Psychological Distress and Well-Being among Students of Health Disciplines: The Importance of Academic Satisfaction in the Context of Academic Year-End and COVID-19 Stress

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Abstract

Background

University students' psychological health is linked to their academic satisfaction. This study aimed to investigate students' psychological health and academic satisfaction in the context of COVID-19 and academic year-end stress.

Methods

Standardized self-filled scales for anxiety, depression, stress, psychological well-being, and an ad-hoc COVID-19 stress scale were used in this cross-sectional study. Participants were first- to third-year students of eight different health-related tracks in Geneva, Switzerland. Descriptive statistics and hierarchical regression analyses were applied.

Results

In June 2020, out of 2835 invited students, 433 (15%) completed the survey. Academic satisfaction was a stronger mental health predictor than COVID-19, which mainly predicted stress and anxiety. Lower academic satisfaction scores were significantly associated with stress ($\beta = -.53$, $p < .001$), depression ($\beta = -.26$, $p < .001$), anxiety ($\beta = -.20$, $p < .001$), while higher scores with psychological well-being ($\beta = .48$, $p < .001$). Being female was strongly associated with anxiety and stress but not with depression or psychological well-being. Lower age was associated with stress only. The nature of the academic training had a lesser impact on mental health and the academic year none. Compared to students starting the academic year, year-end

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students reported significantly lower academic satisfaction, higher depression, and particularly higher anxiety and stress. There was, however, no difference in psychological well-being.

Conclusion

Students suffer more from anxiety, stress, depression, and lower satisfaction with studies at the end of the academic year than at the beginning. Academic satisfaction plays a more substantial role than COVID-19 in predicting students' overall mental health status. Training institutions should address the underlying factors that can enhance students' academic satisfaction, especially during the COVID-19 period, in addition to ensuring that they have a continuous and adequate learning experience, as well as access to psychosocial services that help them cope with mental distress and enhance their psychological well-being.

Keywords

Mental health, psychological well-being, depression, anxiety, stress, undergraduate students, Bachelor's degree students, students' academic satisfaction, COVID-19.

Background

Both psychological well-being and distress should be considered when researching student mental health, not least because such a holistic approach aligns with the World Health Organization's definition of mental health: *a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community* [1].

Most of the research in health sciences training has centered on the psychological distress of medical and nursing students. A systematic review of the literature found among medical students a very high depression and anxiety prevalence and a higher psychological distress level than in the general population [2]. Several studies showed that nursing students

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report very high anxiety, stress, and depression scores, and more stress, anxiety, and depression than students from other disciplines and people in the labor force [3-5]. Clinical practice, theoretical training, personal life, and social life were identified as four causes of stress in a qualitative study [6], whereas clinical practice was established as the primary stressor in other research [3, 7-9].

There is limited literature on student mental health, specifically at the end of the academic year. In contrast, exams and tests, which often intensify during the academic year-end, represent a well-established source of stress among students [10-12]. For some students, the primary cause of stress is examinations and the subsequent wait for results, often at the end of the academic year [13]. Nepali undergraduate medical students reported that exams and academic concerns were among the most common and severe stress sources [14]. Common factors of exam anxiety include extensive course loads and lack physical activities [15]. Pre-examination stress is also widespread and can manifest, for example, in changed concentration span, disturbed sleep, irritability, mood swings, anorexia, or fatigue, as evidenced by a study of second-year medical students in Pakistan [11].

Only a few studies investigated students' psychological well-being compared to research on psychological distress. According to a study, the majority of students had a good quality of life and were satisfied with their health and way of life [3]. Another study found a relationship between nursing students' psychological well-being and physical activity [16]. The majority of the body of research investigating contributing factors has examined risk factors for increased psychological distress. An important factor for anxiety, depression, and stress is gender. Overall, female students show higher levels of anxiety and stress than male students [17]. In terms of general psychological distress, the same is true for female students in health-related disciplines [2, 5]. Only one study that we are aware of did not confirm this gender gap [4]. The academic year is also a decisive factor: first-year and second-year students

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are more stressed, depressed, and anxious than others (due, among other things, to higher student dropout rates earlier in the curriculum) [6, 8, 17-20], and fourth-year students have lower depression scores than second and third-year students [3]. Only a few studies examined protective factors in comparison to the numerous ones on risk factors. Internal and external factors predicting psychological well-being in nursing students were investigated in one study [21, 22]. Self-efficacy, resilience, mindfulness skills, and social support were found to have a positive impact on their psychological well-being.

