



## COVID-19 Pandemic, Mental Health Status and Suicide Ideation of Iranian University Students

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### Abstract

**Background:** The COVID-19 pandemic has had far-reaching effects on societies globally, including significant psychological impacts. This study aims to address the research gap by examining the impact of the COVID-19 pandemic on mental health and suicidality among Iranian university students, comparing pre-pandemic and pandemic data.

**Methods:** The data collection for this cross-national study involved 2 sections: pre-pandemic data from 11,515 records of new incoming students in 2019 and post-pandemic data from 27,743 records of students studying in 2020. The data were merged, resulting in a total of 10,240 students for analysis. The instrument used was the "Iranian Mental Health Scale for Students (IMHS).

The variables were compared before and during the pandemic using the McNemar and paired t tests. Multiple linear regression models assessed determinants of mental health, while logistic regression examined predictors of suicidal ideation during COVID-19. Risk factors and protective factors on students' mental health and suicidal thoughts during the pandemic were investigated.

**Results:** The mean mental health score of students during the COVID-19 pandemic was slightly higher than before the pandemic ( $P = 0.001$ ). The number of suicide attempts among students decreased from 23 before the pandemic to 0 during the pandemic. However, the rate of suicidal ideation increased from 10.2% before the pandemic to 16% during the pandemic.

**Conclusion:** Evaluating the mental health of university students is crucial to identifying potential issues early and providing appropriate interventions. Understanding the effects of the pandemic on this vulnerable population can inform strategies for supporting their well-being during these challenging times.

**Keywords:** COVID-19 Pandemic, Mental Health Status, Suicide Ideation, University Students

**Conflicts of Interest:** None declared

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### Introduction

COVID-19 has spread rapidly worldwide, and countries experienced several waves of infection. In addition to res-

piratory disease, COVID-19 has triggered various psychological issues within societies. Governments have responded by implementing quarantine and social distancing

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#### ↑What is "already known" in this topic:

Previous studies have shown that the pandemic crisis has negatively affected the mental health of university students, leading to increased rates of depression, anxiety, and suicidal ideation in this population. However, the precise impact of the COVID-19 pandemic on the mental health and suicidal ideation of Iranian university students has been less studied.

#### →What this article adds:

The results of this article showed that despite a decrease in suicide attempts, the rates of suicidal ideation increased during the pandemic period. The study's findings, which take into account risk and protective variables in crises such as a pandemic era, provide policymakers and administrators with useful guidance on how to manage such a crisis in advance.

Mental health problems can develop among students living close to one another in settings like campuses. For instance, early recognition and swift action by mental health specialists are required in cases of cluster suicide.

measures to curb the spread of the disease. Many people have lost their jobs, leading to financial difficulties. The high number of COVID-19 cases and deaths has created fear and uncertainty. Taken together, these factors have transformed COVID-19 from a mere contagious disease to a full-blown psychosocial crisis.

The negative effects of the COVID-19 pandemic have been studied widely among the general population and different age groups (1). Perceived stress, social support, marital satisfaction, family conflicts, the child's learning stage, and parents' history of mental illness significantly affected parents' anxiety and depression.

Existing pre-COVID mental health problems make people more vulnerable to suffering from anxiety (37%) and depression (25%) than those without such a history (10% and 4%), respectively. Living alone (relative risk [RR], 1.6), family conflict (RR, 2.6), and financial problems (RR, 2.2) make them more vulnerable to depression and anxiety (2).

The more vulnerable population, such as those with severe mental illness, is more likely to exacerbate significant disease (3).

Amid the pandemic, a significant area of concern has been the mental health of university students. According to the 2019 Annual Report by the Center for Collegiate Mental Health (4), most students (62.7% of 82,685 respondents) who completed the Counseling Center Assessment of Psychological Symptoms reported anxiety as their primary issue. Around 75% of mental health conditions that persist throughout a person's lifetime start to develop during their young adult years (2). Generally, university students experience elevated levels of psychological distress, which can lead to adverse academic outcomes even in nonpandemic times (4). Therefore, students' mental health issues are expected to be considered seriously during social crises like pandemics.

