

# Risk Perception, Preventive Behavior, and Medical Care Avoidance among American Older Adults During the COVID-19 Pandemic

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## Abstract

**Objectives:** This study investigated the predictors of risk perception and its effect on older adults' preventive behavior and/or medical care avoidance during the COVID-19 pandemic. **Methods:** Older respondents (age >50 years) from the MIT COVID-19 Preventive Health Survey reported their social distancing, hand washing, mask wearing, and medical care avoidance between July and October 2020 ( $n = 4395$ ). Structural equation models were used. **Results:** Significant predictors of higher risk perception were female gender, older age, poorer health, city residency, personally knowing someone who had COVID-19, and correct knowledge of vaccine/treatment. Higher risk perception was subsequently associated with higher frequency/probability of practicing preventive behavior and/or avoiding medical care. Knowledge had the strongest path coefficient with risk perception. **Discussion:** Disseminating correct information to older adults could help them evaluate infection risk accurately. Educational programs on the precautions implemented at clinical settings to ensure patient safety may encourage older adults to seek timely medical care.

## Keywords

COVID-19, medical care avoidance, preventive behavior, risk perception

## Introduction

Practicing personal hygiene and social distancing are important measures to control virus transmission during a pandemic. However, avoiding medical visits due to the fear of virus exposure is not ideal because such medical care avoidance may delay treatment of existing conditions and diagnosis of new conditions, leading subsequently to higher health risks (Czeisler et al., 2020). According to the Centers for Disease Control and Prevention (CDC), older adults have been disproportionately impacted due to their much higher infection and death rates during the ongoing coronavirus disease 2019 (COVID-19) pandemic (CDC, 2020a). Societal disruptions caused by COVID-19, such as closure and shortage of healthcare facilities or interrupted public transportation, together with fear of infection, could contribute to medical care avoidance among older adults (Czeisler et al., 2020). Identifying the factors influencing older adults' preventive behavior and/or medical avoidance therefore has practical implications for developing intervention strategies to reduce their infection risk while ensuring their reception of proper medical treatments. This study investigated significant

predictors of risk perception and their effects on older adults' preventive behavior and/or medical avoidance during the COVID-19 pandemic.

Preventive behaviors have been widely studied in previous pandemics. Existing literature mainly focused on personal hygiene measures (e.g., hand washing and mask wearing) and social distancing such as avoiding public spaces (Majid et al., 2020; Matiza, 2020). Studies consistently found many people adopted preventive behaviors in the pandemic to reduce their infection risk (Majid et al., 2020). Such personal hygiene and social distancing behaviors are undoubtedly helpful for individuals and society to mitigate virus transmission.

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However, avoiding hospitals is not an optimal choice for older adults, especially for those with preexisting chronic conditions or treatment needs. Medical care avoidance delays their best opportunity for treatment, which subsequently may lead to higher mortality and morbidity risk that could have been treated or prevented (Czeisler et al., 2020; Maringe et al., 2020). However, most extant studies have considered avoiding hospitals as part of social distancing or precautionary behavior during a pandemic (Majid et al., 2020). New evidence focusing on medical avoidance is urgently needed in the evolving COVID-19 pandemic context.

Some reports have revealed the prevalence of medical avoidance in different periods of the pandemic. A CDC report using national syndromic surveillance data suggested a great decline in emergency visits during the COVID-19 pandemic, including declines of 23% for heart attack, 20% for stroke, and 10% for hyperglycemic crisis from January to May 2020 (Lange et al., 2020). In June 2020, a nationwide survey comprised representative US adults aged 18 years and older indicated 40.9% avoided or delayed medical care during the pandemic because of concern about COVID-19 exposure in the hospital (Czeisler et al., 2020). Medical professionals have raised concerns about the decreased diagnosis of some diseases, such as stroke (Dula et al., 2020) and their potential harm to older adults' health (Sharma et al., 2020).

