Reducing Stigma Toward Psychiatry Among Medical Students: A Multicenter Controlled Trial

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ABSTRACT

Objective: To examine the effect of a novel antistigma intervention curriculum (ASIC) in reducing stigma toward psychiatry among medical students.

Methods: Medical students from 8 hospitals in central Israel were divided into intervention (n = 57) and control (n = 163) arms. The students completed the 30-item Attitudes Toward Psychiatry (ATP-30) and the Attitudes Toward Mental Illness (AMI) scales at psychiatry rotation onset and conclusion. The ASIC was designed to target prejudices and stigma through direct informal encounters with people with serious mental illness (SMI) during periods of remission and recovery. Supervised small-group discussions followed those encounters to facilitate processing of thoughts and emotions that ensued and to discuss salient topics in psychiatry. The study was conducted between November 2017 and July 2018.

Results: Significant between-group differences were found at endpoint for attitudes toward psychiatry and psychiatric patients ($P < .001$). Although changing attitudes toward psychiatry as a career choice was not part of the ASIC, a significant between-group difference emerged by endpoint ($P < .001$).

Conclusions: Implementation of an ASIC that includes contact with individuals with lived SMI experience followed by supervised small-group discussions is effective in reducing stigma in medical students' perceptions of people with mental illness and psychiatry. Further evaluation is warranted with regard to the long-term destigmatizing effects of an ASIC.

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Stigma refers to negative beliefs and stereotypes held toward a specific topic or group of people.[1] Research[2] has found that stigma toward psychiatry and psychiatric patients is common among physicians and medical students. Stigma toward people with mental illness among physicians contributes to poor medical treatment and outcomes, including earlier death in patients with psychiatric disorders such as schizophrenia.[3–6]

Stigma in physicians' attitudes toward psychiatric patients has been reported as already present from the early stages of medical school.[7,8] Studies[7–14] looking at stigmatizing attitudes found that medical students tend to perceive people with mental illness as totally dependent and thus in need of living in hospitals or supervised settings rather than in the community. Medical students have also commonly reported a perception that psychiatric treatments are ineffective, of little utility, and administered mostly to control disruptive behaviors.[8–13] They tend to view psychiatry as a non–evidence-based and unscientific medical discipline largely consisting of vague speculations.[14]

The psychiatry rotation during medical school is a core component of psychiatric training that can play an important role in shaping students' attitudes toward psychiatry. However, findings from worldwide studies[15–20] examining whether a psychiatric clerkship reduces students' stigma toward psychiatry have been inconclusive. A systematic review[21] of 26 studies on the impact of the psychiatry clerkship on attitudes toward psychiatry, including considering choosing a residency in psychiatry, found that 16 of the studies reported a positive change in attitudes at the end of the clerkship, while the remaining 10 reported no change. Research has suggested that a psychiatry rotation by itself is ineffective in reducing stigma toward people with serious mental illness (SMI) and psychiatry[22] and that an active antistigma intervention curriculum (ASIC) is essential.[23] Specifically, in a study by Thornicroft et al,[22] live social contacts or first-person narratives were found to be the most effective methods for reducing stigma toward psychiatric care compared to factual data or video clips depicting individuals with SMI. Social

Clinical Points

- The combination of live social contacts and small-group discussions is effective in reducing stigma in medical students' perceptions of people with mental illness and psychiatry.
- A reduction in stigma toward people with mental illness produced an improvement in students' attitudes toward psychiatry as a career choice.

contact between people with and without lived experience with mental illness can lead to the mitigation of negative stereotypical beliefs and attitudinal change, especially by reducing fear and enhancing empathy.[24]

The purpose of this multicenter controlled study was to examine the efficacy of an ASIC in reducing stigma in medical students' attitudes toward psychiatric patients, psychiatric illnesses and treatments, and the psychiatric knowledge base in clinical practice.

METHODS

Design and Participants

This study used a controlled trial design and was conducted between November 2017 and July 2018 in 8 academic hospitals in central Israel (ClinicalTrials.gov identifier: NCT03907696). The study population consisted of medical students during their 6-week psychiatry clerkship. There were 16 groups of students (11 groups from a 4-year program and 5 groups from a 6-year program), yielding a total of 244 eligible students, of whom 220 (90.2%) consented to participate. Eighty of these students (36.4%) were Americans studying under the auspices of a special program at Tel Aviv University.

