ORIGINAL ARTICLE

Longitudinal evaluation of the impact of an integrated psychiatry course on medical students as a tool to combat mental health stigma

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ABSTRACT

Background and aim: This study seeks to investigate if the involvement of fifth-year medical school students in the Integrated Course in Psychiatry within the curriculum leads to enhanced understanding of mental health, improved attitudes towards individuals facing mental health distress, and intended behavior and/or contact with those experiencing mental health issues. Additionally, the study aims to identify potential predictors linked to changes over time in the three mentioned variables (knowledge, attitudes, and behaviors).
Methods: All participating students were requested to complete a socio-demographic questionnaire and the Italian versions of three psychometric instruments: Mental Health Knowledge Schedule (MAKS-I), Community Attitudes to Mental Illness (CAMI-I), and the Reported and Intended Behavior Scale (RIBS-I). Each student was assigned a code which was used to match the questionnaires when re-administered at 3 months and 6 months.
Results: Of 150 eligible students, 87 (58%) participated at baseline; 41 (27%) completed the 6-month follow-up. The results showed an improvement in attitudes (CAMI-I mean score from 113.13 to 115.88; $p=.02$) and behaviors (RIBS-I from 16.74 to 17.08; $p=.05$) toward individuals with mental distress. However, knowledge decreased (MAKS-I from 23.24 to 19.88; $p<.001$). Following people on social media who discuss mental health was significantly associated with improved attitudes over time ($\beta = -6.47$; $p=.004$), while having experienced mental health challenges was linked to higher intended behavior ($\beta = -2.35$; $p=.03$).
Conclusions: The results obtained demonstrated that participation in a curricular course in psychiatry cannot be equated with participation in an anti-stigma activity. To hypothesize further improvement in the training

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activity, it could be useful to involve peer-workers as well, aiming to provide a perspective that is not solely doctor centered. (www.actabiomedica.it)

Key words: psychiatry training program, medical students, stigma, anti-stigma activity, discrimination

Introduction

Erving Goffman's seminal work, "Stigma: Notes on the Management of Spoiled Identity", published in 1963, is a foundational text in various disciplines and sciences, such as sociology, psychology, psychiatry, and anthropology (to name a few). In this book, Goffman introduces the concept of stigma as a deeply discrediting attribute that an individual possesses, leading to their reduced social status and devaluation of their identity within society (1). His work has provided a framework for comprehending the complexities of stigma and its implications for individuals with mental health conditions. Consequently, Goffman's pioneering research has paved the way for further investigations into the origins, manifestations, and consequences of mental health stigma, as well as the development of interventions to mitigate its effects (2). The study of the stigma phenomenon has garnered increasing attention, and currently, within the context of mental health, eight different types have been identified (3): public stigma pertains to the general population's response to individuals facing mental health challenges; structural stigma involves rules, laws, or institutions that systematically discriminate against or disadvantage people with mental disorders; self-stigma refers to the negative opinions individuals with mental challenges hold about their own conditions; felt or perceived stigma arises when individuals believe that those around them would negatively judge them for possessing a certain characteristic; label avoidance occurs when individuals steer clear of seeking or participating in mental healthcare to avoid the impact of a stigmatizing label; experienced stigma encompasses the actual experience of discrimination and/or participation on the part of the affected person; courtesy stigma, also known as stigma by association, refers to the stigmatization experienced by individuals connected to a stigmatized person or group (4); spiritual stigma involves beliefs about mental illness associating it with sinful behaviour or encouraging individuals to focus on religious practices and rituals as treatment for mental health challenges (5,6). To combat the stigma of mental illness, Patrick W. Corrigan proposed three approaches: protest, education, and contact. Education seeks to substitute stigmatized beliefs with more precise understandings of mental illness, while protest endeavors to actively suppress stigmatized beliefs and the behaviours linked to them. Conversely, contact challenges stigma by fostering direct interaction between participants and individuals living with mental illness or their caregivers (7). The phenomenon of stigma in mental health has been studied in various geographical contexts (nationality, culture, language) and among different subgroups (based on age, sex, occupation, education, spirituality, etc.) (8). One professional group that has frequently been the focus of research in the context of stigma are health professionals: literature has shown that mental health professionals exhibit stigmatizing attitudes towards individuals with mental illness, leading to barriers in treatment and recovery (9). This heightened stigma among healthcare professionals is attributed to perceived knowledge on the subject (10). A comprehensive review study suggests that stigma among healthcare professionals is a prevalent phenomenon that varies across cultures, genders, and the extent of non-professional interactions with individuals experiencing mental disorders (11). In the field of health professions, different studies have focused on physicians and their voluntary or involuntary role as perpetrators of stigma: stigmatization towards schizophrenia has been observed to be significantly more pronounced than towards depression (12). The findings also reveal that physicians tend to harbor

