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Pre- and post-pandemic knowledge of psychiatry: an assessment using the mhGAP basic course test

Conocimiento sobre psiquiatría antes y después de la pandemia: una evaluación mediante el examen del curso básico de mhGAP

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ABSTRACT

Objective: To determine the level of knowledge about psychiatry among sixth-year medical students before and after the pandemic, using the Mental Health Gap Action Programme basic course test (mhGAP-BCT). **Methodology:** It was a descriptive, cross-sectional study. Sociodemographic data and responses to mhGAP-BCT were collected. **Results:** Students who completed an elective rotation in psychiatry scored higher on the mhGAP-BCT ($\beta = 1.90$; 95% CI [0.94, 2.87]; $p < 0.001$). Psychiatry knowledge scores using the mhGAP-BCT were lower in students during the 2022 period (post-pandemic) compared to the 2019 period (pre-pandemic) (14.44 ± 4.25 vs. 15.57 ± 1.89; $p = 0.048$). **Conclusions:** Students who completed an elective rotation in psychiatry achieved higher scores on the mhGAP-BCT. Post-pandemic mhGAP-BCT scores were lower than pre-pandemic scores. To the best of our knowledge, this is the first attempt in our country to explore knowledge acquired by clerkship students using the mhGAP-BCT.

Keywords: mental health; psychiatry; mental disorders; medical education; knowledge.

RESUMEN

Objetivo: Determinar el nivel de conocimiento en psiquiatría y salud mental de los externos de medicina de una Facultad de Medicina, mediante la aplicación de la prueba del curso básico del Programa de Acción para la Brecha de Salud Mental (PCB-mhGAP). **Metodología:** El estudio fue descriptivo. La recolección de los datos generales y las respuestas de la PCB-mhGAP fue de tipo transversal.

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Resultados: Los estudiantes que realizaron una rotación electiva en psiquiatría obtuvieron un mayor puntaje en la PCB-mhGAP en comparación con quienes no la hicieron (β = 1,90; IC 95%: 0,94-2,87; p < 0,001). Los puntajes de conocimiento sobre psiquiatría y salud mental fueron más bajos en los estudiantes del externado durante el período 2022 (postpandemia) en comparación con aquellos del período 2019 (prepandemia) (14,44 ± 4,25 vs. 15,57 ± 1,89; p = 0,048). **Conclusiones:** Los estudiantes que realizaron una rotación electiva en psiquiatría tienen un mayor puntaje en la PCB-mhGAP. Los puntajes pospandemia de la PCB-mhGAP fueron menores que los obtenidos en prepandemia. Hasta donde sabemos, este es el primer intento de explorar en nuestro país el nivel de conocimiento adquirido por los estudiantes de pasantía mediante la PCB-mhGAP.

Palabras clave: salud mental; psiquiatría; trastornos mentales; educación médica; conocimiento.

INTRODUCTION

"There is no health without mental health". Mental health, as well as health, is a fundamental right for all people and is crucial for personal, family, professional, community, and socioeconomic development. Mental health is just as important as physical health. Good mental health enables individuals to cope with daily stressors, recognize their abilities, learn and work effectively, and contribute to society (1). Mental health exists on a complex and variable continuum, ranging from an optimal state of well-being to states of significant disability. In 2020, due to the COVID-19 pandemic, studies estimated that the prevalence of anxiety disorders and depression increased by 26% and 28%, respectively, in that year alone (2). The COVID-19 pandemic affected the mental health and well-being of individuals, both those with and without pre-existing mental disorders, highlighting the urgent need to strengthen mental health systems worldwide (3).

Mental disorders are highly prevalent worldwide. The World Mental Health Report estimated that, in 2019, before the pandemic, approximately 970 million people were living with a mental disorder, with anxiety disorders (31.0%) and depression (28.9%) being the most common (1). Worldwide, one in eight people lives with a mental disorder. Of these, 82% are in low- and middle-income countries, such as ours. The prevalence of mental disorders remained stable at approximately 13% between 2000 and 2019 (2).

A systematic review of population-based studies, which included 36 studies on anxiety disorders in Latin America, reported a lifetime prevalence of 14.55% (95% CI [12.32%, 17.11%], a 12-month prevalence of 6.61% (95% CI [5.20%, 8.37%]), and a point prevalence of 3.27% (95% CI [2.34%, 4.56%]). The review indicates that approximately 1 in 7 people will experience an anxiety disorder at some point in their lives (4).

