



Outcomes of One-Time Contact Multi-Modal Educational Intervention on Mental Illness Stigma with Undergraduate Medical Students -Suez Canal University Hospital-Egypt

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Abstract

Background: For mentally ill patients, stigma is a severe problem. Unfortunately, stigmatizing behaviors against patients suffering from mental diseases are frequent not only among the general population but also among healthcare practitioners. Medical students share the same stereotypical views and attitudes towards mental ill patients. The results from anti-stigma educational interventions with undergraduate medical students are mixed. One time contact educational interventions proven to be as effective as traditional education methods in several studies. This study looked at the outcomes of a one-time contact multi-modal educational intervention given to fourth-year medical undergraduate students at Suez Canal University in Ismailia, Egypt, prior to their medical school's curriculum psychiatric rotation.

Aim: To examine the effects of a one-time, multi-modal educational intervention on undergraduate medical students' attitudes, knowledge, and behavior on stigma associated to mental illness.

Subjects and methods: A pre-post quasi-experimental study was done on 120 fourth-year undergraduate medical students from the Faculty of Medicine at Suez Canal University. The participants completed anonymously self-administered three validated scales with response values reported on a 5-point Likert scale before and after implementation of a multi-modal educational intervention consisting of 4- hour education including didactic methods and experiential learning methods by contact with people with lived mental disorders experience. The scales included; The Mental Health Knowledge Schedule (MAKS) comprises of six items used to assess mental health knowledge. A higher score represents more knowledge; the range is from 6 to 30. Beliefs toward Mental Illness Scale (BMI), which consists of 21 items to measure negative stereotypical views of mental illness and has a score range of 21 to 105, and a higher score reflects a less negative belief toward the mentally ill, and Reported and Intended Behaviour Scale (RIBS), which has a score range of 4 to 20, and a higher score indicates more favourable intended behavior. The outcome measures were evaluated at three points: baseline, immediately after the intervention, and six months later. Participation was totally voluntary, and consents were obtained for all participants students. Data was obtained throughout November 2019 and May 2020.

Results: The outcome measures scores expressed as median values were statistically significantly higher at both immediate and 6 months reassessment, compared with baseline scores. Mental health-related knowledge scores (MAKS) were 17, 24, and 23, Beliefs toward mental illness scores (BMI) were 49.5, 83, and 76.5, while Intended behavior scores (RIBS) were 7, 31, and 28 at baseline , immediate after the intervention , and at 6 months follow up assessment, respectively.

Conclusion: According to the findings of this study, a one-time contact multi-modal educational intervention for mental illness stigma with medical undergraduate students resulted in favorable changes in their knowledge, beliefs, and planned behavior toward mentally ill patients immediately after the intervention, and these changes were maintained at a 6-month follow up. A combination of different teaching techniques, including knowledge, contact-based education, and paying attention to the student's personal experience of working with patients with mental illness, as well delivery during the right time of undergraduate medical curriculum, appear to be necessary for an effective educational intervention against mental illness stigma.

Keywords: Mental Illness; Stigmatization; Medical Education

Introduction

Despite the fact that there are more than 1.1 billion people worldwide who suffer from mental and drug use disorders, only 30- 40% seek treatment [1,2]. In high-income countries, 35% to 50% of those with mental disorders obtain therapy, compared to 76% to 85% of those in low- and middle-income nations. People with mental illnesses typically die at young age , according to the WHO [2]. One explanation for undertreatment is that the physical healthcare offered is less appropriate than that provided to those who do not have mental health disorders [3]. There is an urgent need to address the factors that contribute to these inequalities, one of which is the stigmatization and discrimination of people with mental illnesses by healthcare professionals who reflect the stigmatizing views of the general public toward mentally ill patients [4]. When it comes to improving the attitudes of health care practitioners toward persons with mental illnesses, medical students are an important group to work on. As students progress through medical school and residency, their attitudes harden and they become less susceptible to change [5,6]. Stigma can be defined as a combination of information (ignorance), attitude (prejudice), and behavior (discrimination) difficulties [7]. Several strategies, including knowledge- and contact-based initiatives, have been proposed to eliminate stigma related with mental illness in medical students. Contact-based learning initiatives, which contain remarks made by individuals regarding their interactions with the healthcare system and their own experiences with mental illness, have proven to be extremely effective [8-11].

Comparing medical students from different countries, US students outperformed Brazilian students on four non-stigmatized viewpoints, students from China performed the worst in terms of personal social acceptance of people with mental illness, and

students from Nigeria and Ghana were the worst in terms of the supernatural ethology of mental illness. These variations may point to underlying sociocultural views that are more stigmatized in poorer nations ⁽¹²⁾ . Students in medical schools that place a strong emphasis on psychiatry education exhibited more positive attitudes, and medical students considering specializing in psychiatry significantly showed fewer stigmatizing attitudes and displayed smaller social distance towards those who had mental illnesses [13].

Many of national and regional programs have been launched to combat stigma related to mental illness which have either finished or are ongoing as programs. 'The Time to Change' anti-stigma campaign is England's largest program launched in 2008, that built on evidence-based approaches to reduce stigma and discrimination against people with mental health problems, with an emphasis on contact-based education strategies [14]. The Lancet published its Commission report on ending stigma and discrimination in mental health on October 10 that coincide with World Mental Health Day. The report stated that the most effective interventions to reduce stigma and discrimination are those that are culturally and contextually appropriate and that involve contact with those who are stigmatized and discriminated against. The Commission suggested that mandatory training on the needs and rights of people with mental health disorders, co-delivered by people with lived experience (PWLE) be provided to all medical staff [15].