The COVID-19 pandemic led to the closure of educational institutions, including universities, and necessitated a shift to online platforms for all teaching and assessment activities. It can lead to an increase in anxiety rate. A study showed that within 4 months of the pandemic's onset, there was a notable increase in the prevalence of moderate to severe anxiety and depression, rising from 18.1% to 25.3% and 21.5% to 31.7%, respectively, compared with pre-pandemic levels (5).

A cross-national study among 9 countries showed that the mental health of university students could be one of the essential subjects of health in the COVID-19 pandemic. The prevalence of high stress, depression, and anxiety symptoms was 61.30%, 40.3%, and 30%, respectively. Female sex, living in urban areas, and junior level of study were risk factors for mental health problems (6). Such a trend is visible among medical students with some differences. A systematic review conducted by Pu Peng et al (2023) (7) revealed that the prevalence among them is much higher than in the general population: depression 41%, anxiety 38%, stress 34%, posttraumatic stress disorder 34%, suicide ideation 15%, and burnout 38%. The unique rectorors were more likely exposed to the viral, being

junior or preclinical students, exposure to COVID-19, academic stress, psychiatric or physical disorders history, fear of education impairment, online learning trouble, loneliness, low physical activity, and young age.

Another study in Iran showed that the prevalence of anxiety and depression among Iranian medical university students was 38.1% and 27.6%, respectively (8).

There are worries about a potential rise in suicide behaviors because of the impact of the pandemic on various aspects of life (5, 8). According to Killgore et al (2020), suicidal thoughts increased among people in lockdown, from 17.6% in April 2020 to 30.7% in June 2020 (9). In 2020, the number of students experiencing suicidal ideation was twice as high as in previous years. Additionally, levels of depression and suicidal thoughts were more significant in 2020 than they were in 2019 and 2016 (10).

Given the heightened vulnerability of university students during the ongoing pandemic, it is crucial to assess their mental health to address any concerns that may arise. Such evaluations can help identify potential issues early, enabling timely and effective interventions to ensure the well-being of this population. So far, Iran experienced 7 waves of the COVID-19 pandemic, and there is a dearth of data about the effects of the COVID-19 pandemic on mental health and suicidality among university students in Iran. To address this research gap, this study aimed to determine the level of COVID-19-related mental health issues and suicide behaviors by comparing prepandemic and pandemic data among Iranian university students.

## Methods

### Design and Participants

The participants were a subsample of a larger sample consisting of students from one of the central universities in Iran. They completed a demographic questionnaire and the "Iranian Mental Health Scale for Students."

### Sample Size and Data Gathering

As part of an annual mental health exam, all incoming freshmen are asked to complete this questionnaire.

The first section of the data contains 11,515 records related to the new incoming students, completed in September/October 2019 (before the COVID-19 pandemic). The second section contains 27,743 records related to the students studying and completed in September/October 2020 (6 months after the start of COVID).

The students' information in each department was recorded separately and based on the year of entry. All data received then; the whole data were matched using SPSS and R software. After merging the data, 10,240 students completed the pre- and post-COVID screening forms. The results reported in this article are related to these students.

### Instrument

The questionnaire, known as the "Iranian Mental Health Scale for Students (IMHS), is a screening scale for students" (11) and consists of 3 sections. The demographics are covered in the first section, the mental health status is evaluated in the second, and information on psychiatric disorders, suicidal thoughts and behaviors, social support,

financial worries, the circumstances surrounding students and their families during the COVID-19 pandemic, and leisure activities are covered in the third section.

The questionnaire has 2 questions related to suicide: the history of suicidal thoughts and attempts. The second section is a 6-point Likert scale with a rating of 0 to 5 (from never to always). The total score ranges from 0 to 100, with higher scores indicating a worse mental health status.

### Statistical Analysis

Categorical data were described using frequencies and percentages, and numeric data were summarized using the mean and standard deviation. A comparison of variables before and after the beginning of the pandemic was done using the McNemar and paired-sample *t* tests. We employed multiple linear regression models to assess the association of determinants variables and mental health during the COVID-19 pandemic. Moreover, multiple logistic regression was used to examine the relationship between independent variables and suicidal ideation. The stepwise selection method was applied for both regression methods to eliminate independent variables that had no significant effect on model fit.  $P < 0.05$  was considered statistically significant for all analyses. IBM SPSS for Windows Version 22.0 (IBM Corp) was used for statistical analyses.