more negative attitudes towards mental illness in comparison to other professional groups and the general population. Comparative studies among these groups indicate that physicians exhibit the highest levels of stigmatizing attitudes, followed by other primary care professionals, mental health professionals, and the general population (10,13). Even aspiring doctors (medical students) have been studied in the context of mental health stigma from two different perspectives. Research has consistently shown that stigma acts as a substantial barrier to seeking mental health services among medical students. Despite experiencing mental health difficulties, medical students are often reluctant to openly admit their challenges due to fear of repercussions and stigma (14). Moreover, the influence of external factors, such as the COVID-19 pandemic, has been identified as a contributing factor to the worsening of mental health issues among medical students. This underscores the necessity for heightened awareness and support (15). On the other hand, there is numerous evidence in the literature demonstrating that medical students exhibit stigmatizing attitudes towards individuals with psychological challenges (16). These stigmatizing attitudes have been found to influence medical students' career choices, with many being deterred from considering psychiatry as a career (17,18). In conclusion, training medical students against stigma is essential to ensure the provision of quality mental health care, promote positive attitudes towards psychiatry, and safeguard the mental wellbeing of both patients and medical students. Several studies have evaluated the impact of educational and clinical training interventions aimed at reducing mental health stigma among medical students. Educational strategies, including lectures and brief instructional programs, have shown potential to shift attitudes positively. For example, a one-hour lecture focused on psychiatric services and the rights of people with mental illness led to significant improvements in attitudes related to social distance and perceptions of independence and human rights (19). More recently, Akpinar Aslan and Batmaz (20) demonstrated that a structured psychiatry clerkship and internship program was associated with a significant increase in medical students' knowledge about schizophrenia, along with a reduction in negative beliefs and a modest improvement in attitudes. Their findings also highlighted the nuanced relationship between knowledge, beliefs, and attitudes, suggesting that while knowledge gain is associated with reduced negative beliefs, it may not be sufficient alone to influence more complex attitudinal dimensions. For this reason, this study aims to: 1) verify whether the participation of five-year medical school students in the curricular Integrated Course in Psychiatry results in an improvement in knowledge of mental health, attitudes towards people with mental health distress, and intended behaviour and/or contact with individuals experiencing mental health issues; 2) identify possible predictors associated with changes over time in the three variables described above (knowledge, attitudes, and behaviours).

Materials and Methods

Participants

All fifth-year students in the Medicine and Surgery degree program for the Academic Year 2022/2023 (N=150) were invited to take part in the study. The study protocol, its objectives, and the participation procedures were explained to all students. No additional inclusion or exclusion criteria were specified. Each student who agreed to participate signed the informed consent form.

Research procedure

In September 2022, all participating students were requested to complete a socio-demographic questionnaire and the Italian versions of three psychometric instruments: Mental Health Knowledge Schedule (MAKS-I), Community Attitudes to Mental Illness (CAMI-I), and the Reported and Intended Behavior Scale (RIBS-I). Each student was assigned a code that will be used to match the questionnaires when re-administered at 3 months (December 2022) and 6 months (March 2023).

Adherence with ethical standards

This study has received ethical approval from the Emilia North-Wide Area Ethics Committee,

established by AUSLPC (Local Health Unit of Piacenza), with protocol number AOU 0025386/22 (08/09/2022).