The COVID-19 pandemic has had a significant impact on global mental health. In Latin America, the prevalence of mental disorders has increased disproportionately, most likely due to external factors such as reduced access to housing, sanitation, and food security (5). The high prevalence of mental disorders and the substantial burden of disease in Latin America have contributed to a significant proportion of adults and children with mental illnesses not receiving treatment. This has resulted in a significant gap in addressing mental health problems, posing a serious public health challenge (6). Studies have shown that the World Health Organization's Mental Health Gap Action Programme (mhGAP), designed for non-specialist health workers to provide care for people with mental disorders, has been successfully implemented in the training of medical and nursing students (7-9).

According to Saavedra et al. (10), who examined the prevalence, access, and factors associated with major mental disorders among adults in Metropolitan Lima during the COVID-19 pandemic, 57.2% of a sample of 1,823 individuals experienced moderate to severe levels of stress. Additionally, the prevalence of mental disorders was 19.6% in the last 12 months, 17.8% in the last six months, and 12.5% at the time of the study. The pandemic-related increase in the prevalence of mental disorders in the country widened the gap in access to treatment.

The COVID-19 pandemic had a significant impact on the mental health and well-being of all individuals worldwide. While many individuals were able to adapt, others experienced mental health problems.

The pandemic restricted and, in some cases, even prevented access to mental health services (11). In 2020, the COVID-19 pandemic led to an increase in mental health problems, with a prevalence of depressive and anxiety disorders increasing by 27.6% and 25.6%, respectively.

The pandemic posed significant challenges to health systems; however, they were not the only sector affected. Educational institutions, including medical schools, also faced considerable challenges, such as the need to rapidly adapt clinical practices to virtual environments, ensure access to secure and efficient digital platforms for students and faculty, and provide training in the use of new technologies. Medical schools were required to transform their in-person clinical practices into digital simulations. Among the methodologies implemented, synchronous virtual classes, distance simulations, and online seminars stood out, which enabled the continuity of medical education during exceptional circumstances, including the training of medical students in addressing mental health issues (12-17).

The main purpose of this study was to assess knowledge of psychiatry among sixth-year medical students using the mhGAP-Basic Course Test (mhGAP-BCT). In summary, assessing knowledge of psychiatry among medical students using the mhGAP-BCT can provide valuable insights to guide potential modifications in the psychiatry curricula.

METHODOLOGY

This was a descriptive, cross-sectional study. General data and responses to the mhGAP-BCT were collected from participants. The study population consisted of all sixth-year medical students in their clerkship year at a Peruvian university. The test was administered on the day sixth-year medical students took their final exam of the year. The total number of sixth-year medical students enrolled in the second term of 2019 and 2022 was 137 and 177, respectively.

- *Inclusion criteria*: Sixth-year medical students who provided informed consent to participate in the study.
- *Exclusion criteria*: Sixth-year medical students who did not provide informed consent to participate in the study.

The sample size calculation was based on a mean difference in two independent groups. An average difference of 1 point in psychiatry knowledge scores in students from the 2022 and 2019 periods was considered. Assuming equal variances, with a common standard deviation of 1.96, a 95% confidence level, and 80% statistical power for a two-tailed test, a minimum sample size of 70 students from each period was required.

mhGAP-BCT

The mhGAP-BCT was designed to assess the mhGAP modules. It consists of 25 questions: questions 1-11 are true or false, and questions 12-25 are multiple-choice, each with 3 alternatives. The questions cover several subject areas: Essential health care and practices (1, 2, 10 and 25), Depression (3, 8, 12, 13 and 14), Psychosis (15 and 16), Epilepsy (7, 17 and 18), Child and adolescent mental and behavioral disorders (6, 9, 22 and 23), Dementia (4 and 21), Substance use disorders (5, 20 and 24) and Self-harm/suicide (11 and 19).

Procedure

Authorization was obtained from the Pan American Health Organization and the School of Medicine to administer the mhGAP-BCT to sixth-year medical students. It was then determined that the test would be given to all students on the day they took the general knowledge exam at the end of the academic year. Both were online in a face-to-face format.