Risk perception is the most significant predictor of preventive behaviors during the pandemic (Majid et al., 2020). Strong evidence has been found in several pandemic contexts, including severe acute respiratory syndrome, influenza A H1N1, Middle East respiratory syndrome, Ebola virus disease (Majid et al., 2020), and COVID-19 (Matiza, 2020), indicating higher risk perception leads to more preventive behaviors. The fear of COVID-19 exposure was associated with medical care avoidance (Czeisler et al., 2020). However, the relationship between knowledge and risk perception or preventive behavior is less conclusive. Some studies suggested that accurate knowledge about a disease leads to higher risk perception and subsequent preventive behaviors (Majid et al., 2020). However, others reported reverse or nonsignificant relationships, indicating that despite high knowledge, risk perception was lower or not associated with precautionary measures (Quandt et al., 2020). Therefore, exploring the association of knowledge with older adults' risk perception and subsequent preventive behavior or medical avoidance in the evolving COVID-19 pandemic context is warranted.

Using data from a large-scale Internet-based survey collected amid the pandemic, this study aimed to (1) investigate predictors of older adults' risk perception regarding COVID-19 and (2) examine the relationship of risk perception with preventive behaviors engagement and/or medical care avoidance. Different from previous studies (Majid et al., 2020), this study separated medical avoidance from preventive behaviors and discusses its implications to ensure that

older adults obtain timely and appropriate medical treatment while minimizing their infection risk. Study findings have the potential to extend the literature by disentangling the association between knowledge and both older adults' risk perception and their subsequent behaviors in the COVID-19 pandemic. Findings could be helpful for clinical professionals to develop relevant education and/or public health interventions to encourage older adults to evaluate their infection risk accurately and make informed decisions related to their preventive behaviors and medical care-seeking.

## Methods

### Data and sample

Data from the COVID-19 Preventive Health Survey conducted by researchers at the Massachusetts Institute of Technology (MIT) were used. Global Facebook users aged 18 years and older from 67 countries and territories were invited to respond to an Internet-based survey focusing on their knowledge, attitudes, and practices related to COVID-19 (MIT COVID-19 Survey, 2020). The MIT COVID-19 survey was launched on July 6, 2020 and has been collecting information daily from Facebook users (Collisa et al., 2020). This study accessed and analyzed the data in early November. Respondents from the United States who completed the survey between July 7, 2020 and October 31, 2020 were included in the present study. We further restricted the samples to older adults (aged 50 years or more), resulting in a final analytic sample of 4395 American older adults. This study has received institutional review board approval from Iowa State University.

### Measures

**Demographic characteristics.** Gender was dichotomous (male and female). Age was ordinal with 10-year intervals: 51–60, 61–70, 71–80, and over 80. Education was binary (college/university/graduate school was recoded into “higher education” and others were recoded into “lower education”). Density assessed respondents' residence (city, town, and village/rural). Self-reported health measured respondents' overall health, ranging from 1 = poor to 5 = excellent. Race/ethnicity was not released because MIT researchers were still working on preserving privacy at the time of data analysis. Employment status was excluded due to a large amount of missing data. Sensitivity analysis showed including employment status as a covariate achieved similar model results and did not change key findings.

**Knowledge.** Respondents were first asked if they personally knew someone who had tested positive for COVID-19 (yes/no). Furthermore, they were asked about the existence of vaccine and/or drug treatment for COVID-19 at the time of the survey. Only the option that there was currently no drug

treatment or vaccine for COVID-19 was considered “correct.” Other answers were recoded into “incorrect.”

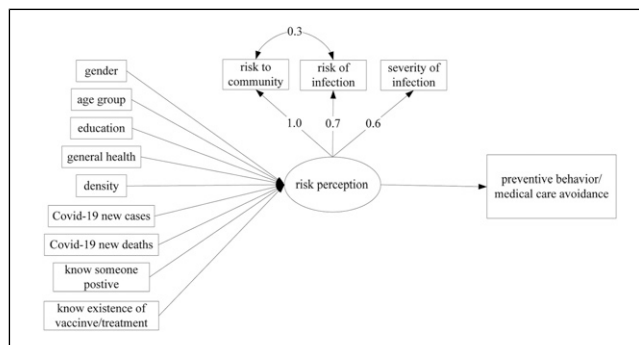
**COVID-19 new cases/deaths.** To account for the potential contextual effect of COVID-19 prevalence on individuals, we retrieved daily numbers of new COVID-19 cases and deaths from CDC (CDC, 2020b) and merged with the MIT dataset. We matched the new cases and deaths with individual-level data based on the residential state and date of survey so that every respondent had his/her own unique value of new cases/deaths corresponding to the state he/she resided in and the date he/she responded to the survey. The numbers were further rescaled by dividing by the state total population in 2018.

