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Depressive Symptoms among Slovenian Female Tertiary Students before and during the COVID-19 Pandemic: Analysis of Two Repeated Cross-Sectional Surveys in 2020 and 2021

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Abstract: The COVID-19 pandemic has adversely affected the mental health of the general population. This holds true especially for vulnerable groups, including young people, students, and females. Our study examined cross-sectional changes in depressive symptoms from immediately before the COVID-19 pandemic (January/February 2020) to the second wave of the epidemic in Slovenia (January/February 2021) among female tertiary students. A multivariate analysis of two repeated cross-sectional surveys was performed using relatively homogeneous samples. The pooled sample included 418 young adult female students ($M_{age} = 21.21$ years). Depressed affect items were used to measure depressive symptomatology. All three feelings indicating depressed affect increased substantially and significantly from 2020 to 2021: feeling depressed (23% vs. 38%), lonely (16% vs. 43%), and sad (21% vs. 49%). In 2021, female students had almost a three-fold increase in the odds of reporting at least two out of three depressed affect symptoms compared to 2020 (19% vs. 43%; aOR 2.97; 95% CI 1.59–5.54; $p < 0.001$), adjusted for sociodemographic and socioeconomic confounders. Our findings suggest that Slovenian female students' mental health deteriorated during the first year of the COVID-19 pandemic. Public health professionals' efforts to combat the pandemic's mental health-related negative short-term and potential long-term impacts should thus focus on young people, especially on younger female students.



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1. Introduction

While the COVID-19 pandemic entails large economic, social, and political costs [1,2], the health impact is particularly enormous. As of August 2023, over 770 million cumulative cases of COVID-19 and over 6.95 million deaths worldwide have been reported [3]. In addition, the COVID-19 pandemic has had a strong negative impact on the mental health outcomes of populations. Individuals are not only facing increased stress and worry concerning contracting the COVID-19 virus, but also other stressors, uncertainties, and disruptions to their everyday life. For example, cross-national evidence suggests that the public frequently experiences various COVID-19 crisis-specific stressors [4].

Individuals' mental health may deteriorate during social shocks and uncertain circumstances. For example, a meta-analysis by Salari et al. [5] showed a relatively high prevalence of stress, anxiety, and depression in the general population (29.6, 31.9, and 33.7%, respectively) during the COVID-19 pandemic. Similarly, Shevlin and colleagues [6] observed increased anxiety, stress, and depression in the pandemic's early stages.

Among young people, tertiary education students may have been more strongly mentally affected by the COVID-19 crisis. The loss of daily structure owing to distance learning, uncertainties regarding students' academic achievements, future educational and professional careers, and a decline in the quality of students' social lives are some of the negative consequences of the pandemic measures. A study in 62 countries revealed that the most frequent negative emotion expressed by students during the COVID-19

crisis was boredom (45.2%), followed by anxiety (39.8%), frustration (39.1%), and anger (25.9%) [7]. Unsurprisingly, studies show that symptoms of depression, anxiety, and distress have increased among students compared to the pre-pandemic period [8,9]. In addition, increases in one form of mental health issues (e.g., anxiety) were found to increase others (e.g., depression) [10]. These findings are in line with other research indicating comorbidity of anxiety and depression among adults [11,12] and young people [13,14]. Among students, for example, studies found correlations of 0.40–0.75 between anxiety and depression [15–18].

Studies carried out during the COVID-19 pandemic in Slovenia have shown that, compared to adults, younger Slovenians had higher odds of perceived stress, less favourable psychological functioning, and worse mental health [19–23]. A study comparing Slovenian students' and adults' mental health found that 16% of the surveyed students experienced moderate to severe generalised anxiety [22], a 1.77-fold rate compared to the non-student sample. The greater prevalence of mental health problems among Slovenian youth is consistent with pre-pandemic research showing that young people (e.g., 18–24/29-year-olds) have the highest prevalence of mental health problems and psychiatric disorders, which tend to linearly decrease with age [24–26].

