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**Évolution de la santé mentale des étudiants universitaires français au
décours de la première quarantaine – Etude COSAMe**

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Avant-propos

Cette thèse d'exercice a été réalisée à partir des données de l'enquête COSAMe, un projet porté par le Centre National de Ressources et Résilience (CN2R) en partenariat avec le Fonds Recherche & Innovation de la Fédération Hospitalière de France (FHF) et le Ministère de l'Enseignement Supérieur, de la Recherche et de l'Innovation (MESRI), et promu par la F2RSM. Ce travail a été conduit sous la codirection des Docteurs Marielle Wathelet et Fabien D'Hondt.

Résumé

Introduction. La pandémie de Covid-19 et les mesures sanitaires associées ont eu des conséquences négatives sur la santé mentale des étudiants. L'objectif de cette étude était de décrire l'évolution de la santé mentale des étudiants universitaires français un mois après la levée du premier confinement et d'identifier les facteurs associés à la persistance ou l'aggravation des symptômes au décours de la quarantaine.

Méthodes. Cette étude transversale répétée a été menée auprès des étudiants universitaires lors du premier confinement instauré en France (T1, N = 69 054) et un mois après sa levée (T2, N = 22 361). Tous les étudiants universitaires français ont reçu, par mail, un auto-questionnaire à compléter. Les prévalences des idées suicidaires, de l'anxiété sévère (évaluée par la sous-échelle « état » de l'Inventaire d'anxiété État-Trait), de la dépression sévère (Inventaire de dépression de Beck) et du stress sévère (Échelle de stress perçu) ont été mesurées à T1 et T2. À partir des données longitudinales (étudiants ayant répondu à T1 et à T2, N = 6 361), les facteurs de risque de persistance ou d'aggravation des symptômes ont été identifiés parmi les indicateurs sociodémographiques, économiques, médicaux, de consommation des médias et de soutien social.

Résultats. Les prévalences de stress (21,7%), d'anxiété (22,1%) et de dépression sévère (13,9%) observées un mois après la levée du confinement étaient inférieures à celles observées pendant le confinement (24,7%, 27,5% et 16,1%, respectivement). La prévalence des idées suicidaires a augmenté, passant de 11,4% à 13,1%. Deux facteurs étaient systématiquement associés à la persistance ou l'aggravation des symptômes : un faible sentiment d'intégration (OR [95%CI] = 1,97 [1,58-2,45] pour le stress sévère, 1,94 [1,55-2,42] pour l'anxiété sévère, 1,72 [1,37-2,16] pour la dépression sévère, 2,86 [2,05-3,98] pour les idées suicidaires) et des antécédents de suivi psychiatrique (1,22 [1,03-1,43] pour le stress sévère, 1,30 [1,10-1,53] pour l'anxiété sévère, 1,32 [1,12-1,56] pour la dépression sévère, et 2,08 [1,63-2,65] pour les idées suicidaires).

Conclusion. Les prévalences de stress, d'anxiété et de dépression sévère, bien qu'inférieures à celles mesurées pendant le premier confinement, restaient élevées 1 mois après sa levée et la prévalence des idées suicidaires a augmenté. Ces résultats soulignent l'importance d'une prise en compte urgente de l'impact durable de la pandémie sur la santé mentale des étudiants.

Abstract

Introduction. The Covid-19 related quarantine had negative psychological effects among university students. We aimed at assessing the evolution of students' mental health one month after the lift of the lockdown and identifying factors associated with persistent or worsened symptoms.

Methods. This repeated cross-sectional study collected data during the first quarantine in France (T1, N = 69,054) and one month after its lift (T2, N = 22,361), through an online questionnaire sent to all French university students. Using cross-sectional data, we estimated prevalence rates of suicidal thoughts, severe anxiety (20-item State-Trait Anxiety Inventory, State subscale), depression (13-item Beck Depression Inventory), and stress (10-item Perceived Stress Scale) at T1 and T2. Using longitudinal data (N = 6,361), we identified risk factors of persistent or worsened symptoms among sociodemographic, economic, medical, media consumption, and social support indicators.

Results. We found lower prevalence rates of severe stress (21.7%), anxiety (22.1%), and depression (13.9%) one month after the quarantine compared to the quarantine period (24.7%, 27.5%, and 16.1%, respectively). The prevalence rate of suicidal thoughts increased from 11.4% to 13.1%. Two factors were systematically associated with persistent or worsened symptoms: a low feeling of integration (odds [OR], 1.97; 95% CI, 1.58-2.45; $P < .001$ for severe stress, OR, 1.94; 95% CI, 1.55-2.42, $P < .001$ for severe anxiety, OR, 1.72; 95% CI, 1.37-2.16; $P < .001$ for severe depression, and OR, 2.86; 95% CI, 2.05-3.98; $P < .001$ for suicidal thoughts), and a history of psychiatric follow-up (OR, 1.22; 95% CI, 1.03-1.43; $P = .019$ for severe stress, OR, 1.30; 95% CI, 1.10-1.53; $P = .002$ for severe anxiety, OR, 1.32; 95% CI, 1.12-1.56; $P = .001$ for severe depression, and OR, 2.08; 95% CI, 1.63-2.65; $P < .001$ for suicidal thoughts).

Conclusion. The prevalence rates of severe stress, anxiety, and depression, although being lower than during the first lockdown, remained high after its lift, and the prevalence rate of suicidal ideation increased. This stresses the need to consider the enduring psychological impact of the pandemic on students as a critical public health issue.