**Risk perception.** Three items were used to measure risk perception. Risk to community measured the degree of danger COVID-19 risk presents to their community (not at all dangerous = 1, slightly dangerous = 2, moderately dangerous = 3, very dangerous = 4, and extremely dangerous = 5). Risk of infection asked how likely someone of respondents’ same age in their community became sick from COVID-19 (not at all likely = 1, slightly likely = 2, moderately likely = 3, very likely = 4, and extremely likely = 5). Infection severity was the perceived severity if the respondent became infected with COVID-19 (not at all serious = 1, somewhat serious = 2, and very serious = 3). For all items, higher values indicated higher risk perception.

**Preventive behaviors and medical avoidance.** Preventive behaviors were assessed by asking respondents how often they engaged in three recommended behaviors, including staying at least 1 m away from people not in their households, cleaning their hands with soap or alcohol-based handrub, and wearing a mask or face covering in public (never = 1, rarely = 2, sometimes = 3, often = 4, and always = 5). Medical avoidance measured whether the respondents had avoided contact with healthcare facilities or healthcare workers in the past week due to fear of exposure to COVID-19 (no = 0 and yes = 1).

### Statistical analysis

Descriptive statistics were used to summarize sample characteristics. Structural equation modeling (SEM) was used to examine the relationships among study variables. The conceptual analytic model is presented in Figure 1. An initial confirmatory factor analysis model used three items to measure the latent variable (risk perception). Preliminary results showed excellent model fit. Next, in the structural models, demographic characteristics, COVID-19 covariates, and knowledge predicted risk perception. Furthermore, risk perception was used to predict preventive behaviors and medical avoidance, separately. Through the mediation effect model, this study was able to investigate the extent to which individuals’ characteristics and contextual variables influence



**Figure 1.** Conceptual analytic model for structural equation modeling.

their preventive behaviors or medical avoidance through risk perception indirectly.

To ensure the latent concept (risk perception) was measured consistently across preventive behavior and medical avoidance, the factor loadings and covariances were constrained to be the same across models. Because the study sample was restricted to a small proportion of respondents, using the weighting procedures provided by the MIT team to mitigate the coverage, sampling variability, and nonresponse biases was no longer appropriate (Collisa et al., 2020). Therefore, all analyses were unweighted. Further discussion of potential bias and limitations of this study are provided in the Discussion section. All analyses were conducted in R using the packages “car,” “tidyr,” and “lavaan.”

## Results

### Sample characteristics

Descriptive characteristics of the respondents are shown in Table 1. More than 60% of respondents were women (61.58%). Most respondents were aged between 51 and 70 years and most had higher education (76.87%). About half lived in cities (46.71%). The average score of self-reported health was 3.36 (range 1–5) with SD .97. Over 60% of respondents knew someone who had tested positive for COVID-19 (61.03%) and had accurate knowledge of the existence of vaccine/treatment (68.71%). Respondents reported relatively high risk to their community and risk of infection (>3 on the range 1–5) and severity of infection (2.5 out of 3). Overall, respondents frequently engaged in preventive behaviors in practice (mean scores for all three behaviors >4). About 21% of the respondents avoided contact with healthcare facilities or healthcare workers in the past week due to fear of exposure to COVID-19.

### SEM Results

Table 2 presents the SEM results for four models, separately. All goodness-of-fit indices were satisfactory (comparative fit

**Table 1.** Descriptive Statistics for Respondents ( $n = 4395$ ).

Variable	Mean (SD), %	Variable	Mean (SD), %
Gender (female)	61.58	Know someone positive (yes)	61.03
Gender (male)	38.42	Know someone positive (no)	38.97
Age (51–60 years)	39.61	Know existence of vaccine/treatment (correct)	68.71
Age (61–70 years)	38.54	Know existence of vaccine/treatment (incorrect)	31.29
Age (71–80 years)	18.63	COVID-19 new cases <sup>a</sup>	1.58 ± 1.32
Age (over 80 years)	3.21	COVID-19 new deaths <sup>b</sup>	2.38 ± 2.65
Education (higher)	76.87	Risk to community (range 1–5)	3.41 ± 1.11
Education (lower)	23.13	Risk of infection (range 1–5)	3.36 ± 1.04
Density (city)	46.71	Severity of infection (range 1–3)	2.50 ± .64
Density (town)	30.79	Social distancing (range 1–5)	4.00 ± .92
Density (rural)	22.50	Hand washing (range 1–5)	4.55 ± .66
Self-reported health (range 1–5)	3.36 ± .97	Mask wearing (range 1–5)	4.72 ± .73
		Medical avoidance (yes)	20.97
		Medical avoidance (no)	79.03

<sup>a</sup>Unit: per 10,000 people of the residential state.