There is some evidence that mental health has declined among Slovenian youth compared to pre-COVID-19 levels. Some pediatricians and mental health experts have reported that hospital admissions for suicidal behavior among Slovenian high school students increased by 30% in 2020, along with the need for treatment for eating disorders [27]. In addition, a study of adults found decreased subjective well-being and increased scores for depression and emotional loneliness. However, as the authors point out, the detected differences might have been due to differences in sample characteristics [28]. Some researchers have emphasized the lack of comprehensive studies on changes in mental health among students (and adults) in Slovenia [22], while existing panel studies began only after the first wave of the pandemic [23].

Although young people, especially students, may be most susceptible to the negative mental health consequences of the COVID-19 pandemic [29], another population at risk is females [22,23], for several reasons. First, females are generally a particularly at-risk group for poor mental health outcomes [30], including depression [31], especially between the ages of 15 and 25 [32]. Second, data show that during the COVID-19 outbreak, mental health in the general population of females declined the most [33]. Females in Slovenia also reported lower mental health during the COVID-19 outbreak [20]. Third, female students are at double-risk for worse mental health because of their sex and student status. Compared to male students, female college students from the U.S., for example, were more affected by the long-term psychological impact of the COVID-19 pandemic [34], reporting higher levels of distress, even when controlling for distress before the pandemic [9]. In addition, female tertiary education students worldwide are more likely to report the experience of negative emotional well-being and increased stress during the COVID-19 outbreak compared to male students [7]. Although sex differences in depression tend to appear around thirteen years of age and continue throughout females' reproductive years [35], it should be noted that among young people, males suffer from mental health issues as well, including depressive symptoms. Young males, however, are less likely to report on these symptoms, instead applying coping strategies such as substance use, antisocial behavior and other forms of externalizing behavior [36,37]. Interestingly, however, some recent studies suggest a reversal in the sex gap among young people, with females scoring higher on externalizing behavior [38,39].

It also appears that younger students' mental health outcomes, including depression, may be more adversely affected by the pandemic, as this group is beginning the process of working towards important life goals while simultaneously dealing with the stress of academic life. Being in a student role increases one's vulnerability, given that students encounter distinctive worries linked to COVID-19, including sudden changes in their academic pursuits, transitioning to digital online learning, having uncertain employ-

ment, and experiencing job loss amid the pandemic [40]. This makes them more likely to experience psychological distress during crises and disruption; for example, during pandemic restrictions, which resulted in their decreased social contacts, interactions and social support [29,41–44]. In sum, given the evidence that past or current mental health conditions accentuate the negative mental health impact of the COVID-19 crisis [4], young female students may be especially vulnerable to the deleterious long-term consequences of the COVID-19 outbreak and accompanying public health measures [34].

2. Study Aim

There are currently no studies examining cross-sectional changes in mental health just before and during the COVID-19 pandemic among the Slovenian student population. Our study aimed to examine and compare an at-risk population of female tertiary education students in terms of their levels of depressed affect from January/February 2020 to January/February 2021, using purposive, relatively homogeneous samples and controlling for confounding factors. Consistent with recent research worldwide, we anticipated the worsening of female students' mental health during this period, i.e., increased depressed affect.

3. Methods

3.1. Sample

Cross-sectional quantitative studies were performed in January/February 2020 and January/February 2021. In both cases, the sample was obtained through the online survey 1ka.si. Both samples included young people below 34 years old who resided in Slovenia at the time of the surveys, which were the two main eligibility criteria. In the first time-point, data were collected from a national study of Slovenian youth. We collected survey data from young people in Slovenia ($N = 1508$; $M_{\text{age}} = 19.25$; 57.6% female), initially gathered to study cultural participation and lifestyle among youths [45]. The participants comprised those attending primary school ($n = 147$), secondary school ($n = 982$), and tertiary education ($n = 248$), as well as those employed ($n = 88$) and unemployed ($n = 47$) youngsters who were living in Slovenia during the survey period (January and February 2020). The survey was administered across all twelve statistical regions of Slovenia. The sample was compiled by contacting randomly selected primary and secondary schools in Slovenia and disseminating an e-survey link through the project's online social networks and the Faculty of Arts at the University of Maribor. While the national sample was not representative of the Slovenian youth population, it did encompass all primary categories of activity status and included youth from all twelve regions. For the current study, we selected a subsample of female tertiary students ($n = 183$; $M_{\text{age}} = 23.26$ years).