Only a small number of medical schools have examined the programs' success in lowering stigma associated with mental illness and boosting students' confidence in working with those who have mental illness ⁽¹⁶⁾ . This study was carried to examine the outcomes of one time contact multimodal educational intervention including elements of simulated patients with lived experience

of mental illnesses on mental illness related stigma on the fourth-year medical students affiliated to faculty of medicine, Suez Canal University and prior to their medical school' curriculum-based psychiatry rotation.

Subjects and Methods

Subjects

The current study, was conducted between November 2019 and May 2020 on 120 fourth-year medical students from the college of medicine at Suez Canal University in Ismailia, Egypt, before beginning their medical school psychiatry rotation. Based on a previously published study, the sample size of 97 people was determined with a power of 80% and a level of significance of 0.05. [17]. All fourth- year students were represented in a comprehensive sample in this study. All study participants gave their informed permission after giving their full consent to participate in the study.

Methods

The methods used in this study consisted of four parts to complete anonymously self-administered questionnaire and three validated reliable psychiatry scales, all of them were completed at 3 time points; at the baseline, immediate after implementation of an educational intervention, and at 6-months follow up. These four parts were the following.

The first section: contains each medical student's socio-demographic information, such as age, gender, family history of mental illness, recent contact with patients who are mentally ill, and whether he or she has attended seminars, workshops, or other educational sessions about the stigma of mental illness in the past year.

The second section: Contains specific questions that assess public knowledge of mental health issues using the Mental Health Knowledge Schedule (MAKS). Its validity has been thoroughly reviewed by experts, including service users and world-renowned stigma researchers, and it has been found to be brief and practicable, with moderate to substantial internal reliability and test-retest [18]. Part B of the scale consists of six items that inquire about the classification of various disorders as mental diseases to help contextualize the responses to other items. Part A of the

scale consists of six items covering stigma-related mental health knowledge categories (need for paid work, advise for professional help, medication is successful, psychotherapy is effective, full recovery from mental illness, seeking professional treatment by mentally ill). Response options on a 5-point Likert scale ranged from 1 for utterly disagree to 5 for totally agree. . By giving "don't know" a value of 3, a total score was created. Items 6, 8, and 12 have been reverse-coded to reflect the proper response's direction. Only the response values for items 1-6 (Part A) with scores ranging from 6 to 30 were added to determine the final score. More knowledge is indicated by a higher score. The MAKS scale's Cronbach's alpha was 0.749.

The third section: is the Beliefs toward Mental Illness scale (BMI) that was developed to assess cross-cultural differences in such beliefs as well as to predict treatment-seeking behavior among diverse ethnic groups. Each factor's reliability estimates showed moderate to high internal consistency [19]. There are 21 measurements in it that evaluate false presumptions regarding mental disease. The BMI scale has three subscales: the dangerousness subscale, which has five items [1,2,3,6,13] related to the perception of danger posed by patients with mental illness, the social and interpersonal skills subscale, which has ten items [4,5,8,11,12,14,15,17,18,21] related to the effect of mental illness on interpersonal relationships and related feelings to hopelessness. It evaluates the degree of annoyance and hopelessness experienced when interacting with people who have mental illnesses, and sentiments of guilt associated with mental illness and the idea that people with mental illnesses are unreliable. The third subscale is the Incurability that measures the perception of the incurability of mental disease and is covered by six items [7,9,10,16,19,20], reverse coded with 1 being the strongest agreement and 5 being the least agreement (strongly disagree). The response values for the 21 elements of BMI scale, whose scores ranged from 21 to 105, were added to determine the final score. The lower score implies a more less favourable opinion toward people with mental illnesses. The BMI scale's Cronbach's alpha was 0.82, while its subscales ranged from 0.69 to 0.80.

The fourth section: is the Intended Behaviour Scale (RIBS), which was discovered to be a quick, practical, and psychometrically sound measure for assessing health-related reported and intended behavioural discrimination, with moderate to substantial internal consistency and test-retest reliability [20]. RIBS is used to assess the reported and intended behaviour related to mental health. Living with, working with, living nearby, and maintaining a relationship with someone who has a mental health condition were the four reported behaviour outcomes, whereas the four planned behaviour outcomes evaluated the future expected performance of the same items. Response options on a 5-point Likert scale ranged from 1 for utterly disagree to 5 for totally agree. A total score was calculated by assigning "don't know" a value of 3. The response values for the items measuring planned behaviour, which have scores ranging from 4 to 20, are added together to get each student's overall score. A higher score denotes behaviour that is more likely to be favourable. The RIBS scale had a 0.75 Cronbach's alpha.

