

Well-Being and Mental Health of Students during the COVID-19 Pandemic

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Keywords

COVID-19 pandemic · Well-being · Mental health · Social isolation · Depression · University students

Abstract

Background: During the COVID-19 pandemic, a decrease in well-being and an increase in mental health problems were registered in medical and psychotherapeutic practices, counseling centers, and clinics. According to previous studies, younger people and women seemed to be particularly affected. The aim of this study was to describe mental health problems of students and to draw consequences for the further handling of pandemics and other crises. **Method:** Students at the University of Heidelberg, a typical German “full university,” were surveyed online using internationally comparable screening instruments like the Well-Being Index (WHO-5) and the Patient Health Questionnaire (PHQ). In addition, the students had the opportunity to describe in a narrative form their well-being and to make suggestions how to improve their situation. **Results:** Out of a population of 27,162 students who were contacted by email, 2,137 students completed the questionnaire. The salient finding is that according to the WHO-5 Well-Being Index, 72.2% of the

respondents feel seriously impaired in their well-being. This corresponds to the finding that 75.8% of the respondents in the PHQ-D show indications of at least one syndrome diagnosis. Depression was found in 41.8% of the respondents in the PHQ-D. Indications of moderate to severe and severe depressive syndromes were present in 31.8%. Signs of somatoform syndromes are found in 25.4% and of anxiety syndromes in 20.0%. 1,089 students gave narrative reports on how they were feeling and made suggestions for improvement. About 75% reported severely reduced well-being. Their main complaints were loneliness and depression and lack of recognition for their specific academic and life situation during the pandemic. By far, the largest proportion of students supposed that their mental health issues were caused and/or intensified by the pandemic-related social contact restrictions. The vast majority of them made reasonable suggestions for controlled relaxation of contact restrictions. **Conclusions:** Students suffer severely from the pandemic-related social restriction. In respect to future pandemic outbreaks or other crises leading to social isolation, the dramatic consequences of social lockdowns should be taken into account. Under pandemic conditions, we especially should support persons lacking social networks.

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Introduction

During the COVID-19 pandemic, an increase in mental disorders was registered in medical and psychotherapeutic practices, counseling centers, and clinics. According to the representative German study by Beutel et al. [1], younger people and women seem to be particularly affected. The internationally highest numbers of students were screened in a Chinese study [2]. Ma et al. [2] surveyed students from February 3rd to 10th, 2020 using modules from the Patient Health Questionnaire (PHQ), among others, and received 746,217 fully completed questionnaires. Indications of pronounced “mental health problems” were found in 45% of the respondents. The prevalence rates of acute stress reaction were 34.9%, of depressive disorders 21.1%, and of anxiety disorders 11.0%. In September 2020, Nature [3] published the summary of a study of 45,000 US students who were surveyed with a short form of the PHQ from May 26th to June 11th, 2021 [4]. In this study, 35% of undergraduates and 32% of graduate and professional students screened positive for major depressive disorder, while 39% of undergraduate and graduate and professional students screened positive for generalized anxiety disorder. The prevalence of major depressive disorder was 2 times higher in 2020 than the pre-pandemic year, and the prevalence of generalized anxiety disorder was 1.5 times higher. Woolston [3] summarizes in Nature that there was also a pandemic of anxiety and depression in students during the COVID-19 pandemic. The authors of the study recommend that more attention should be paid to the mental health of students, particularly through recognition of psychosocial crises at universities [4].

In a pre-pandemic study at the University of Cologne, a “full university” comparable to Heidelberg University, 53.6% of the 4,957 students screened with the PHQ-D from December to February 2014/2015 showed at least one syndromal disorder at the time of the survey [5]. Among these, depressive syndrome was the most common at 35% (of which 20.6% were “major depression” and 14.4% “minor depression”), followed by somatoform syndrome at 23.6%. The PHQ-D criteria for alcohol syndrome were fulfilled in 19.1% of the respondents. Indications of generalized anxiety disorder and panic syndrome were found in 13.5% of the students. A longitudinal study during the year 2020 found that 77.1% of the students of Lübeck University, Germany, rated their general health as good or very good [6]. No significant differences in general health, stress, and symptoms were found among these students between 2019 and 2020. In contrary, in a study with Australian students conducted between May

29th and July 6th 2020, only 34.7% of the participants reported a sufficient level of well-being [7]. A study with Turkish students, conducted between May 16th and June 10th 2020, using the Generalized Anxiety Scale (GAD-7) and the PHQ-6 found that 57% of the students met the criteria of general anxiety syndrome and 63% of depressive syndrome [8].