In the second time-point, January/February 2021, an online survey sample was collected among Slovenian tertiary students of both genders. Purposive, homogenous sampling was employed in surveying female tertiary students to achieve comparability across two samples and population characteristics including two time points. We asked tertiary school teachers across all three Slovenian universities to share the online survey questionnaire with their students during online lectures. In line with the aim of our paper, we again selected a subsample of female tertiary students ($n = 235$; $M_{\text{age}} = 20.02$ years). We note that neither of the samples analyzed in the present study was representative of Slovenian youth, so caution should be exercised regarding the generalizability of our findings.

3.2. Measures

We measured depression with the depressed affect dimension items on The Center for Epidemiologic Studies–Depression Scale (CES-D) scale, a commonly used self-rating scale to measure depressive symptomatology [46–48]. The original CES-D scale consists of 20 items [49,50], although various abbreviated versions have been used in the literature, including an 8-item SES-D scale [51,52]. The CES-D scale consists of several dimensions, including depressed (or negative) affect, absence of positive affect (or anhedonia), somatic

complaints and interpersonal difficulties, depending on the number of items used and the population to which the scale is being administered [51,53,54].

Only items from the depressed affect dimension of the CES-D were used in our study, since these items show the strongest correlation with the full CES-D scale among young, adult and clinical populations [47,55]. Researchers can rely on the dimension of depressed affect alone to assess depressive symptoms, as “negative [depressed] affect . . . may be the most characteristic and consistent symptoms of depression” [55]. Furthermore, our analysis of 2020 data shows that all three depressed affect items have the strongest correlation with the full CES-D-8 scale ($\rho \geq 0.75$).

Three of the depressed affect symptoms found to be most prevalent among populations in previous studies [56] were included in our surveys. Furthermore, they enabled us to conduct cross-sectional comparison (all three depressed affect items were included in the 2020 and 2021 surveys). Respondents indicated the frequency of experiencing depressed affect symptoms in the previous seven days: “I felt depressed”, “I felt lonely”, “I felt sad”. (0 = rarely or none of the time (less than one day); 1 = some or a little of the time (1–2 days); 2 = occasionally or a moderate amount of time (3–4 days); 3 = most or all the time (5–7 days)).

We created a depressed affect classification based on respondents’ answers to all the three questions. Those who reported two or all three depressed feelings, each at least “occasionally or a moderate amount of time (3–4 days)” or more often, were classified as experiencing depressed affect. We dichotomized the outcome variable into 0 (did not experience depressed affect in the previous seven days) and 1 (experienced depressed affect in the previous seven days). We note that our scale did not measure the clinical assessment of depression.

Nonetheless, our three-item scale proved to be sufficiently reliable (Cronbach’s $\alpha_{2020} = 0.86$ and $\alpha_{2021} = 0.83$). We assessed the psychometric qualities of our three-item scale in three additional ways. First, factorial validity was confirmed, since a single-factor structure emerged when Principal Component Analysis was performed, consistent with depressed affect dimensions in previous studies [57]. Second, known-groups validity was demonstrated, with females scoring significantly higher on the three-item scale than men ($p < 0.001$), consistent with previous studies [47]. Third, nomological validity was assessed with correlational analyses that showed a significant correlation between our three-item scale and other constructs in accordance with established theory [47,58]. Our three-item measure proved to be positively associated with poor self-rated mental health ($\rho = -0.54$), poor self-rated health ($\rho = -0.30$), high anxiety ($\rho = 0.64$), low satisfaction with life (-0.56) and high perceived stress ($\rho = 0.47$ ($p < 0.01$)) in the 2020 sample, all consistent with theoretical expectations. Additionally, the 2020 data enabled us to examine a correlation between the three-item and the full CES-8 scales, indicating a robust correlation (0.92; $p < 0.001$). Our analysis thus showed that our three-item scale measures depressed affect and is a reliable and valid indicator of depressive symptomatology.