The intervention arm included 3 groups of students (n = 57) at a single general hospital, and the control arm comprised 13 groups of students (n = 163) from 6 psychiatric hospitals (n = 139) and 1 general hospital (n = 24). All students were informed that the purpose of the study was to explore their attitudes about people with mental illness and psychiatry in general at the beginning (baseline) and end (endpoint) of their rotation. The participants were assured that their responses would remain confidential and would not influence their rotation grade.

Procedure

The intervention and control groups received the same lecture and practical training components. Topics covered in the lectures included psychopathology, psychopharmacologic treatment, psychotherapy, and forensic psychiatry. Practical training included participation in inpatient rounds, visits to outpatient clinics and consultation-liaison services, and seminars consisting of patient interviews and discussions of clinical cases. All students were placed in a psychiatric ward under the supervision and responsibility of psychiatry residents and senior psychiatrists. Each ward was assigned 4 to 7 students. During the rotation, students assumed supervised clinical responsibility for at least 1 clinical case. Although all students were exposed to a variety of patients in different clinical scenarios, they mostly saw acutely ill inpatients.

Study Intervention

The ASIC component that was added to the intervention group was designed to target stigma toward psychiatric patients, psychiatric treatment, and the knowledge base of clinical practice in psychiatry. The first part of the intervention, aimed at reducing stigma toward people with SMI as defined by the National Institute of Mental Health,[25] consisted of 2 forms of direct encounters with individuals with SMI in recovery or rehabilitation: (1) a 2-hour panel session with 3 people who shared their personal stories as consumers of mental health services followed by an open discussion with the students and (2) a visit to a rehabilitation center, which included direct contact with the consumers. The emphasis in both of those encounters was on exposing students to the competence and strengths of the individuals, rather than to the symptoms and signs of their underlying illnesses. The second part of the intervention, which was designed to target stigma toward psychiatric treatment and the knowledge base of clinical practice in psychiatry, included small-group discussions (20 minutes each) on the efficacy of different treatments, the clinical utility of admission to inpatient wards, evidence-based medicine in psychiatry, and the biological pathways underpinning psychiatric disorders.

The study was conducted after receiving Helsinki ethics committee approval for a multicenter study from the University of Tel Aviv Institutional Review Board. Because the ethics committee approval was contingent on personal information being de-identified, only aggregate, unpaired, pre- and postrotation data were used.

Study Evaluations

Participants completed 1 sociodemographic and 2 self-report questionnaires, the 30-item Attitudes Toward Psychiatry (ATP-30)[26] and the Attitudes Toward Mental Illness (AMI),[7] which were administrated through a secured online server (SurveyMonkey). The ATP-30 consists of 30 items and measures medical students' attitudes toward 8 different attitudinal domains: (1) psychiatric patients, (2) psychiatric illness, (3) psychiatric treatment, (4) psychiatric institutions, (5) psychiatric knowledge base in clinical practice, (6) psychiatric education, (7) psychiatry as a career choice, and (8) psychiatrists. The AMI consists of 20 items and measures medical students' attitudes toward mental illnesses and, more specifically, their causes, treatments, and impact on individuals and society. Each item in both questionnaires is rated on a 5-point Likert scale ranging from "strongly agree" to "strongly disagree." Some items are negatively phrased to minimize the likelihood of social desirability bias, and higher composite scores indicate more favorable attitudes (less stigma) toward mental illness. Both the ATP-30 and AMI have been shown to have good

Table 1. Demographic Data of the Study Participants

Variable	Intervention (n = 57)	Control (n = 163)
Female, %	44	55
Age, %, y		
23–26	18	31
27–29	42	42
≥ 30	40	26

Table 2. Comparison of the Intervention (n = 57) and Control (n = 163) Groups' 30-item Attitude Toward Psychiatry (ATP-30) and Attitude Toward Mental Illness (AMI) Total Scores at Baseline and Endpoint[a,b]

Variable	Intervention	Control	Delta	*t* Test[c] (*df*)	*P* Value
ATP-30					
Baseline, mean (SD)	108.5 (13.0)	108.0 (13.5)	0.5	0.25 (218)	.80
Endpoint, mean (SD)	115.3 (14.1)	111.3 (14.9)	4.0	1.74 (208)	.08
Change (95% CI)	6.8 (1.7–11.8)	3.3 (0.2–6.4)	3.5		
t test[c] (*df*)	2.66 (112)	2.09 (324)			
P value	**<.01**	**<.05**			
AMI					
Baseline, mean (SD)	73.5 (7.4)	73.5 (8.4)	0.0	0.01 (218)	.989
Endpoint, mean (SD)	76.9 (5.9)	74.8 (6.7)	2.1	2.16 (208)	**<.05**
Change (95% CI)	3.4 (0.9–5.9)	1.3 (−2.9–0.4)	2.1		
t test[c] (*df*)	2.72 (112)	1.50 (324)			
P value	**<.01**	.13			