Mental illness stigma educational intervention

A multi-modal educational intervention was implemented consisting of a 4- hour education program that included didactic methods and experiential learning methods by contact with people with lived mental disorders experience. The knowledge part consisted of a 2-hour lecture with a discussion to explain the key facts and figures about stigma, discrimination related to mental illness, and causes and consequence of stigma, followed by one hour video presentation ended by open discussion showing examples of social stigma related to mental illness and its impact on mentally ill patients and their family, and how to combat stigma related to mental illness. The experiential part was a contact based learning consisting of half an hour of a personal testimony from a person with experience of schizophrenia after his recovery, using trained role-player who had some theatre experiences, followed by, half an hour role-plays in small groups, using trained role-players to act the part of service users who suffer from depression and caregiver of schizophrenic patient, and medical students volunteered to take medical history. All procedures were carried out in agreement with the applicable rules and regulations.

Statistical Analysis

With the help of the statistical program SPSS version 28, the data from the current investigation was evaluated (IBM, Armonk, New York, United States). After normality testing, categorical data

were reported as frequency and percentage, and numerical data as median and interquartile range (IQR). The scores of mental health related knowledge, belief towards mental disease (with its three subscales), and intended behavior were categorised as poor or good based on the Likert scale threshold score (cut off point): $[(\text{total highest score} - \text{total lowest score}) / 2] + \text{total lowest score}$ Equals threshold score.

Univariate linear regression analysis was used to identify predictors of baseline knowledge, belief, and behavior scores. If there were more than one significant predictor, the significant variables were used in a multivariate regression analysis. Following completion of the educational program, the knowledge, belief, and behavior scores were compared over time using Related-Samples. Friedman's Two-Way Variance Analysis by Ranks. To analyze the difference between the two time periods, a pairwise analysis was done. The Mann-Whitney test was used to compare the results of males and females. P values of less than 0.05 were regarded as significant. The findings were provided in the form of tables and graphs.

Results

The mean age of the study participants was 21 year and 53.3% were females. Eighty-three participants representing 69.2% has never been in contact with people with mental illness in past 3 months and 36 participants representing 30% had family history of mental illness. No one of the study participants had received any form of formal learning regarding mental illness stigma in a preceding year. The computed median threshold level (cut-off point) for mental health related about mental disease, and intended behavior were 17, 49.5, and 7, respectively (Table 1). The results of linear regression analysis of baseline data in relation to the outcome measures, showed that none of variables selected, including, age, gender, contact with people with mental illness in the last 3 months could predict change in mental health related knowledge outcome (Table 2), while the same variables at the baseline were statistically significant at predicting change in beliefs toward mental illness outcome in both univariate, and multivariate regression analysis (Table 3), and only the total beliefs score was statistically significant at predicting change in the intended behaviour outcome (Table 4). The outcomes of the education intervention both immediately after the intervention and at 6- months follow up

showed that all the outcome measures scores expressed as median with interquartile range were statistically significantly higher. Mental health related knowledge scores were 17, 24, and 23, at the baseline , immediate after the intervention, and at 6-months follow up, respectively, while beliefs towards mental illness scores were 49.5, 83, and 76.5, at the baseline line, immediate after the intervention, and at 6-months follow up respectively, and intended behaviour scores were 7, 31, 28, at the baseline , immediate after the intervention, and at 6-months follow up , respectively (Table 5, figure 1-3). The same statistically significant higher scores observed for the three main outcomes, were also shown for the three subscales of beliefs toward mental illness outcome. These three subscales included dangerousness score that was 14, 21, and 19, at the baseline, immediate after the intervention, and at 6-months follow up, respectively, while poor interpersonal and social skills score, was 22, 38.5, and 36, at the baseline, immediate after the intervention, and at 6- months follow up, respectively, and the score for incurability, was 15, 23, and 22, at the baseline, immediate after the intervention, and at 6- months follow up, respectively (Table 6). Comparison of male and female students regarding the main three outcomes before and after the educational intervention, showed no statistically significant difference between them in mental health related knowledge, while there was a statistically significant difference between them at baseline in beliefs towards mental illness, with the male participants scoring higher (less negative beliefs) than the female participants (59.5 Vs 45.5, $p < 0.001$), and just slightly significant difference at the baseline in intended behaviour, with male participants scoring higher (more favourable intended behaviour) than female participants (8 Vs 7, $p < 0.048$) (Table 7, figure 4,5). The comparison between male, and female students for the three subscales of beliefs towards mental illness outcome, showed statistically significant difference at the baseline in dangerousness, poor interpersonal and social skills, and incurability, with female students scoring less (more negative

beliefs) than male counterparts (13 Vs 15, 19.5 Vs 25, and 14 Vs 16, $P < 0.001$) respectively, and non-statistically significant scores differences for females compared with males (21 Vs 20, 38 Vs 39, and 23 Vs 23.5) at immediate follow up, and (19 Vs 18, 36 Vs 36, and 22 Vs 22) at 6-months follow up (Table 8).

Variables	N	%
Gender		
Male	56	46.7
Female	64	53.3
Contact with people with mental illness in the past 3 months.		
Never	83	69.2
Sometimes (once per month)	29	24.2
Often (once every 2 weeks)	7	5.8
Always (once per week)	1	0.8
Family history of mental illness.	36	30.0
Did you receive in the previous year any of the followings?		
Seminar about stigma of mental illness	0	0.0
Workshop training about stigma of mental illness	0	0.0
Read article about stigma of mental illness	0	0.0
None	120	100.0
	Me- dian	IQR
Age	21	21-21
Mental health related Knowledge	17	14-19
Belief towards mental illness	49.5	42-59.5
Intended behavior	7	5-10

Table 1: Baseline data of medical students participants (n = 120).