## Results

### Demographic and Psychological Factors

The total number of students who participated in the second stage of the study was 10,240, of whom 4534 were female (44.3%) and 5706 were male students (55.7%). Participants' age ranged from 20 to 56 years (mean age, 28.32 ± 7.38 years) (Table 1).

### Comparison of Psychological Factors Before and After Starting the COVID-19 Pandemic

Tables 2 and 3 compare psychological variables measured before and after the beginning COVID-19 pandemic.

Although the mean students' mental health condition during the COVID-19 pandemic was higher than before the pandemic, the difference was statistically small (Cohen's  $d = 0.44$ ) (Table 2).

Table 1. Description of Demographic and Psychological Factors

Variable	Frequency (%)	
Age	<30	7273 (71.1)
	30-45	2555 (25.0)
	>45	405 (4.0)
Gender	Female	4534 (44.3)
	Male	5706 (55.7)
Educational level	Bachelor	3193 (31.2)
	Masters	5554 (54.2)
	PHD	1493 (14.6)
Marital status	Single	7936 (79.5)
	Married	1985 (19.9)
	Divorced	63 (0.6)

Before the COVID-19 pandemic, 23 students had attempted suicide. However, during the COVID-19 pandemic, no participant attempted suicide. In contrast, the rate of suicidal ideation increased from 10.2% (705) before the pandemic to 16% (1065) during the pandemic ( $P = 0.001$ ) (Table 3). The results also revealed that the percentage of participants who had already been visited by psychiatrists (14.4%) or taken psychiatric medicine (26.8%) increased to 20% and 44.1% during the pandemic, respectively (both,  $P = 0.001$ ) (Table 3).

### Evaluation of Factors Affecting the Mental Health Condition of Students During the COVID-19 Pandemic

Table 4 shows the regression results of the full model as well as the reduced model resulting from the stepwise method when the mental health condition in the COVID-19 era (higher scores indicating worse mental health condition) was set as the dependent variable. Thirteen out of 16 independent variables remained after implementing stepwise selection. The final model indicated that mental health conditions during COVID-19 increased by 0.5 for 1 unit compared to the prepandemic era ( $\beta = 0.50$ ,  $P < 0.001$ ). Those who had suicidal thoughts had a mean mental health state that was higher than that of those who did not ( $\beta = 9.37$ ). Furthermore, a significant increase in the mean mental health score during COVID-19 was observed in those without an intimate relationship in the family ( $\beta = 6.84$ ), those with financial difficulties ( $\beta = 4.47$ ), those who were concerned that their family may be infected with COVID-19 ( $\beta = 4.21$ ), those with a history of psychiatric visits ( $\beta =$

Table 2. Comparison of Mental Health Scores before and after the COVID-19 Pandemic

Mental health score		Mean (SD)	Mean difference	T	P
		Before			
	Before	22.11 (±17.00)	-7.45	-4.64	<0.001
	After	29.56 (±19.55)			

\*Among 10240, 6323 students completed the questionnaire on mental health conditions.

Table 3. Comparison of Psychiatric Visits, Psychiatric Medicine use, and Suicidal Ideation Before and After the COVID-19 Pandemic

			During COVID		P <sub>1</sub>	P <sub>2</sub>	P*
			No	Yes			
Before COVID-19	Psychiatric visit (n=6652)	No	5095 (89.5%)	596 (10.5%)	14.4%	20%	<0.001
		Yes	229 (23.8%)	732 (76.2%)			
Before COVID-19	Taking psychiatric medicines (n=66652)	No	6253 (96.6%)	221 (3.4%)	26.8%	44.1%	<0.001
		Yes	106 (59.6%)	72 (40.4%)			
Before COVID-19	Suicidal Ideation (n=6652)	No	5316 (89.4%)	631 (10.6%)	10%	16%	<0.001
		Yes	271 (38.4%)	434 (61.6%)			

P<sub>1</sub>: The prevalence before COVID-19, P<sub>2</sub>: The prevalence during COVID-19

\*McNemar test

Table 4. The Multiple Linear Regression Results of the Full Model and the Reduced Model Resulted from the Stepwise Method When Mental Health Score was set as a Dependent Variable