We included several confounding variables measured in both surveys in our multivariate model: age (in years), mother’s education (1 = secondary or lower; 2 = tertiary), father’s education (1 = secondary or lower; 2 = tertiary), self-assessed family socioeconomic status (1 = low; 2 = middle; 3 = high), and size of residential settlement (1 = below 10,000 inhabitants; 2 = 10,000–100,000 inhabitants; 3 = over 100,000 inhabitants). Table 1 presents the demographic characteristics of both samples and outcome indicators.

Table 1. Demographic characteristics of the two samples.

Female Population Characteristics	Sample 2020 (N = 183) (%)	Sample 2021 (N = 235) (%)
Age		
≤20	13	72
21	16	13
22	14	10
23–25	56	5
Mother’s education		
Secondary or lower	46	45
Tertiary	54	55
Father’s education		
Secondary or lower	59	54
Tertiary	42	46
Family socioeconomic status		
Low	23	15
Middle	46	52
High	31	33
Residential settlement size (inhabitants)		
Below 10,000	34	53
10,000–100,000	12	27
100,000+	54	20
Depressed affect (Yes) *	19	43
Felt depressed.**	23	38
Felt lonely.**	16	43
Felt sad.**	21	49

Notes: * See the Measures section for our categorization of depressed affect. ** Occasionally or a moderate amount of time (3–4 days) or more often in the last seven days.

3.3. Statistical Analyses

Descriptive statistics were used to analyze the study characteristics of both samples. The proportion and 95% confidence interval (CI) of depressed affect among female tertiary students were calculated separately for samples collected before and during the pandemic. The crude odds ratio (OR) with a 95% confidence interval (CI) was used to analyze univariate associations between the confounding and the independent variable (survey year) with the outcome variable (depressed affect). Respondents who reported two or three symptoms of depression in the last seven days, each at least “occasionally or a moderate amount of time (3–4 days)” or more often, were classified as experiencing depressed affect. Confounders in multivariate analysis included students’ age, parental education, self-assessed family socioeconomic status, and size of residential settlement, while the primary independent variable was survey year (pre- vs. during-pandemic).

All variables were included in the multivariate logistic regression models. The multivariate logistic regression analysis identified predictors (confounders and the independent variable) of depressed affect using an adjusted odds ratio (aOR) with 95% CI. The Hosmer–Lemeshow test was used as a statistical test for goodness of fit of logistic regression. Statistical significance in all analyses was computed for the probability value of <0.05. The Statistical Package for the Social Sciences Program (IBM SPSS Statistics Versions 26) was used for the analyses.

4. Results

4.1. The Proportion of Depressed Affect and Associations with Sociodemographic and Socioeconomic Characteristics (Pre-COVID-19 Sample)

Table 1 shows that all three feelings indicating depressed affect increased substantially and significantly from 2020 to 2021: feeling depressed (23% vs. 38%), lonely (16% vs. 43%), and sad (21% vs. 49%). Depressed affect was reported by 19% of students in 2020. The proportion of depressed affect symptoms within the categories of different predictors is presented in Table 2. The results of the univariate analysis showed that female students with better-educated mothers were more likely to report depressed affect (OR 2.37; 95% CI 1.06–5.29; $p < 0.05$). In addition, students with families from middle socioeconomic status were less likely to be depressed (OR 0.37; 95% CI 0.15–0.93; $p < 0.05$). The proportion of depressed affect in the sample prior to the COVID-19 pandemic did not differ according to the student's age, father's education, or residential settlement size ($p > 0.05$).

Table 2. The proportion of depressed affect and associations with sociodemographic and socioeconomic characteristics in the pre-COVID-19 sample.