<sup>b</sup>Unit: per 1,000,000 people of the residential state.

**Table 2.** Structural Equation Modeling Result for Four Models.

	Social distancing	Hand washing	Mask wearing	Medical avoidance (Yes)
Risk perception as outcome variable				
Gender (male)	-.108***	-.122***	-.125***	-.114***
Age (61–70 years)	.100***	.098***	.094***	.094***
Age (71–80 years)	.146***	.143***	.142***	.140***
Age (over 80 years)	.092***	.091***	.086***	.089***
Education (lower)	-.029	-.027	-.031	-.026
Self-reported health	-.273***	-.270***	-.265***	-.281***
Density (town)	-.103***	-.101***	-.099***	-.104***
Density (rural)	-.137***	-.139***	-.143***	-.136***
COVID-19 new cases	.016	.016	.016	.018
COVID-19 new deaths	-.028	-.029	-.030	-.024
Know someone positive (yes)	.096***	.100***	.101***	.100***
Know existence of vaccine/treatment (incorrect)	-.286***	-.287***	-.290***	-.283***
Risk perception as predictor variable	.255***	.223***	.556***	.271***
Goodness-of-fit indices				
CFI	.906	.880	.906	.906
TLI	.873	.838	.874	.873
RMSEA	.051	.059	.053	.052

Note. CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation.

Medical avoidance (yes) was recoded as a dummy variable. Reference levels were female for gender; 51–60 years for age-group; higher for education; city for density; no for knowing someone positive; correct for knowing existence of vaccine/treatment. All coefficients were standardized. Models were estimated using full information maximum likelihood. Standard errors were estimated using bootstrapping. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

index (CFI) close to or above .9; Tucker–Lewis index (TLI)  $>.83$ ; and root mean square error of approximation (RMSEA) close to .05). Except for education, COVID-19 new cases, and deaths, most demographic characteristics and knowledge variables were significant predictors of risk perception. Among all significant predictors, having incorrect knowledge of COVID-19 vaccine/treatment had the highest standardized path coefficient with risk perception

( $b \approx -.280$ ). In addition, risk perception was a strong predictor for preventive behavior and medical avoidance across the models.

Specifically, respondents with female gender, older age, poorer self-reported health, city residency, personally knowing someone who had tested positive for COVID-19, and accurate knowledge of vaccine/treatment had higher levels of risk perception and were more likely to engage in

preventive behaviors (i.e., social distancing, washing hands, and wearing a mask) and to avoid medical visits. Among them, the mask wearing model had the highest path coefficient ( $b = .556$ ), indicating that risk perception had a stronger effect on mask wearing than did the other two preventive behaviors.

## Discussion

Using data from a national sample of American older adults, this is the first study examining both the determinants of risk perception regarding COVID-19 and its association with preventive behaviors and medical care avoidance. First, our findings indicate medical care avoidance was prevalent among older Americans mid-pandemic (>20%). The finding also corroborates the existing literature that risk perception was a strong predictor of preventive/avoidance behavior (Majid et al., 2020). Model results indicated that the significant predictors of higher risk perceptions were female gender, older age, poorer self-reported health, city residency, personally knowing someone who had been tested positive for COVID-19, and having correct knowledge of vaccine/treatment. Subsequently, higher risk perception was associated with higher frequency to practice preventive behaviors and/or higher probability to avoid medical care. Our findings unveil the preventive/avoidance behavior and its associated factors among older Americans, extending empirical evidence on the health/healthcare behavior of older adults in the evolving pandemic.

More than 20% of older respondents reported having avoided contact with healthcare facilities or healthcare workers in the past week due to fear of exposure to COVID-19. Although medical care avoidance may indicate adherence to recommended COVID-19 mitigation guidelines, such as stay-at-home orders/advisory, the prolonged avoidance of medical care may lead to delayed treatment of existing chronic conditions and diagnosis/treatment of new conditions, which subsequently can lead to potentially avoidable negative health outcomes (Czeisler et al., 2020). Medical care avoidance may represent an unintended consequence of COVID-19 risk mitigation guidelines to prevent community spread among American older adults.