In summary, most of the studies on student mental health focused on psychological distress, with just a few examing psychological well-being. A holistic approach, on the other hand, should consider both positive and negative aspects, as well as both protective and risk factors. Furthermore, extant studies have primarily concentrated on medical and nursing students. Students in other health fields, such as midwifery, physiotherapy, nutrition and dietetics, medical radiology technology, psychology, or pharmaceutical sciences were not included in any of the studies, according to our understanding, despite they all being highly related to health.

Against this background, Franzen et al. (2021) conducted in October 2019—the first month of the 2019-2020 academic year—a cross-sectional study on the mental health status of Bachelor's degree students training in different health disciplines in Geneva, Switzerland [22]. The study explored both psychological distress and well-being and related risk and protective factors [22]. The research highlighted the importance of academic satisfaction as the most powerful predictor of depression, anxiety, stress, and psychological well-being among those considered. Additionally, being female was strongly associated with anxiety and stress but not with depression or psychological wellbeing, and increased age was associated with enhanced psychological well-being. The nature of the academic discipline had less of an influence, whereas the academic year had none.

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In March 2020, the COVID-19 pandemic locked down Western Europe. The pandemic has affected the mental health of the general population across the globe, as illustrated by a systematic review and meta-analysis of studies published in the early months of the pandemic (until May 2020) and conducted in ten countries across Asia, Europe, and Africa. This analysis showed a pooled prevalence of stress equal to 30%, of anxiety to 32%, and of depression to 34% [23]. COVID-19 abruptly closed schools and universities, upending students' in-person learning and living conditions. Reflecting the widespread effects of health-related fears, uncertainty, and downstream academic consequences, studies have reported negative impacts on students' mental health. For example, a large cohort study involving initially 164,101 college students in China showed a prevalence of stress of 35% during the acute phase of the outbreak, decreasing to 16% two months later as the outbreak subsided [24]. However, during the same period, depression increased from 22% to 26% and anxiety from 11% to 15%. Less physical exercise, lower social support, and a dysfunctional family negatively worsened students' psychological distress along with COVID-19 related worries and knowledge of confirmed or suspected cases in their community. A mixed-method study among 195 US college students carried out in April 2020, a month after the stay-at-home order, indicated that 71% of students reported increased stress and anxiety related to the outbreak [25]. As for health discipline students, a nationwide survey conducted in April 2020 in Saudi Arabia among dentistry students reported a high prevalence of depression (61%), followed by anxiety (37%) and stress (35%), all of which affected more female students living alone and junior students than others [26]. In Israel, a study during the third week of the national lockdown among nursing students showed that the prevalence of moderate and severe anxiety was 43% and 13%, respectively, compounded by the female gender and lack of personal protective equipment [27].

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In line with the new measures announced by the Swiss authorities to stem COVID-19 transmission, the University of Geneva suspended all in-person teaching from March 2020 onward. All teaching moved online for most of the remaining semester. In response to the COVID-19 pandemic, we launched a survey in June 2020 with a design similar to that of Franzen et al. (2021), which was conducted in October 2019. This research aimed first to investigate students' psychological health and academic satisfaction in the context of COVID-19 and academic year-end stress, hypothesizing that both factors could worsen students' mental health, and, second, to compare results with those of Franzen et al. (2021).

Materials and Methods

Study population and setting

This was a cross-sectional study involving Bachelor's level students enrolled in the 2019-2020 academic year at the School of Health Sciences Geneva, the Faculty of Medicine, School of Pharmaceutical Sciences, and Psychology Department of the University of Geneva. Random sampling stratified by health disciplines was applied by inviting all the students to participate in the study in June 2020. There were no exclusion criteria.

Measurements

Socio-demographic data included age, gender, current academic year, and health discipline. The study used the following scales for perceived stress, anxiety, depression, psychological well-being, satisfaction with studies, and stress due to COVID-19.

Depression and anxiety

The Hospital Anxiety and Depression Scale (HADS) was used to identify the presence of depression and anxiety symptoms and assess their severity [28, 29]. The questionnaire

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consists of a depression subscale and an anxiety subscale, each with seven items rated from 0 to 3.

Perceived stress

The 14-item Cohen Perceived Stress Scale (PSS) was used to assess students' perceived stress or, put differently, the extent to which they generally perceive life situations as threatening [30]. Participants rate statements on a scale of 0 (never) to 4 (very often).