[a]ATP-30: minimum score = 30, maximum score = 150; AMI: minimum score = 20, maximum score = 100. Higher scores indicate less stigma.
[b]Bolded values indicate statistical significance.
[c]Independent *t* test.

psychometric properties and have been translated into many languages and used in numerous countries worldwide.[7,26]

Statistical Analysis

We used independent sample *t* tests to compare mean differences in ATP-30 and AMI total scores within and between groups at baseline and at endpoint, as well as for each subscale of the ATP. We next dichotomized the 5-point Likert scale into agreement and disagreement categories in line with previous research.[15] The agreement category included "strongly agree" and "agree" responses, and the disagreement category included "strongly disagree," "disagree," and "neutral" (no opinion) responses. The change in proportion of agreement between baseline and endpoint was calculated separately for each item, with the difference defined as risk difference (RD). The McNemar test was used separately for the intervention and control groups to determine changes from baseline to endpoint. SPSS version 25.0 (IBM Corp, Armonk, New York) was used to conduct all statistical analyses, with the threshold for significance set at $P < .05$.

RESULTS

All 57 students in the intervention group completed the baseline survey, and 56 (98%) completed the endpoint survey. A total of 163 (87%) of 187 students in the control group completed the baseline survey, and 154 (94%) completed the endpoint survey. The groups were similar in their distributions by sex and age (Table 1) and by interactions with people with lived experience of mental illness.

The mean ATP-30 and AMI total scores at baseline and endpoint for the intervention and control groups are presented in Table 2. We found a significant difference for both the intervention ($P = .009$) and control ($P = .039$) groups on the ATP-30 total scores but only for the intervention group ($P = .008$) on the AMI total scores. Although no significant between-group differences were found at baseline, there was a marginally significant difference ($P = .08$) in the ATP-30 total scores and a significant difference ($P = .03$) in the AMI total scores between groups at endpoint. There were no significant differences in the ATP-30 and AMI scores between male and female mean total scores at baseline and endpoint for both the intervention and control groups ($P > .27$ for all).

We found no significant between-group differences at baseline for any of the ATP-30 or AMI subscales (Table 3). We did find by endpoint, as initially hypothesized, significant differences between groups on attitude toward psychiatric patients ($P < .001$), psychiatric illness ($P < .001$), psychiatric treatment ($P = .018$), and the psychiatric knowledge base in clinical practice ($P = .001$). Although changing attitudes toward psychiatry as a career choice and psychiatric teaching were not part of our intervention plan, we did find a significant between-group difference by endpoint ($P < .001$ and $P = .005$, respectively).

The intervention group showed an overall greater reduction in negative (stigmatized) attitudes. This reduction is evident in the positive RDs between the intervention and control groups for 26 of 30 items (87%) of the ATP-30 and 17 of 20 items (85%) of the AMI. Positive RDs indicate a greater reduction in negative views in the intervention

Table 3. Comparison of the Intervention (n = 57) and Control (n = 163) Groups on Subscales of the 30-Item Attitude Toward Psychiatry (ATP-30) and Attitude Toward Mental Illness (AMI) at Baseline and Endpoint

Attitude Toward:		Intervention	Control	Delta	*t* Test[a]	*P* Value[b]
Psychiatric patients	Baseline	7.53 (2.37)	7.63 (2.33)	0.10	−0.28	.78
	Endpoint	9.23 (1.80)	8.01 (2.14)	1.22	3.66	**<.001**
Psychiatric illness	Baseline	8.40 (1.85)	8.08 (2.19)	0.32	1.00	.32
	Endpoint	9.84 (1.51)	8.81 (1.74)	1.03	3.92	**<.001**
Psychiatric treatment	Baseline	2.58 (1.65)	2.47 (1.50)	0.11	0.45	.65
	Endpoint	3.59 (1.26)	3.08 (1.41)	0.51	2.39	**<.05**
Psychiatric knowledge	Baseline	2.61 (1.24)	2.36 (1.37)	0.25	1.23	.22
	Endpoint	2.95 (1.18)	2.25 (1.30)	0.70	3.50	**.001**
Psychiatry as a career choice	Baseline	3.09 (1.62)	2.91 (1.32)	0.18	0.81	.42
	Endpoint	4.29 (1.63)	3.38 (1.61)	0.91	3.61	**<.001**
Psychiatric institutions	Baseline	1.88 (0.98)	1.93 (0.90)	0.05	−0.35	.73
	Endpoint	2.46 (0.79)	2.44 (0.71)	0.02	0.26	.80
Psychiatrists	Baseline	3.51 (1.21)	3.48 (1.28)	0.03	0.16	.88
	Endpoint	3.95 (1.28)	3.71 (1.22)	0.24	1.26	.21
Psychiatric teaching	Baseline	1.89 (1.06)	1.79 (1.05)	0.10	0.64	.53
	Endpoint	2.59 (0.87)	2.18 (0.95)	0.41	2.85	**<.01**

[a]Independent *t* test.
[b]Bolded values indicate statistical significance.