	Ref.*	Full Model			Reduced Model		
		B	SE	P	B	SE	P
Mental health before COVID-19	-	0.50	0.012	<0.001	0.50	0.01	<0.001
Suicidal ideation	No	9.42	0.53	<0.001	9.37	0.52	<0.001
Age 30-45	<30	-0.94	0.576	0.102	-1.09	0.52	0.037
Age >45		-3.30	1.299	0.011	-3.39	1.28	0.008
Gender	Male	1.22	0.375	0.001	1.23	0.37	<0.001
Marital status(single)	Married	1.64	0.594	0.006	1.58	0.59	0.007
Grade (Masters)	Bachelor	0.06	0.426	0.885	-	-	-
Grade (Ph.D.)		-0.52	0.703	0.458	-	-	-
Habitation (With family)	Others	-0.88	0.391	0.024	-0.84	0.39	0.031
Interest of major (High)	Low	-6.26	0.649	<0.001	-6.26	0.65	<0.001
Family status (Others)	Intimate and respectful	6.82	0.488	<0.001	6.84	0.49	<0.001
Psychiatric visit (Yes)	No	3.14	0.475	<0.001	3.18	0.47	<0.001
Financial problem (Yes)	No	4.40	0.39	<0.001	4.47	0.39	<0.001
worried about family members getting infected with COVID-19 (Yes)	No	3.81	0.44	<0.001	4.21	0.38	<0.001
worried about yourself getting infected with COVID-19 (Yes)	No	0.83	0.46	0.073	-	-	-
History during COVID-19(Slight)	No	1.26	0.72	0.080	-	-	-
History during COVID-19 (Severe or admitted)	No	2.53	1.24	0.041	-	-	-
History during COVID in the family (Slight)	No	2.50	0.82	0.002	3.17	0.78	<0.001
History during COVID-19 in the family (Severe or admitted)	No	2.79	1.04	0.007	3.28	1.03	<0.001
COVID-19 death (Yes)	No	1.94	0.67	0.004	2.05	0.67	0.002

β: Regression coefficient, SE: Standard error

2.51), those who had a history of infection during the virus (slight,  $\beta = 3.17$ ,  $P < 0.001$  and, severe or admitted,  $\beta = 3.28$ ), a family death experience ( $\beta = 2.050$ ), and those who were single or divorced ( $\beta = 0.59$ ), and among women ( $\beta = 1.23$ ).

Conversely, having an interest in their major ( $\beta = -6.26$ ), being over 45 years ( $\beta = -3.39$ ), and being over 30 to 45 years ( $\beta = -1.09$ ) all had a protective effect on the students' mental health.

### Evaluation of Factors Influencing Student Suicidal Ideation During the COVID-19 Pandemic

Table 5 shows the logistic regression results from the full model and the backward stepwise method when suicidal ideation was set as the dependent variable. Eleven out of 18 independent variables remained after implementing stepwise selection, observable in the final model section.

Those who had previously experienced suicidal ideation were 9.79 times more likely to do so than those who had no prior history of suicidal ideation during the pandemic. Other risk factors for suicidal ideation during the COVID-19 pandemic included not having an intimate family relationship (OR, 1.73), having visited a psychiatrist (OR, 1.93), and having financial difficulties (OR, 1.32).

Studying PhDs (OR, 0.33 [95% CI, 0.23-0.48]) and master's degrees (OR, 0.49), on the other hand, was protective against suicidal ideation during the pandemic compared to a bachelor's degree.

### Discussion

This longitudinal study aimed to assess the impact of the

COVID-19 pandemic on mental health and suicidal ideation in college students. The present study applied a population-specific questionnaire the Iranian Mental Health Scale for Students (IMHS)—to measure students' overall mental health condition. The results showed that the mental health condition of students has worsened, which was in parallel to the frequency of the students taking psychiatric medication and being visited by psychiatrists have been increased. Also, suicidal thoughts increased. In contrast, attempt suicide decreased to zero.

Our results correspond with studies such as a systematic review that showed worsening mental health components, including anxiety, depression, and stress levels (12). The severity of those symptoms is higher during the COVID-19 era as well (13). Several longitudinal studies reported increased depressive and anxiety symptoms during the COVID-19 lockdown compared with the conditions before the restrictions (14-16). Also, a large international study conducted in 40 countries showed that having a history of depression increases the prevalence of depression from 18% to 32%. Additionally, having any mental disorder increases the risk of experiencing anxiety and depression (17).