Integrated course in psychiatry

The Integrated Course in Psychiatry took place from October 2022 to November 2022. It consists of 55 hours of classroom teaching: 44 hours of Psychiatry and 11 hours of Child Neuropsychiatry. The clinical activities that each student must carry out, supervised by an attending physician, include: 11 hours in the psychiatric emergency ward, 3 hours at the local Mental Health Center, and 6 hours at the hospital Psychiatric Consultation Service. In addition, there are 20 hours of classroom activities, including the discussion of clinical cases, small-group activities on specific topics covered in class, and a guided visit (4 hours) to the Museum of the History of Reggio Emilia.

Socio-demographic schedule and psychometric questionnaires

The socio-demographic schedule consists of questions related to personal information (age, assigned gender at birth, gender identity), academic status, parental information (educational background, psychiatric history), and the student's awareness of issues related to stigma in mental health.

The MAKS was originally developed in English by Evans-Lacko and colleagues (21) and has been validated in Italian, demonstrating good psychometric results (22). The 12 items of the MAKS-I are scored on a Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). "Don't know" is coded as neutral (a value of 3). The MAKS-I questionnaire is divided into two parts. The initial six statements pertain to mental health knowledge and allow for the calculation of a total score (e.g., "People with severe mental health problems can fully recover"); a higher score indicates greater knowledge of mental illness. Items 7 to 12 relate to six clinical conditions, aiming to assess levels of recognition and familiarity with these clinical situations. For instance, participants are presented with a description of someone exhibiting concerns and asked to indicate "whether you think each condition is a type of mental illness", with several options provided for selection. The CAMI has been validated in Italian language by Buizza and colleague (23), demonstrating good psychometric properties. CAMI-I refers to attitudes towards people who are mentally ill. Participants rate the 27 statements from 1, "Strongly Disagree", to 5, "Strongly Agree", and a high score corresponds with positive attitude. The Italian adaptation of the Reported and Intended Behaviour Scale (RIBS) is a self-administered questionnaire consisting of eight items that assess reported and intended behaviors in four distinct domains (24,25): (1) living with, (2) working with, (3) living nearby, and (4) maintaining a relationship with someone with a mental health problem. The overall intended behavior score is computed by summing the responses to items five through eight. A higher score reflects a greater level of intended behavior and/or contact with individuals experiencing mental health issues.

Statistical analysis

Qualitative variables were described using absolute and relative frequencies, while quantitative variables were described using mean and standard deviation. The distribution of the total score of the three questionnaires was described using the mean (SD), the Shapiro-Wilk test (to assess the normality of the distribution), and the median. The assessment of a statistically significant difference between the scores of the three questionnaires at t0 and t1, t1 and t2, and t0 and t2 was conducted using the Wilcoxon signed-rank test. Linear regression analysis was used to identify potential predictors of changes over time in the scores obtained on the three questionnaires. To achieve this, the delta between the score obtained at t2 subtracted from the score obtained at t0 for each questionnaire served as the dependent variable. All predictors included in the linear regression models (e.g., social media engagement and previous mental health experience) were assessed exclusively at baseline (t0). The check for the absence of collinearity was conducted using the Variance Inflation Factor (VIF; if exceeds 5, it indicates a potential issue of collinearity) and the tolerance index (should be greater than 0.1 to avoid potential issues of collinearity). Missing data were handled using a

complete case approach. Cross-sectional analyses at baseline (t0) included all available data (n = 87). For longitudinal analyses and regression models based on change scores (Δ t2–t0), only participants with data at both baseline and 6-month follow-up (n = 41) were included. No imputation methods were applied. In order to assess potential attrition bias, we compared baseline characteristics between participants who completed all three assessments (t0, t1, and t2) and those who did not. Continuous variables (age, MAKS-I, CAMI-I, RIBS-I scores) were analyzed using the Mann–Whitney U test due to non-normal distribution, while categorical variables (e.g., gender, mental health history, social media engagement) were compared using chi-square tests. No imputation methods were used. Additionally, we conducted a binary logistic regression to investigate whether baseline characteristics predicted study completion. The dependent variable was study completion status (yes/no). Independent variables included age, gender identity, out-of-term status, parents' education level, working student status, personal and familial mental health experience, perceived social support, and following people on social media who discuss mental health.