Liste des abréviations

95%CI	95% Confidence Interval
BDI	Beck Depression Inventory
Covid-19	Coronavirus Disease 2019
OR	Odds Ratio
PSS	Perceived Stress Scale
STAI Y-2	State-Trait Anxiety Inventory, Trait subscale

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Contexte

Dans la population générale, les étudiants universitaires sont particulièrement vulnérables aux troubles de santé mentale. En France, comme dans de nombreux pays à haut revenu, le suicide est la deuxième cause de décès chez les 15-25 ans (1). Dans une étude menée durant l'année scolaire 2012-2013 auprès de 4 184 étudiants de licence vus lors de la visite médicale obligatoire, 12,6% présentaient des symptômes de dépression et 7,6% des symptômes d'anxiété (2). Dans une enquête nationale menée par l'Observatoire de la vie étudiante en 2016 auprès de 18 875 étudiants universitaires français, 37% des participants déclaraient avoir vécu un épisode de dépression, et 8% avoir eu des pensées suicidaires au cours des 12 derniers mois (3).

Dans ce contexte de pandémie de Covid-19, la vulnérabilité des étudiants universitaires, les perturbations dans la provision de soins de santé mentale au sein d'une population déjà peu susceptible d'y accéder (4–6), et les conséquences sociales et économiques des mesures sanitaires renforçant isolement et précarité (6–8) ont généré de fortes inquiétudes quant à la santé mentale des étudiants. Les premiers résultats des études menées en Chine ont rapidement confirmé ces inquiétudes : au cours de la phase initiale de l'épidémie de COVID-19, Wang et al. ont constaté que les étudiants en Chine étaient plus à risque de stress, d'anxiété et de dépression en réponse à l'épidémie de COVID-19 que les adultes plus âgés (9).

C'est dans ce contexte que le Centre National de Ressources et Résilience (CN2R) a mis en place l'étude transversale répétée COSAMe (Conséquences de la pandémie sur la Santé Mentale des étudiants), interrogeant les étudiants universitaires français à divers moments de la période pandémique. Un premier temps de mesure a été réalisé durant le premier confinement général (10), un deuxième à un mois de sa levée.

Introduction

On March 17, 2020, the French government mandated a quarantine on its territory, as many other countries did. This lockdown forbade all nonessential movements to limit the spread of the Covid-19 pandemic and lasted 8 weeks until May 11, 2020. If quarantine is one of the oldest tools to control contagious diseases, evidence from previous epidemics suggests that it also has a negative impact on the mental health of the population (11).

The negative psychological effects of the Covid-19 pandemic and related quarantine were rapidly confirmed (9), notably in university students, whose vulnerability to mental health problems is well-known (12). In France, the first measurement time (T1) of the repeated cross-sectional COSAMe study, conducted during the first lockdown period (from April 17 to May 4, 2020), revealed high prevalence rates of severe self-reported stress (24.7%), anxiety (27.5%), depression (16.1%), and suicidal thoughts (11.4%) among the 69,054 French university students who responded to the survey (10). Recently, a French study found that students reported more frequently perceived stress (33.1% vs 22.1%), anxiety (24.0% vs 14.7%), and depressive symptoms (32.5% vs 16.2%), as well as suicidal thoughts (11.7% vs 7.6%) than non-students during this period (13).

Evidence from previous epidemics suggests that negative psychological effects of quarantine measures can last or even worsen after the quarantine lift (11). However, no study has addressed the delayed repercussions on suicidal behavior, despite growing concerns about this issue (14,15). To the best of our knowledge, only one study assessed mental health after the lift of a Covid-19 related quarantine (16). This study was conducted in the Chinese general population two months after the end of the quarantine and found that 52.1% and 45.7% of participants reported anxiety and depression symptoms, respectively. These prevalence rates, while being lower than those measured during the quarantine period (9), were still higher than estimates

obtained outside any pandemic context (17,18). However, in this study, the authors used different samples to compare prevalence rates after and during or before quarantine, which strongly limits their interpretation.

The present study used data from the COSAMe survey, including those collected during the second measurement interval (T2) one month after the first quarantine was lifted (from June 15 to July 15, 2020), with the aim of: (i) measuring changes in prevalence rates of self-reported mental health symptoms (stress, anxiety, depression and suicidal thoughts) using repeated cross-sectional data, and (ii) identifying factors associated with persistence or worsening of mental health symptoms using longitudinal data.

Methods

Study design and study population

To promote student participation at each measurement interval of the COSAMe survey, the French Ministry of Higher Education, Research, and Innovation asked all 82 French universities to offer their students the opportunity to complete an online questionnaire sent by email. The eligibility criteria were being a university student and having resided in France during the first lockdown. Students who answered both T1 and T2 were linked using a pseudonymization method.

This study was approved by a French research ethics committee, the *Comité de Protection des Personnes Ile de France VIII*, before its initiation. The protocol of COSAMe and detailed results of T1 have been published elsewhere (10).

Data collected

We focused on the following 4 outcomes, collected at T1 and T2: (i) suicidal thoughts, by asking participants whether they had experienced suicidal thoughts during the preceding month, (ii) depression, using the 13-item Beck Depression Inventory (BDI-13), (iii) anxiety, through the 20-item State-Trait Anxiety Inventory, State subscale (STAI Y-2), and (iv) stress, using the Perceived Stress Scale (PSS-10). Outcomes were the presence of severe self-reported symptoms, i.e., the presence of suicidal thoughts or a high score on at least 1 scale, as defined in the literature (i.e., PSS-10 >26; BDI-13 >15; or STAI-Y2 >55).