Questions

The aim of this study was to investigate how many students suffer from reduction of well-being and mental health after a year and a half of severe social restrictions like cessation of face-to-face teaching and shutdown of meeting facilities in seminars, libraries, refectories, cafés, sports facilities, etc. during the COVID-19 pandemic. At the time of the study also, public life and private personal encounters were still restricted. Regarding this situation, we were interested in the well-being and the prevalence of psychopathological syndromes as well as in the suggestions made by the students to improve their situation.

Methods

After approval by the Ethics Committee of the University Hospital and the Data Protection Officer of Heidelberg University, all students with a university email address were asked to participate in the anonymous online survey. The survey took place from May 26th, 2021 to June 11th, 2021 via the “Limesurvey” platform while the aforementioned social restrictions were still in place. Demographic variables collected included age, gender, and field of study.

The entire data analysis was carried out using RStudio (source: <https://www.rstudio.com/>). The R packages “tidyverse” and “cross-table” were used for the calculation of descriptive parameters and “psych” for the calculation of Cronbach’s Alpha. For PHQ-D and WHO-5, comparisons were made of the descriptive data with corresponding norm values for students and other populations.

Investigative Tools

The German version of the WHO-5 Well-Being Index [9] is particularly suitable as a screening instrument for depression. The WHO-5 is used worldwide as a screening instrument to measure subjective well-being [10] and allows international comparisons. It has a high internal consistency of Cronbach’s $\alpha = 0.88$.

Mental health symptoms were assessed with the PHQ-D [11], the German version of the PHQ [12]. In international comparison, the PHQ is the most frequently used screening instrument to quantify the presence of depressive and anxiety as well as somatoform disorders. Especially the subtests for depressive and anxiety disorders included in the PHQ show a high reliability: internal consistency is Cronbach’s $\alpha = 0.88$ for the depression module and the anxiety module, and $\alpha = 0.79$ for the somatisation module [13]. Test-retest reliabilities are $r = 0.83$ and $r = 0.84$, respectively, and

Table 1. Relative frequencies (in %) of syndromes of PHQ-D by gender (m/f/d) and total number

Syndrome	Male	Female	Diverse/ no answer	Total	<i>p</i>
Somatoform syndrome	9.38	33.05	25.00	25.36	<0.001
Major depressive syndrome	36.80	43.49	55.56	41.56	0.003
Other depressive syndromes	29.18	30.19	27.78	29.83	0.895
Panic/other anxiety syndromes	12.02	23.87	19.44	20.02	<0.001
Bulimia/"binge-eating" disorder	7.77	8.59	8.33	8.33	0.795
Alcohol syndrome	13.07	8.25	13.89	9.88	0.002

Due to missing values, the figures are based on slightly different case numbers: male $N = 681$ – 682 , female $N = 1,418$ – $1,421$, diverse/no answer $N = 36$. Significance value p of the test for equality of the relative frequencies of the individual syndromes by sex, Fisher's exact test, hybrid form according to Mehta and Patel [16].

the reliabilities for self- and external evaluation are also $r = 0.83$ and $r = 0.84$ [10].

The Fear of COVID-19 Scale [14] is the not yet validated German adaptation of the FCV-19S [15], which uses 7 questions to elicit worries and fears about COVID-19 disease in their personal and professional environment. This scale also has an internal consistency of Cronbach's $\alpha = 0.88$.