	Unstandardized Coefficients		Standardized Coefficients	P value	95.0% C.I for β	
	β	S.E.	Beta		Lower Bound	Upper Bound
Gender	-0.88	1.02	-0.13	0.17	-2.13	0.37
Age	-0.21	0.77	-0.03	0.79	-1.74	1.32
Contact with people with mental illness	0.3	0.5	0.06	0.54	-0.67	1.29
Family history of mental illness	-0.43	0.69	-0.06	0.54	-1.8	0.94

Table 2: Univariate linear regression of baseline data as predictors of mental health related knowledge among medical students participants (n = 120).

	Unstandardized Coefficients		Standardized Coefficients	P value	95.0% C.I for β	
	β	S.E.	Beta		Lower Bound	Upper Bound
Univariate analysis						
Gender	-11.83	1.84	-0.51	<0.001*	-15.48	-8.18
Age	10.7	2.4	0.38	<0.001*	5.95	15.44
Contact with people with mental illness.	6.19	1.58	0.34	<0.001*	3.05	9.32
Family history of mental illness.	2.78	2.32	0.11	0.23	-1.81	7.36
Total knowledge score	0.57	0.31	0.17	0.064	-0.34	1.17
Multivariate analysis						
Gender	-8.62	1.79	-0.37	<0.001*	-12.16	-5.07
Age	8.29	2.13	0.3	<0.001*	4.07	12.51
Contact with people with mental illness.	5.18	1.35	0.28	<0.001*	2.5	7.86

Table 3: Linear regression of baseline data as predictors of beliefs toward mental illness among medical students participants (n = 120).

*Statistically significant at p value < 0.05.

	Unstandardized Coefficients		Standardized Coefficients	P value	95.0% C.I for β	
	β	S.E.	Beta		Lower Bound	Upper Bound
Gender	-0.73	0.47	-0.14	0.12	-1.66	0.2
Age	0.85	0.57	0.14	0.14	-0.27	1.97
Contact with people with mental illness.	0.61	0.37	0.15	0.1	-0.12	1.33
Family history of mental illness.	0.55	0.51	0.098	0.29	-0.47	1.56
Total knowledge score	0.064	0.068	0.086	0.35	-0.07	0.2
Total belief score	0.11	0.018	0.48	<0.001*	0.07	0.14

Table 4: Linear regression of baseline data as predictors of intended behavior toward mental illness among medical students participants (n = 120).

*Statistically significant at p value < 0.05.

Variables	T0 Median (IQR) (n = 120)	T1 Median (IQR) (n = 120)	T2 Median (IQR) (n = 120)	p-value
Mental health related Knowledge	17 (14-19)	24 (23-25)	23 (22-24)	<0.001*
p-value	T0 vs. T1: <0.001*	T1 vs. T2: 0.022*	T2 vs. T0: <0.001*	
Belief towards mental illness	49.5 (42-59.5)	83 (78-86)	76.5 (72.5-80)	<0.001*
p-value	T0 vs. T1: <0.001*	T1 vs. T2: <0.001*	T2 vs. T0: <0.001*	
Intended behavior	7 (5-10)	31 (29-33)	28 (26-31)	<0.001*
p-value	T0 vs. T1: <0.001*	T1 vs. T2: <0.001*	T2 vs. T0: <0.001*	

Table 5: Scores of mental health related knowledge, beliefs, and intended behaviour toward mental illness before and after educational intervention.

IQR: Interquartile Range; T0: at Baseline; T1: Immediately After the Program; T2: 6-Months After the Program

*: Statistically significant at p value < 0.05.

Subscales	T0 Median (IQR) (n = 120)	T1 Median (IQR) (n = 120)	T2 Median (IQR) (n = 120)	p-value
Dangerousness	14 (12-16)	21 (19-22)	19 (17-20.5)	<0.001*
p-value	T0 vs. T1: <0.001*	T1 vs. T2: <0.001*	T2 vs. T0: <0.001*	
Poor interpersonal and social skills	22 (17-26)	38.5 (36-41)	36 (33-38)	<0.001*
p-value	T0 vs. T1: <0.001*	T1 vs. T2: <0.001*	T2 vs. T0: <0.001*	
Incurability	15 (12-17)	23 (21-25)	22 (20-24)	<0.001*
p-value	T0 vs. T1: <0.001*	T1 vs. T2: 0.003*	T2 vs. T0: <0.001*	

Table 6: Subscale scores of beliefs toward mental illness of the undergraduate medical students before and after educational intervention.

IQR: Interquartile Range; T0: at Baseline; T1: Immediately After the Program; T2: 6-Months After the Program

*: Statistically significant at p value < 0.05.