Consistent with prior studies (Abdelrahman, 2020; Plohl & Musil, 2020), our findings indicate that a higher level of COVID-19 risk perception was linked to a greater level of engagement in preventive behaviors and medical care avoidance. Put differently, older adults who perceived COVID-19 as dangerous and risky were more likely to engage in preventive behaviors and avoid medical care to mitigate their infection risk. Accurate risk perception, which does not overestimate or underestimate the infection risk, is therefore critical in facilitating medical care-seeking and adherence with public health guidelines. Public health interventions targeting accurate risk perception may facilitate engagement in preventive behaviors and medical

care-seeking behaviors. Healthcare professionals should also explain to the public that they are implementing necessary measures to prevent and control the virus in hospitals to ensure the safety of medical visits (Lange et al., 2020).

Study findings highlight several significant correlates of older adults' engagement in COVID-19 preventive behaviors. Older age was associated with a higher likelihood of engagement in preventive behaviors, probably because of greater likelihood of preexisting conditions and infection risk and thus greater vigilance about governments' recommended anti-transmission guidelines to reduce their infection risks (Kim & Crimmins, 2021; Muto et al., 2020). An interesting gender difference was observed. Consistent with other studies (Abdelrahman, 2020; Al-Hanawi et al., 2020), women were more likely than men to practice social distancing. One possible reason is that women were more likely to express negative emotional responses to a pandemic (Lau et al., 2010); therefore, women usually had higher levels of risk perception (Ibuka et al., 2010), leading to subsequent preventive measures. Targeted health education interventions could focus on men since they are less likely to practice preventive behaviors. Additionally, city residency was associated with higher risk than rural/town residency probably due to higher population density in city areas. People residing in cities may be less able to keep physical distance and therefore face a higher risk of contracting COVID-19 (Carozzi et al., 2020).

Results also suggest that older adults with poorer self-reported health were more likely to have higher perceived risk. This probably reflects the reality that many older adults have underlying medical conditions and face higher risk of contracting COVID-19 and possibly dying from it because of the disproportional effect of COVID-19 on older adults (CDC, 2020a). A prior study reported that the presence of two or more chronic conditions and disability was associated with a higher likelihood of medical care avoidance (Czeisler et al., 2020). The high prevalence of medical care avoidance could explain the increasing mortality from underlying chronic conditions other than COVID-19 observed during the pandemic such as diabetes, heart disease, and cerebrovascular diseases (Woolf et al., 2020). This finding is also consistent with the documented decline in emergency department visits and hospitalization due to life-threatening conditions other than COVID-19 during the pandemic (Lange et al., 2020; Oseran et al., 2020). Older adults could be more vulnerable than younger populations to negative ramifications of medical care avoidance.

More than 60% of respondents personally knew someone who tested positive for COVID-19. Because a prior study reported that individuals with personal experiences related to COVID-19 diagnosis or death were more likely to have psychological symptoms (Gallagher et al., 2020), appropriate intervention strategies and programs need to be developed to mitigate emotional sequelae among older adults who experience loss and grief from the pandemic. This finding is

consistent with emerging literature that predicted the alarming demand for mental health services after the pandemic (Pfefferbaum & North, 2020; Simon et al., 2020). Moreover, congruent with a prior study (Czeisler et al., 2020), the findings further suggest that knowing someone who tested positive for COVID-19 was a significant predictor of both engagement in preventive behaviors and medical care avoidance among older adults. We postulate that personal experience related to COVID-19 may authenticate the existence and severity of the pandemic and help the skeptical realize COVID-19 is not a hoax. Therefore, the immediate concern of contracting COVID-19 in real life determines older adults' behaviors. Personal experience related to COVID-19, therefore, may represent a potential screening tool to identify older adults at higher risk for medical avoidance.

It is worth noting that over 30% of the older respondents had inaccurate knowledge regarding the existence of COVID-19 vaccine/treatment. Misinformation among the general public about COVID-19 has been documented by an emerging body of literature (Roozenbeek et al., 2020). Prior studies suggested that misinformation was associated with a lower likelihood of adherence to public health mitigation recommendations and willingness to get vaccinated, which in turn may lead to spread of the virus (Mian & Khan, 2020; Roozenbeek et al., 2020). Only with accurate knowledge of the virus can the public objectively evaluate the risk and adopt effective preventive behaviors. In this study, knowledge of COVID-19 vaccine/treatment had the strongest path coefficient for risk perception, highlighting the importance of disseminating correct information to help the public understand the pandemic. Credible sources of information on transmission reduction strategies should be made available to older adults. Because inaccurate knowledge was associated with risk perception, which thereby influences compliance with preventive behaviors and medical avoidance, educational campaigns tailored to older adults are urgently needed to denounce misinformation related to COVID-19.

