

Mental health impairment triggered by the COVID-19 pandemic in a sample population of German students

Jenny Schlichtiger, Stefan Brunner, Julius Steffen, Bruno C Huber 

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Department of Cardiology, University Hospital of Munich, LMU Munich, Munich, Germany

Correspondence to

Dr Bruno C Huber, Department of Cardiology, LMU Munich, 80336 Munich, Germany; bruno.huber@med.uni-muenchen.de

JS and SB contributed equally.

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ABSTRACT

Due to the rapid spread of the COVID-19 pandemic, a lockdown including limitation of activity and restrictions of non-essential travel was imposed on March 21, 2020 in the State of Bavaria, Germany. The implementation of activity restrictions not only strongly affects the economy but will possibly also impact the mental and physical health status of the general population. Therefore, the present study aimed to explore psychological effects of the COVID-19 crisis on a sample of Bavarian students. In this cross-sectional study, we enrolled 1943 voluntary subjects from Bavarian universities. All subjects completed an online questionnaire asking for mental health stress, as well as potential factors, influencing the state of mental stress during pandemic lockdown. In our study cohort, 17.3% (n=336) of the students indicated that they experienced less mental stress through COVID-19 pandemic, while 39.6% (n=770) stated that they had an increased psychological burden. The bivariate analysis identified sex and the level of physical activity as potential risk factors for the level of mental stress during the COVID-19 pandemic. Further research is necessary to investigate specific symptoms of mental stress and the overall long-term impact on mental health.

INTRODUCTION

In early 2020, the new respiratory disease COVID-19 spread globally and quickly reached a pandemic status with dramatic consequences on populations worldwide.¹ On January 27, 2020, the first German patient was diagnosed with COVID-19 in the federal state of Bavaria. Due to the rapid spread, a lockdown was imposed on March 21, 2020. For about 2 months, people were obliged to only leave their accommodations for essential occupational requirements or to ensure household supplies. In the meantime, although lockdown measures have been eased, daily life is still extremely restricted. The lockdown period and the persisting restrictions will lead to economic losses, as well as social distress, potentially resulting in increased psychological stress and, consequently, in the manifestation of mental illness.² In the long term, in addition to direct health consequences, mental diseases and

their effects on physical health might also have a significant public health impact.³

While several studies evaluated the mental health impact of the COVID-19 pandemic on health workers and vulnerable groups, there is currently only very limited information available on the impact of the pandemic on mental stress, especially among young adults.⁴ Therefore, this study aimed to evaluate how much a sample of Bavarian students are psychologically affected by the COVID-19 crises and what factors might enhance mental stress.

METHODS

In our cross-sectional study, we evaluated data from a self-administered online questionnaire that was sent to students of six public Bavarian universities via the mailing list of the universities' main offices. The survey was accessible for 2 weeks from April 3, 2020. The participation was voluntary.

A total of 8252 students were contacted, of whom 1943 fully completed the online questionnaire (response rate 24%). All universities were located in urban Bavarian areas, with a comparable range of courses.

Items obtained from the survey (see online supplemental material) included demographics (sex and age), physical activity, adverse health behavior (smoking and alcohol), and COVID-19-related questions (COVID-19 test and mental stress).

Statistical analyses were performed using SPSS V.25. χ^2 test was used to identify potential correlations in bivariate analyses. All variables with $p\chi^2 < 0.05$ were included in a multinomial logistic regression model.

RESULTS

Overall, 70.7% (n=1373) of the subjects were female; the mean age was 23.3 years (SD \pm 4.0). In total, 17.3% (n=336) of the students indicated that they experienced less mental stress through the COVID-19 pandemic, while 39.6% (n=770) felt an increased psychological burden. Of the subjects, 43.1% reported not to be mentally stressed by the COVID-19 crisis. The bivariate analysis identified gender and the level of physical activity as potential risk factors for the level of mental stress through

Table 1 Bivariate analyses on mental stress through the COVID-19 crisis and potential risk factors