Variables		T0 Median (IQR) (n = 120)	T1 Median (IQR) (n = 120)	T2 Median (IQR) (n = 120)	p-value
Mental health related Knowledge	Male	17.5 (15-19)	24 (22.5-25)	23 (22-24)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: 0.089	T2 vs. T0: <0.001*	
	Female	17 (13.5-19)	24 (23-25)	23 (22-24)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: 0.12	T2 vs. T0: <0.001*	
p-value ^b	0.23	0.65	0.86		
Belief towards mental illness	Male	59.5 (46.5-67.5)	84 (78-86)	76.5 (73-79.5)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: <0.001*	T2 vs. T0: <0.001*	
	Female	45.5 (41-50.5)	81 (77.5-87)	76.5 (72-80.5)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: <0.001*	T2 vs. T0: <0.001*	
p-value ^b	<0.001*	0.34	0.98		
Intended behavior	Male	8 (7-10)	30 (29-33)	28 (26-30)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: 0.005*	T2 vs. T0: <0.001*	
	Female	7 (5-9.5)	31 (29-33.5)	28.5 (25.5-31.5)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: <0.001*	T2 vs. T0: <0.001*	
p-value ^b	0.048*	0.58	0.55		

Table 7: Comparison between males and females regarding the scores of mental health related knowledge, beliefs, and intended behaviour towards mental illness before and after educational intervention

IQR: Interquartile Range; T0: at Baseline; T1: Immediately After the Program; T2: 6-Months After the Program

*: Statistically significant at p value<0.05, a: p value for comparison across time, b: p value for comparison between males and females.

Variables		T0 Median (IQR) (n = 120)	T1 Median (IQR) (n = 120)	T2 Median (IQR) (n = 120)	p-value
Dangerousness	Male	15 (14-18)	20 (19-22)	18 (16-20)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: <0.001*	T2 vs. T0: <0.001*	
	Female	13 (10.5-14)	21 (20-22)	19 (18-21)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: 0.013*	T2 vs. T0: <0.001*	
	p-value ^b	<0.001*	0.072	0.011*	
Poor interpersonal and social skills	Male	25 (18-32)	39 (37-41.5)	36 (33-38)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: <0.001*	T2 vs. T0: <0.001*	
	Female	19.5 (15.5-22)	38 (35-40.5)	36 (31-38)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: <0.001*	T2 vs. T0: <0.001*	
	p-value ^b	<0.001*	0.039*	0.44	
Incurability	Male	16 (13-18)	23.5 (21-25)	22 (20.5-24)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: 0.033*	T2 vs. T0: <0.001*	
	Female	14 (12-16)	23 (21-25.5)	22 (19-24)	<0.001*
	p-value ^a	T0 vs. T1: <0.001*	T1 vs. T2: 0.038*	T2 vs. T0: <0.001*	
	p-value ^b	<0.001*	0.51	0.46	

Table 8: Comparison between males and females concerning the subscale scores of beliefs toward mental illness before and after educational intervention

IQR: Interquartile Range; T0: at Baseline; T1: Immediately After the Program; T2: 6-Months After the Program

*: Statistically significant at p value < 0.05, a: p value for comparison across time, b: p value for comparison between males and females.

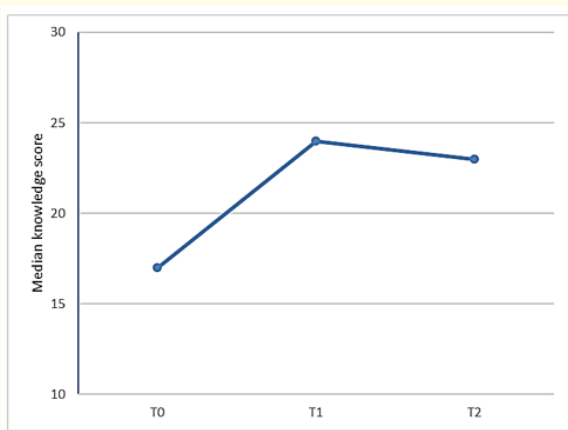


Figure 1: Changes of total knowledge score across time.

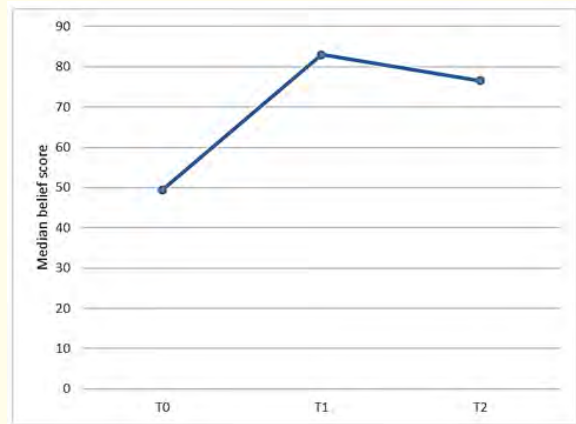


Figure 2: Changes of total beliefs score across time.

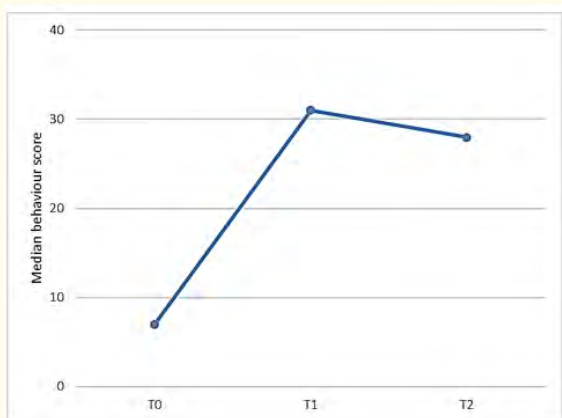


Figure 3: Changes of total behaviour score across time.