Results

Out of 150 fifth-year students enrolled in the master's degree program in Medicine and Surgery, 87 (58%) agreed to participate in the study. In the first follow-up at 3 months, 36 (41.4%) participants took part, while the second follow-up at 6 months involved 41 (47.1%) students. Table 1 details the sociodemographic characteristics of the study sample.

The average age is 23.55 years (SD: ±1.59) and 59.8% (N=52) identify their gender as female. Only two students are taking longer than expected in completing the degree (2.3%), while 13, in addition to studying, are employed for at least 10 hours per week (14.9%). The most common educational qualification among the parents of the respondents is a high school diploma (N=41; 47.1%). A quarter of the sample (N=22; 25.3%) has experienced mental health challenges in their lives, while the percentage is higher for their parents (N=34; 39.1%). Four students have participated in awareness events on the topic of stigma (4.6%), while 41 (47.1%) follow individuals on social media who address the issue of mental distress. A total of 37 participants completed all three assessments (t0, t1, and t2), while 50 did not complete follow-up. Comparisons between completers and non-completers on key baseline characteristics revealed no statistically significant differences in age, gender, baseline scores on MAKS-I, CAMI-I, RIBS-I, history of mental health challenges, or social media engagement (see Tables S1 and S2). To further explore predictors of dropout, we conducted a binary logistic regression analysis using the baseline variables described above. As shown in Table S3, no independent variable significantly predicted attrition (all $p > .05$), suggesting that the likelihood of completing the study was not systematically associated with any specific baseline trait. Table 2 presents the distributions related to the average scores obtained at t0, t1, and t2 for the three questionnaires. The mean MAKS-I scores, 23.24 (SD=±2.52) at t0, decreases at both t1 (22.97±2.87) and t2 (19.88±2.99) while the average scores of the CAMI-I show an opposite trend: an increase between t0 (113.13±8.73) and t1 (115.06±9.55), and t2 (115.88±7.17). Finally, the mean RIBS-I score increases between t0 (16.74±2.73) and t1 (17.91±2.23) and then decreases at t2 (17.08±2.75), although it remains higher than that of t1.

All scores from the three questionnaires exhibited a statistically significant difference between t0 and t2: MAKS-I (W=732; z=4.77; $p<.001$), CAMI-I (W=223.5; z=-2.32; p=.02), and the RIBS-I (W=171.50; z=-1.95; p=.05). Concerning CAMI-I and RIBS-I, an improvement in attitude and behavior towards individuals facing psychological challenges was observed. Conversely, for MAKS-I, there was a decrease in knowledge related to mental health. There is only one statistically significant difference between t0 and t1 (RIBS-I: W=72.50; z=-2.21; p=.03), indicating an improvement in intended behaviors towards people with psychological distress. Similarly, a significant difference is observed between t1 and t2 for the MAKS-I (W=124.50; z=2.92; p=.004), signifying a decrease in knowledge about mental health (Table 3).

No predictors related to the difference between t2 and t0 (delta) of the total score of the MAKS-I questionnaire were identified (Table 4). However, it

Table 1. Socio-demographic characteristics of the study sample

	Mean	**Standard Deviation**		**Minimum; Maximum**
Age	**23.55**	**1.59**		**21; 33**
	N		**%**	
Assigned gender at birth				
Male	32		36.8%	
Female	55		63.2%	
Gender identity				
Male	32		36.8%	
Female	52		59.8%	
Other (gender fluid. non-binary. agender. etc.)	1		1.1%	
Prefer not to answer	2		2.3%	
Are you an out-of-term student?				
Yes	2		2.3%	
No	85		97.7%	
What is the highest level of education attained by your parents?				
Elementary school diploma	1		1.1%	
Junior high school diploma	3		3.4%	
High school diploma	41		47.1%	
Bachelor's / Master's degree	35		4.2%	
Doctoral degree	7		8.0%	
Are you a working student (at least 10 hours of work per week)?				
Yes	13		14.9%	
No	74		85.1%	
In your life. have you experienced mental health challenges?				
Yes	22		25.3%	
No	64		73.6%	
Prefer not to answer	1		1.1%	
In your family (first or second degree). has any relative experienced mental health challenges?				
Yes	34		39.1%	
No	50		57.5%	
Prefer not to answer	3		3.4%	
Has an intimate friend/partner of yours experienced mental health challenges?				
Yes	62		71.3%	
No	24		27.6%	
Prefer not to answer	1		1.1%	
Do you follow people on social media who talk about mental health challenges?				
Yes	41		47.1%	
No	46		52.9%	