Regarding covariates, we considered (i) sociodemographic characteristics (gender, year of study, being a foreign student, living area, living in a worst-hit department), (ii) economic indicators (housing quality, loss of income due to quarantine), (iii) health-related information (history of

psychiatric follow-up, symptoms consistent with COVID-19 since the beginning of the pandemic, and physical activity during the quarantine), (iv) media or information data (consumption of media information related to the pandemic in minutes per day and perceived quality of information received), and (v) social support indicators (feeling socially integrated before the quarantine, having children, housing composition during the quarantine, concern for relatives' health, quality of perceived social relationships during the quarantine).

Statistical analysis

Only fully completed questionnaires were analyzed. The statistical analyses were conducted in three stages.

The first analysis described the crude prevalence rates of mental health outcomes at each measurement time as the number of prevalent cases divided by the total number of respondents. Gender- and degree-standardized prevalence rates were calculated using the University Students population 2019-2020 published by the French Ministry of National Education (19). These standardized rates were calculated excluding non-binary students since there is no available information regarding their proportion among students.

The second analysis assessed the association between quarantine and mental health outcomes. Bivariate analyses using Chi-2 tests compared proportions of mental health disorders at T2 (after quarantine) and T1 (during quarantine). Then, we carried out logistic regression models to assess the impact of no longer being quarantined (T2 vs T1) on mental health, after adjustment for all covariates described in the previous section.

In the third analysis, only students who answered both T1 and T2 questionnaires were considered. We estimated the proportion of students whose mental health did not improve one month after being lifted from quarantine and identified factors associated with persistence or worsening of mental health symptoms. We performed multivariate logistic regression models for

each outcome. For stress, anxiety, and depression, the dependent variable was a score difference (T2 score - T1 score) greater than or equal to 0. For suicidal thoughts, we considered the presence of suicidal ideation at T2, preceded or not by suicidal ideation at T1. Models were adjusted for all covariates, including mental health status at baseline (score at T1 for stress, anxiety, and depression, or presence of suicidal thoughts at T1 for suicidal thoughts). Moreover, associations between suicidal ideation at T2 and persistence or worsening of other symptoms have also been studied using Chi-square tests.

Data analysis was performed using R version 3.4.2. The significance level was set at $\alpha = 0.05$ and all tests were 2-tailed. Results of regression models are presented as adjusted prevalence odds ratios and 95% confidence intervals (aOR [95%CI]).

Results

Repeated cross-sectional data

A total of 69,054 students fully completed the questionnaire at T1 and 22,361 at T2. Among them, 6,361 answered at both T1 and T2. The vast majority of the sample was made up of bachelor students at both T1 and T2 (80.4% and 77.4%, respectively). Women were over-represented whatever the degree (72.8% at T1, 72.5% at T2), and more than half of the sample were female bachelor students (59.5% at T1, and 57.3% at T2). Non-binary students represented 1.8% of the sample at T1 (N=1,234), and 1.5% at T2 (N = 331).

Crude and standardized prevalence rates are described in **Table 1**. A significant ($p < 0.001$) lower proportion of severe self-reported stress, anxiety and depression was measured at T2 (standardized prevalence rates [95%CI] at 20.1% vs 22.4%, 20.8% vs 25.5%, and 12.6% vs 14.3%, respectively). However, the proportion of suicidal thoughts increased (12.2% vs 10.6%, $p < 0.001$).

Table 1: Crude and adjusted prevalence rates of mental health outcomes at T1 and T2 in the whole sample (n=69,054 at T1; n=22,361 at T2) and detailed prevalence rates according to gender and degree

	Characteristics		Mental health outcomes								
	Target population	Study sample		Stress (PSS >26)		Anxiety (STAI-Y2 >55)		Depression (BDI >15)		Suicidal thoughts	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
Crude prevalence rate [95%CI] <i>including non-binary students</i>	N = 69,054	N = 22,361	24.7 [24.4-25.1]	21.7 [21.2-22.3]	27.5 [27.1-27.8]	22.1 [21.5-22.6]	16.1 [15.8-16.4]	13.9 [13.5-14.4]	11.4 [11.2-11.7]	13.1 [12.7-13.6]	
Crude prevalence rate [95%CI] <i>excluding non-binary students</i>	N = 68,270	N = 22,030	24.5 [22.2-24.8]	21.4 [20.9-22.0]	27.2 [26.9-27.5]	21.7 [21.2-22.3]	15.8 [15.5-16.1]	13.6 [13.2-14.1]	11.0 [10.8-11.2]	12.7 [12.2-13.1]	
Adjusted prevalence rate [95%CI]	N = 1,635,350	N = 68,270	22.4 [22.0-22.7]	20.1 [19.5-20.6]	25.5 [25.1-25.8]	20.8 [20.2-22.3]	14.3 [14.0-14.6]	12.6 [12.1-13.0]	10.6 [10.3-10.8]	12.2 [11.7-12.6]	
Bachelor, n (%)											
Men	423,923 (25.9)	14,285 (20.9)	4,435 (20.1)	2,066 (14.5)	632 (14.2)	2,350 (16.4)	646 (14.5)	1,708 (11.9)	513 (11.6)	1,428 (10.0)	512 (11.5)
Women	573,542 (35.1)	40,633 (59.5)	12,630 (57.3)	11,464 (28.2)	2,989 (23.7)	12,410 (30.5)	2,977 (23.6)	7,374 (18.1)	1,959 (15.5)	4,755 (11.7)	1,706 (13.5)
Master, n (%)											
Men	234,829 (14.3)	3,273 (4.8)	1,197 (5.4)	516 (15.8)	169 (14.1)	652 (19.9)	212 (17.7)	341 (10.4)	119 (9.9)	300 (9.2)	132 (11.0)
Women	347,872 (21.3)	8,670 (12.7)	3,169 (14.4)	2,420 (27.9)	808 (25.5)	2,816 (32.5)	826 (26.0)	1,261 (14.5)	364 (11.5)	879 (10.3)	382 (12.0)
Doctorate, n (%)											
Men	28,365 (1.7)	461 (0.7)	189 (0.8)	58 (12.6)	25 (13.2)	79 (17.1)	31 (16.4)	35 (7.6)	13 (6.9)	55 (11.9)	14 (7.4)
Women	26,819 (1.6)	948 (1.4)	410 (1.9)	197 (20.8)	97 (23.6)	271 (28.6)	97 (23.6)	82 (8.6)	41 (10.0)	93 (9.8)	46 (11.2)