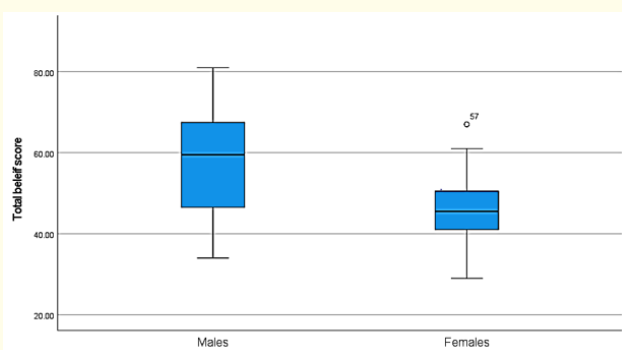


Figure 4: Difference between males and females in the baseline total beliefs score.

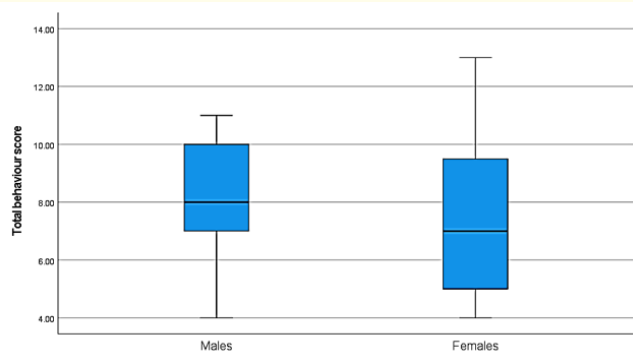


Figure 5: Difference between males and females in the baseline total behaviour score.

Discussion

The results in this study showed that a one-time multi-modal education intervention with four-year undergraduate medical students on mental illness related stigma having a significant and maintained destigmatizing changes up to 6 - months in knowledge, beliefs, and behaviour toward mentally ill patients. These results favour the effectiveness of an educational intervention employing mixed teaching methods, and consistent with evidence from studies supporting one time contact experiential learning gained from interacting with patients and their caregivers sharing their lived psychiatric diseases experience. The favourable changes observed in the present study were maintained up to 6-months of follow up, have not seen frequently in other published studies and reflect the methodological differences, and the limited scale of this study.

In a 2012 British study, 760 UK medical students conducted a nationwide online survey using the Medical Condition Regards Scale (MCRS), and they were also asked if they considered medical school education lessened stigma, attitudes toward mental illness vs attitudes toward other medical conditions, the influence of the number of years spent in medical school, as well as other socio-demographic, ethnic, and cultural characteristics. Although fifth-year students had more good feelings toward pneumonia, they had negative attitudes toward unexplained chronic stomach pain. Personal experience with mental health treatment, as well as those of family and friends, was linked to less stigmatizing attitudes. Men stigmatized nearly all conditions more than women; Chinese and South Asian students stigmatized delusions and hallucinations more than their white British classmates [21]. 2019 saw the completion of another study including 1372 medical students from 12 Chinese institutions who answered a questionnaire regarding their attitudes and views toward those who suffer from mental illness. Students with no prior experience in psychiatry, those who had only taken a didactic course, and those who had completed both a course and a clinical rotation were all compared using ANOVA. Specific attitudes were uncovered by factor analysis. Interest in extra training as well as other personal experiences were considered. According to the study, the lack of consistent patterns throughout training levels indicated that education did not promote non-stigmatized views, that the areas of most stigmatization were poor social acceptability and little favor for social integration, and that the variables most significantly related with non-stigmatized attitudes were interest in clinical psychiatry, the belief that psychiatry should be given greater respect, and

having friends who had mental illness [22]. Researchers in Brazil sought to determine whether a psychiatric clerkship reduces stigmatized attitudes toward people with mental illnesses among medical students by assessing their attitudes and beliefs about the causes of mental illness prior to and after their participation in a psychiatric clerkship at a major medical school in Rio de Janeiro. Greater social acceptance was linked to taking part in a psychiatric clerkship, but other attitudinal characteristics did not improve. The authors came to the conclusion that this may be due to ceiling effects in responses made prior to the clerkship regarding beliefs in the existence of supernatural beings and bio-psychosocial causes of mental illness, which allowed limited possibility for adjustment [23].

Contrary to the less favourable results of the previous studies, other studies showed a more favourable outcomes, Using a self-reporting questionnaire, In 2015, a cross-sectional descriptive study was undertaken among medical students in India who had received (n = 115) or had not received (n = 61) psychiatry training. The findings revealed that students' attitudes toward mental illness improved after exposure to psychiatric training in the kindness and stigmatization domains; additionally, gender, domicile, and contact with mental illness were found to influence students' attitudes toward each other [24]. In a separate study conducted in 2015 in Nigeria, views regarding mental illness were examined among Nigerian medical professionals at three different levels of training and experience: graduate physicians, medical students who had finished their psychiatry rotations, and medical students who had not. Clinical training appears to have the largest impact on stigmatizing views toward patients with mental diseases, despite the fact that perceptions of the efficacy of medications for treating psychiatric illnesses do not differ between medical trainees and graduate doctors. The study found that psychiatry education, particularly clinical practice, results in more positive attitudes toward individuals with mental diseases [25]. A total of 538 people participated in a 2019 Canadian study at McMaster University, including 382 undergraduate students, 118 medical undergraduate students, and 38 psychiatrists. Participants took the Opening Minds Scale for Healthcare Providers (OMS-HC), a 12-item survey that assesses explicit stigma, as well as the Implicit Association Test (IAT), which assesses implicit bias toward physical illness (diabetes mellitus) or mental illness (schizophrenia). Compared to non-medical undergraduate students and medical school students, psychiatrists showed considerably less explicit and implicit stigma, and having a mental disease diagnosis or being in a close contact