Procedure on the day of application of the mhGAP-BCT

On the day of the exam, the following procedure was followed: 1) The objectives of the study were explained to participants; 2) Participants were given time to review the informed consent, and all their questions were addressed; 3) Those who provided consent completed a general information form and the mhGAP-BCT online. The same procedure was followed in 2019 (pre-pandemic) and 2022 (post-pandemic).

Statistical analysis plan

The characteristics of the study populations in 2019 (pre-pandemic) and 2022 (post-pandemic) were described using summary statistics (frequencies and percentages for categorical variables and mean ± SD for numerical variables) and compared using the chi-square test and Student's t-test, as required. The mhGAP-BCT scores were summarized as mean ± SD and were analyzed by academic period (2019 and 2022), and participant characteristics. Finally, regression coefficients were

obtained using generalized linear models (GLM) with a Gaussian family and an identity link function to evaluate significant differences between the mhGAP-BCT scores and the academic period. Briefly, bivariate equations were executed between each of the variables of interest with the outcome variable (mhGAP-BCT scores), and then all variables were included using a stepwise-forward-selection model to identify those variables to be included in a fine-tuned linear regression model, considering p values < 0.05 for the selection of each variable in the model. The regression coefficients (β) estimated from the regression models were presented with their respective 95% confidence intervals. Statistical analyses were performed in Stata/IC 19.5 (StataCorp LLC, College Station, TX, US). A statistical significance level of 5% was considered.

Ethical considerations

The project was approved, and all renewals were obtained in accordance with the regulations and procedures of the Institutional Committee on Research Ethics in Human Beings of the Universidad Peruana Cayetano Heredia. Data confidentiality was ensured. This study posed no risk to the population under study. Participation was voluntary, and all participants signed informed consent.

RESULTS

The characteristics of both study populations are presented in Table 1. The mean age was lower among medical students in 2022 (post-pandemic) than in 2019 (pre-pandemic) (mean SD ±: 23.37 ± 1.64 years vs. 24.21 ± 1.33 years; Student's t-test, p < 0.001). The distribution by sex did not differ significantly between the two groups. All students in both groups were single, and the distribution of personal and family psychiatric history did not differ between the pre-pandemic and post-pandemic clerkship students. On the other hand, a higher proportion of clerkship students in 2022 reported previous rotations in psychiatry compared to 2019 clerkship students (16/67, 24.24%, vs. 8/135, 5.93%; chi-square test, p < 0.001).

The analysis of mhGAP-BCT scores showed greater dispersion and were lower among medical students in 2022 (post-pandemic) than in 2019 (pre-pandemic) (14.44 ± 4.25 vs. 15.57 ± 1.89). These differences were statistically significant in the bivariate linear regression model (β = –1.13; 95% CI [–2.26, –0.01]; p = 0.048). No significant differences were observed in mhGAP-BCT scores according to the age, personal or family psychiatric history, or completion of elective rotations in psychiatry (all p values ≥ 0.05). However, after the inclusion of all the variables in the regression model, only the academic period and the presence of previous rotations in psychiatry were observed as statistically significant variables (p < 0.05). With respect to the academic period, after adjustment for previous rotations in psychiatry, clerkship students in 2022 (post-pandemic) had a 1.44-point lower expected mhGAP-BCT score compared with those in 2019 (pre-pandemic) (β = –1.33; 95% CI [–2.54, –0.13]; p = 0.030). In addition, after adjustment for academic period, students who reported elective rotations in psychiatry had a 1.90-point higher expected mhGAP-BCT score than those who did not (β = 1.90; 95% CI [0.94, 2.87]; p < 0.001) (Table 2).

Table 1. Characteristics of sixth-year medical students by academic period (2019 and 2022).

Features	Academic period				p
	2019		2022		
	n = 135/137	%	n = 67/177	%	
Age (years)[1]					
Mean ± SD	24.21 ± 1.33		23.37 ± 1.64		<0.001
Age categories[1]					
≤24 years	73	54.07	43	84.31	<0.001
>24 years	62	45.93	8	15.69	

[1] 16 missing data for age.
[2] 1 missing data for personal psychiatric history.
[3] Frequencies obtained over the total number of students with a psychiatric history.
[4] Frequencies obtained over the total number of students with a family member with a psychiatric history.
[5] 1 missing data for previous psychiatry rotation.

Table 1. (*Continuation*).

