# Self-harm behaviors before and during the COVID-19 pandemic in a high-risk group

Hillary R. Kingman, Kyle C. Retzer, Ricardo F. Muñoz, Nancy H. Liu, Suzanne Barakat, Yan Leykin

### Abstract

**Aim of the study:** The COVID-19 pandemic has adversely affected the mental health of most populations and communities. This study sought to investigate the impact of COVID-19 on the likelihood of engaging in self-harm behaviors in a high-risk group.

**Material and Methods**: Participants (N = 659) were recruited to a multilingual depression/suicide screener. Counts of self-harm behaviors with intent to die, with ambivalent intent, and with no intent to die were examined during two time periods – mid-COVID-19 (March 15 to July 15 of 2021) and pre-COVID-19 (March 15 to July 15 periods of 2018-9).

**Results:** Regarding self-harm behaviors with the intent to die, pre-COVID-19, men were less likely to self-harm than women, whereas mid-COVID-19, the rates of these behaviors were similar for both genders and higher than pre-COVID-19. Regarding self-harm behaviors with ambivalent intent, a 3-way (cohort*gender*age group) interaction was noted, with younger men reporting fewer behaviors mid-COVID-19 compared to pre-COVID-19 and other men – more such behaviors; for women, these behaviors increased somewhat regardless of age group.

**Discussion:** The COVID-19 pandemic may have altered the pattern and likelihood of engaging in self-harm behaviors. The effect of COVID-19 on these behaviors may be different for men and women, depending on their age and the type of behavior.

**Conclusions:** Providers should be mindful of the potential of self-harming in the pandemic era, especially among those with existing risk factors.

**self-harm; COVID-19; suicide; depression; gender**

## INTRODUCTION

The COVID-19 pandemic has contributed to adverse psychological effects such as increases in

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stress, anxiety, and depressive symptoms [1–3]. The pandemic and measures undertaken to prevent the spread of COVID-19 reduced access to mental health promotion factors and resulted in a loss of mental health resources, including for those in extreme need [1]. Though similar adverse effects were observed in other widely spread disease outbreaks [4], the COVID-19 pandemic is unique in its global spread and ubiquity of protective measures, suggesting that is-

sues seen during previous worldwide disease outbreaks may be even more widespread with COVID-19.

The increase in mental health problems seen in the COVID-19 pandemic differed based on factors such as age and gender [1,2]. Self-harm behaviors are often used for emotion regulation and distress management [5,6], and it is therefore likely that these behaviors were affected by the pandemic. Self-harm varies by age and gender. Adolescents tend to self-harm more than other age groups, and the prevalence decreases markedly with age [7]. Women are more likely than men to report engaging in self-harm; this difference may be more pronounced in clinical samples [8,9]. This gender difference is most apparent in younger samples and decreases dramatically from young adolescence to adulthood [9].

In recent decades, self-harm rates have been increasing for specific groups [10], but not necessarily for community-wide samples [7]. There is evidence that those who have past suicidality are also at higher risk for engaging in self-harm behaviors [11], and past suicide attempts are well understood to be highly potent predictors of future attempts [12]. Additionally, self-harm risk is higher among individuals who are living alone, are unemployed, have relationship difficulties, or mental health challenges [13–16]. Early research also suggests increases in self-harming rates in the general population during the COVID-19 pandemic [17–19], however, other studies show that in some populations a decrease was observed, at least early in the pandemic [20,21]. Reasons for changes in self-harm behaviors vary but may involve the pandemic itself and lockdown restrictions, along with the reduction of health care services, isolation and loneliness, and financial anxiety [18,22]. To reduce and prevent self-harm behaviors, it is important to continue understanding the effect of COVID-19 on these behaviors and to identify specific factors that can contribute to heightened risk; it is even more important to address the needs of high-risk populations, such as those with a history of suicidality.

Therefore, this study aims to determine whether the onset of COVID-19 was associated with changes in the likelihood of engaging in self-harm behaviors, and if so, whether certain factors may have related to these differences.