Psychological well-being

The Psychological Well-Being Scale (BEP) was used to assess participants' psychological well-being [31, 32]. This 18-item scale contains six dimensions: autonomy, environmental mastery, personal growth, positive relationships with others, purpose in life, and self-acceptance. Participants rate statements on a scale of 1 (disagree) to 6 (agree).

Academic satisfaction

The Scale of Satisfaction with Studies (SSS) was used to measure students' academic satisfaction [33]. This five-item scale measures an overall and subjective assessment of students' quality of life in their educational setting. Participants rate statements on a scale of 1 (strongly disagree) to 7 (strongly agree).

Additional stress due to COVID-19

Using a visual analogue scale, participants answered the following questions: "To what extent has the COVID-19 situation put additional stress on your learning experience?" Answers ranged from 0 (no additional stress) to 10 (severe additional stress).

Data collection

Participant recruitment proceeded via institutional e-mails sent by the different school secretariats to complete lists of students. Interested students were invited to participate in the

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study by logging onto a secure electronic site (EvaSys Education Survey Automation Suite version 7.1, Electric Paper Evaluation Systems GmbH, Lüneburg, Germany). After providing their informed consent, participants anonymously answered socio-demographic questions and the HADS, PSS, BEP, SSS, and COVID-19 questionnaires. Data was collected shortly close to the end of the academic year in June 2020. All data were handled confidentially and securely on EvaSys and archived on a hard drive located in a locked office only accessible to the principal investigator.

Statistical analysis

We report descriptive statistics for demographic data as means and standard deviations (SD). We computed multiple hierarchical linear regression analyses to estimate the contribution of these potential predictors on depression, anxiety, stress, psychological well-being, and COVID-19 stress scales. To do so, we entered five separate blocks of independent variables. The sequential entry of predictors was drawn from the findings of previous research and included gender and age (block 1) [2, 5, 17], academic year of training (block 2) [3, 6, 8, 17], the health discipline (block 3) [3], academic satisfaction (block 4) [17], and finally COVID-19 (block 5) [23-27]. Predictors were considered significant when their p-value was .05 or less. We evaluated the increase in R^2 to determine increase in effect size between two consecutive blocks. To compare results between October 2019 and June 2020 studies, the chi-square test was used for gender and t-test for age and the mental health scales with statistical significance determined by $p \leq .05$. There were no missing data as the electronic survey required mandatory answers to all the questions. All analyses were computed using SPSS, version 25 (IBM, Armonk, NY, USA).

Ethics statement

The Ethics Research Committee of the Geneva University Hospitals reviewed the study protocol and decided to waive the need for an internal review board review as the study

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involved students and was anonymous (reference number: 2019-00696). The exact date of ethical approval is 7 May 2019.

Results

Out of 2835 students invited to participate in the study, 433 (15%) completed the survey. There was no invalid or missing data. As for Franzen et al. (2021), the vast majority were women (n = 357, 82%)—the proportion of women of the overall sampling pool ranged from 64% in the Faculty of Medicine to 81% in the Psychology Department. Participants' age ranged from 16 to 62 years, with a mean age of 23, which was significantly older than in Franzen et al. (2021) by almost a year— the mean age of the overall sampling pool ranged from 21 years (Faculty of Medicine and School of Pharmaceutical Sciences) to 24 years (School of Health Sciences Geneva). As for Franzen et al. (2021), in addition to students of psychology, pharmaceutical sciences, and medicine, participants included students of the other health disciplines taught at the School of Health Sciences Geneva, including midwifery, nursing, physiotherapy, nutrition and dietetics, and medical radiology technology. However, we considered all School of Health Sciences students together because a finer analysis by discipline would have led to insufficient subsample sizes. Gender, age, and scores of the depression/HADS, anxiety/HADS, stress/PSS, psychological well-being/BEP, academic satisfaction/SSS scales, and comparison between Franzen et al. (2021) and this study results are presented in Table 1. The COVID-19 stress score was perceived on average as 4.9 out of 10. Year-end participants, compared to those enrolled at the beginning of the school year, reported significantly lower academic satisfaction (21.90 vs. 23.24, $p < .001$), higher depression (5.75 vs. 5.04, $p = .002$), and particularly higher anxiety (10.21 vs. 9.19, $p < .001$) and stress (28.06 vs. 25.59, $p < .001$). There was, however, no difference in psychological well-being scores.