After adjustment, identical patterns were identified (**Table 2**): no longer being quarantined (T2 vs T1) was significantly associated with a lower risk of severe self-reported stress (OR [95%CI] = 0.80 [0.77-0.83]), anxiety (0.78 [0.74-0.82]) and depression (0.78 [0.74-0.82]). However, it was associated with a significantly higher risk of suicidal thoughts (1.14 [1.08-1.19]).

Table 2: Association between no longer being quarantined (T2 versus T1) and mental health outcomes, in the global and the paired samples: results of bivariate and multivariate analyzes

	Stress (PSS >26)	Anxiety (STAI-Y2 >55)	Depression (BDI >15)	Suicidal thoughts
Global sample				
Crude OR [95%CI]	0.84 [0.81-0.87]	0.75 [0.72-0.77]	0.84 [0.81-0.88]	1.17 [1.12-1.23]
Adjusted OR [95%CI]	0.80 [0.77-0.83]	0.78 [0.74-0.82]	0.78 [0.74-0.82]	1.14 [1.08-1.19]
Paired sample				
OR [95%CI]	0.83 [0.76-0.90]	0.85 [0.78-0.92]	0.96 [0.87-1.06]	1.10 [0.99-1.23]

Longitudinal data

Mental health outcomes at T1 and T2

When considering only the students who answered both T1 and T2, we found similar prevalence rates of mental health outcomes to those observed in the full sample. At T1, among the 6,361 students who both answered T1 and T2, 798 (12.5%) reported suicidal thoughts, 1,656 (26.0%) severe stress, 1,665 (26.2%) severe anxiety, and 937 (14.7%) severe depression. At T2, they were 871 (13.7%), 1,436 (22.6%), 1,470 (23.1%), 905 (14.2%), respectively. For the association between the lift of quarantine and mental health outcomes, patterns were similar to those found in the overall sample, although not significant for depression and suicidal thoughts (**Table 2**).

Factors associated with persistence or worsening of mental health symptoms

Among students who answered both T1 and T2, 4,762 (74.9% [73.8%-75.9%]) stabilized or worsened at least one type of symptoms at T2: 2,888 (45.4% [44.2%-46.6%]) showed stabilized or worsened stress level, 2,972 (46.7% [45.5%-47.9%]) showed stabilized or worsened anxiety and 3,170 (49.8% [48.6%-51.1%]) showed stabilized or worsened depression. Suicidal thoughts persisted or appeared at T2 for 871 (13.7% [12.9%-14.6%]) students.

Factors associated with persistence or worsening of the mental health outcomes are presented in **Table 3**. Excepted mental health status at baseline, two factors were significantly associated with all poor mental health outcomes at T2: a low feeling of integration (aOR [95%CI] from 1.72 [1.37-2.16], $p < 0.001$ for depression, to 5.76 [4.48-7.72], $p < 0.001$ for suicidal thoughts), and history of psychiatric follow-up (from 1.22 [1.03-1.43], $p = 0.019$ for stress, to 3.42 [2.84-4.11], $p < 0.001$ for suicidal thoughts).

Female and non-binary students were at higher risk of persistent or worsening stress levels and suicidal thoughts at T2 than male students (1.18 [1.04-1.35], $p = 0.011$ and 1.30 [1.02-1.68], $p = 0.037$ for women, respectively; 1.60 [1.05-2.43], $p = 0.001$ and 1.88 [1.02-3.43], $p = 0.042$ for non-binary students, respectively). A high level of concern for relatives' health was at risk of not reducing stress (1.22 [1.05-1.43], $p = 0.010$) or anxiety level (1.17 [1.00-1.37], $p = 0.045$) at T2. Low quality of social ties during quarantine was significantly at risk of persistent or worsened depression (1.18 [1.00-1.38], $p = 0.044$, for low quality) and medium quality of social ties was at risk of persistent or emerging suicidal thoughts (1.47 [1.18-1.84], $p < 0.001$). Having experienced symptoms consistent with COVID-19 was significantly associated with persistent or worsened stress, anxiety, and depression (1.33 [1.17-1.51], $p < 0.001$, 1.25 [1.10-1.42], $p < 0.001$ and 1.15 [1.01-1.30], $p = 0.029$, respectively). The year of study was significantly associated with worsening anxiety and depression, but patterns were unclear.