## MATERIAL AND METHODS

### Participants

Participants were recruited to an online depression/suicide screening study [23] primarily via Google Ads [24]. To control for seasonal differences in self-harm [25], only those recruited between March 15 and July 15 of 2018 and 2019 (pre-COVID-19, n = 457), and March 15 and July 15 of 2021 (mid-COVID-19, n = 202) were analyzed. There were no changes in study design or methods from before to after the onset of the COVID-19 pandemic. Eligible individuals were 18+ years of age and literate in one of the study's languages (Arabic, English, Russian, Spanish). Given our goal of studying a high-risk group, only those reporting lifetime suicidal ideation (via MDE Screener; [26]) and self-harm behaviors in the past year (via SBQ – 14; [27]) were included.

### Measures

Demographics – 1. Participants responded to questions about their age, gender (only those identifying as a man or a woman were included, as the number of individuals who indicated a different gender identity was too small to analyze; pre-COVID-19: n = 25; mid-COVID-19: n = 10), race, country of residence, and zip/postal code.

Demographics – 2. Participants reported their marital status, employment status, number of people in household, and responded to other questions that are not relevant to this report.

The Major Depressive Episode (MDE) Screener [26]. This validated [28,29] measure contains 18 Yes/No items that assess symptoms of depression according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; [30]); both current and past episodes are assessed. The MDE Screener is freely available (https://i4health.paloaltou.edu/downloads/MScreenerEN.pdf).

Suicidal Behavior Questionnaire – 14 (SBQ-14; [27,31]). The SBQ-14 assesses various aspects of suicidality and self-harm. Regarding self-harm, participants first reported (Yes/No) whether they had engaged in any self-harm behaviors in the past year. Those responding Yes were asked

about 10 behaviors (cutting, overdosing, burning, hanging/strangulation, jumping heights, shooting, poisoning, asphyxiating, drowning, stabbing) and "other" behaviors. Participants reported the number of times each behavior was used "with intent to die", "no intent to die", or "ambivalent/not sure", in the past 12 months. Behaviors and intentions that were not marked were assumed to have had 0 instances. Permission for use was obtained from the authors.

Participants also completed other measures that are not part of this report.

## Procedure

This report is a secondary analysis of an ongoing study of depression and suicidality online [23,32,33]. The study procedures have been previously described elsewhere [23]. Briefly, searching for information on depression or suicide on Google may have prompted an ad for the study. Interested individuals clicked on that ad, which took them to the landing page that described the study. Individuals then proceeded to the Demographic questionnaire and, if deemed eligible, completed the Current part of the MDE screener. They were then asked whether they were "just testing" the site or whether their responses were accurate (data from individuals indicating they were "testing" were not analyzed). Individuals then received feedback on their responses and were offered to join a monthly depression rescreening study for 12 months. Interested individuals read and signed the online consent document and completed other study measures, including the Lifetime portion of the MDE screener. If suicidality at any level (ideation or behavior) was reported on the MDE Screener, participants also completed the SBQ-14. The research was approved by the Institutional Review Boards of University of California, San Francisco and Palo Alto University.

## Statistical analyses

Generalized linear models specifying negative binomial distribution were used for analyses. For each model, the dependent variables were counts of behaviors performed with in-

tent to die, with ambivalent intent, and with no intent to die. Age group (see below), gender (man, woman), cohort (pre-COVID-19, mid-COVID-19), and their interactions were the predictors of interest. Non-significant interactions were iteratively removed. Because self-harming rates are considerably higher among young people compared to all other age groups, and because the sample was predominantly younger, age was dichotomized into youngest individuals (18-21 years old) and everyone else (22+ years old). Regarding control variables, relationship status (partnered / not partnered), employment status (employed/unemployed), and living status (living alone / living with others) were included; these variables are known to be related to self-harm [13–15,34] and they were likely to have been affected by the pandemic. Finally, language of recruitment was also added as a control.

## RESULTS

Overall, there were no differences between pre-COVID-19 and mid-COVID-19 cohorts regarding gender (Fisher's Exact Test, $p = .67$), age group (Fisher's Exact Test, $p = .33$), or relationship status (Fisher's Exact Test, $p = .09$). However, participants in the mid-COVID-19 cohort were more likely to live alone (Fisher's Exact Test, $p < .001$) and be unemployed (Fisher's Exact Test, $p < .001$). There were also differences between cohorts in language of recruitment ($X2(3, N = 624) = 163.5$, $p < .001$). See Table 1.