Female Population Characteristics	The Proportion of Depressed Affect (%)	95% CI	Crude OR	95% CI
Students	19	13–24		
Age				
≤20	17	1–33	-	-
21	20	5–35	1.25	0.31–5.06
22	08	0–19	0.42	0.07–2.52
23–25	21	13–29	1.36	0.42–4.39
Mother's education				
Secondary or lower	12	5–19	-	-
Tertiary	24	16–33	2.37 *	1.06–5.29
Father's education				
Secondary or lower	17	10–24	-	-
Tertiary	21	12–30	1.32	0.62–2.79
Family socioeconomic status				
Low	29	14–43	-	-
Middle	13	6–20	0.37 *	0.15–0.93
High	20	9–30	0.61	0.24–1.56
Residential settlement size (inhabitants)				
Below 10,000	16	7–26	-	-
10,000–100,000	18	1–36	1.16	0.32–4.15
100,000+	20	12–28	1.32	0.57–3.04

Notes: Significant findings ($p < 0.05$) are marked with (*). Abbreviations: CI = confidence interval; OR = odds ratio.

4.2. The Proportion of Depressed Affect and Associations with Sociodemographic and Socioeconomic Characteristics in the COVID-19 Sample

In 2021, depressed affect was reported by 43% of students. Its proportion within categories of different predictors is presented in Table 3. The results of the univariate analysis showed that the proportion of depressed affect did not differ according to the student's age, mother's and father's education, family socioeconomic status, or residential settlement ($p > 0.05$).

Table 3. The proportion of depressed affect and associations with sociodemographic and socioeconomic characteristics in the COVID-19 sample.

Female Population Characteristics	The Proportion of Depressed Affect (%)	95% CI	Crude OR	95% CI
Students	43	37–49		
Age				
≤20	47	40–55	-	-
21	39	21–57	0.70	0.32–1.54
22	26	7–46	0.39	0.15–1.05
23–25	25	0–54	0.37	0.10–1.42
Mother’s education				
Secondary or lower	48	38–58	-	-
Tertiary	39	30–47	0.68	0.41–1.15
Father’s education				
Secondary or lower	41	33–50	-	-
Tertiary	45	35–54	1.16	0.69–1.95
Family socioeconomic status				
Low	46	28–63	-	-
Middle	43	34–52	0.88	0.41–1.88
High	42	31–54	0.87	0.39–1.94
Residential settlement size (inhabitants)				
Below 10,000	43	34–52	-	-
10,000–100,000	45	33–58	1.09	0.59–2.00
100,000+	39	24–54	0.85	0.42–1.69

Notes: Abbreviations: CI = confidence interval; OR = odds ratio.

4.3. Predictors of Depressed Affect in the Pre-COVID-19 and COVID-19 Samples

The multivariate analysis of the pooled sample (survey data from 2020 and 2021) of depressed affect, and the proportion within the categories of different predictors is presented in Table 4. The results of multivariate analysis showed that the model was significant ($p < 0.001$). Higher age was an independent predictor of a lower likelihood of depressed affect, although statistical significance was found only for 22-year-olds (aOR 0.37; 95% CI 0.16–0.87; $p < 0.05$) compared to 20-year-olds. While this may be due to the subgroup size showing statistical significance, it may also be due to 22-year-old students being in the final years of their study (many having a pause (Slovenian: “absolvent”), which might have decreased their need for in-classroom presence, and thus, distant learning might have less of a deleterious mental health effect. This, of course, needs further study in the future. The proportion of depressed affect did not differ by other confounders, including the mother’s and father’s education, family socioeconomic status and size of residential settlement ($p > 0.05$).

Most important, results in Table 4 indicate that in 2021, female students had an almost three-fold increase in the odds of reporting at least two out of three depressed affect symptoms compared to 2020 (aOR 2.97; 95% CI 1.59–5.54; $p < 0.001$), adjusted for sociodemographic and socioeconomic factors (age, parental education, self-assessed family socioeconomic status, and size of residential settlement).

Table 4. Predictors of depressed affect in the pre-COVID-19 and COVID-19 samples.