Interestingly, state-level COVID-19 new cases/death covariates were nonsignificant predictors. A potential explanation is that state-level measures could not well capture the prevalence or severity of COVID-19 in their residence. It is possible that individual differences represent major determinants of older adults' engagement in preventive behavior and medical care avoidance, regardless of contextual factors.

### **Limitations**

Several limitations of the study warrant discussion. First, data used in this study were self-reported online by older adult Facebook users, which may introduce selection, coverage, and nonresponse bias in the study sample. The study sample may not be representative of older adults with low educational background and/or low technology literacy. Therefore, generalization of these findings is limited. Data quality also

was subject to the common limitations of Internet-based surveys. Although limited available data on older adults related to COVID-19 and its relatively large sample size justify the significance of this study, the findings should be interpreted with caution. Future studies using representative data are also needed to validate these findings. Second, the medical care avoidance measure used here assessed whether the respondents avoided any medical care without differentiating routine versus urgent/emergency care. Therefore, it was not possible to determine whether older adults avoided their routine or urgent/emergency care, which could provide nuanced information to inform targeted interventions. Future studies need to investigate predictors and outcomes associated with the extent to which older adults avoid varying types of medical care.

Third, due to limitations of secondary data analysis, certain variables that may be related to preventive behaviors and medical care avoidance (e.g., race/ethnicity, health insurance status, and existing chronic conditions) were not included in the analyses and warrant investigation in future studies. Especially, since racial/ethnic minority communities have been disproportionately affected by COVID-19 (Garcia et al., 2020), the inability to investigate race-/ethnicity-based differences in this research presents a significant limitation. Future studies need to investigate racial/ethnic disparities in medical care avoidance and preventive behaviors. Fourth, data used in this study are self-reported and thus possibly subject to recall bias.

### **Implications**

Findings from this study have significant public health and research implications. First, medical care avoidance due to concerns about COVID-19 among older adults calls for attention from clinicians working with this population. Considering the potential negative health outcomes of medical care avoidance, interventions to promote timely care utilization, particularly among older adults with existing chronic conditions, are urgently needed. Ensuring older adults with chronic conditions obtain necessary medical care to maintain and manage their conditions is imperative. Contactless care delivery models, such as telehealth, need to be evaluated to alleviate medical care avoidance among older adults whose needs could be served in such care delivery settings.

Second, to promote accurate risk perception, it is critical to develop educational campaigns to inform populations of COVID-19 knowledge and risk reduction strategies, as well as denounce misinformation related to COVID-19. Public health professionals informing older adults about COVID-19 risks could improve compliance with preventive behaviors. Healthcare professionals should assist in raising public awareness of the safety precautions implemented at health-care facilities to encourage care-seeking. Moreover, educational programs focusing on health risks of medical care avoidance and the necessity of care-seeking for certain

conditions may be helpful to facilitate timely care-seeking among older adults. Finally, to develop targeted interventions, future studies need to investigate specific/nuanced reasons of medical care avoidance among older adults other than fear of COVID-19 exposure.

## Conclusion

Over 20% of American older adults reported avoiding medical care due to COVID-19–related concerns during the pandemic. Unintended consequences associated with COVID-19 mitigation recommendations among older adults warrant urgent attention for research and practice. Outreach programs to increase awareness of COVID-19 safety precautions implemented by healthcare facilities may be helpful in promoting timely care-seeking behaviors among older adults. Study findings underscore the importance of risk perception in explaining older adults' engagement in preventive behaviors and medical care avoidance. Accessing credible information regarding COVID-19 is critical to form accurate risk perception.

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This research is based on survey results from the Massachusetts Institute of Technology. For more information, please refer to the MIT COVID-19 Survey website (<https://covidsurvey.mit.edu/>).

## Declaration of Conflicting Interests

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## Ethical Approval

This study has received Institutional Review Board approval from Iowa State University.