Tables 1 and 2 show relative frequencies of the individual syndromes by sex and subject. Equality of frequencies was tested by Fisher's exact test, hybrid form according to Mehta and Patel [16]. Finally, we qualitatively analyzed the narrative reports that 1,089 students were willing to write about how they felt and what solutions they proposed. Hereby we used a hermeneutic procedure in which the readers use their pre-understanding to capture the meaning and classify the messages of the texts systematically [17]. The qualitative-hermeneutic analysis was performed by a psychopathologically experienced psychiatrist and 2 experienced student counselors and psychotherapists and finally consensually validated in shared conferences under the directory of the students' counseling service at Heidelberg University. The presentation of the results obtained by means of the following additional questionnaires will be reserved for a more comprehensive publication: Sense of Coherence Scale (SOC), Brief COPE, Social Support Inventory (ESSI-D), Interpersonal Reactivity Index (IRI), and General Self-Efficacy Scale (SGSE).

Results

From a population of 27,162 students (54.8% female, 45.2% male) who were contacted by email, 2398 responded. 2,135 students (66.5% female, 31.8% male, 1.7% diverse/no answer) completed the extensive questionnaire and were included in the analysis. The whole response rates of 8.8% and of 7.9% to the extensive questionnaire were much higher than those of the regular surveys of the German Student Union ("Deutsches Studierendenwerk"), where a maximum response rate of 3.5% had been achieved [18]. The age distribution compared with the whole student population at Heidelberg University is as follows: under 21: 27.6% ver-

sus 22.2%; 21–23: 39.2% versus 28.9%; 24–25 16.3% versus 16.1%; 26–27: 6.7% versus 10.7; over 27: 10.1% versus 22.1%. This shows that the students in our sample were younger than the whole student population of Heidelberg University which includes also doctoral candidates. The distribution in respect to field of study is rather similar between the participants of our study and all the students of Heidelberg University: law: 9.3% versus 9.5%; economy and empirical social sciences: 10.8% versus 10.7%; medicine 15.8% versus 15.6%; mathematics, computer science, natural sciences and technical studies: 30.9 versus 31.2%; humanities, theology, and others: 33.2% versus 33.0%.

The most prominent finding of the present study is that 72.2% of the respondents in the present study had a WHO-5 Well-Being Score of less than 50. This indicates serious impairment of well-being [9, 10]. The average value of the German version of the WHO-5 Well-Being Index in our sample is $MW = 37.6$ ($SD = 21.3$).

The serious impairment of well-being corresponds to the fact that 75.8% of the respondents to the PHQ-D show indications of mental health problems. Depressive syndromes are dominant. From a categorical point of view, 41.6% of the respondents have indications of a "major depressive" syndrome (see Table 1). The average depression score (PHQ-9) is 11.6 ($SD: 6.1$). A score of less than 5, indicating "no or minimal" impairment, show 12.2% of the respondents. A score of 5–10, indicating "mild depressive" impairment, have 28.7% of the respondents. A score of 10–14, which is seen as an indication of "moderate depressive" impairment, is shown by 27.3%. A score of 15–19 indicating "moderately severe" symptoms is shown by 20.0% and a score of 20–27 indicating "severe depressive" symptoms have 11.8% of the respondents. This means that 31.8% of the surveyed students show indications of "moderately severe" or "severe" depression.

Table 2. Relative frequencies (in %) of syndromes of the PHQ-D by field of study and total number

Syndrome	Medicine	MCNT	Other	ES	HT	Law	Total	<i>p</i>
Somatoform syndrome	17.70	20.61	26.83	26.59	32.35	33.50	25.36	<0.001
Major depressive syndrome	31.07	39.64	41.82	43.66	48.92	44.00	41.56	<0.001
Other depressive syndromes	28.40	30.11	27.27	34.33	26.43	36.00	29.83	0.081
General anxiety and panic syndrome	15.98	15.43	20.00	23.13	23.72	28.50	20.02	<0.001
Bulimia/binge-eating syndrome	9.76	7.11	7.27	8.21	9.27	8.54	8.33	0.688
Alcohol syndrome	9.47	9.26	8.48	15.30	8.89	9.05	9.88	0.102

MCNT, mathematics, computer science, natural sciences, and technical studies; ES, psychology, economics and empirical social sciences; HT, humanities and theology. Due to missing values based on partially different case numbers: medicine $n = 338\text{--}339$; MCNT $n = 659\text{--}661$, other degree programs $n = 164\text{--}165$, ES $n = 267\text{--}268$, HT $n = 506\text{--}507$, law $n = 199\text{--}200$. Significance value p of the test for equality of the relative frequencies of the individual syndromes in the subjects; Fisher's exact test, hybrid form according to Mehta and Patel [16].