	Adjusted OR	95% CI
Age		
≤20 (ref.)	-	-
21	0.79	0.41–1.55
22	0.37 *	0.16–0.87
23–25	0.81	0.40–1.64
Mother’s education		
Secondary or lower (ref.)	-	-
Tertiary	0.98	0.61–1.58
Father’s education		
Secondary or lower (ref.)	-	-
Tertiary	1.22	0.76–1.95
Family socioeconomic status		
Low (ref.)	-	-
Middle	0.69	0.38–1.25
High	0.74	0.38–1.43
Residential settlement size (inhabitants)		
Below 10,000 (ref.)	-	-
10,000–100,000	1.06	0.60–1.85
100,000+	1.05	0.61–1.79
Independent variable		
Time		
2020 (ref.)	-	-
2021	2.97 *	1.59–5.54
Nagelkerke R Squared	10.5%	

Notes: Significant findings ($p < 0.05$) are marked with (*). Abbreviations: CI = confidence interval.

5. Discussion

Our study aimed to examine trends in the levels of depressed affect from January/February 2020 to January/February 2021 among an at-risk population of female tertiary education students, using purposive, relatively homogeneous samples, and controlling for confounding factors. We focused on female students since studies show that females are more likely to suffer from the impact of the COVID-19 pandemic, i.e., having reduced work hours, losing their jobs, and decreasing incomes [59]. Female students may also be more affected by the COVID-19 pandemic for several reasons, including their higher proportion of pre-existing mental health problems [30,31], especially in mid- and late-adolescence, 15 to 25 years [32].

Our study indicates that in January/February 2021, during the second epidemic wave in Slovenia, there was an almost three-fold increase ($p < 0.001$) in depressed affect among Slovenian female students compared to the pre-pandemic months of January/February 2020, controlling for sociodemographic and socioeconomic confounders. The deterioration in female tertiary students’ mental health in Slovenia is a novel finding, no empirical evidence on this issue has been found to date. Other prior evidence in Slovenia shows that high school students’ hospital admissions and the need for treatment for mental health issues increased in 2020 [27]. Research on adults also indicated that the pandemic increased their mental health issues, including depression [20]. Nonetheless, there is a paucity of evidence on Slovenian young people’s pre- and during-COVID-19 pandemic longitudinal and cross-sectional changes in mental health outcomes, including among at-risk groups, such as students and young females.

However, research elsewhere shows that mood disorders substantially and significantly increased across all continents from pre- to mid-pandemic in various age groups [29]. Our findings are consistent with other homogenous studies of young adults. For example, a repeated cross-sectional survey in Poland [41] assessing university students' mental health issues in the early stages of the COVID-19 pandemic found increases in depression. Similarly, a longitudinal study of first-year college students in the US [60] reported that the rates of depression increased from 21.5% to 31.7%, pre- vs. mid-pandemic, similar to our findings (among Slovenian female students in our study, depressed affect increased from 19% in 2020 to 43% in 2021).

One of the critical explanations for increased depression in 2021 compared to 2020 among Slovenian female tertiary students (and other populations) may be the experienced and perceived social isolation due to the COVID-19 restrictions, which included distance learning and decreased social contact. For example, the US college students had a 17.7 percentage point increase in depression during the pandemic if they reported feeling socially isolated mid-pandemic (and had not experienced social isolation in pre-pandemic) [60].

Giving credence to an emphasis on examining young females' changes in depression, the above-mentioned Polish study found that young adult students (aged 18–24 years) had more symptoms of depression, anxiety, and suicidal ideation than adult students (≥ 25 years). In addition, both genders recorded an increase in depression as the COVID-19 pandemic progressed, although the increase was more pronounced in Polish females [41]. Similarly, a study of South African students found those aged between 18 and 24 were approximately 1.75 times more likely to report problems associated with mental health than older students. In addition, female students were 1.83 times more likely than male students to indicate problems associated with mental health, which included perceived stress, anxiety and depression [61]. Since we did not include Slovenian male students in our analysis, it may be that increases in their rates of depressed affect were lower compared to those for female students. Future studies on Slovenian youth should overcome our study's caveat and examine gender differences in mental health outcomes.