Features	Academic period				p
	2019		2022		
	n = 135/137	%	n = 67/177	%	
Sex					
Female	73	54.07	37	55.22	0.877
Male	62	45.93	30	44.78	
Marital status					
Single	135	100.00	67	100.00	ND
Personal psychiatric history[2]					
No	92	68.15	45	68.18	0.996
Yes	43	31.85	21	31.82	
Psychiatric disorder history[3]					
Depression	35	81.40	16	76.19	0.627
Anxiety	14	32.56	3	14.29	0.120
Others	4	9.30	6	28.57	0.046
Psychiatric family history[4]					
No	71	52.59	41	61.19	
Yes	41	30.37	18	26.87	0.462
Unknown	23	17.04	8	11.94	
Psychiatric disorder family history					
Depression	30	73.17	8	44.44	0.034
Anxiety	4	9.76	4	22.22	0.198
Others	13	31.71	10	55.56	0.084
Previous psychiatry rotation[5]					
No	127	94.07	50	75.76	<0.001
Yes	8	5.93	16	24.24	

[1] 16 missing data for age.
[2] 1 missing data for personal psychiatric history.
[3] Frequencies obtained over the total number of students with a psychiatric history.
[4] Frequencies obtained over the total number of students with a family member with a psychiatric history.
[5] 1 missing data for previous psychiatry rotation.

Table 2. Crude and adjusted linear regression coefficients* to evaluate the association between study variables and mean mhGAP-BCT scores in clerkship students (2019 and 2022).

Features	Mean ± SD	Raw data		Adjusted data**	
		β (95% CI)	p	β (95% CI)	p
Age					
≤24 years	15.36 ± 2.84	Ref.			
>24 years	15.25 ± 2.63	–0.11 (–0.91, 0.69)	0.782		

*Regression coefficients obtained from generalized linear models (GLM), Gaussian distribution family, identity link function, and robust variances.
**Model selection using a Stepwise-forward-selection model, retaining variables with a p value < 0.05)

Table 2. (*Continuation*).

Features	Mean ± SD	Raw data		Adjusted data**	
		β (95% CI)	p	β (95% CI)	p
Sex					
Female	15.22 ± 2.8	Ref.			
Male	15.17 ± 3.31	–0.7 (–0.93, 0.80)	0.882		
Psychiatric history					
No	15.29 ± 2.96	Ref.			
Yes	15.6 ± 2.99	–0.13 (–1.01, 0.7)	0.771		
Family psychiatric history					
No	14.96 ± 3.46	Ref.			
Yes	15.38 ± 2.30	0.2 (–0.45, 1.28)	0.343		
Unknown	15.69 ± 2.92	0.73 (–0.46, 1.93)	0.230		
Previous psychiatry rotation					
No	1.08 ± 3.09	Ref.		Ref.	
Yes	15.93 ± 2.98	0.86 (–0.40, 2.11)	0.182	1.90 (0.94, 2.87)	<0.001
Academic period					
2019	15.57 ± 1.89	Ref.		Ref.	
2022	14.44 ± 4.55	–1.13 (–2.26, –0.01)	0.048	–1.33 (–2.54, –0.13)	0.030

*Regression coefficients obtained from generalized linear models (GLM), Gaussian distribution family, identity link function, and robust variances.
**Model selection using a Stepwise-forward-selection model, retaining variables with a p value < 0.05)

DISCUSSION

The most relevant findings of the study are: 1) Knowledge about psychiatry, as measured by the mhGAP-BCT score, was higher among students who participated in an elective rotation in psychiatry compared to those who did not complete such a rotation; and 2) Knowledge about psychiatry, according to the mhGAP-BCT score, was lower in 2022 (post-pandemic) than in 2019 (pre-pandemic). The most relevant findings of the study are discussed below.

Knowledge of psychiatry, as measured by the mhGAP-BCT score, and elective rotations in psychiatry

This study found that students who completed an elective rotation in psychiatry demonstrated greater knowledge in psychiatry, as measured by the mhGAP-BCT score. No studies in the literature have reported an improvement in knowledge, as assessed by the mhGAP-BCT, following participation in an elective psychiatry rotation. However, other studies have described several benefits of participating in an elective rotation in this specialty, such as reduced stigma, an increased likelihood of choosing psychiatry as a specialty, and a more positive attitude towards people with mental disorders.