Table 4. Comparison Between Intervention (N = 57) and Control (N = 163) Groups on Selected Items of the 30-Item Attitude Toward Psychiatry (ATP-30) and Attitude Toward Mental Illness (AMI) at Baseline and Endpoint

Variable	Group	Baseline n (%)	Endpoint n (%)[a]	Risk Difference	*P* Value[b]
ATP-30					
Item 4: I would like to be a psychiatrist	Intervention	10 (17.5)	24 (42.9)	15.9	**<.001**
	Control	12 (7.4)	26 (16.9)		**<.05**
Item 19: There is very little that psychiatrists can do for their patients	Intervention	18 (31.6)	10 (17.9)	10.2	**<.01**
	Control	46 (28.2)	38 (24.7)		.497
Item 25: In recent years psychiatric treatment has become quite effective	Intervention	22 (38.6)	34 (60.7)	14.7	**<.001**
	Control	60 (36.8)	68 (44.2)		.169
Item 26: Most of the so-called facts in psychiatry are really just vague speculations	Intervention	23 (40.4)	18 (32.1)	14.2	.063
	Control	74 (45.4)	79 (51.3)		.328
Item 30: Psychiatry is so amorphous that it cannot really be taught effectively	Intervention	20 (35.1)	6 (10.7)	21.6	**<.01**
	Control	66 (40.5)	58 (37.7)		.609
AMI					
Item 1: Psychiatric patients generally speaking are difficult to like	Intervention	15 (26.3)	7 (12.5)	10.7	**<.01**
	Control	41 (25.2)	34 (22.1)		.683
Item 20: Patients with chronic schizophrenia are incapable of looking after themselves	Intervention	27 (47.4)	20 (35.7)	22.3	**<.05**
	Control	97 (59.5)	108 (70.1)		.068

[a]McNemar test.
[b]Bolded values indicate statistical significance.

group compared to the control group, with a mean RD of +9% (range, −5% to +27%) for the ATP-30 and +9% (range, −7% to +24%) for the AMI. Table 4 highlights select items of the 2 questionnaires, and all 50 items are included in Appendix 1.

The mean RD for stigma toward psychiatric patients was +11% (range, +5% to +22%) in favor of the intervention group. There was a statistically significant reduction in the proportion of students endorsing negative views for 8 of 12 items (67%) in the intervention group compared to 3 of 12 items (25%) in the control group. The mean RD for statements regarding the efficacy of psychiatric illness was +5% (range, −7% to +24%) in favor of the intervention group. There was a statistically significant reduction in the proportion of students endorsing negative views for 5 of 12 items (42%) in both the intervention and control groups.

The mean RD for statements regarding the efficacy of psychiatric treatment was +8% (range, −1% to +15%) in favor of the intervention group. We found a statistically significant reduction in the proportion of students endorsing negative views for all 5 items in the intervention group compared to 3 of 5 items (60%) in the control group. The mean RD for items related to attitude toward the psychiatric knowledge base of clinical practice in psychiatry was +11% (range, −5% to +27%) in favor of the intervention group. There was a statistically significant reduction in the proportion of students in the intervention group who endorsed negative views for 1 of 4 items (25%). Conversely, there was an

increase in the proportion of students in the control group who endorsed negative views at endpoint for 3 of 4 items (75%).

Although changing attitudes toward psychiatry as a career choice was not part of our intervention plan, the mean RD was +12% (range, +7% to +16%) in favor of the intervention group. For example, the proportion of students agreeing with the statement "Psychiatry is not one of the most exciting medical specialties" (ATP item 21) decreased by 27% in the intervention group compared with 13% in the control group (RD of +14%), implying that the intervention group found psychiatry more attractive at endpoint than did the controls. Another example of changing attitudes is the reversed item (ATP item 4) "I would like to be a psychiatrist": 43% of the students in the intervention group stated that they would like to be a psychiatrist at endpoint compared to only 17% in the control group. A similarly significant reduction in the proportion of students endorsing negative views was found for 4 of the 6 items (67%) in the "psychiatry as a career choice" category in both the intervention and control groups. The mean RD for statements regarding psychiatric teaching, psychiatric institutes, and psychiatrists was 8% (range, −1% to +22%), 4% (range, +0% to +8%), and 9% (range, +4% to +13%), respectively.