The occurrence or persistence of suicidal thoughts was also associated with loss of income, being a foreign student, and media consumption. A loss of income was associated with an increased risk (1.29 [1.01-1.65], $p = 0.045$), whereas being a foreign student was protective (0,50 [0,27-0,89], $p = 0.023$). Regarding media consumption, compared to students who declared watching the news less than 15 minutes per day, those who reported spending 15 to 29 (0.69 [0.51-0.93], $p = 0.014$) or 30 to 59 minutes per day (0.72 [0.54-0.95], $p = 0.020$) were less likely to have suicidal thoughts at T2.

Table 3: Factors associated with stabilized or worsened mental health outcomes at T2 (n = 6,361): results of the multivariate logistic regression models

	Characteristics N (%)	PSS score change [†] ≥ 0		STAI-Y2 score change [†] ≥ 0		BDI score schange [†] ≥ 0		Remaining or emerging suicidal thoughts	
		aOR [95%CI] [‡]	p [§]	aOR [95%CI]	p [§]	aOR [95%CI]	p [§]	aOR [95%CI]	p [§]
Baseline mental health status [¶]		0.93 [0.92-0.94]	<0.001	0.96 [0.96-0.97]	<0.001	0.92 [0.91-0.93]	<0.001	34.2 [27.7-42.3]	<0.001
Demographic characteristics									
Gender			0.010		0.353		0.258		0.037
Male	1,446 (22.7)	ref		ref		ref		ref	
Female	4,809 (75.6)	1.18 [1.04-1.35]	0.011	1.05 [0.93-1.19]	0.438	1.11 [0.98-1.26]	0.101	1.30 [1.02-1.68]	0.037
Non-binary	106 (1.7)	1.60 [1.05-2.43]	0.028	0.80 [0.52-1.23]	0.314	1.11 [0.73-1.68]	0.623	1.88 [1.02-3.43]	0.042
Year of study			0.078		0.027		0.034		0.316
First	2,613 (41.1)	ref		ref		ref		ref	
Second or third	2,265 (35.6)	0.94 [0.83-1.05]	0.272	1.00 [0.89-1.12]	0.984	0.91 [0.81-1.03]	0.138	1.04 [0.83-1.30]	0.723
Fourth or fifth	1,286 (20.2)	1.07 [0.92-1.23]	0.390	1.19 [1.03-1.38]	0.017	1.13 [0.98-1.30]	0.100	0.90 [0.68-1.20]	0.490
Sixth or greater	197 (3.1)	1.34 [0.98-1.83]	0.072	1.33 [0.98-1.82]	0.070	1.09 [0.80-1.50]	0.575	0.61 [0.32-1.11]	0.118
Foreign student (Yes vs No)	217 (3.4)	1.10 [0.82-1.48]	0.510	1.11 [0.83-1.50]	0.470	1.31 [0.97-1.76]	0.074	0.50 [0.27-0.89]	0.023
Department of residence affected (Yes vs No)	1,852 (29.1)	1.11 [0.99-1.25]	0.083	1.04 [0.93-1.17]	0.515	0.97 [0.86-1.08]	0.548	1.03 [0.83-1.28]	0.769
Area			0.310		0.684		0.846		0.620
Urban	2,919 (45.9)	ref		ref		ref		ref	
Semiurban	1,671 (26.3)	1.10 [0.97-1.26]	0.141	1.05 [0.93-1.20]	0.427	1.04 [0.91-1.18]	0.564	1.08 [0.85-1.38]	0.523
Rural	1,771 (27.8)	1.02 [0.89-1.16]	0.793	1.00 [0.88-1.14]	0.980	1.01 [0.89-1.16]	0.826	0.95 [0.73-1.23]	0.691
Precariousness indicators									
Loss of income (Yes vs No)	1,069 (16.8)	1.12 [0.97-1.29]	0.115	1.02 [0.88-1.17]	0.795	1.07 [0.93-1.22]	0.376	1.29 [1.01-1.65]	0.045
Housing quality (rated out of 10)			0.683		0.220		0.122		0.837
High (7-10)	5,515 (86.7)	ref		ref		ref		ref	
Medium (4-6)	707 (11.1)	1.08 [0.91-1.28]	0.389	1.09 [0.92-1.30]	0.322	0.98 [0.83-1.17]	0.841	0.92 [0.68-1.23]	0.585
Low (0-3)	139 (2.2)	1.05 [0.73-1.50]	0.806	0.78 [0.54-1.13]	0.194	0.68 [0.47-0.98]	0.042	0.91 [0.50-1.63]	0.754