Generalized anxiety or panic syndromes are to be found in 20.0% of the respondents. Signs of somatoform syndromes are reported by 25.4% of the students and alcohol syndromes in the form of harmful use or dependence in 9.9% of the respondents. Eating disorders are found in 8.4%, mostly in the form of binge-eating with 7.0% (see Table 1).

With regard to the gender distribution, it is noticeable from a categorical point of view that "major depressive" syndromes are present in 43.5% of women ($n = 1,419$) and in 36.8% of men ($n = 682$). Anxiety syndromes are found in 23.9% of women and 12.0% of men (see Table 1). The values for students who indicate "no information" or "diverse" in relation to gender ($n = 36$) are 55.6% for depressive and 19.4% for anxiety syndromes.

With regard to the distribution of academic disciplines, it is noteworthy that students of medicine, followed by students of mathematics, computer science, natural science, and technical studies are less affected than students of law and students of economics and social sciences as well as students of the humanities and theology (see Table 2).

On the German version of the Fear of COVID-19 Scale (FCV-19S), responding students score an average of 14.5 ($SD = 5.0$). This means that the average student felt no or only mild fear of COVID-19 at the time of the survey. In the narrative reports written by 1,089 students about their well-being about 25% articulated "good" or "quite good" well-being, whereas about 75% wrote that they felt "not good," "bad," or "very bad" or found similar expressions. Loneliness is by far the most uttered complaint followed by depressive moods, lack of drive and motivation, and hopelessness. These complaints and symptoms were not related to fears of a COVID-19 illness of themselves or close friends and family members but almost exclusively to social contact restrictions. Typical answers were as fol-

lows: "I feel some kind of 'corona depression'." "I feel lonely. I have a complete lack of motivation and there are no ways to compensate studying only at home." "I feel lonely and lost and feel a deep sadness." "I feel incredibly lonely and neglected by politics. I sit at home since over a year... Besides loneliness I am paralyzed by boredom..." "The less I see people the worse I feel and the worse I feel the less I want to see people. I've got suicidal ideas again which I had forgotten since many years... As a student I feel very neglected and forgotten by politics. At 1st I was angry and desperate about this situation, now resignation has spread." Accordingly, the suggestions for improvement focus on the controlled facilitation of social encounters in the form of face-to-face teaching, in seminars, refectories, libraries, sports facilities, and cultural events. Two typical reports: "I have the feeling that I hit rock bottom in the last year. Opening the university would significantly improve my situation. Constant online teaching makes me depressive and I cannot concentrate any longer." "Please offer possibilities to interact with other persons." "After one and half year of online teaching and isolation I'd like to study in a real sense." Easier access to counseling and psychotherapy was frequently proposed. Less than 3 percent generally opposed COVID-19 safety measures. Many expressed their hope for vaccination and only 4 out of 1,089 students opposed explicitly vaccination.

Discussion

The fact that 72.2% of the respondents in the present study have a WHO-5 Well-Being Index of less than 50, which is considered to be an indication of a serious impairment of well-being [9], and that 75.8% have indica-

tions of a mental disorder is worrying. Equally noteworthy is the finding that 41.6% of respondents in this study show signs of a “major” depressive syndrome. This exceeds the percentage of 22.7% in a comparable pre-pandemic study with students [5]. The presence of “moderate-severe” and “severe” depressive disorder, which shows up in 31.8% of the respondents, is similar to the findings of the qualitative analysis, which shows indications of “moderately severe” or “severe” depression in about 30% of the cases. When “moderate” depressive disorders (27.3%) were included in the continuous diagnoses in addition to the “moderately severe” and “severe” depressive syndromes, this amounts to 59.1% depressive syndromes. From the point of view of clinical psychopathology however, this seems to be excessive because also indications of mild mood syndromes are regarded in the PHQ-Manual as depressive symptoms; notably, no psychopathological differentiation or even clinical diagnosis can be made based on the questionnaire [19].