DISCUSSION

There are limited data on the efficacy of an ASIC in reducing negative (ie, stigmatized) views of medical students toward psychiatric patients, psychiatric illness and treatment, and the knowledge base of clinical practice in psychiatry. We chose those themes because they have been shown by various studies[2–6] to be pivotal and recurrent. The ASIC included encounters with people having lived experience with SMI and small-group discussions on salient topics, such as psychiatric care, evidence-based medicine in psychiatry, and the neuroscientific underpinnings of clinical psychiatry. As we hypothesized, there was a greater reduction in the intervention group compared to the control group in the majority of items. Although changing attitudes toward psychiatry as a career choice and psychiatric teaching were not part of the ASIC, we found more positive changes in these 2 domains in the intervention group. Overall, the ASIC had a significant positive effect on the attitude of medical students toward psychiatry, as demonstrated by changes in the widely used ATP-30 and AMI total scores.

Only a few studies,[27–29] to our knowledge, have examined the effect of an ASIC on attitudes of medical students toward psychiatry. One study[27] that aimed to reduce stigma toward patients with schizophrenia and psychiatric treatment included intervention and control groups (consisting of 25 and 35 participants, respectively). The intervention consisted of live social contact with a patient with schizophrenia, viewing of the movie *A Beautiful Mind*, and a lecture on stigma. The authors[27] observed a significant reduction in the proportion of students who endorsed negative statements, but only a minority of tested items reached such a reduction. In another study,[28] medical students (n = 95) were presented with a 1-hour case study of an ambulatory patient with schizophrenia who receives community-based services: no significant reduction in stigma toward psychiatric patients and services ensued. A third study[29] used the ATP-30 and AMI scales over 3 time points to examine the efficacy of 2 learning methods, didactic education (n = 29 participants) and problem-based learning (n = 41 participants), but not the efficacy of a structured ASIC, in reducing stigma toward psychiatry. Both learning methods yielded weak positive changes solely in AMI scores.[29]

Our study has several advantages over previous research on ASICs among medical students, including a relatively sizable sample and the use of a predesigned comprehensive ASIC that targets pivotal aspects of stigma. A major component of our ASIC was live social contact with patients, as recommended by Thornicroft et al.[22] The only other study[27] that examined the influence of social contact found no significant difference for most of the items, but we were able to demonstrate a significant reduction in the proportion of medical students who endorsed negative statements. A possible explanation for this discrepancy is that each live social contact in our study was followed by a small-group discussion that provided an environment that facilitated processing and generalization of the thoughts and emotions that had been evoked during the encounter. Stereotypical beliefs about people with SMI were contested in the open-group discussion by the emerging realization that those beliefs stem from anxiety and fear.[26] Thus, it appears that small groups were essential in creating an environment that enabled students to express their fears and anxieties with regard to psychiatric patients.

Moreover, small-group discussions were beneficial not only in processing emotions, but also in changing attitudes toward psychiatric treatment by understanding gaps in knowledge and providing more comprehensive and informed details. For example, we challenged the common notion that psychiatric drugs "don't work" by presenting data from randomized control trials in psychiatry and by emphasizing the similarity in methodology to that used in treatment studies for general medical conditions. The efficacy of psychiatric treatments was highlighted by showing that effect sizes and numbers needed to treat, as computed in clinical trials in psychiatry, are mostly equivalent to those computed in corresponding trials in other areas of medicine.

Although it was not one of the direct aims of our ASIC, we found an improvement in students' attitude toward psychiatry as a career choice. Recruitment into the field is a worldwide concern, and experiences during the psychiatry rotation play an important role in the choice of psychiatry as a career.[30] Our findings are inconsistent with other studies[29,31] that showed that psychiatry training has a limited impact on students' attitudes and that those effects subside over time as students get closer to choosing their residency program. A review of the literature[32,33] revealed that seeing patients recover and experiencing a positive contact with patients were among the strongest factors that can change a student's perception

or even career choice. Our ASIC included an encounter with people with SMI during recovery and remission and emphasized the potential for positive trajectories and outcomes. It is therefore plausible that improving attitudes toward psychiatry as a career choice requires components similar to those necessary for changing attitudes toward psychiatric patients and psychiatric treatment.