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Table 1. Gender, age, health disciplines, and questionnaires scores (means (sd)), and comparison between June 2020 and October 2019 (Franzen et al., 2021)

Variables	June 2020 (n=433)	October 2019 (n=915) (Franzen et al., 2021)	Chi-square/ t-test value	p-value
Female	357 (82.4 %)	753 (82.3 %)	0.01	.95
Age	22.91 (4.05)	22.15 (4.25)	-3.09	.002
Mental health scales				
Depression (HADS)	5.75 (4.38)	5.04 (3.62)	-3.14	.002
Anxiety (HADS)	10.21 (4.80)	9.19 (4.45)	-3.82	<.001
Stress (PSS)	28.06 (9.60)	25.59 (9.00)	-4.60	<.001
Psychological well-being (BEP)	82.95 (11.03)	82.75 (11.14)	-0.32	.75
Academic satisfaction (SSS)	21.90 (7.79)	23.24 (6.91)	3.19	.001
Additional stress due to COVID-19	4.91 (2.70)	Not applicable		

Notes: BEP: Psychological Well-Being Scale; SSS: Scale of Satisfaction with Studies; HADS: Hospital Anxiety and Depression Scale; PSS: Perceived Stress Scale.

Table 2 reports the linear hierarchical regressions results. For all outcomes, the first three blocks predicted minimal amounts of variance (from less than 1% to 6%, mean amount = 3 %). Academic satisfaction in block 4 was by far the strongest predictor, with R^2 increases ranging from 14% to 29%. The addition of COVID-19 in block 5 contributed to a lesser extent, with higher R^2 increases for stress (15%) and anxiety (13%) than depression (6%) and psychological well-being (3%). Lower academic satisfaction/SSS scores were strongly associated with more stress ($\beta = -.53$, $p < .001$), depression ($\beta = -.26$, $p < .001$), and anxiety ($\beta = -.20$, $p < .001$), while higher satisfaction predicted greater psychological well-being ($\beta = .48$, $p < .001$). Higher COVID-19 stress scores were strongly associated with greater stress ($\beta = 1.53$, $p < .001$), anxiety ($\beta = .70$, $p < .001$), and depression ($\beta = .45$, $p < .001$), while less COVID-19 stress predicter higher psychological well-being ($\beta = -.84$, $p < .001$). Female gender was also strongly associated with higher stress ($\beta = -3.42$, $p < .001$) and anxiety ($\beta = -1.94$, $p < .001$), but not with depression or psychological well-being. Lower age was associated only with more stress ($\beta = -.27$, $p < .01$). There were no marked differences between the different health disciplines in relation to stress and psychological well-being. However, pharmaceutical sciences students reported higher depression ($\beta = 1.64$, $p < .01$) and anxiety ($\beta = 1.41$, $p < .05$) compared to participants from other disciplines. The academic years across the different Bachelor's degrees did not predict any outcome.

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Table 2. Hierarchical regression