	Characteristics N (%)	PSS score change [†] ≥ 0		STAI-Y2 score change [†] ≥ 0		BDI score schange [†] ≥ 0		Remaining or emerging suicidal thoughts	
		aOR [95%CI] [‡]	p [§]	aOR [95%CI]	p [§]	aOR [95%CI]	p [§]	aOR [95%CI]	p [§]
Social data									
Having children (Yes vs No)	70 (1.1)	0.99 [0.60-1.63]	0.962	1.37 [0.84-2.26]	0.210	1.30 [0.79-2.17]	0.297	0.96 [0.31-2.47]	0.934
Housing arrangement			0.137		0.365		0.433		0.485
Living with family	5,276 (82.9)	ref		ref		ref		ref	
Living alone	775 (12.2)	1.15 [0.97-1.37]	0.117	1.11 [0.93-1.32]	0.248	1.13 [0.95-1.34]	0.174	1.06 [0.78-1.45]	0.694
Living with roommates	226 (3.6)	1.20 [0.90-1.60]	0.211	1.21 [0.91-1.60]	0.193	0.98 [0.74-1.30]	0.878	1.43 [0.85-2.35]	0.164
Other	84 (1.3)	1.44 [0.91-2.27]	0.118	1.22 [0.78-1.92]	0.385	1.25 [0.79-1.97]	0.338	1.38 [0.62-2.89]	0.414
Feeling of integration (rated ou of 10)			<0.001		<0.001		<0.001		<0.001
High (7-10)	4,037 (63.5)	ref		ref		ref		ref	
Medium (4-6)	1,885 (29.6)	1.36 [1.20-1.53]	<0.001	1.49 [1.32-1.69]	<0.001	1.42 [1.26-1.61]	<0.001	1.94 [1.57-2.40]	<0.001
Low (0-3)	439 (6.9)	1.97 [1.58-2.45]	<0.001	1.94 [1.55-2.42]	<0.001	1.72 [1.37-2.16]	<0.001	2.86 [2.05-3.98]	<0.001
Concern for relatives' health (rated out of 10)			0.013		0.036		0.055		0.732
Low (0-3)	1,044 (16.4)	ref		ref		ref		ref	
Medium (4-6)	2,050 (32.2)	1.07 [0.91-1.25]	0.402	1.02 [0.87-1.19]	0.794	1.16 [1.00-1.35]	0.053	1.11 [0.82-1.49]	0.505
High (7-10)	3,267 (51.4)	1.22 [1.05-1.43]	0.010	1.17 [1.00-1.37]	0.045	1.03 [0.88-1.20]	0.727	1.12 [0.84-1.49]	0.444
Quality of social ties (rated out of 10)			0.783		0.997		0.025		0.002
High (7-10)	2,853 (44.9)	ref		ref		ref		ref	
Medium (4-6)	2,482 (39.0)	0.99 [0.88-1.11]	0.893	1.00 [0.89-1.12]	0.955	0.95 [0.85-1.06]	0.355	1.47 [1.18-1.84]	<0.001
Low (0-3)	1,026 (16.1)	1.05 [0.89-1.23]	0.560	0.99 [0.85-1.17]	0.948	1.18 [1.00-1.38]	0.044	1.24 [0.94-1.63]	0.124

	Characteristics N (%)	PSS score change [†] ≥ 0		STAI-Y2 score change [†] ≥ 0		BDI score change [†] ≥ 0		Remaining or emerging suicidal thoughts	
		aOR [95%CI] [‡]	p [§]	aOR [95%CI]	p [§]	aOR [95%CI]	p [§]	aOR [95%CI]	p [§]
Media and information									
Time spent consulting information (in min/d)			0.216		0.166		0.310		0.007
<15	2,353 (37.0)	ref		ref		ref		ref	
15-29	1,114 (17.5)	0.88 [0.76-1.02]	0.099	0.98 [0.84-1.14]	0.799	0.96 [0.83-1.12]	0.627	0.69 [0.51-0.93]	0.014
30-59	1,344 (21.1)	0.95 [0.82-1.09]	0.471	0.92 [0.80-1.06]	0.266	0.94 [0.82-1.08]	0.387	0.72 [0.54-0.95]	0.020
60-119	1,072 (16.9)	0.93 [0.79-1.08]	0.329	0.83 [0.71-0.96]	0.016	0.90 [0.78-1.05]	0.195	1.04 [0.78-1.38]	0.780
≥120	478 (7.5)	1.12 [0.91-1.39]	0.274	0.90 [0.73-1.11]	0.343	1.14 [0.92-1.40]	0.232	1.17 [0.81-1.68]	0.388
Quality of information received (rated out of 10)			0.081		0.138		0.816		0.856
High (7-10)	2,460 (38.7)	ref		ref		ref		ref	
Medium (4-6)	2,907 (45.7)	1.11 [0.99-1.24]	0.069	1.05 [0.93-1.17]	0.439	1.00 [0.90-1.12]	0.955	1.06 [0.85-1.32]	0.606
Low (0-3)	994 (15.6)	1.17 [1.00-1.37]	0.053	1.17 [1.00-1.37]	0.046	1.05 [0.90-1.23]	0.546	1.06 [0.80-1.41]	0.676
Health-related data									
History of psychiatric follow-up (Yes vs No)	777 (12.2)	1.22 [1.03-1.43]	0.019	1.30 [1.10-1.53]	0.002	1.32 [1.12-1.56]	0.001	2.08 [1.63-2.65]	<0.001
Symptoms consistent with COVID-19 (Yes vs No)	1,404 (22.1)	1.33 [1.17-1.51]	<0.001	1.25 [1.10-1.42]	<0.001	1.15 [1.01-1.30]	0.029	1.17 [0.94-1.46]	0.157
Duration of physical activity (in min/d)			0.107		0.239		0.239		0.337
≥60	1,896 (29.8)	ref		ref		ref		ref	
30-59	1,828 (28.7)	0.86 [0.75-0.98]	0.028	0.95 [0.83-1.08]	0.416	0.94 [0.82-1.08]	0.377	0.93 [0.71-1.21]	0.580
15-29	1,203 (18.9)	0.89 [0.77-1.04]	0.144	0.91 [0.78-1.06]	0.249	0.96 [0.82-1.12]	0.585	1.20 [0.90-1.60]	0.207
<15	1,434 (22.5)	0.98 [0.84-1.13]	0.760	0.86 [0.74-1.00]	0.044	0.86 [0.74-0.99]	0.043	1.08 [0.82-1.41]	0.594