**Table 1.**

|  | Pre-COVID-19 N = 432 | Mid-COVID-19 N = 192 |
|---|---|---|
| Gender % female | 336 (77.8%) | 153 (79.7%) |
| Age groups |  |  |
| 18-21 | 252 (58.3%) | 120 (62.5%) |
| 22+ | 180 (41.7%) | 72 (37.5%) |
| Employed* | 181 (41.9%) | 50 (26.3%) |
| Partnered | 165 (38.2%) | 59 (30.7%) |
| Lives Alone* | 378 (88.7%) | 185 (96.9%) |
| Language* |  |  |
| Arabic | 30 (6.9%) | 98 (51.0%) |

| English | 44 (10.2%) | 18 (9.4%) |
| Spanish | 192 (44.4%) | 48 (25.0%) |
| Russian | 166 (38.4%) | 28 (14.6%) |

Note: * denotes differences between cohorts at p < .05

### Self-harm behaviors performed with intent to die

Mean counts of self-harm behaviors performed with lethal intent were: pre-COVID-19 – 3.16 (SD = 8.13), mid-COVID-19 – 4.56 (SD = 9.48). The three-way (cohort*age*gender) interaction was not significant and was removed. The cohort*gender interaction remained significant (Wald chi-square(1) = 8.70, $p$ = .003). Examining
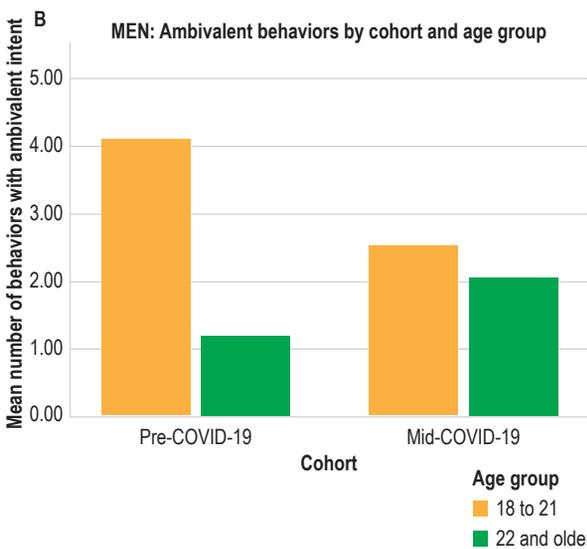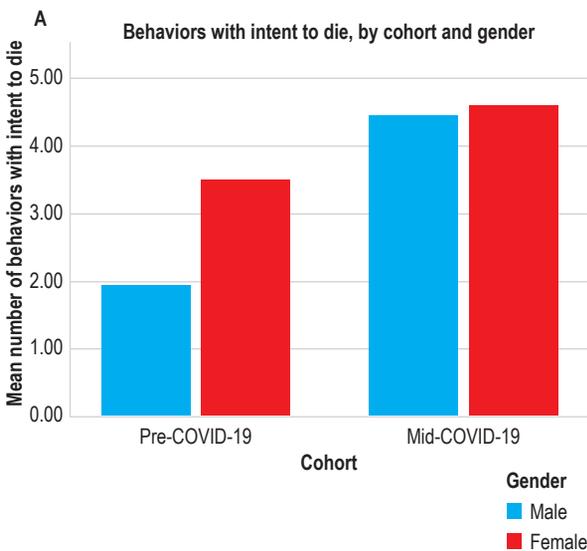


**Figure 1.** Counts of self-harm behaviors, by gender and/or age group.

Figure 1A, it appears that pre-COVID-19, men were less likely to self-harm with lethal intent than women, whereas mid-COVID-19, the rate of these behaviors for both genders were similar as well as higher.