Zavorotnyy et al. (18) conducted a study to analyze factors influencing stigmatizing attitudes toward mental disorders among medical students during an elective psychiatry rotation. The study included 256 students from a medical school in Germany using pre- and post-elective surveys. The questionnaires included questions about students' attitudes toward psychiatry and stigma. After the elective rotation, a significant reduction in stigma was observed, and students were more willing to choose psychiatry as their specialty after completing medical school. The findings demonstrated that a psychiatry rotation with direct interaction of students with patients can reduce stigma. They suggested that incorporating direct student-patient interaction can reduce stigma. The author suggested that incorporating direct interaction into medical education to combat stigma and

discrimination could lead to improved management of patients with mental disorders.

Additionally, Lyons and Janca (19) state that those mental illnesses are a serious public health problem, and psychiatry remains an unattractive specialty for medical students, which contributes to the shortage of psychiatrists. Their study evaluated the impact of an eight-week psychiatry rotation on medical students' knowledge, interest, attitudes, and perceptions of stigma toward psychiatry. The results, measured with an analogous scale from 1 (low interest/knowledge) to 10 (high interest/knowledge), showed that knowledge of psychiatry improved from 3.5 to 6.0 after the elective rotation, a statistically significant difference. Interest in the specialty increased from 5.7 before the rotation to 6.1 after the rotation. They reported a significant reduction in stigmatizing views regarding mental illness, and the number of students who seriously considered psychiatry as a career increased. The authors concluded that integrating anti-stigma strategies into physician training could improve the perception of psychiatry as a specialty and motivate more students to choose it.

Similarly, Economou et al. (20) explored the impact of psychiatry rotations on students' attitudes. A total of 678 final-year medical students completed a self-administered questionnaire that included the Attitudes towards psychiatry scale, the Attitudes towards mental illness scale, and the Social distance scale, both before and after their rotation. The results indicated that the rotation had a positive effect on reducing stigma towards both psychiatry and mental disorders. This effect was more pronounced in general hospitals, while in specialized hospitals, the stigma reduction was more marked toward patients with mental disorders. Further exploration revealed that improvement in the general hospital was detected only among those with no prior professional mental health experience. Therefore, a rotation in psychiatry can exert a considerable influence on the development of favorable attitudes toward both mental illness and psychiatry.

Similarly, Grant et al. (17) described the benefits of elective rotations in child psychiatry, noting that most young people with mental health problems lack access to psychiatric care and often rely on doctors who are inadequately prepared. They emphasized that enhancing medical education in child psychiatry is essential. This study evaluated changes in medical students' perspectives after participating in an elective rotation in Child and Adolescent Psychiatry, revealing significant improvements in students' abilities to assess suicidal ideation, diagnose mental health conditions, and understand biopsychosocial factors. The results suggest that participation in elective rotations in child and adolescent psychiatry may increase students' confidence in managing mental health issues among youth.

Additionally, the World Psychiatric Association highlights a shortage of psychiatrists and identifies factors that influence choosing psychiatry as a career, such as having positive experiences during training, a personal or family history of mental illness, and prior exposure to the field. They noted that elective rotations in psychiatry can encourage students to select psychiatry as a specialty. Conversely, factors such as the lack of facilities, limited social recognition, low remuneration, stigma, and prejudice can make this choice more challenging. To enhance recruitment, the Association recommends increasing the quality and accessibility of psychiatric care, improving training, integrating psychiatry into the curriculum from the outset, reducing social stigma, and promoting extracurricular activities and initiatives that raise awareness of the specialty and mental health (19).

The motivational model of adult learning theories states that both motivation and reflection are key elements to facilitate learning (21). This model could help explain the findings of this study, as it suggests that students who choose to participate in an elective rotation in psychiatry are more motivated toward the specialty, which may account for their higher scores on the mhGAP-BCT. All curricular activities that encourage students to become more motivated by psychiatry as a specialty could lead to greater learning and improved care for individuals with mental health problems.

Knowledge of psychiatry before and after the pandemic, according to the mhGAP-BCT score

This study found that knowledge of psychiatry, as measured by the mhGAP-BCT score in 2022 (post-pandemic), was lower than in 2019 (pre-pandemic) (14.44 ± 4.25 vs. 15.57 ± 1.89), and these differences were statistically significant.