[†] T2 score - T1 score

[‡] aOR [95%CI] = adjusted odd ratio [95% confidence interval]

[§] For each variable, the p-value opposite the name of the variable refers to its global effect, and when applicable, p-value referring to each category vs reference are also presented

[¶] Baseline score for stress, anxiety, and depression; suicidal thoughts at T1 for remaining or emerging suicidal thoughts

Association between suicidal ideation and other mental health outcomes

Finally, the prevalence rates of occurrence or persistence of suicidal thoughts were significantly higher in students whose symptoms did not regress at T2 (**Table 4**). Between 15.9% and 17.1% of the students showing persistent or worsened other mental health symptoms reported suicidal thoughts at T2, versus 10.8% to 11.5% among students showing regression.

Table 4: Association between suicidal thoughts and evolution of symptoms of stress, anxiety, and depression at T2: results of the bivariate analyses.

	PSS score change [†] ≥ 0		STAI-Y2 score change [†] ≥ 0		BDI score schange [†] ≥ 0	
	Yes N = 2,888	No N = 3,473	Yes N = 2,972	No N = 3,389	Yes N = 3,170	No N = 3,191
Remaining or emerging suicidal thoughts at T2						
Yes	495 (17.1)	376 (10.8)	478 (17.1)	393 (11.0)	504 (15.9)	367 (11.5)
No	2,393 (82.9)	3,097 (89.2)	2,314 (82.9)	3,176 (89.0)	2,666 (84.1)	2,824 (88.5)
p	<0.001		<0.001		<0.001	

[†] T2 score - T1 score

Discussion

This study revealed lower prevalence rates of severe symptoms of stress (21.7%), anxiety (22.1%), and depression (13.9%) among university students one month after the COVID-19 related quarantine was lifted in France when compared to the quarantine period (24.7%, 27.5%, and 16.1% for severe self-reported stress, anxiety, and depression, respectively). Conversely, the prevalence rate of suicidal thoughts increased from 11.4% of the students during the quarantine, to 13.1% one month after the quarantine was ended. Overall, two factors, which had already been identified as risk factors for mental health disorders during the quarantine (10), were significantly associated with the persistence or worsening of both suicidal ideation and severe mental health symptoms (anxiety, depression, and stress) one month after the COVID-19 related quarantine was lifted: a low feeling of integration, and a history of psychiatric follow-up.

Regarding anxiety and depression, our results are consistent with the decrease in prevalence rates obtained by Lu et al. (2020) in the only study that compared prevalence rates of mental health symptoms during and after a Covid-19 related lockdown period, although using different samples (16). In line with the particular vulnerability of the university student population to the psychological impact of the quarantine, we found higher prevalence rates of severe self-reported symptoms of anxiety and depression (22.1% and 13.9%, respectively) than Lu et al. (6.3% and 6.8%, respectively) who conducted their study in the Chinese general population. Importantly, although these prevalence rates were lower one month after than during the lockdown, they remained higher than before the Covid-19 pandemic. Indeed, a study involving 4,184 French undergraduate university students in 2017 reported prevalence rates of 12.6% and 7.6%, for depression and anxiety, respectively (2).

Regarding suicidal ideations, several studies found high rates of suicidal ideations during Covid-19 related quarantine (10,20) but the present study is the first to assess and to show increased

suicidal ideation after a quarantine lift. This result is in line with observations made by the *French Institute of Public Opinion* (IFOP), which found that 17% of the participants with lifetime suicidal ideations reported having experienced them after the quarantine, compared to 11% during the quarantine (overall 20% of the sample reported lifetime suicidal ideation) in a survey of 2,000 participants, representative of the French population aged 18 and over, carried out in September 2020 (21). Importantly, we found more frequent suicidal ideations among students who reported persistent or worsening of other mental health symptoms after the lift of the quarantine, which is consistent with the high prevalence of suicidal ideations in people affected by psychiatric symptoms and disorders (22), including during pandemic crises (23). Loss of income, feeling of integration, and quality of social ties, which are well-documented predisposing factors for suicide (8,22) were also significantly associated with an increased risk of reporting suicidal thoughts after quarantine.

Considering that stressful life events, including natural disasters, precede many suicides and suicide attempts (22) and because suicidal ideation is an indicator of future suicide attempts, psychiatric disorders, and global impaired functioning (24–27), particular attention should be paid to the high prevalence rates of suicidal ideation in the student population during the Covid-19 pandemic. Moreover, recent estimations predict an increase in the number of suicides based on the expected number of job losses due to COVID-19 (8). Several recommendations have been formulated using examples from countries that have efficiently broken the link between unemployment and suicide rates and notably to promote: (i) access to secondary prevention (treat disorders such as depression), (ii) active labor market programs, and (iii) gender equality in the workplace (7).

Limitations

Some limitations should be considered in the interpretation of these results. First, although the number of respondents is large, it represents 4.2% of French university students at T1 and 1.3% at T2. Caution is therefore necessary before generalizing these results. Nevertheless, this problem is encountered in all large epidemiologic studies and does not systematically mean that a self-selection bias has altered the results (28,29). Indeed, it has been shown that a low response rate in epidemiological surveys only marginally affects prevalence and association measures (28,29). Besides, the prevalence rates were stratified by and adjusted for gender and degree, and multivariate analyses included gender and degree as a covariate. To control for potential confounding bias related to differences in sample characteristics from one measurement time to another, the multivariate models included all covariates, and a subgroup analysis on the longitudinal data was performed. Second, although validated, the questionnaires used for this study to identify mental health symptoms are screening but not diagnostic tools. However, a high score on these validated tests is highly correlated with the presence of a mental health disorder.