Table 2. Distributions related to the average scores obtained at t. t1. and t2 for MAKS-I. CAMI-I and RIBS-I

		Mean score (±DS)	Shapiro-Wilk test	Median	Minimum; Maximum
MAKS-I	t0	23.24 (±2.52)	.96; p=.02*	23	17; 29
	t1	22.97 (±2.87)	.93; p=.03*	23	18; 27
	t2	19.88 (±2.99)	.82; p<.001*	20	7; 24
CAMI-I	t0	113.13 (±8.73)	.95; p=.003*	114	77; 129
	t1	115.06 (±9.55)	.95; p=.07*	117.5	92;130
	t2	115.88 (±7.17)	.96; p=.17*	117	99; 129
RIBS-I	t0	16.74 (±2.73)	.90; p<.001*	17	8; 20
	t1	17.91 (±2.23)	.82; p<.001*	19	13; 20
	t2	17.08 (±2.75)	.86; p<.001*	17.5	12; 20

*The distribution is non-parametric

Table 3. Statistical significance between the different study benchmarks

	t0 vs t1	t1 vs t2	t0 vs t2
MAKS-I	W=265; z=.67; p=.51	W=124.50; z=2.92; p=.004	W=732; z=.4.77; p<.001
CAMI-I	W=208; z=-1.53; p=.13	W=75.50; z=-.44; p=.68	W=223.5; z=-2.32; p=.02
RIBS-I	W=72.50; z=-2.21; p=.03	W=41; z=.71; p=.50	W=171.50; z=-1.95; p=.05

emerged that following people on social media who talk about mental health challenges is associated with an increase in attitude overtime (CAMI-I) (-6.47; p=.004) while having experienced mental health challenges increases the level of intended behavior and/or contact with individuals experiencing mental health issues.

Discussion

This study endeavors to explore the impact of the participation of five-year medical school students in the Integrated Course in Psychiatry on various dimensions. The primary objectives include examining whether engagement in this curricular program leads to an enhancement in the students' understanding of mental health, shifts in attitudes towards individuals facing mental health challenges, and changes in their intended behaviours or interactions with those experiencing mental health issues. Furthermore, the study seeks to pinpoint potential predictors associated with the evolution of the aforementioned variables - knowledge, attitudes, and behaviours - over time. The first noteworthy result pertains to the fact that fifth-year medical students reported a decline in their knowledge of mental health after attending the psychiatry curricular course. The result appears to be in contrast with previous evidence in the literature, which suggests that participation in a psychiatric module may be associated with a positive impact on students' knowledge (26). We can propose some hypotheses regarding this result. Firstly, it is important to note that the MAKS-I questionnaire was validated to assess knowledge of mental health, not specifically knowledge of the discipline of psychiatry. While mental health is a holistic concept encompassing overall well-being, psychiatry is a medical discipline specifically concerned with the diagnosis and treatment of mental disorders. Mental health involves maintaining a positive state of emotional and psychological well-being, while psychiatry deals with addressing and managing mental illnesses and conditions when they arise (27). Another hypothesis revolves around information overload. It is possible that the psychiatry course inundated students with an excessive amount of information within a brief

Table 4. Linear regression analysis using the delta between t2 and t0 of the total score of MAKS-I. CAMI-I and RIBS-I as dependent variables