The pandemic generated great challenges to health systems; however, educational institutions—including medical schools—were also greatly affected. Medical schools faced the urgent need to rapidly adapt clinical training to virtual environments, ensure both students and faculty had access to secure and efficient digital platforms, and provide faculty training in the

use of new technologies. Notable methodologies were implemented, including synchronous virtual classes, online simulations, and seminars. These strategies enabled the continuation of medical education under exceptional circumstances, including training medical students in mental health problems. As a result, these adaptations aimed to ensure continuity of teaching, preserve educational quality, and enable students to acquire essential clinical competencies despite restrictions on in-person learning and social distancing (12-14). Our medical school implemented all necessary adaptations to maintain educational standards during the pandemic; however, this study found a decrease in the mhGAP-BCT score, which may suggest a decline in knowledge of psychiatry.

Like the findings of this study, a scoping review reported that the COVID-19 pandemic negatively impacted the education of medical students worldwide, affecting both high-income and low- and middle-income countries. Several factors affected students and educators, including curriculum changes due to the pandemic, assessment design, reduced patient contact, the adoption of new technologies, and limited infrastructure. Low- and middle-income countries faced additional barriers and challenges, such as limited access to information technology infrastructure and a lack of government support (22).

Similarly, Dost et al. (23) investigated medical students' perceptions of how online teaching facilitated medical education during the COVID-19 pandemic. They conducted a national cross-sectional online survey from May 4-11, 2020, across 40 medical schools in the United Kingdom. The 2721 students who participated rated their experience with online teaching using a Likert scale, where 1 indicated strong disagreement, and 5 indicated strong agreement. Overall, students were not engaged with online teaching, did not find it entertaining, and reported few opportunities to ask questions. On average, students were neutral when asked if online teaching should be more interactive; however, they reported that they did not find it as effective as face-to-face teaching. On the other hand, students identified family distractions (26.76%), internet connection issues (21.53%), tutoring schedule (17.31%), anxiety (11.08%), and lack of space (11.03%) as barriers to effective online teaching. Eighty-one students commented that they experienced a lack of motivation, difficulty concentrating and asking questions, as well as a lack of contact with peers, and not receiving feedback as important limitations. Compared to face-to-face teaching, the students in this study were less satisfied with online teaching (1.92/5) and unprepared for their profession (2.28/5).

In contrast to this study, Wilkes et al. (24) evaluated the Structured Objective Clinical Examinations (OSCEs) of the Psychiatry and Addictions course within a medical program, comparing the three years prior to the pandemic (2017-2019), as a reference, with the three years during the COVID-19 pandemic (2020–2022). The analysis involved a review of the summative assessment of medical students, comparing results from before and during the pandemic. A significant increase in the average exam scores was observed following the onset of the pandemic, both for the combined OSCE scores across all final-year disciplines and for the role-playing scenario in Psychiatry and Addictions. However, this increase did not occur in the mental status examination component. The transition to online OSCEs during the pandemic was associated with higher scores in some, but not all, test domains.

Torda and Shulruf (25) demonstrated that social activities among students, such as interacting with peers and tutors, collaborating in groups, and establishing friendships, directly influence well-being and indirectly affect learning outcomes, including motivation, satisfaction, and integration of knowledge. In a rapidly evolving educational context, such as during the pandemic, it is essential to consider these aspects when designing academic activities. The results of their study support the idea that the design of activities and the teacher's experience in facilitating small group work have a greater impact on student learning than the teaching format used.

The COVID-19 pandemic significantly disrupted medical education globally. A study was conducted to assess medical students' perceptions, experiences, and the changes in teaching methods during this period. An international global team recruited medical students for an online survey in Autumn 2020. The survey examined COVID-19's perceived impact on their training and related factors. Univariate and multivariable analyses identified associations. Of 1,604 eligible participants from 45 countries, 56.3% were female, and the median age was 21 (IQR: 21–23). Nearly half of medical students were in clinical years, and 84.5% lived in low- or middle-income nations. Overall, 81.4% said COVID-19 negatively affected their training. Younger age, female gender, and reduced traditional teaching correlated with a more negative impact ($p \leq 0.001$), while increased clinical responsibilities reduced this effect ($p < 0.001$). The

economic context of participants' countries and their training stage influenced some training experiences ($p < 0.05$) (26).