		Depression (HADS)		Anxiety (HADS)		Stress (PSS)		Psychological well-being (BEP)	
		B	SE	B	SE	B	SE	B	SE
Intercept		5.89***	.23	10.71***	.25	43.05***	.50	82.49***	.58
Block 1	Age	.01	.05	-.002	.06	-.14	.11	-.09	.13
	Gender	-.76	.55	-2.90***	.60	-5.72***	1.18	2.60	1.39
	R^2	*.004*		*.05*		*.06*		*.009*	
Intercept		5.33***	.39	10.08***	.41	42.27***	.83	82.66***	.98
Block 1	Age	.03	.05	.03	.06	-.08	.12	-.11	.14
	Gender	-.72	.55	-2.87***	.59	-5.71***	1.18	2.59	1.40
Block 2	1st year	1.25*	.51	1.63**	.54	2.42*	1.09	-.52	1.29
	3rd year	.34	.54	.16	.57	-.24	1.14	.06	1.35
	increase in R^2	*.02*		*.02*		*.02*		*.001*	
Intercept		5.06***	.49	9.61***	.53	42.16***	1.06	83.46***	1.26
Block 1	Age	.04	.05	.03	.06	-.10	.12	-.08	.14
	Gender	-.75	.54	-2.84***	.58	-5.58***	1.17	.2.28	1.39
Block 2	1st year	1.42**	.50	1.79**	.54	2.83*	1.07	-.93	1.28
	3rd year	.26	.52	.14	.56	-.30	1.12	-.07	1.34
Block 3	Medicine	-.69	.56	-.59	.61	-2.44*	1.22	2.16	1.45
	Pharmaceutical sciences	3.02***	.69	2.79***	.74	4.30**	1.49	B =3.83	1.78
	Psychology	.13	.53	.68	.56	.18	1.13	-2.01	1.35
	increase in R^2	*.06*		*.05*		*.04*		*.03*	
Intercept		4.92***	.41	9.49***	.47	41.85***	.87	83.71***	1.16
Block 1	Age	-.02	.05	-.02	.05	-.23*	1.0	.03	.13
	Gender	-.32	.46	-2.46***	.52	-4.60***	.96	1.48	1.29
Block 2	1st year	.66	.43	1.10*	.48	1.08	.89	.50	1.20
	3rd year	.59	.44	.44	.50	.47	.93	-.69	1.24
Block 3	Medicine	.30	.48	.31	.55	-.16	1.01	.32	1.36
	Pharmaceutical sciences	1.48**	.59	1.71*	.67	1.57	1.24	-1.62	1.66
	Psychology	.38	.45	.90	.51	.76	.93	-2.48*	1.25
Block 4	Academic satisfaction	-.30***	.02	-.28***	.03	-.70***	.05	.57***	.07
	increase in R^2	*.26*		*.18*		*.29*		*.14*	
Intercept		2.27***	.56	5.35***	.60	32.87***	1.07	88.63***	1.62
Block 1	Age	-.03	.04	-.04	.05	-.27**	.08	.05	.13
	Gender	.01	.44	-1.94***	.47	-3.42***	.84	.86	1.27
Block 2	1st year	.30	.41	.54	.44	-.12	.78	1.15	1.18
	3rd year	.61	.42	.48	.45	.54	.80	-.73	1.22
Block 3	Medicine	.42	.46	.51	.50	.26	.88	.08	1.33
	Pharmaceutical sciences	1.64**	.57	1.41*	.61	.91	1.08	-1.26	1.63
	Psychology	.28	.43	.75	56	42	.81	-2.30	1.23
Block 4	Academic satisfaction	-.26***	.02	-.20***	.03	-.53***	.05	.48***	.07
Block 5	COVID-19 stress	.45***	.07	.70***	.07	1.53***	.13	-.84***	.20
	increase in R^2	*.06*		*.13*		*.15*		*.03*	

Note. * p < .05 ; ** p < .01 ; *** p < .001 ; B: Beta coefficients; SE: standard error; HADS: Hospital Anxiety and Depression Scale; PSS: Perceived Stress Scale; BEP: Psychological Well-Being Scale; SSS: Scale of Satisfaction with Studies. Reference categories: women, second year, School of Health Sciences Geneva.

Discussion

This study sought to investigate the mental health status of Bachelor's degree students of different health disciplines and related risk and protective factors in the context of COVID-19 and academic year-end. Year-end students reported lower academic satisfaction and were more stressed, anxious, and depressed than their counterparts at the beginning of the year. Similar to Franzen et al. (2021) conducted in October 2019, year-end academic satisfaction

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had a critical impact on depression, anxiety, stress, and psychological well-being. COVID-19 was comparably a weaker predictor of students' overall mental health—it still had some influence, but rather on stress and anxiety than depression and psychological well-being. As in Franzen et al. (2021), women reported more anxiety and stress than men, decreased age was associated with stress, and the academic year had no influence. Pharmaceutical sciences students reported higher psychological distress more in the form of depression than stress as in Franzen et al. (2021).

The overall results converge with those of earlier studies with regard to gendered anxiety and stress levels and the positive relationship between academic satisfaction and mental health [2, 5, 17, 34]. However, we did not find first- or second-year students to be more depressed, anxious, and stressed than their peers in other years [6, 8, 17-20]. Nor did we show that nursing students and other students attending the School of Health Sciences Geneva had more risk of poorer mental health than their counterparts from psychology, medicine, or pharmaceutical sciences [3-5].

Several factors may explain the worsening in student mental health in this study compared to Franzen et al. (2021). First, during the academic year-end period and despite the COVID-19 disruptions, all the training institutions involved in this research continued to carry out university tests and exams—a known source of student stress [10-12]. Leniency was, however, applied to exam no-shows and grading to account for the COVID-19 situation.

Second, COVID-19 has been shown to affect negatively the mental health of students worldwide [24-26]. Our study indicates that it mainly worsened stress and anxiety levels, which mirrors another Swiss study, where students reported higher levels of loneliness, stress, and anxiety and decreased social interaction [35]. In a global study covering 62 countries, students expressed anxiety, boredom, frustration, and concerns about their academic and professional careers [36]. In another study from Bangladesh, students reported e-learning burden and fear

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of missing out [37]. Nursing students in Israel stressed the lack of personal protective equipment as a source of high anxiety [27]. To cope with anxiety and stress, students have resorted to seeking support from others, using humor, or engaging in mental disengagement behaviors, such as excessive eating and alcohol or sedative use [25, 27].