Limitations

Our study has several limitations. First, the intervention group consisted of students from a single hospital, and it is possible that hospital-specific factors had a direct effect on the study outcomes, independent of the ASIC. However, all participating hospitals are affiliated with 1 medical school and teaching in all those hospitals is overseen by a single curriculum committee, thus reducing the likelihood that such factors had a significant effect on the study outcomes. Second, due to IRB restrictions, we made no individual-level pairing of the study scores between baseline and endpoint. Third, generalization of our study's findings might be limited to student populations with similar characteristics. However, approximately 25% of our study subjects were students from the United States attending medical school in Israel. Thus, it is very likely that our results could be applicable to US medical students as well. Fourth, students were not randomized, and group assignment (intervention and control) was determined by which hospital students were assigned to for the rotation. This factor could have generated selection bias, because students who share similar views and ideas related to stigma are more likely to cluster into groups. However, it is reasonable to assume that such bias was minimal, as student grouping is determined by a lottery prior to each rotation. Lastly, our study did not evaluate the long-term effects of our ASIC.

CONCLUSION

This study emphasizes the important effects of a predesigned ASIC during the psychiatry rotation of medical students. We found that a combination of live social contacts and small-group discussions is effective in reducing negative (stigmatized) perceptions of individuals with SMI, psychiatric illnesses and treatments, the psychiatric knowledge base of clinical practice in psychiatry, and psychiatry as a profession. Further investigation is required to determine the long-term efficacy of an ASIC.

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Supplementary material follows this article.

THE PRIMARY CARE COMPANION
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Supplementary Material

Article Title: Reducing Stigma Toward Psychiatry Among Medical Students: A Multicenter Controlled Trial

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List of Supplementary Material for the article

1. Supplementary Table 1A–H. Comparison Between Intervention (N=57) and Control (N=163) Group Scores on the 30-Item Attitudes Toward Psychiatry (ATP-30) and Attitudes Toward Mental Illness (AMI) Questionnaires at Baseline and at Endpoint

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Supplementary Table 1A-H. Comparison Between Intervention (N=57) and Control (N=163) Group Scores on the 30-Item Attitudes Toward Psychiatry (ATP-30) and Attitudes Toward Mental Illness (AMI) Questionnaires at Baseline and at Endpoint

A. Attitude Toward Psychiatric Patients Items

Items	Group	Baseline N (%)	Endpoint N (%)	RD[b]	*P* value
ATP-30:					
27. If we listen to them, psychiatric patients are just as human as other people	Intervention	49 (86.0)	52 (92.9)	6.7	0.125
	Control	152 (93.3)	144 (93.5)		1.000
29. Psychiatric patients are often more interesting to work with than other patients	Intervention	27 (47.4)	41 (73.2)	11.4	**0.000**
	Control	76 (46.6)	94 (61.0)		**0.019**
AMI:					
1. Psychiatric patients generally speaking are difficult to like	Intervention	15 (26.3)	7 (12.5)	10.7	**0.008**
	Control	41 (25.2)	34 (22.1)		0.683
2. The mentally ill should be discouraged from marrying	Intervention	17 (29.8)	5 (8.9)	8.7	**0.000**
	Control	44 (27.0)	23 (14.9)		**0.011**
4. Those with a psychiatric history should never be given a job with responsibility	Intervention	5 (8.8)	0 (0.0)	7.5	-
	Control	17 (10.4)	14 (9.1)		1.000
5. Psychiatric diagnoses stigmatize people and should not be used	Intervention	18 (31.6)	12 (21.4)	10.6	**0.031**
	Control	49 (30.1)	47 (30.5)		1.000
7. Those who attempt suicide leaving them with serious liver damage should not be given transplants	Intervention	29 (50.9)	22 (39.3)	7.7	**0.016**
	Control	73 (44.8)	63 (40.9)		0.556
10. People who take an overdose are in need of compassionate treatment	Intervention	34 (59.6)	45 (80.4)	12.1	**0.000**
	Control	97 (59.5)	104 (68.2)		0.142
14. Alcohol abusers have no self-control	Intervention	33 (57.9)	31 (55.4)	5.3	0.824
	Control	79 (48.5)	79 (51.3)		-
16. People who had good parenting as children rarely suffer from mental illness	Intervention	17 (29.8)	16 (28.6)	14.9	1.000
	Control	54 (33.1)	72 (46.8)		-
18. It is preferable that the mentally ill live independently rather than in hospital	Intervention	24 (42.1)	44 (78.6)	14.6	**0.000**
	Control	68 (41.7)	98 (63.6)		**0.000**
20. Patients with chronic schizophrenia are incapable of looking after themselves	Intervention	27 (47.4)	20 (35.7)	22.3	**0.016**
	Control	97 (59.5)	108 (70.1)		-