		MAKS-I as dependent variable								CAMI-I as dependent variable								RIBS-I as dependent variable							
						95% C.I.		Collinearity statistics						95% C.I.		Collinearity statistics						95% C.I.		Collinearity statistics	
		Unstandardized coefficient	SE	t	p	Lower	Upper	Tolerance	VIF	Unstandardized coefficient	SE	t	p	Lower	Upper	Tolerance	VIF	Unstandardized coefficient	SE	t	p	Lower	Upper	Tolerance	VIF
Independent variables	Age	.16	.44	.37	.71	-.74	-1.81	.66	1.52	-.9	.86	-1.19	.31	-2.67	.87	.66	1.52	.01	.33	.03	.97	-.66	.68	.65	1.54
	Gender identity (Female)	.32	1.47	.22	.83	-2.7	3.34	.6	1.69	-.31	2.93	-.11	.92	-6.31	5.68	.59	1.69	-.73	1.11	-.66	.52	-3	1.55	.61	1.65
	Are you an out-of-term student? (Yes)	1.46	2.93	.5	.62	-4.54	7.47	.7	1.43	7.31	5.83	1.26	.22	-4.62	19.24	.7	1.43	1.45	2.22	.65	.52	-3.12	6.02	.69	1.47
	What is the highest level of education attained by your parents?	-.26	.76	-.34	.74	-1.81	1.3	.73	1.38	-1.33	1.51	-.89	.38	-4.42	1.75	.73	1.38	.23	.58	.4	.69	-.95	1.41	.72	1.39
	Are you a working student? (Yes)	1.05	1.96	.54	.6	-2.96	5.06	.68	1.47	-5.39	3.89	-1.39	.18	-13.63	2.58	.68	1.47	.74	1.47	.51	.62	-2.28	3.77	.68	1.47
	In your life. have you experienced mental health challenges? (Yes)	-.91	1.61	-.57	.58	-4.2	2.38	.77	1.3	-2.87	3.19	-.9	.38	-9.41	3.67	.77	1.3	-2.89	1.23	-2.35	.03	-5.42	-.37	.74	1.34
	In your family (first or second degree). has any relative experienced mental health challenges? (Yes)	-.07	1.17	-.06	.96	-2.47	2.34	.87	1.15	-3.65	2.33	-1.57	.13	-8.43	1.13	.87	1.15	-.72	.91	-.79	.44	-2.58	1.15	.86	1.16
	Has an intimate friend/ partner of yours experienced mental health challenges? (Yes)	1.39	1.62	.86	.4	-1.93	4.72	.59	1.71	.78	3.22	.24	.81	-5.82	7.39	.59	1.71	.92	1.21	.76	.45	-1.57	3.42	.6	1.68
	Do you follow people on social media who talk about mental health challenges? (Yes)	-1.98	1.55	-1.28	.21	-5.15	1.2	.51	1.96	-6.47	3.08	-2.1	.04	-12.77	-.16	.51	1.96	-2.23	1.2	-1.86	.07	-4.69	.23	.52	1.92