Interestingly, there is some evidence that despite the sharp rise in depressed affect that we detected, the rates of youth mental health issues in Slovenia may have been lower during the COVID-19 pandemic compared to other high-income countries. For example, a cross-national longitudinal study during the COVID-19 pandemic reported that Slovenian youth had the lowest levels of depression compared to young people from Germany, Israel, and Poland [40]. Future studies using cross-national longitudinal data would help to elucidate cross-national differences in mental health trends before and during the COVID-19 pandemic.

Although informative, our study has several limitations that need to be mentioned. Since we employed a repeated cross-sectional study design at two time points, causal mechanisms were not addressed. Other factors unrelated to the pandemic may have increased depressive affect among Slovenian female students from 2020 to 2021. However, it seems unlikely that the three-fold increase in depressed affect could have resulted exclusively from non-pandemic-related factors. Nonetheless, longitudinal (i.e., panel) designs are needed to ascertain causal factors affecting mental health outcomes during pandemics, and to control for potential determinants and confounders, including anxiety [10], sleep quality (e.g., insomnia) [62] and lifestyles [63]. Second, our findings' external validity (generalizability) may be low, as neither of the two primary data samples was representative of Slovenian youth or female students. Therefore, future studies should employ representative samples of various sub-populations to cross-validate our findings regarding the increase in depressed affect and to examine other mental health outcomes longitudinally. Third, future studies should examine changes in depression using established (clinical) cut-off points to detect and compare changes in severe forms of depression in at-risk groups. In addition, only female students were included in our samples to increase cross-sectional comparability based on characteristics of the sample structure, so it remains unclear whether and how the COVID-19 epidemic impacted Slovenian male students' mental health, including depressed

affect. Fifth, our study only analyzed depressed affect; future research should also examine positive dimensions of mental health. Finally, coping strategies, resilience, mastery, social support, and other potential determinants, mediators, and moderators of mental health outcomes during the COVID-19 crisis should also be examined in the future.

Our findings, combined with the literature on mental health changes due to the pandemic, indicate that the health of the young population after the COVID-19 pandemic and during future global social crises needs to be closely monitored because lockdowns, social distancing (including reductions in face-to-face social interaction), distance learning and other measures may all affect to young people's mental health. Prior evidence suggests that the detrimental mental health consequences of the COVID-19 crisis have been (unevenly) experienced across social groups [64]. Our study is the first in Slovenia to provide empirical data confirming that mental health deteriorated significantly among a population of female students during the COVID-19 epidemic. However, due to non-representative samples, future studies must be performed to corroborate our findings further.

6. Conclusions

Our study suggests that Slovenian female students' mental health deteriorated during the first year of the COVID-19 pandemic. Public health professionals' efforts to combat the pandemic's negative mental health-related short-term and potential long-term impacts should focus on young people, including younger female students. Providing social support (including on campuses) and monitoring mental health symptoms among students may be crucial for addressing mental health in future pandemics and widespread social disruptions. Identifying mental health changes in vulnerable populations remains critical for preparing evidence-based public health policies, strategies, and interventions. In future crises, rapid and effective action will be needed from public health professionals and decision-makers in terms of measures and policies that address hospital care, lockdowns, social distancing, and the mental health of the population in general, particularly the at-risk groups.

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Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki. All study participants provided written informed consent to use and share their data for scientific purposes. No personally identifiable respondent information was obtained in the survey, ensuring anonymity. Subjects were informed that participation was entirely voluntary, that completion of the questionnaire indicated their consent for study participation and that all gathered data would be collectively elaborated, having no other purpose than evaluation of determinants of respondents' attitudes. In addition, they were informed that they could withdraw from the survey at any point without penalty.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data are available upon reasonable request to the author.

Conflicts of Interest: The author declares that he has no financial, professional, or personal conflicting interests related to this study. The funders had no role in the study's design; the collection, analysis or interpretation of data; the writing of the manuscript; or the decision to publish the results.

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