Our study demonstrated that risk factors for having worse mental health during the COVID-19 pandemic are suicidal ideation, female sex, being single, lacking a supportive family, having a history of psychiatric visits, experiencing financial problems, being worried about family members getting infected with COVID-19, having a family member with a history during COVID-19, and having a family member who died from COVID-19 (Table 4). Lacking intimate relationships, suicide ideation, and financial

Table 5. The Logistic Regression Results of the full and Reduced Models

	Ref.*	P	Full Model			Reduced Model			
			OR	95% C.I.**		P	OR	95% C.I.**	
				Lower	Upper			Lower	Upper
History of suicidal ideation	-	<0.001	9.77	8.03	11.88	<0.001	9.79	8.05	11.90
Age 30-45	<30	0.055	0.96	0.73	1.27	0.576	0.93	0.72	1.20
Age >45		0.584	0.37	0.13	1.02	0.039	0.35	0.13	0.95
Gender	Male	0.444	0.96	0.81	1.12	-	-	-	-
Marital status	Married	<0.001	1.13	0.83	1.53	-	-	-	-
Grade (Masters)	Bachelor	<0.001	.49	0.41	0.59	<0.001	0.49	0.41	0.58
Grade (Ph.D.)		<0.001	.34	0.24	0.49	<0.001	0.33	0.23	0.48
Habitation (With family)	Others	0.213	1.11	0.94	1.32	-	-	-	-
Interest of major (High)	Low	0.884	1.02	0.80	1.30	-	-	-	-
Family status (Others)	Intimate and respectful	<0.001	1.71	1.43	2.04	<0.001	1.73	1.45	2.07
Psychiatric visit (Yes)	No	<0.001	1.92	1.61	2.30	<0.001	1.93	1.61	2.30
Financial problem (Yes)	No	<0.001	1.36	1.15	1.61	<0.001	1.32	1.12	1.56
worried about family members getting infected with COVID-19 (Yes)	No	0.243	0.90	0.74	1.08	-	-	-	-
worried about yourself getting infected with COVID-19 (Yes)	No	0.003	0.74	0.61	0.90	<0.001	0.70	0.58	0.83
History during COVID-19 (Slight)	No	0.411	0.88	0.65	1.19	-	-	-	-
History during COVID-19 (Severe or admitted)	No	0.126	.65	0.37	1.13	-	-	-	-
History during COVID-19 in the family (Slight)	No	0.543	1.11	0.80	1.54	-	-	-	-
History during COVID-19 in the family (Severe or admitted)	No	0.268	0.78	0.49	1.22	-	-	-	-
COVID-19 death (Yes)	No	0.043	1.32	1.01	1.73	0.090	1.25	0.96	1.62
Mental health during COVID-19	-	<0.001	1.04	1.04	1.05	<0.001	1.04	1.04	1.05

\*Reference category

\*\* Confidence Interval for OR

problems were the factors with a more detrimental impact on mental health. Comparable research on Italian and French university students revealed that the degree of depressed and anxious symptoms during the lockdown was substantially correlated with being a woman, having a history of mental problems, having low income, and having poor housing and interpersonal relationships (17, 18). A community-based national study in Iran showed that younger people with an age range of 21 to 40 years are more vulnerable to anxiety (19).

Furthermore, with respect to supportive variables, older age groups exhibited less mental stress than younger ones. This could be because younger age groups tend to worry more intensely about their academic performance, job security, and financial stability.

Furthermore, the older groups may have richer life experiences and reduced expectations. The protective factors emphasize that having more experience in life, having something to make life meaningful (interest in major), and protecting family make students happy and satisfied. A Korean study among the adult population revealed that those with a good understanding of COVID-19 public health measures were less likely to suffer from mental health problems. In contrast, those with a greater risk perception had higher odds of tension and anxiety in addition to sadness and depression (20).

Our study showed that 23 students attempted suicide before COVID-19, but no suicide attempts were reported during the pandemic. In line with this finding, a repeated

cross-sectional survey reported a decrease in the rate of suicide attempts among students after the pandemic (21). This finding contrasts the experience of the influenza epidemic in the United States and Hong Kong in 1918 and 2003, or during the SARS outbreak in China, and during the Ebola infection in Africa, where a high rate of suicide was speculated (22-24). Another interpretation is that social crises could potentially reduce the occurrence of suicide (25) and decrease the incidence of suicidal ideation among those who had suicide ideation before COVID-19. A systematic review showed no increase in the rate of self-harm and attempted suicide in the COVID era (26).

