Psychiatry Research 281 (2019) 112581

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Effects of education and social contact on mental health-related stigma among high-school students

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ARTICLE INFO

Keywords:
Attitudes
Help seeking
Adolescents
Contact
Mental health literacy
Social distance

ABSTRACT

Poor knowledge and stigma toward people with mental illness negatively affect intentions to seek help among adolescents. The study aimed to assess the impact of three school-based interventions and to explore whether positive changes in attitudes were linked to more favorable changes in desire for social distance and seeking help. A total of 221 upper secondary students were allocated to three interventions: 1. social contact; 2. Mental Health Literacy (MHL) conducted by clinicians; 3. MHL conducted by dis-peer instructors. Measures of knowledge, attitudes, views on empowerment and recovery, willingness to interact, and help seeking were collected. Generalized Estimating Equations and Structural Equation Modeling (SEM) were used to evaluate scores differences between interventions through time, and to test the interrelationships between knowledge, attitudes variables and the two outcomes of interest. Findings showed that all groups improved in knowledge, attitudes, empowerment, willingness to interact, and seeking help. SEM revealed that the increase in knowledge was significantly associated with the *General attitudes toward people with mental illness* construct that, in turn, was positively associated with willingness to interact and seeking help. Results encourage the use of anti-stigma interventions in order to decrease negative attitudes toward mental illness and improve behavioral intentions among students.

1. Introduction

The worldwide-pooled prevalence of mental disorders in children and adolescents was estimated at 13.4% (Polanczyk et al., 2015) but only a minority of them, and often after several years following the onset of symptoms, seek or access to professional help (Auerbach et al., 2016; Zachrisson et al., 2006). Poor knowledge and stigma about mental illness negatively affect intentions to seek help among young people (Rickwood et al., 2007), and, in turn, represent a barrier to subsequent help- seeking behaviors (Gulliver et al., 2010; Rusch and Thornicroft, 2014; Yap et al., 2011) and to accessing services (Clement et al., 2015) for those experiencing mental illness. A recent report from the UK's Time to Change program (https://www.timetochange.org.uk/sites/default/files/TTC%20CYP%20Report%20FINAL.pdf) showed that young people with mental health problems reported that stigma prevented them from hanging out with friends (54%), having a relationship (40%), and it stopped them from going to school (40%). According to Major and O'Brien (2005) the stigma represents an identity threat that occurs when one's sense of self is challenged by association with a stigmatized group. People with a diagnosis of mental illness who internalize stigma often experience these harmful effects in terms of low hope, empowerment, self-esteem, self-efficacy, quality of life, and poor social support (Livingston and Boyd, 2010). These negative expectations often cause the so called "why try" effect that leads individuals with mental illness to undermine pursuit of relevant life goals in academic, professional, social and personal life (Corrigan et al., 2009).

Consequently, reducing public stigma toward mental illness and improving mental health knowledge among young people represent two major challenges in order to enable early interventions (Kelly et al., 2007; Koike et al., 2018). Moreover, considering that mental health problems are often associated to absenteeism or drop-out from school (Egger et al., 2003; Kearney, 2008), school-age adolescents represent a target population.

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https://doi.org/10.1016/j.psychres.2019.112581
Received 16 April 2019; Received in revised form 25 September 2019; Accepted 26 September 2019
Available online 27 September 2019
0165-1781/

Among anti-stigma efforts, educational- or contact-only interventions or a combination of the two approaches have been the most commonly used in different target populations (Corrigan et al., 2001; Gronholm et al., 2017). Among educational approaches, Mental Health Literacy (MHL) programs have been develop to promote accurate knowledge regarding mental illness, help-seeking options and available treatments, knowledge of effective self-help strategies for milder problems, and first aid skills to support others suffering from mental health problems (Jorm et al., 1997; Jorm, 2012). To date, research into school-based MHL programs (Wei et al., 2013) has reported low quality of the evidence about knowledge and attitudes outcomes among youth. Contact has been considered as one of the key components for improving attitudes toward mental illness among the general population (Pinfold et al., 2005b), as it may foster transformative learning (Chen et al., 2018). Previous studies using different types of contact among young people (in-person contact or para-social contact with the use of video or online communications) found mixed results (Janoušková et al., 2017; Koller and Stuart, 2016; Yamaguchi et al., 2019). First, some studies found that social contact was better than educational elements alone in reducing stigma among adults (Corrigan et al., 2012). However, an opposite pattern was found among adolescents, for whom the most effective approach was education (Corrigan et al., 2012; Painter et al., 2017). Second, other studies evaluating the effect of combining education with either direct or indirect social contact (Chan et al., 2009; Meise et al., 2000) found that this is the most effective strategy in order to improve attitudes and reduce desire for social distance compared to education alone also among high school students. There is little evidence as to which strategies or types of implementers work best when delivering anti-stigma interventions, and findings on their effectiveness both in the short and long term are poor (Mellor, 2014; Sakellari et al., 2011; Schachter et al., 2008; Wei et al., 2013).