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## References

- Abdelrahman, M. (2020). Personality traits, risk perception, and protective behaviors of arab residents of qatar during the COVID-19 pandemic. *International Journal of Mental Health and Addiction*, 1-12. doi:10.1007/s11469-020-00352-7
- Al-Hanawi, M. K., Angawi, K., Alshareef, N., Qattan, A. M. N., Helmy, H. Z., Abudawood, Y., Alqurashi, M., Kattan, W. M., Kadasah, N. A., Chirwa, G. C., & Alsharqi, O. (2020). Knowledge, attitude and practice toward COVID-19 among the public in the kingdom of Saudi Arabia: A cross-sectional study. *Frontiers in Public Health*, 8, 217. doi:10.3389/fpubh.2020.00217
- Carozzi, F., Provenzano, S., & Roth, S. (2020). Urban density and COVID-19. In: *IZA discussion papers (issue 13440)*. Institute of Labor Economics (IZA).
- CDC. (2020a). *Older Adults are at greater risk of requiring hospitalization or dying if diagnosed with COVID-19*. <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/older-adults.html>
- CDC. (2020b). *United States COVID-19 cases and deaths by state over time*. <https://data.cdc.gov/Case-Surveillance/United-States-COVID-19-Cases-and-Deaths-by-State-o/9mfq-cb36>
- Collisa, A., Garimellac, K., Moehringd, A., Rahimiana, M. A., Babalolaf, S., Shattuckh, D., Ecklesa, D., & Arala, S. (2020). *Global survey on COVID-19 beliefs, behaviors, and norms*.
- Czeisler, M. É., Marynak, K., Clarke, K. E. N., Salah, Z., Shykya, I., Thierry, J. M., Ali, N., McMillan, H., Wiley, J. F., Weaver, M. D., Czeisler, C. A., Rajaratnam, S. M. W., & Howard, M. E. (2020). Delay or avoidance of medical care because of COVID-19-related concerns - United States, June 2020. *MMWR. Morbidity and Mortality Weekly Report*, 69(36), 1250-1257. doi:10.15585/mmwr.mm6936a4
- Dula, A. N., Brown, G. G., Aggarwal, A., & Clark, K. L. (2020). Decrease in stroke diagnoses during the COVID-19 pandemic: Where did all our stroke patients go? *JMIR Aging*, 3(2), 1-10. doi:10.2196/21608
- Gallagher, M. W., Zvolensky, M. J., Long, L. J., Rogers, A. H., & Garey, L. (2020). The impact of Covid-19 experiences and associated stress on anxiety, depression, and functional impairment in American adults. *Cognitive Therapy and Research*, 44(6), 1043-1051. doi:10.1007/s10608-020-10143-y
- Garcia, M. A., Homan, P. A., Garcia, C., & Brown, T. H. (2020). The color of COVID-19: Structural racism and the disproportionate impact of the pandemic on older black and Latinx adults. *The Journals of Gerontology: Series B*, 76(3), e75-e80. doi:10.1093/geronb/gbaa114
- Ibuka, Y., Chapman, G. B., Meyers, L. A., Li, M., & Galvani, A. P. (2010). The dynamics of risk perceptions and precautionary behavior in response to 2009 (H1N1) pandemic influenza. *BMC Infectious Diseases*, 10(296), 1-11. doi:10.1186/1471-2334-10-296
- Kim, J. K., & Crimmins, E. M. (2021). Age differences in the relationship between threatening and coping mechanisms and preventive behaviors in the time of COVID-19 in the United States: Protection motivation theory. *Research in Psychotherapy: Psychopathology, Process and Outcome*, 23(3), 239-246. doi:10.4081/ripppo.2020.485
- Lange, S. J., Ritchey, M. D., Goodman, A. B., Dias, T., Twentym, E., Fuld, J., Schieve, L. A., Imperatore, G., Benoit, S. R., Kite-Powell, A., Stein, Z., Peacock, G., Dowling, N. F., Briss, P. A., Hacker, K., Gundlapalli, A. V., & Yang, Q. (2020). Potential indirect effects of the COVID-19 pandemic on use of emergency departments for acute life-threatening conditions — United States, January–May 2020. *American Journal of Transplantation*, 20(9), 2612-2617. doi:10.1111/ajt.16239