### Self-harm behaviors performed with ambivalent intent

Mean counts of self-harm behaviors performed with ambivalent intent were: pre-COVID-19 – 3.37 (SD = 8.36), mid-COVID-19 – 4.10 (SD = 8.47). A significant 3-way (cohort*age*gender) interaction was found (Wald chi-square(2) = 6.82, $p$ = .009). To better understand the interaction, separate analyses were conducted per gender. For men, the cohort*age interaction was significant (Wald chi-square(1) = 6.43, $p$ = .011), such that young men reported fewer self-harm behaviors mid-COVID-19 compared to pre-COVID-19, whereas men 22+ years of age reported more behaviors (Figure 1B). For women, however, the cohort*age interaction was not significant ($p$ = .11); once removed, the cohort main effect fell just short of significance (Wald chi-square(1) = 3.77, $p$ = .052, OR = .78, 95%CI: .60-1.00), with women in the mid-COVID-19 cohort reporting somewhat more behaviors (3.52 (SD = 7.59) vs 4.57 (SD = 9.08)).

### Self-harm behavior performed with no intent to die

Mean counts of self-harm behaviors performed with no intent to die were: pre-COVID-19 – 5.24 (SD = 9.52), mid-COVID-19 – 4.98 (SD = 10.61). No significant 3-way or 2-way interactions were observed. Though the effect of cohort was significant (Wald chi-square(1) = 4.07, $p$ = .04, OR = .79, 95%CI: .63-.99), the direction of the effect was inconsistent with observed data, suggesting a Simpson's paradox [35] (removing control variables resolved the paradox; other models were similarly tested by removing control variables, and all aforementioned significant effects remained and were consistent with observed data).

## DISCUSSION

Our findings broadly suggest that among high-risk individuals, self-harm behaviors with lethal and ambivalent intent were more prevalent mid-COVID-19 compared to pre-COVID-19, adding further evidence of the deleterious effects of the pandemic on mental health [36]. Additionally, gender and age may play a role in differences in self-harm behaviors between pre- and mid-COVID-19 cohorts.

Self-harm behaviors performed with lethal intent appeared to have increased among both men and women after the onset of COVID-19, with a greater increase found among men. This may be due to the effects of multiple stressors and life events during the pandemic, such as job-related or financial concerns, and an accompanying rise in mental health difficulties [18,36]; this is especially worrying considering that these and other individual factors related to increased self-harm behaviors were exacerbated during COVID-19 [13–16]. Additionally, negative changes in these factors may have been particularly acute amongst men [37]. Combined with initial reports of men being more susceptible to COVID-19 infection [38], it is likely that heightened stressors during mid-COVID-19 may have contributed to this increase in self-harm behaviors with lethal intent.

Although women exhibited a nonsignificant increase in self-harm behaviors with ambivalent intent overall, it appeared that for men, age was a significant factor in the likelihood of using these behaviors. Specifically, behaviors performed with ambivalent intent decreased from pre-COVID-19 to mid-COVID-19 for young men but increased for men of other ages. It is possible that when compared to young men, older men may be particularly more susceptible to financial and employment worries that were evident during the pandemic [39]. For young men, the decrease in these reported behaviors might be considered in the context of the increase in behaviors with lethal intent, that is, it is possible that distress associated with COVID-19 pushed some men into behaviors with more lethal intent.

Finally, prevalence of self-harm behaviors with no intent did not differ between pre- and mid-COVID-19 cohorts. Given the increases in behaviors with lethal and ambivalent intents, it is possible that any increase in self-harm behaviors corresponded with increases in lethality of intent; however, more research is needed to better understand these effects.

Several limitations should be acknowledged. Data were collected via an online depression and suicidality screener and as such, individuals uninterested in their mental health may not be represented. Behaviors in the year 2020 were omitted given that participants were asked about behaviors in the past year. To control for seasonal differences given available data, only certain months were represented; whether self-harm behaviors differed in other months is not known. Individuals whose self-harm behaviors resulted in lethal outcomes are not represented.

This study contributes to the growing literature describing the mental health impact of the COVID-19 pandemic. Mental health and medical professionals should be highly mindful of the potential of self-harming in the pandemic era, and especially among individuals with existing risk factors. Although individuals with a history of self-harm and suicide are already at higher risk for future self-harm behaviors, it appears that the stress of global health crises may have a more deleterious effect on some individuals compared to others. Using this knowledge, clinicians can take preventative measures to minimize the likelihood of self-harm behaviors among individuals deemed to be high-risk based on their past behaviors and their demographics.

*Declaration of interest*
*The authors declare that they have no conflicts of interest.*

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