Conclusions

As a whole, two main conclusions can be drawn from the present study. First, severe symptoms of stress, anxiety, and depression were less prevalent after than during the COVID-19 related quarantine among university students but remained more prevalent than before the pandemic. Second, suicidal ideations, which were already frequent during the quarantine, were even more prevalent after the lift of the quarantine. This stresses the need to consider the psychological impact of the pandemic on students as a critical public health issue, demanding an urgent and strong policy response. Future studies will necessarily have to assess the long-term consequences of this enduring crisis, with a special focus on suicidal behavior.

Perspectives

Au cours de la pandémie de COVID-19, les effets psychologiques et sociétaux de la crise ont été immédiats, notamment chez les jeunes adultes et les résultats de cette étude indiquent qu'ils semblent persister voire s'accroître en ce qui concerne les idées suicidaires.

En France, il n'y a pour le moment pas de preuve de traduction de l'augmentation des idées suicidaires en comportements suicidaires, mais les données sont rares et partielles. Une étude réalisée par Jollant et al. sur les hospitalisations pour automutilation a constaté une diminution de 8,5% du nombre global d'hospitalisations entre 2019 et 2020, sauf pour la sous-catégorie des actes les plus graves (30). Les auteurs suggèrent ainsi que la diminution du recours aux soins peut expliquer ces résultats. Au Japon, une première étude menée par Tanaka et al. sur la mortalité par suicide au niveau national a en revanche montré qu'après une diminution au cours de la première vague de Covid-19, les décès par suicide ont augmenté de juillet à octobre 2020, suggérant une apparition retardée ou masquée par les mesures sanitaires telles que la quarantaine (31).

Prévenir le suicide, rompre l'isolement social, soutenir l'accès à l'emploi, et maintenir le lien avec les structures de soins semblent être des axes prioritaires de travail. Il conviendra également de continuer à surveiller l'état de santé mentale de cette population vulnérable dans un contexte de crise qui perdure. Un troisième temps de mesure prévu à un an de la première quarantaine sera réalisé à cet effet dans le cadre de l'étude COSAMe.

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Titre de la Thèse : Évolution de la santé mentale des étudiants universitaires français au décours de la première quarantaine – Etude COSAMe

Thèse - Médecine - Lille 2021

Cadre de classement : Médecine

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Mots-clés : COVID-19, étudiants, quarantaine, santé mentale

Résumé :

Introduction. La pandémie de Covid-19 et les mesures sanitaires associées ont eu des conséquences négatives sur la santé mentale des étudiants. L'objectif de cette étude était de décrire l'évolution de la santé mentale des étudiants universitaires français un mois après la levée du premier confinement et d'identifier les facteurs associés à la persistance ou l'aggravation des symptômes au décours de la quarantaine.

Méthodes. Cette étude transversale répétée a été menée auprès des étudiants universitaires lors du premier confinement instauré en France (T1, N = 69 054) et un mois après sa levée (T2, N = 22 361). Tous les étudiants universitaires français ont reçu, par mail, un auto-questionnaire à compléter. Les prévalences des idées suicidaires, de l'anxiété sévère (évaluée par la sous-échelle « état » de l'Inventaire d'anxiété État-Trait), de la dépression sévère (Inventaire de dépression de Beck) et du stress sévère (Échelle de stress perçu) ont été mesurées à T1 et T2. À partir des données longitudinales (étudiants ayant répondu à T1 et à T2, N = 6 361), les facteurs de risque de persistance ou d'aggravation des symptômes ont été identifiés parmi les indicateurs sociodémographiques, économiques, médicaux, de consommation des médias et de soutien social.

Résultats. Les prévalences de stress (21,7%), d'anxiété (22,1%) et de dépression sévère (13,9%) observées un mois après la levée du confinement étaient inférieures à celles observées pendant le confinement (24,7%, 27,5% et 16,1%, respectivement). La prévalence des idées suicidaires a augmenté, passant de 11,4% à 13,1%. Deux facteurs étaient systématiquement associés à la persistance ou l'aggravation des symptômes : un faible sentiment d'intégration (OR [95%CI] = 1,97 [1,58-2,45] pour le stress sévère, 1,94 [1,55-2,42] pour l'anxiété sévère, 1,72 [1,37-2,16] pour la dépression sévère, 2,86 [2,05-3,98] pour les idées suicidaires) et des antécédents de suivi psychiatrique (1,22 [1,03-1,43] pour le stress sévère, 1,30 [1,10-1,53] pour l'anxiété sévère, 1,32 [1,12-1,56] pour la dépression sévère, et 2,08 [1,63-2,65] pour les idées suicidaires).

Conclusion. Les prévalences de stress, d'anxiété et de dépression sévère, bien qu'inférieures à celles mesurées pendant le premier confinement, restaient élevées 1 mois après sa levée et la prévalence des idées suicidaires a augmenté. Ces résultats soulignent l'importance d'une prise en compte urgente de l'impact durable de la pandémie sur la santé mentale des étudiants.

Composition du Jury :

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Assesseurs : Monsieur le Professeur Guillaume VAIVA

Directeurs de thèse : Monsieur le Docteur Fabien D'HONDT

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