- Lau, J. T. F., Griffiths, S., Choi, K. C., & Tsui, H. Y. (2010). Avoidance behaviors and negative psychological responses in the general population in the initial stage of the H1N1 pandemic in Hong Kong. *BMC Infectious Diseases*, 10(1), 139. doi:10.1186/1471-2334-10-139
- Majid, U., Wasim, A., Bakshi, S., & Truong, J. (2020). Knowledge, (mis-)conceptions, risk perception, and behavior change during pandemics: A scoping review of 149 studies. *Public Understanding of Science*, 29(8), 777-799. doi:10.1177/0963662520963365
- Maringe, C., Spicer, J., Morris, M., Purushotham, A., Nolte, E., Sullivan, R., Rachet, B., & Aggarwal, A. (2020). The impact of the COVID-19 pandemic on cancer deaths due to delays in diagnosis in England, UK: A national, population-based, modelling study. *The Lancet Oncology*, 21(8), 1023-1034. doi:10.1016/S1470-2045(20)30388-0
- Matiza, T. (2020). Post-COVID-19 crisis travel behaviour: Towards mitigating the effects of perceived risk. *Journal of Tourism Futures*, doi:10.1108/JTF-04-2020-0063
- Mian, A., & Khan, S. (2020). Coronavirus: The spread of misinformation. *BMC Medicine*, 18(1), 1-2. doi:10.1186/s12916-020-01556-3
- MIT COVID-19 Survey. (2020). *COVID-19 beliefs, behaviors & norms survey*. <https://covidsurvey.mit.edu/>
- Muto, K., Yamamoto, I., Nagasu, M., Tanaka, M., & Wada, K. (2020). Japanese citizens' behavioral changes and preparedness against COVID-19: An online survey during the early phase of the pandemic. *Plos One*, 15(6), 1-18. doi:10.1371/journal.pone.0234292
- Oseran, A. S., Nash, D., Kim, C., Moisuk, S., Lai, P. Y., Pyhtila, J., Sequist, T. D., & Wasfy, J. H. (2020). Changes in hospital admissions for urgent conditions during COVID-19 pandemic. *American Journal of Managed Care*, 26(8), 327-328. doi:10.37765/ajmc.2020.43837
- Pfefferbaum, B., & North, C. S. (2020). Mental health and the Covid-19 pandemic. *The New England Journal of Medicine*, 383(6), 510-512.
- Plohl, N., & Musil, B. (2020). Modeling compliance with COVID-19 prevention guidelines: The critical role of trust in science. *Psychology, Health & Medicine*, 26(1), 1-12. doi:10.1080/13548506.2020.1772988
- Quandt, S. A., Lamonto, N. J., Mora, D. C., Talton, J. W., Laurienti, P. J., & Arcury, T. A. (2020). Covid-19 pandemic among latinx farmworker and nonfarmworker families in north carolina: Knowledge, risk perceptions, and preventive behaviors. *International Journal of Environmental Research and Public Health*, 17(16), 1-17. doi:10.3390/ijerph17165786.
- Roozenbeek, J., Schneider, C. R., Dryhurst, S., Kerr, J., Freeman, A. L. J., Recchia, G., Van Der Bles, A. M., & Van Der Linden, S. (2020). Susceptibility to misinformation about COVID-19 around the world: Susceptibility to COVID misinformation. *Royal Society Open Science*, 7(10), 201199. doi:10.1098/rsos.201199
- Sharma, M., Lioutas, V. A., Madsen, T., Clark, J., O'Sullivan, J., Elkind, M. S. V., Willey, J. Z., Marshall, R. S., Selim, M. H., Greer, D., Tirschwell, D. L., Burton, T., Boehme, A., & Aparicio, H. J. (2020). Decline in stroke alerts and hospitalisations during the COVID-19 pandemic. *Stroke and Vascular Neurology*, 5(4), 403-405. doi:10.1136/svn-2020-000441
- Simon, N. M., Saxe, G. N., & Marmar, C. R. (2020). Mental health disorders related to COVID-19-related deaths. *JAMA - Journal of the American Medical Association*, 324(15), 1493-1494. doi:10.1001/jama.2020.19632
- Wolf, S. H., Chapman, D. A., Sabo, R. T., Weinberger, D. M., Hill, L., & Taylor, D. D. H. (2020). Excess deaths from COVID-19 and other causes, March-July 2020. *JAMA - Journal of the American Medical Association*, 324(15), 1562-1564. doi:10.1001/jama.2020.19545