An adult learning model introduced by Taylor and Hamdy (21) proposed five stages in the learning process. It begins with the learner's prior knowledge. 1) Dissonance Phase: When this knowledge is challenged, either internally or externally, provided by a patient or teacher, engagement depends on the nature of the task, resources, motivation, development stage, and learning style. 2) Refinement Phase: The learner then refines new information through elaboration, research, and discussion, creating new concepts. 3) Organization Phase: The ideas are restructured by testing hypotheses and forming meaningful schemata. 4) Feedback phase: During feedback, learners present their understanding to peers and teachers for validation or revision. 5) Consolidation Phase: Finally, the consolidation phase involves reflecting on both the content learned and the overall learning process. The COVID-19 pandemic altered the learning process of medical students by disrupting traditional educational methods and introducing new challenges. The shift from in-person instruction to remote learning environments required students to adapt quickly, often with limited resources and changing expectations from faculty and peers. This transition affected how medical students engaged with course material, interacted with mentors and patients, and processed feedback within their educational journey (27, 28). Altering the learning process could explain why the students' knowledge of psychiatry, measured by the mhGAP-BCT score, was lower after than before the pandemic

Moreover, the COVID-19 pandemic led to an increase in mental health problems worldwide, with depressive and anxiety disorders, rising by 27.6% and 25.6% respectively (3). Sarabia (29) reported the relationship between depressive symptoms and academic performance in first- to fifth-year medical students, using the PHQ-9 questionnaire to identify depressive symptoms, and using grade averages and class ranking at the end of each academic semester as performance indicators. The study involved 534 students: 33.5% (n = 179) had mild depressive symptoms, 12.4% (n = 66) showed moderate to severe symptoms, and 4.5% (n = 24) had suicidal ideation. Multivariate analysis revealed that students with moderate to severe depressive symptoms ranked, on average, 15 places lower (95% CI [3.96, 27.22]) than their peers with minimal symptoms in the first semester, and 12 places lower (95% CI [0.51, 23.86]) in the second semester. In conclusion, students with moderate to severe depressive symptoms (12.4% of the sample) were, on average, 15 and 12 positions below those with minimal symptoms, lower in the first and second semesters, respectively. This association between depression and poor academic performance highlights the importance of implementing preventive programs and promoting timely detection and treatment. The pandemic contributed to the increase in depressive symptoms among students, which could explain the decline in their academic performance.

The main limitations of the study were as follows: Regarding the design, the mhGAP-BCT was used to assess knowledge after the mhGAP modules for non-specialized health care; however, there is no published evidence of the validity of this test. This study assessed knowledge, which is one area of competence, and did not assess other areas, such as skills and attitude. The study population was limited to sixth-year medical students at a private university. Regarding the sample size, notable differences emerged between the pre-pandemic and post-pandemic periods. In 2019, before the pandemic, 98.54% of students completed the test. By contrast, in 2022, after the pandemic, the completion rate dropped significantly, with only 37.85% of students finishing the test. Although the target sample size of 70 students was not reached in 2022, statistical analysis still revealed a significant difference between both periods.

CONCLUSIONS

Despite the limitations, the results allow us to draw the following conclusions:

- Students who completed an elective rotation in psychiatry demonstrated higher knowledge of psychiatry, using the mhGAP-BCT score, compared to those who did not complete an elective rotation in psychiatry.
- Students' knowledge of psychiatry, measured by the mhGAP-BCT score, was lower after than before the pandemic. It is important to consider a possible selection bias, because only 37.85% of students responded after the pandemic.

RECOMMENDATIONS

Encourage a greater number of students to participate in elective rotations in psychiatry, as the findings of this study demonstrate that such experiences enhance their knowledge in this field.

More research is needed to analyze the underlying factors contributing to the decrease in the mhGAP-BCT score and develop academic support programs, workshops, or reinforcement courses to compensate for the negative impact.

Advocate for the comprehensive inclusion of psychiatry and mental health education within the medical curriculum to enhance the overall knowledge and preparedness of medical students in these critical areas.

Conduct regular assessments of students' competencies in psychiatry and mental health to identify areas needing improvement and adjust educational strategies to address the identified needs.

Although simulation is a valuable teaching tool, direct contact with patients is essential to strengthen learning; it should be prioritized in the medical school curriculum.

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