Compared to the 21.1% of depressive syndromes in the comprehensive study by Ma et al. [2], our study presents significantly higher values. However, the Ma et al. [2] study had very high values for acute stress symptoms (intrusion, avoidance, hyperarousal) at 34.9%.

The indications for “major” depression in 41.6% of the cases by the categorical approach in the present study are higher than in the comparable study from the USA with 30,725 undergraduate students and 15,346 graduate and professional students conducted in May–July 2020 at 9 public research universities by Chirikov et al. [3, 4]. This study shows that the prevalence of signs of depressive disorders among students was twice as high in 2020 as in 2019, with 35% of “undergraduates” and 32% of “graduate and professional students” showing evidence of “major depressive disorder.” In the year before the pandemic, only 15% of students showed evidence of major depression.

The main shortcoming of the comprehensive study by Chirikov et al. [3, 4] is that it uses the PHQ-2, which consists of only 2 items. Other obligatory symptoms for the diagnosis of major depression in the sense of the International Classification of Disease (ICD-10) and the International Diagnostic Statistical Manual (DSM-5-R), such as reduced activities and somatic syndrome, are not assessed. In this respect, the term “major depression” is not appropriate from a clinical-psychiatric perspective [19]. The application of the PHQ-9 is more advanced because it takes into account the breadth of depressive symptoms with lack of activities, joylessness and somatic syndrome in addition to the mood disorder.

A major advantage of the study by Chirikov et al. [3, 4] is that it allows a comparison of prevalence rates of depressive and anxiety syndromes before and during the COVID-19 pandemic. With this in mind, we are planning a follow-up study in which we will examine the extent to which depressive and anxiety disorders decline after the pandemic has subsided, when social restrictions have been relaxed or lifted.

Indications of generalized anxiety syndrome and panic syndrome are seen in 20.0% of the participants of our study. In comparison, the study of students from 9 “research universities” in the USA showed much higher values. Using the GAD-2, which contains only 2 questions, 39% of the students were found to have an anxiety syndrome. The prevalence of generalized anxiety syndrome at pandemic time 2020 was 1.5 times higher in this study than in the pre-pandemic time 2019 [4]. In contrast, signs of an anxiety syndrome are more frequent in our study at 20.0% than 11.0% in the Chinese study by Ma et al. [2].

The higher prevalence of evidence of depressive syndromes in the Heidelberg sample than the cited studies from the USA and China could be explained by the fact that the Heidelberg study was conducted from May 26th to June 11th, 2021, after the social contact restrictions had unfolded their harmful effects 1 year longer than in the studies from China [2] and the USA [4], which took place from February 3rd to 10th, 2020 and from May 18th to July 20th, 2020, respectively.

Somatoform syndromes were found in 25.4% of the students surveyed in Heidelberg. These syndromes were not surveyed in the studies by Chirikov et al. [4] and Ma et al. [2]. Weber et al. [5] found signs of a “major” depressive syndrome in 35.0% of a German sample of students in the winter semester 2014/2015 using a categorical approach, compared to 41.6% in our study. In the study by Weber et al. [5], 23.6% had indications of a somatoform syndromes compared to 25.4% in the present study. Symptoms of generalized anxiety or panic syndrome were found in 13.5% compared to 20.0% in our study, while alcohol syndromes were reported in 19.1% compared to 9.9% in our study. The latter, which comprises alcohol abuse and alcohol dependence, is the only syndrome that seems to be more frequent pre-pandemically. This convenes with the findings of a study of health risk behavior of German university students before and during the COVID-19 pandemic by Busse et al. [20] where 24.4% of the students reported a decrease in binge-drinking during the pandemic.