[a] McNemar's test; [b] Risk Difference

B. Attitude Toward Psychiatric Illness Items

Items	Group	Baseline N (%)	Endpoint N (%)	RD[b]	*P* value
ATP-30:					
12. Psychiatric illness deserves at least as much attention as physical illness	Intervention	56 (98.2)	56 (100)	2.1	1.000
	Control	155 (95.1)	146 (94.8)		-
18. It is interesting to try to unravel the cause of a psychiatric illness	Intervention	56 (98.2)	55 (98.2)	-4.1	1.000
	Control	149 (91.4)	147 (95.5)		0.189
AMI:					
3. Violence mostly results from mental illness	Intervention	11 (19.3)	10 (17.9)	-0.2	1.000
	Control	45 (27.6)	40 (26.0)		0.788
6. Mental illnesses are wrongly diagnosed in women and ethnic minorities	Intervention	51 (89.5)	40 (71.4)	7.6	**0.001**
	Control	142 (86.5)	117 (76.0)		**0.016**
8. Psychiatric drugs are mostly used to control disruptive behavior	Intervention	19 (33.3)	6 (10.7)	17.1	**0.000**
	Intervention	62 (38.0)	50 (32.5)		0.207
9. ECT should be banned	Control	25 (43.9)	1 (1.8)	3.0	**0.000**
	Intervention	68 (41.7)	4 (2.6)		**0.000**
11. Psychiatric drugs do more harm than good	Intervention	14 (24.6)	6 (10.7)	2.2	**0.008**
	Control	56 (34.4)	35 (22.7)		**0.044**
12. Depression occurs in people with a weak personality	Control	8 (14.0)	8 (14.3)	3.6	-
	Control	20 (12.3)	25 (16.2)		-
13. Mental illness is the result of adverse social circumstances	Intervention	29 (50.9)	24 (42.9)	24.3	0.458
	Control	79 (48.5)	100 (64.9)		-
15. Mental illnesses are genetic in origin	Intervention	26 (45.6)	44 (78.6)	10.4	**0.000**
	Control	91 (55.8)	102 (66.2)		**0.022**
17. Care in the community for the mentally ill puts society at risk	Intervention	3 (5.3)	2 (3.6)	-6.6	1.000
	Control	22 (13.5)	8 (5.2)		**0.019**
19. Not enough is being done for the care of the mentally ill	Intervention	12 (21.1)	11 (19.6)	-1.2	1.000
	Control	52 (31.9)	45 (29.2)		0.532

[a]McNemar's test; [b]Risk Difference.

C. Attitude Toward Psychiatric Treatment Items

ATP-30 Items:	Group	Baseline N (%)	Endpoint N (%)	RD[b]	*P* value
5. It is quite easy for me to accept the efficacy of psychotherapy	Intervention	35 (61.4)	43 (76.8)	2.8	**0.004**
	Control	87 (53.4)	102 (66.2)		**0.025**
14. With the forms of therapy now at hand most psychiatric patients improve	Intervention	23 (40.4)	41 (73.2)	13.0	**0.000**
	Control	61 (37.4)	88 (57.1)		**0.001**
16. Psychiatric treatment causes patients to worry too much about their symptoms	Intervention	29 (50.9)	19 (33.9)	-0.5	**0.002**
	Control	85 (52.1)	54 (35.1)		**0.004**
19. There is very little that psychiatrists can do for their patients	Intervention	18 (31.6)	10 (17.9)	10.2	**0.008**
	Control	46 (28.2)	38 (24.7)		0.497
25. In recent years psychiatric treatment has become quite effective	Intervention	22 (38.6)	34 (60.7)	14.7	**0.000**
	Control	60 (36.8)	68 (44.2)		0.169

[a] McNemar's test; [b] Risk Difference

D. Attitude Toward Psychiatric Knowledge Items

ATP-30 Items:	Group	Baseline N (%)	Endpoint N (%)	RD[b]	*P* value
8. The practice of psychotherapy basically is fraudulent since there is no strong evidence that it is effective	Intervention	7 (12.3)	2 (3.6)	-4.8	0.063
	Control	42 (25.8)	19 (12.3)		**0.003**
13. Psychiatry has very little scientific information to go on	Intervention	26 (45.6)	26 (46.4)	8.1	-
	Control	86 (52.8)	95 (61.7)		-
24. Psychiatry is so unscientific that even psychiatrists can't agree as to what its basic applied sciences are	Intervention	23 (40.4)	13 (23.2)	26.7	**0.004**
	Control	65 (39.9)	76 (49.4)		-
26. Most of the so-called facts in psychiatry are really just vague speculations	Intervention	23 (40.4)	18 (32.1)	14.2	0.063
	Control	74 (45.4)	79 (51.3)		-