timeframe, rendering it challenging to retain and integrate that knowledge with other concepts related to mental health (28). Ultimately, it is essential to note that the integrated psychiatry course was designed not as an "anti-stigma campaign" but as a means to impart knowledge and skills specific to the medical discipline of psychiatry: literature emphasizes that education alone may have limited impact on reducing prejudice and stereotypes about mental illness (29). The findings concerning the students' attitudes towards individuals with psychological challenges are notably positive: both the assessments at t1 and t2 indicate an improvement compared to the baseline evaluation. Research indicates that engagement in psychiatric education and clinical rotations can have a positive impact on the attitudes of medical students toward mental illness. Several studies have illustrated that exposure to psychiatry training is associated with enhanced benevolence and reduced stigmatization among medical students (19). Additionally, there is evidence suggesting that attitudes towards psychiatric disorders significantly improve after clinical rotations in psychiatry (20). Our results also elucidated that, among the student population who underwent the integrated psychiatry curricular course, a higher level of intended behaviour and/or interaction with individuals experiencing mental health issues was attained. Research indicates that medical students often display stigmatizing attitudes towards individuals with mental illness (30). These attitudes can significantly shape their behaviour and interactions with people experiencing mental health issues (31). Furthermore, faculty attitudes regarding mental health issues, which may include a hesitancy to openly acknowledge experiencing such challenges, can be transmitted to medical students through an "implicit curriculum", instructing them to conceal psychological struggles (32). Our study findings appear to be corroborated by the existing literature: educational programs can positively shape medical students' attitudes towards mental illness, resulting in favorable changes in their behaviours (19,33). The second objective of our study (identifying possible predictors associated with changes over time in knowledge, attitudes, and behaviours) yielded two results that we believe are important to discuss. The first pertains to the association between an improvement in attitude and intended behaviour when following someone on social media who discusses mental health challenges. Research has shown that exposure to positive comments and information about mental health service on social media can help combat negative perceptions and stigma surrounding mental health (34). Additionally, having information about mental illness and previous contact with individuals with mental illness have been identified as important predictive factors of positive attitudes towards mental illness (35). However, it is important to note that the impact of social media on mental health attitudes and behaviours is not uniformly positive. While social media can be harnessed to create more accurate and personalized mental health models, increased usage of social media has been linked to online harassment, poor sleep, low self-esteem, and negative body image, all of which are associated with more mental health difficulties (36). Additionally, problematic depictions of mental health issues in mass media, including dramatization, stereotyping, and trivialization, have contributed to stigma and false concepts about mental health, thereby influencing public attitudes towards mental illness (37). In our study, having had an experience with mental health challenges is a predictor of positive attitudes and behaviours towards people with mental illness. The relationship between personal experience with mental illness and attitudes/behaviour towards individuals with mental health challenges is a complex and multifaceted issue. Several studies have explored the factors influencing attitudes towards mental illness, shedding light on the predictors of positive attitudes and behaviours. For example, the role of personal experiences, such as seeking psychiatric care, has been identified as a significant predictor of positive attitudes towards mental illness among family caregivers (38). This suggests that firsthand experience with mental health care services may contribute to more favorable attitudes towards individuals with mental health challenges. Moreover, McCutchen et al. highlighted that having experienced mental health treatment and reporting higher levels of internalizing distress were uniquely associated with holding favorable mental health attitudes and consequently, of behaviour. This indicates that personal experiences with mental distress and treatment may contribute to more positive attitudes

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towards individuals with mental illness (39). Finally, participants with past experiences with mental illness scored higher on a positive attitude scale and exhibited lower social distancing, social restrictiveness, prejudice, and misconceptions, indicating a more tolerant and supportive attitude towards individuals with mental illness (40). Regarding sample attrition, although the number of participants who completed all assessments was reduced, baseline comparisons showed no significant differences between completers and non-completers across key demographic and psychometric variables. Therefore, attrition is unlikely to have introduced systematic bias, supporting the validity of the longitudinal analyses. This is further corroborated by the results of a logistic regression model, which showed that none of the examined baseline characteristics — including gender identity, mental health experience, and social media use — were associated with the probability of dropout. These findings support the assumption that attrition in our study was likely random. It is necessary to consider the limitations of this study. The research was conducted at the University of Modena and Reggio Emilia, which is considered a medium-sized university. Therefore, the results used cannot be considered generalizable to other contexts with numerically different student populations. The study focused on a single university situated in a well-defined geographical location (northern Italy). Due to socio-cultural variations, results might differ in other geographic contexts. Only 58% (N=87) of fifth-year medical students chose to participate in the study, and this participation rate decreased further at t1 and t2 (41.9%; N=36 and 47.1%; N=41, respectively).

Conclusions

Equipping medical students with mental health knowledge is essential for delivering high-quality mental health care, fostering positive perceptions of psychiatry, and safeguarding the mental well-being of both patients and the future doctors. However, the results of this study revealed mixed outcomes regarding the impact of an Integrated Psychiatry Course on fifth-year medical students. Contrary to expectations, students reported a decline in their mental health knowledge, potentially due to factors such as information overload and the distinction between psychiatry and broader mental health concepts. Nevertheless, the course had a positive effect on students' attitudes and behaviors towards individuals with mental health challenges, consistent aligning with existing literature suggesting that psychiatric education can reduce stigma and enhance empathy (19). Moreover, personal experiences with mental illness and engagement with mental health content on social media were identified as key predictors of positive attitude changes (34,35). Despite these findings, the study's limited sample size and geographical focus restrict its generalizability. Further studies with larger sample size and a wider geographic distribution may be necessary to better understand the broader impact of psychiatric education on medical students' knowledge, attitudes, and behaviours towards mental health issues.