with someone who has a mental illness was associated with less explicit stigma. More education and experience with mental illness, according to the study's findings, are associated with less stigma [26]. In a 2022 Turkish study on 30 undergraduate final year medical students, the effect of clinical posting in psychiatry on the attitude toward mental disease was examined. The study's findings revealed an increase in positive attitude toward mental illness and psychiatry among female students, but not among male students [27]. The effect of a medical student's education curriculum and clinical placement in psychiatry on the students' stigmatizing beliefs toward psychiatry and mental diseases was examined in a study carried out in France in 2018. All medical students completed a variation of the Mental Illness Clinicians' Attitudes (MICA) test at the start and end of an 11-week clinical rotation in psychiatry. Medical students concurrently enrolled in clinical placements in psychiatric units and medical students enrolled in the 4-year course at the start of the education program in psychiatry were compared (MICA). When combined with a psychiatry clinical placement, a psychiatric education program has a larger favorable impact on reducing stigmatizing attitudes regarding psychiatry and mental diseases [28].

Many research have contrasted stigmatizing attitudes of medical students and medical professionals to investigate the impact of experience and training in psychiatry. Teachers were found to have a higher frequency of stigmatizing attitudes than students in a 2017 survey in the Czech Republic comparing stigmatizing attitudes between 308 medical students and 149 faculty members. Analysing stigmatizing attitudes among students from different years of medical study to discover characteristics predicting stigma, higher tolerant attitudes in students were observed throughout the fourth year, that is, following introduction to psychiatry. Among both students and teachers, men exhibited more stigmatizing attitudes toward people with mental conditions [29]. In another study undertaken in Portugal in 2021 to look at and compare the levels of stigmatization of patients with mental diseases among medical students and doctors with different specialties. The Attribution Questionnaire (AQ-27) in Portuguese was used to assess the attitudes of 203 medical students, 121 non-psychiatry doctors, and 29 psychiatry specialists. Psychiatrists were the group with the lowest levels of stigmatizing attitudes across all AQ-27 questions, followed by students. According to the regression analysis, the professional group and the presence of a relative with mental illness have a substantial impact on the degrees of stigmatization [30]. In a 2017 Polish research of patients suffering

from mental diseases, the attitude of psychiatrists toward mental illness was explored. The results of analyzing 232 questionnaires revealed despite their education and professional mission, a large group of investigated psychiatrists has a family member suffering from a mental illness or they themselves suffer from mental illness, and they have similarly stigmatizing attitudes toward the mentally ill as the general population, 61.5% of respondents compared to 59% in the general population believe that a person who is mentally ill has a chance of recovery. According to this study findings, Polish psychiatrists co-create a support structure and aid in stigmatization process [31].

The results of different anti-stigma educational interventions have been examined in various studies; the main comparison was between contact-based and education interventions. Using a didactic approach, education interventions contrast myths about serious mental disorders (SMI) with facts, eradicating stereotypes in contrast to experimental approach including contact interventions attack stereotypes by presenting a person's "life experience." Among undergraduates, members of the general public, medical students, and mental health care professionals, a meta-analysis was conducted in 2017 indicated that both education and contact interventions significantly improved attitudes about behavioural intentions toward people with SMI. Contact approaches also had bigger overall effect sizes than education-based interventions, decreased stigma of SMI immediately following intervention, and differed in degree of outcomes [32]. In a 2020 study on 19 primary care practitioners randomly assigned to contact interventions, outcomes were evaluated at one-month and three-month intervals. The idea that contact intervention would lead to a substantially greater decrease in stigmatizing attitudes was rejected because there was no statistically significant difference in stigmatizing attitudes between the two interventions [33]. Researchers examined the effects of the Education Not Discrimination (END) anti-stigma program on a large sample of 1452 third-year medical students enrolled at one of four participating medical schools in phase one of the national initiative "Time to Change," which ran from 2008 to 2011 in United Kingdom. Medical practitioners were one of the most targeted groups in this initiative, according to the mental health nonprofit charity "Rethink Mental Illness". The intervention included a short lecture with key facts and figures about stigma and discrimination; testimonies from people who have direct