The average WHO-5 Well-Being Index score of 37.4 (SD = 21.3) is significantly lower than that in pre-pandemic studies for Germany [21]. Overall, 72.2% of the respondents in the present study have a WHO-5 Well-Being score of less than 50, which is considered to indicate a serious impairment of well-being [9].

Kuehner et al. [21] found that in a random sample ($n = 721$) from the general population of Mannheim in April 2020, 29.4% had a PHQ syndrome diagnosis of a mental disorder. 36.7% had a WHO-5 Well-Being Index of less than 50, with an average score of 57. The mean age of 41.8 (SD = 14.2) years in this study and the findings of a representative study [1] that younger age-groups are more impaired make the study by Kuehner et al. [21] difficult to compare with the present one. However, the difference in the attribution of complaints is interesting. While the students in our study attribute their difficulties quite predominantly to social contact restrictions, in the Mannheim study with much older participants and in the initial phase of the pandemic, fears about physical health were in the foreground.

The finding that medical students are significantly less impaired during the COVID-19 pandemic could be related, among other things, to the fact that their activities in the health system provide them with more opportunities for social exchange and activity in the sense of self-efficacy than, for example, students of law and the humanities. The lower impairment in the subjects of the faculty of mathematics, computer science, natural sciences and technical studies could also be related to the fact that practical training in presence was continued, thus allowing for social exchange during the pandemic. Also self-efficient online training was better enabled in the domains of mathematics, computer science, natural sciences and technical studies than in law and the humanities.

After one and half year of massive social restrictions, by far, the most frequent complaint of the students forwarded in the free texts is social isolation triggering or increasing depression. About 30% of the spontaneous reports contain descriptions of pronounced depressive moods, lack of drive, and hopelessness, which indicate severe depression. And 75% report reduced well-being and mostly relate their mental problems to social isolation.

Conclusion

Three of 4 students feel unwell, and one of 3 have moderate to severe depression related to more than a year of social isolation during the pandemic. Future lockdown

policies should take into consideration those negative effects on student mental health. They should focus on controlled facilitation of personal encounters in the form of face-to-face teaching and enabling of social contacts in seminars, refectories, libraries, sports facilities, cultural events, etc. This is also relevant for dealing with future pandemic outbreaks or other crises. The dramatic consequences of social lockdowns must be taken into account. Under pandemic conditions, we especially should support persons lacking social networks [22]. During future lockdowns professors, mentors, and tutors as well as counselors and psychotherapists should reinforce controlled personal encounters at the universities. Special resources could be allocated to facilitate a minimum of social life even in times of crises. Personal contacts are indispensable for well-being, mental health, and social-relatedness [23]. The vast majority of students long for opportunities to develop socially and want to contribute to professional, scientific, and humanistic progress in line with the WHO's guiding principle: "more [socially] active people for a healthier world" [24].

Limitations

Although the response rate to the extensive questionnaire was much higher than in the regular surveys of the German Student Union, our study cannot be considered representative. Those students particularly affected by the pandemic-related restrictions may have responded more frequently. However, this also applies to the comparable studies from Germany, the USA, and China and does not detract from the central finding that the restrictions of options for social encounters are accompanied by considerable psychological impairments and manifest mental disorders for many students. We will review this finding in a subsequent study with the same study design and quantify it more thoroughly when the social contact restrictions are removed. This will allow us to compare students' well-being and mental health during the COVID-19 pandemic with their post-pandemic situation. Finally, we do not know whether our results are specific to the student population. Similar findings may also apply to other populations of the same age and should be investigated.

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Statement of Ethics

The study was approved by the Ethics Commission of the Medical Faculty and the Bureau of Data Protection of Heidelberg University. It is registered with the following number: S-409/2021. The participants of the study consented by answering deliberately to the questions of the anonymous LimeSurvey.

Conflict of Interest Statement

There are no conflicts of interest on the part of any author of the study.

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Author Contributions

The 1st author initiated the study and wrote the 1st version of the paper. The other author participated in the theoretical preparation, election of the instruments, data collection, and analysis of the data and corrected and approved the manuscript.

Data Availability Statement

All data generated and analyzed during the study are included in this article. Further inquiries can be directed to the corresponding author.