Our analyses indicate, however, that academic satisfaction was stronger than COVID-19 in predicting student psychological health, thus offering additional evidence on the connection between students' academic satisfaction and mental health. Previous research includes studies conducted in Korea correlating satisfaction in college with stress, and in Turkey, which showed that students satisfied with their education had lower depression, anxiety, and stress scores than those who were not satisfied [17, 34]. What students have identified as deeply satisfying academically include the balance between study and personal life, society's views of students, feeling able to cope with the workload, the physical condition of the learning environment, the availability of learning resources, feeling able to get financial advice, the variety of assessment techniques, and other students' views of university life [38]. Academic satisfaction was also found to be influenced by factors such as students' grades and performance, the program, the quality of teaching, student-to-faculty ratios, and faculty credentials [39-41]. Furthermore, supportive college environments, students' sense of belonging, civic engagement, and professional confidence allow college students to flourish and positively predict their psychological well-being [42]. Therefore, one can hypothesize how COVID-19 lockdown measures and learning disruption compromised many of the factors contributing to academic satisfaction and mental well-being, such as a sense of belonging, study-life balance, or confidence in one's performance and future professional outlooks.

Implications for policy, practice, and research

Considering COVID-19 upending and the importance of students' academic satisfaction per se and as a predictor of psychological health, academic institutions must

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prioritize implementing and evaluating relevant interventions. In the short and medium-term, it is critical to implement measures to mitigate the impact of COVID-19 restrictions on students' learning experience and psychological distress. In the medium and long term, efforts should be made to tackle the factors influencing students' academic satisfaction directly.

By way of example, establishing blended learning strategies, balancing the unique clinical learning opportunities offered by COVID-19 prevention and control services with proper protective measures and equipment, offering leniency on tests, exams, and deadlines, and ensuring prompt access to quality psychosocial services whenever necessary have been welcome by students [43, 44]. Institutions could also draw from evidence-informed stress management programs, which were developed for medical and nursing students but could benefit those of other health disciplines [45, 46]. Such programs include, for instance, self-hypnosis, meditation, mindfulness-based stress-reduction, feedback on various health habits, educational discussion, changes in the length and type of curriculum, changes in the grading system, or music therapy and muscle relaxation before exams to improve academic performance [45, 46].

Strengths and limitations

There were several limitations in our study. First, the self-administered survey provided subjective measures. Second, the data were not matched to those of Franzen (2021), which would have increased power in our analysis by eliminating variation between samples. Given both studies' anonymous nature, we could not link data at the individual level to offer a longitudinal perspective. Third, using a control group (students with similar demographic characteristics but not studying health) would have expanded the scope of the current study by allowing for more comparative conclusions. However, the main goal of this research was to look at causes other than psychological distress in a variety of health-related fields (not only nursing and medical students) and compare the results to those from Franzen et al (2021).

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Finally, the cross-sectional design could not rule out reverse causality, meaning that lower psychological distress could have resulted in lower COVID-19 stress, greater academic satisfaction, or both.

The research had a number of strengths. First, both psychological distress and well-being were examined. Second, it surveyed students in health fields other than medicine, nursing, and psychology. Third, it used a rigorous statistical analysis approach with hierarchical regressions.

Conclusions

Compared to COVID-19 related stress, academic satisfaction was a stronger predictor of depression, anxiety, stress, and psychological well-being among Bachelor's students of health disciplines at the end of the academic year. Training institutions should tackle the factors that can catalyze academic satisfaction and ensure that students have a continuous and adequate learning experience despite COVID-19 restrictions. Equally critical is the timely access to relevant psychosocial services to prevent and alleviate mental distress and boost their psychological well-being.

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Declarations

Ethics approval and consent to participate

See the ethics statement in the article.

Consent for publication

Not applicable.

Availability of data and materials

Data is available upon reasonable request from the corresponding author.

Competing interests

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Authors' contributions

JF, PG, FJ, SR, and GB conceived and designed the study; JF, FJ, and NTT analyzed the data; NTT drafted the manuscript; JF, FJ, PG, SR, GB, and NTT helped with data interpretation and revised the manuscript critically for important intellectual content. All authors contributed to manuscript revision and have approved the final version.

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