experience with mental health problems, either personally or as caregivers; and small-group role-plays with professional role-players playing the roles of service users and caregivers. As outcome measures, the reported and intended behavior scale (RIBS), the Mental Health Knowledge Schedule (MAKS), three items from the Community Attitudes toward the Mentally Ill (CAMI) to measure attitudes toward mental health, and four items from the Jefferson Scale of Physician Empathy to measure empathy were used. At immediate follow-up, the intervention group demonstrated significantly greater improvements in stigma-related knowledge and reductions in stigma-related attitudes and intended behavior compared to the control group; however, only one attitude item out of three remained significantly better at 6 months' follow-up⁽³⁴⁾. One hundred and ten third-year medical students from an English medical school took part in a controlled non-randomized experiment in 2011 before starting their psychiatry rotation to evaluate the efficacy of a mental illness-related stigma training package that aimed to change knowledge, attitudes, and behavior by contrasting two educational interventions with a control group. A lecture and personal testimonies from a mental health service user and a caregiver made up the first intervention. The second intervention, which was more participatory, added a role-playing training session in a classroom setting by a role player and a student who volunteered in the session with input from a mental health service user and a caregiver to the first intervention approaches. One week after all therapies, students were evaluated using baseline measures. There was a significant positive change in knowledge of people with mental illnesses and stigma when the two interventions were combined with the control, with an adjusted mean difference of 1.19 (95% CI 0.63-1.76), but no evidence of a difference was identified when the two forms were combined. In terms of attitudes or behavior outcomes, there were no notable variations. According to the findings, stigma reduction strategies should target and assess knowledge, attitudes, and behavior separately [35]. A randomized control trial was undertaken at the University of Calgary in Calgary, Canada, to assess the effects of a one-time contact-based educational intervention and a 4-week mandatory psychiatry course on medical students' attitudes toward mental illness. "Psychiatry and Family Violence Training" The outcomes were assessed four times: at the beginning of the trial, after the intervention group got a one-time contact intervention, after the control group completed the mandatory course, and

after three months of follow up. The University of Calgary's 4-week required course was successfully completed by the two groups. In the same study, opinions toward mental illness were compared to views toward type 2 diabetes (T2DM). In the primary analysis, stigma scores for both groups were significantly lower after course completion ($p < 0.0001$) but not after the one-time contact-based educational intervention. However, after correcting for differences between the two groups and the cluster effect, there was a statistically significant difference in change ratings between the two groups, indicating that contact had a meaningful effect. Despite this change, student attitudes of mental illness remained more stigmatized than attitudes toward T2DM at the end of the course [36]. These studies' findings collectively confirm the effectiveness of medical education interventions on mental illness-related stigma, with variable effects on different outcome measures and duration of favourable changes that agree with the current study's findings, albeit the favourable changes persisted for a longer duration. In almost all of the studies examined, one-time contact treatments were not compared only with education interventions, but rather with variously mixed educational interventions [34-36]. The year of study of medical undergraduate students and the temporal relationship to the medical school's assigned psychiatric rotation were two hallmarks of an excellent educational program. Increased tolerant attitudes in students were observed after the fourth year, along with other factors such as attendance at psychiatry courses [29], and a favorable impact was more pronounced when the education program was concurrent with a clinical placement in psychiatry [28]. These qualities could explain the current study's protracted positive changes.

Contact with a mentally ill patient in the previous three months was shown to predict changes in students' attitudes toward mental illness stigma in the current study, which agrees with the findings of many other studies [21,22,24,30]. Female medical students had more stigmatized attitudes toward mentally ill patients than male counterparts, which contradicts the findings of many other studies [21,27,29]. This could be explained by cultural differences and female pupils' stereotyped responses.

Although not all educational interventions with medical undergraduates have been shown to be equally effective in reducing stigma of mental illness, there is a trend toward the use of experiential learning methods involving contact with patients who

have lived experiences with mental disorders, particularly those in a hospital setting.

Limitations of the Study

The main limitations of this study were the inherent biases included in reporting structured questionnaires, like recall, stereotype, tendency to average, tendency to polarity, and social desirability biases. Also, we cannot assure non exposure to other educational inputs like self-learning or any formal courses during the 6-months of follow up. Along with controlled and randomized trials, qualitative techniques like the use of a non-structured questionnaire and thematic analysis may be valuable methodological techniques.

Conclusions

The outcomes of one time contact multi-modal educational intervention for mental illness stigma with undergraduate medical students showed favourable change in mental-health related knowledge, beliefs, and intended behaviour toward mentally ill patients, and these changes were maintained up to 6-months after the intervention. Data at the baseline showed that contact with people with mental illness in the last 3 months was significantly predicting change in beliefs toward mental illness, the total score of beliefs was significantly predicting intended behaviour toward mental illness, female medical students were significantly showing more stigmatizing beliefs, and intended behaviour compared with male students and after the intervention the scores of female and male students were comparable. An effective mental illness stigma educational intervention appears to require the combined effect of various teaching methods including knowledge, contact-based education, and attending to the student's personal experience of working with people with mental illness and delivered at the proper time in course of undergraduate medical curriculum.

Declarations

All methods were carried out in accordance with relevant guidelines and regulations.

Ethics approval and consent to participate

The Ethical Committee of faculty of medicine, Suez Canal University had given its approval for the research protocol of the study before enrolment of any subject. Consent to participate in

the study was totally voluntary and informed consent was obtained from all the study participants.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Competing Interests

No competing or conflict of interest implicated in this study.

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Authors' Contributions

- Ismail Dahshan: Reviewed results of the study in the light of statistical analysis and done the discussion part of the study.
- Menna Mohamed Saad: She done the protocol of the study and supervised collection of the study data.
- Mohamed Mohamady Awad: He done the review of literature and guided progress of the study.
- Hanan Abbas Abdo: Shared in revision of results and discussion part of the study.
- Omneya youseef Ibrahim: Suggested the research question of the study and supervised research protocol completion.
- Mohamed Abd El-Wahed: Updated the review of literature and reviewed the references of the study.

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