Positionality Statement: Mindful that our identities can influence our approach to science (41), the authors wish to provide the reader with information about our backgrounds. With respect to gender, when the manuscript was drafted, two authors self-identified as women and five authors as men. With respect to race, seven authors self-identified as white.

Ethic Approval: This study has received ethical approval from the Emilia North-Wide Area Ethics Committee, established by AUSLPC (Local Health Unit of Piacenza), with protocol number AOU 0025386/22 (08/09/2022).

Conflict of Interest: The authors declare no relevant conflicts of interest or financial ties with organizations or entities discussed in this work. This includes (but is not limited to) consultancy, honoraria, stock ownership, or other benefits that could adversely affect the objectivity of the research. The authors emphasize that the research was conducted ethically and without influence from any conflicts of interest in the design, conduct, or presentation of the results.

Authors Contribution: In accordance with the guidelines of the International Committee of Medical Journal Editors (ICMJE), all authors of this work have made significant contributions to the study. Specifically, M.M. and L.P. were responsible for the conceptualization of the study. G.M.G., A.B. and L.P. developed the methodology, while M.M. and L.P. performed the formal

analysis. The investigation was conducted by B.A. The original draft was written by E.D.M., A.B., and L.P., with critical review and editing contributions from M.M., G.M.G., E.D.M., and L.P. L.P. provided supervision throughout the study. All authors contributed to drafting or critically revising the manuscript for important intellectual content, approved the final version for submission, and agreed to be accountable for all aspects of the work. They ensure that any concerns regarding accuracy or integrity are thoroughly addressed and resolved.

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Annex

Table S1. Baseline comparison between completers and non-completers for continuous variables.

		Test of Normality			Descriptive analysis		Mann-Whitney U test		
		N	*W*	*p*	*Mean*	*SD*	*W*	*p*	*Rank-Biserial Correlation*
Age	Completers	37	.84	<.001	23.51	±1.59	973.50	.66	.05
	Non-completers	50	.55	<.001	23.58	±1.61			
MAKS-I total score	Completers	37	.94	.04	22.89	±2.00	1062.00	.24	.15
	Non-completers	50	.95	.05	23.50	±2.83			
CAMI-I total score	Completers	37	.97	<.01	113.60	±8.16	892.500	.78	-.04
	Non-completers	50	.93	.52	112.78	±9.20			
RIBS-I total score	Completers	37	.92	<.001	16.22	±2.70	1128.00	.08	.20
	Non-completers	50	.87	.01	17.12	±2.73			

Table S2. Baseline comparison between completers and non-completers for non-parametric variables.

	X^2	df	p
Gender identity (Female)	.95	2	.62
Are you an out-of-term student?	.01	1	.91
What is the highest level of education attained by your parents?	4.69	4	.32
Are you a working student?	.10	1	.75
In your life, have you experienced mental health challenges?	2.99	1	.08
In your family (first or second degree), has any relative experienced mental health challenges?	.68	1	.41
Has an intimate friend/partner of yours experienced mental health challenges?	.41	1	.52
Do you follow people on social media who talk about mental health challenges?	2.23	1	.14

Table S3. Binary logistic regression model with study completion status (defined as completing assessments at t0, t1, and t2) as the dependent variable.

		Unstandardized coefficient	**p**
Independent variables	Age	.08	.99
	Gender identity (Female)	-18.19	.62
	Are you an out-of-term student? (Yes)	-.39	.71
	What is the highest level of education attained by your parents?	-15.78	.99
	Are you a working student? (Yes)	.12	.87
	In your life, have you experienced mental health challenges? (Yes)	-.92	.16
	In your family (first or second degree), has any relative experienced mental health challenges? (Yes)	1.01	.07
	Has an intimate friend/partner of yours experienced mental health challenges? (Yes)	.93	.15
	Do you follow people on social media who talk about mental health challenges? (Yes)	-.42	.51