neighborhoods that are safe (acceptability) | 41 | 2.4 |
| Takes too long to travel to the emergency department (availability) | 41 | 2.4 |
| Have no transportation to travel to the emergency department (availability) | 40 | 2.4 |
| No time to go to the emergency department (accessibility) | 27 | 1.6 |
| Other issue unrelated to COVID-19 (please describe) | 23 | 1.4 |
| Did not know where to find an emergency department (availability) | 22 | 1.3 |
| Could not find an emergency department that spoke my language (accommodation) | 8 | 0.5 |

COVID-19, coronavirus disease 2019.

It is conceivable that barriers to ED usage during the ongoing and future pandemics could be mitigated by the interventions identified in this study (Table 4). Given the concern for a prolonged COVID-19 pandemic, hospitals have an obligation to restructure their ED in such a way that individuals, especially those at high risk of emergency conditions, are not deterred from seeking medical care.

In summary, self-reported willingness to use the ED for an urgent/emergent illness decreased during the pandemic compared with before the pandemic. Perceived pandemic severity was inversely related to knowledge of COVID-19. During the pandemic, barriers to ED usage included concerns related to COVID-19 exposure. Hospitals should implement strategies to reduce COVID-19-related barriers to ED usage as well as informing the public about these efforts to potentially prevent unnecessary morbidity and mortality from ED avoidance.

CONFLICT OF INTEREST
The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS
Joshua D. Niforatos, Alexander Chaitoff, Alexander R. Zheutlin, Max M. Feinstein, and Ali S. Raja conceived the study and designed the survey. Joshua D. Niforatos, Alexander Chaitoff, and Ali S. Raja supervised data collection. Joshua D. Niforatos, Alexander Chaitoff, Alexander R. Zheutlin, Max M. Feinstein, and Ali S. Raja provided statistical advice on study design, and Joshua D. Niforatos analyzed the data. Joshua D. Niforatos drafted the manuscript, and all authors significantly contributed substantially to its revision. Joshua D. Niforatos takes responsibility for the article as a whole.
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SUPPORTING INFORMATION
Additional supporting information may be found online in the Supporting Information section at the end of the article.