	Mental stress			P value
	Reduced, n=336	Constant, n=837	Increased, n=770	
	% (n)			
Demographics				
Sex				
Female	14.5 (199)	41.6 (572)	43.9 (602)	0.000
Male	24.2 (133)	46.8 (257)	29.0 (159)	
Missing values	3	8	9	
Age (years)				
17–25	17.7 (266)	43.3 (651)	39.0 (588)	0.694
26–35	16.3 (67)	42.3 (174)	41.4 (170)	
36–50	8.7 (2)	43.5 (10)	47.8 (11)	
Missing values	1	2	1	
Physical activity				
Reduced	15.8 (135)	40.9 (351)	43.3 (371)	0.014
Constant	16.4 (72)	47.4 (208)	36.2 (159)	
Increased	20.2 (128)	42.7 (271)	37.1 (235)	
Missing values	1	7	5	
Adverse health behavior				
Smoking				
Smoker	12.6 (15)	41.2 (49)	46.2 (55)	0.226
Non-smoker	17.4 (314)	43.3 (779)	39.3 (708)	
Missing values	7	9	7	
Alcohol				
Reduced	16.8 (136)	44.3 (359)	38.9 (316)	0.605
Constant	18.6 (157)	42.4 (358)	39.0 (329)	
Increased	15.4 (42)	41.9 (114)	42.7 (116)	
Missing values	1	6	9	
COVID-19 test				
Yes	14.3 (18)	37.3 (47)	48.4 (61)	0.116
No	17.4 (316)	43.5 (789)	39.1 (709)	

the COVID-19 pandemic (table 1). For other variables (age, smoking status, change of alcohol intake and COVID-19 test), no significant associations were detected.

The multinomial logistic regression separately analyzed the influence of the potential risk factors and age for reduced and increased mental stress due to the COVID-19 pandemic: lower age showed to increase the chance of feeling less mentally affected by the pandemic. On the other hand, a reduced physical activity served as a risk factor, since it lowered the probability of reduced mental stress. Male gender showed to be a protective factor ($B=0.564$), which lowered the chance of feeling severely mentally stressed by an OR of 0.57 (CI 0.45 to 0.72). Furthermore, decreased physical activity showed to significantly enhance the risk by a factor of 1.28 for having an adversely influenced mental status (CI 1.01 to 1.62).

DISCUSSION

Our results are in line with other studies showing that women are more likely to be mentally stressed in the context of other health related crises. In this regard, previous studies investigating risk factors of mental diseases during quarantine have shown that women more frequently develop anxiety, depression or sleeping disorders.^{5 6} Further, it is well known that physical activity has a positive influence on mental well-being. In a meta-analysis by White

and colleagues, the relationship of the mental state and physical activity across different life domains showed that particularly physical activity during leisure time positively affected the well-being.^{7 8} This may contrarily explain why we identified decreased physical activity as a risk factor for increased mental stress during lockdown, since leisure time increases when movement and sports are restricted.

Our study was created with a cross-sectional design to be able to generate valid findings about the physical and mental health of a considerably large sample in a dynamically changing pandemic situation. However, the study design is also associated with limitations.

All results presented refer to one point in time during the first month of lockdown. Therefore, we are not able to make any predictions about the development of the mental stress level throughout the course of the pandemic. Additionally, all results are based on a self-assessment of the mental status. Hence, no symptoms or dynamic of psychological distress could be analyzed. Furthermore, because only 24% of the students answered the survey, there is a possible response and desirability bias. Therefore, it must be suggested that the motivated or healthier students were more willing to answer the survey, overestimating the effect especially in terms of physical training.

In this study, we aimed, as a first attempt, to explore alterations of mental status in young adults during the

COVID-19 pandemic lockdown. Further research is highly warranted to investigate symptoms of mental stress, as well as the long-term impact of exit restrictions on mental health.

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Competing interests None declared.

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ORCID iD

Bruno C Huber <http://orcid.org/0000-0002-1032-7686>

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Supplement material: Relevant questions from the online questionnaire

Table 1: Relevant questions from the online questionnaire

Question	Value labels	Variable title
MENTAL STRESS		
How did COVID 19 pandemic effect your mental stress level?	reduced/constant/increased	mental stress
DEMOGRAPHICS		
Sex	male/female/diverse	sex
Age	Free text	age
PHYSICAL ACTIVITY		
How did your physical training change since the implementation of exit restrictions?	reduced/constant/increased	physical training
ADVERSE HEALTH BEHAVIOR		
Are you smoking?	yes/no	smoking
How did the implementation of the exit restriction change your alcohol consumption?	reduced/constant/increased	alcohol