In contrast to our study, 2 cross-sectional studies showed that the rate of students with suicidal ideation reduced after the COVID-19 pandemic (21, 27). Furthermore, the findings of a systematic analysis (2021) on students' suicide ideation during COVID-19 reveal varying rates of suicidal ideation in the studies examined, ranging from 11.4% to 26.7% (14).

Consistent with the results of our study, some previous studies (9, 28) showed an increase in suicidal ideation. The results of a study collected from 5 cohorts (2016-2020) showed that the rate of students suffering from suicidal ideation was 2 times higher in the COVID era (12). Although the results regarding suicidal thoughts are inconsistent, it can be concluded that despite the increase in suicidal thoughts due to high psychological stress and livelihood problems, people with suicidal thoughts may not act in critical situations.

Risk and protective factors have been assessed in our

study since suicidal behaviors are one of the most alarming signs of poor mental health. A history of psychiatric visits, having suicidal thoughts before the pandemic, not having a supportive family, and having financial difficulties are all factors that increase the chance of suicidal ideation (Table 5).

Among those risk factors mentioned above, having a history of suicide ideation has a tremendous negative impact on suicide ideation in the COVID time, which highlights the need to pay attention to the post-COVID-19 era, as it is speculated that after the removal of social restrictions and social disasters, the incidence of suicidal behaviors may increase (8).

However, protective factors from suicide ideation are older age and being in a high education rank like a Ph.D. The same results were yielded in Chinese studies among university students regarding family support and intimacy in the family and financial stability.

In our study, however, students' mental health was considerably protected by their preference for their major and their level of education—a master's or doctoral degree—as opposed to Chinese studies, wherein academic delays were identified as another source of stress (29).

Mental health issues affected senior students more. In Ochnik's study (2021) (6), educational level (first-cycle studies) was a predictor for mental health problems. Comparable results from the study by Pu Peng et al (2023) (7) were observed among senior and preclinical medical students who were at risk of contracting the virus through their regular work.

As per the Ministry of Health report, the suicide rate escalated in the second half of the COVID-19 pandemic, and the study's findings pertain only to the first 6 months of the pandemic (30). Furthermore, research indicates that there has been a rise in suicidal thoughts and behaviors in the post-COVID era and that there have occasionally been modifications to the means of suicide attempts (31-34).

### Conclusion

The COVID-19 pandemic has revealed significant, complex impacts on mental health among Iranian university students, highlighting both increased risks and potential protective factors. Although suicide attempts were notably absent during the pandemic, the rise in suicidal ideation emphasizes the intensified psychological strain students faced.

The long-term implications of this era on mental health remain uncertain, underscoring the need for further research to mitigate the negative effects of COVID-19 on mental health and reduce suicidal ideation. Regularly monitoring the mental health of university students—particularly those vulnerable due to pre-existing mental health issues—in the post-COVID era may help alleviate the lasting effects of the pandemic and lower future suicide risks.

### Authors' Contributions

Mozhgan Taban: Statistical analyses, organization of study data, interpretation of results, revision and critique of the manuscript

Mehrdad Vosoghi: Statistical analysis, interpretation of

results, revision.

Sara Nooraeeen: Research study conception and design, Collecting data, critique of the manuscript.

Marzieh Nojomi: Review of statistical analyses, revision.

Nasrin Mesbah: Critique of the manuscript.

Seyed Kazem Malakouti: Research study conception and design, organization of study data,

review of statistical analyses, interpretation of results, revision, and critique of the manuscript.

### Ethical Considerations

This study has been approved by the Ethics Committee of the Iran University of Medical Sciences (code: IR.IUMS.REC.1401.222). Informed consent was obtained from all participants and they were ensured that their participation in the study was voluntary and their names would not be included in the questionnaire for the confidentiality of the individuals' information. All methods were carried out in accordance with the relevant guidelines and regulations in the manuscript file.

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### Conflict of Interests

The authors declare that they have no competing interests.

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