[a] McNemar's test; [b] Risk Difference

E. Attitude Toward Psychiatry as a Career Choice Items

ATP-30 Items:	Group	Baseline N (%)	Endpoint N (%)	RD[b]	*P* value
1. Psychiatry is unappealing because it makes so little use of medical training	Intervention	22 (38.6)	15 (26.8)	11.6	0.109
	Control	66 (40.5)	62 (40.3)		1.000
4. I would like to be a psychiatrist	Intervention	10 (17.5)	24 (42.9)	15.9	**0.000**
	Control	12 (7.4)	26 (16.9)		**0.020**
11. Psychiatry is a respected branch of medicine	Intervention	41 (71.9)	43 (76.8)	7.4	0.500
	Control	111 (68.1)	101 (65.6)		-
17. Psychiatrists get less satisfaction from their work than other specialists	Intervention	18 (31.6)	6 (10.7)	8.6	**0.008**
	Control	56 (34.4)	34 (22.1)		**0.036**
21. If I were asked what I considered to be the three most exciting medical specialties, psychiatry would be excluded	Intervention	40 (70.2)	24 (42.9)	14.1	**0.000**
	Control	123 (75.5)	96 (62.3)		**0.018**
28. The practice of psychiatry allows the development of really rewarding relationships with people	Intervention	34 (59.6)	50 (90.3)	16.1	**0.000**
	Control	108 (66.3)	123 (79.9)		**0.014**

[a] McNemar's test; [b] Risk Difference

F. Attitude Toward Psychiatric Teaching Items

ATP-30 Items:	Group	Baseline N (%)	Endpoint N (%)	RD[b]	*P* value
9. Psychiatric teaching increases our understanding of medical and surgical patients	Intervention	42 (73.7)	45 (80.4)	-0.8	0.25
	Control	119 (73.0)	124 (80.5)		0.07
10. Most students report that their psychiatric undergraduate training has been valuable	Intervention	22 (38.6)	39 (69.6)	5.4	**0.000**
	Control	62 (38.0)	98 (63.6)		**0.000**
23. These days psychiatry is the most important part of the curriculum in medical schools	Intervention	7 (12.3)	11 (19.6)	4.9	0.063
	Control	14 (8.6)	17 (11.0)		0.557
30. Psychiatry is so amorphous that it cannot really be taught effectively	Intervention	20 (35.1)	6 (10.7)	21.6	**0.004**
	Control	66 (40.5)	58 (37.7)		0.609

[a] McNemar's test; [b] Risk Difference

G. Attitude Toward Psychiatric Institutions Items

ATP-30 Items:	Group	Baseline N (%)	Endpoint N (%)	RD[b]	*P* value
3. Psychiatric hospitals are little more than prisons	Intervention	15 (26.3)	5 (8.9)	0.1	**0.002**
	Control	44 (27.0)	15 (9.7)		**0.000**
20. Psychiatric hospitals have a specific contribution to make to the treatment of the mentally ill	Intervention	37 (64.9)	50 (89.3)	7.9	**0.000**
	Control	117 (71.8)	136 (88.3)		**0.001**

[a] McNemar's test; [b] Risk Difference

H. Attitude Toward Psychiatrists Items

ATP-30 Items:	Group	Baseline N (%)	Endpoint N (%)	RD[b]	*P* value
2. Psychiatrists talk a lot but do very little	Intervention	17 (29.8)	9 (16.1)	11.6	**0.008**
	Control	50 (30.7)	44 (28.6)		0.899
6. On the whole, people taking up psychiatric training are running away from participation in real medicine	Intervention	12 (21.1)	11 (19.6)	3.9	1.000
	Control	30 (18.4)	32 (20.8)		-
7. Psychiatrists seem to talk about nothing but sex	Intervention	10 (17.5)	0 (0.0)	7.2	**0.000**
	Control	22 (13.5)	5 (3.2)		**0.002**
15. Psychiatrists tend to be at least as stable as the average doctor	Intervention	29 (50.9)	19 (33.9)	10.8	**0.002**
	Control	81 (49.7)	67 (43.5)		0.207
22. At times it is hard to think of psychiatrists as equal to other doctors	Intervention	40 (70.2)	36 (64.3)	12.7	0.500
	Control	98 (60.1)	103 (66.9)		-