In Italy, to date, only two school-based interventions aimed at promoting mental health and well-being have been tested among high school students, although they reached promising results on their mental health status compared to controls, these studies did not include measures on attitudes about mental illnesses (Gigantesco et al., 2015; Ruini et al., 2009). Furthermore, the Italian National Institute of Health has recently recommended the implementation of peer education and dis-peer education interventions in secondary schools (De Santi et al., 2009) as young people are more likely to identify with other people with the same age or slightly older who have a better understanding of their culture and language. However, to date, no studies in Italy have evaluated the impact of peer education on knowledge and attitudes toward mental illness among high school youth. Another aspect to consider is that changing attitudes about mental illness do not necessarily translate into more favorable behaviors. In particular, literature reported low quality of the evidence of studies assessing two proxy measure for actual behaviors, namely, help-seeking intentions and desire for social distance (Chisholm et al., 2016; Conrad et al., 2009; Koller and Stuart, 2016; Perry et al., 2014; Rickwood et al., 2004; Roberts et al., 2007; Spagnolo et al., 2008; Wei et al., 2013). Although social distance has been further explored compared to help-seeking intentions and some evidence supports positive changes after interventions (Yamaguchi et al., 2019), the long-term effects of these programs are still arguable. Moreover, few studies used specific standardized measures (Conrad et al., 2009; Ng and Chan, 2002; Pinfold et al., 2003; 2005a) and programs were targeted especially for undergraduate university students rather than for high school students (Yamaguchi et al., 2019). The first aim of this study was to compare the effect of three different school-based anti-stigma programs on knowledge acquisition and attitudes about mental illness, willingness to interact with someone with a mental illness (as a measure of social distance), beliefs about empowerment of people living with severe mental disorders, beliefs about recovery, and personal help-seeking intentions for mental health problems. Moreover, the second aim was to explore whether putative positive changes in knowledge led to changes in attitudes, and, in turn, to changes in both attitudes to help-seeking and willingness to interact with someone with a mental illness.

2. Methods

2.1. Study design

A quasi-experimental design with two time points (pre- and post-intervention) was used in the study. The program included two components: the first part was common to the three arms, and the second part was specific for each arm. Each eligible school was allocated to the three intervention arms. Principals from each school were required to allocate each class to one of the three arms by using a random selection method. However, it was not possible to apply randomization appropriately in all the schools because some principals made decisions based on local needs (these were issues originated by the organization set-up and not by students, teachers or principals' personal choices or preferences). Only one school refused to participate to one out of three interventions because it was delivered out of the school setting in extra-curricular time. Although the allocation of classes to interventions was not influenced by the study investigators in any way, randomization was only partially conducted. The allocation of the classes in the three study arms was communicated by the principals to the investigators after the end of the first part of the intervention, which was common to all the students. Subsequently, they planned all the sessions of each specific arm following the allocations established by the schools. Condition allocation could not be masked from students, teachers and researchers.

2.2. Sample

The study was approved by the Local Ethical Committee. Students of the 12th grade who agreed to participate to the study signed the informed consent (or parents in the case of a minor). The convenience sample included 12 classes from 4 schools located in Brescia, Italy. The participating schools were 3 State upper secondary schools (2 lyceums specializing in human sciences; 1 lyceum specializing in sciences) and a publicly subsidized upper secondary school (1 class of the lyceum specializing in human sciences, 1 class of the professional institute on social sciences of the same school).

2.3. Interventions

The intervention was delivered during the 2015–2016 academic year. In the first part of the program, all students received two educational lectures (of 2 h each, during the morning) conducted by two clinical psychologists in usual classroom settings and during school hours. Lectures were focused on symptoms recognition, psychosocial and biological explanations of mental illnesses (based on NIH Curriculum Supplement Series - Information about Mental Illness and the Brain, 2007 and DSM-V criteria), and information on sources of community mental health care (first session) and the stigma and misconceptions related to mental illness (second session). The educational program included the use of slideshows and videos.

In the second part of the program, classes were assigned to one of the following three conditions: 1. Art-Lab (AL); 2. Educational activities conducted by mental health Clinicians (EC); 3. Educational activities conducted by students of Medicine (EM). Specifically, the AL group consisted of two sessions (for a total of 6 h) in which students attended an art-course conducted in a lab located in the IRCCS Istituto Centro San Giovanni di Dio Fatebenefratelli of Brescia (Italy). Students were trained to the use of sophisticated pictorial practices for making abstract paintings inspired to the Art Informel. This was considered a contact-based condition: teachers were individuals with a diagnosis of mental illness in stable clinical condition who had been previously

trained by a master of Art (supervisor of the sessions and classes' climate). According to social psychology literature, indicating that intergroup contact would maximally reduce prejudice when the two groups share equal status, have common goals, there is intergroup cooperation, and institutional support for the contact (Ng and Chan, 2002), in our study, the Art Lab included the cooperation toward the same goals between the groups of students and their teachers, with the agreement of each school's principal. Differently from other contact-based interventions which typically encompass stories of recovery provided by individuals who have suffered from mental illness, the rational of this intervention was to establish a relative prolonged contact with people with mental illness who act a positive role in terms of embodying a sense of agency and empowerment in a contact condition that foster empathy.

The EC intervention used an active education approach delivered by two clinical psychologists that consisted of two 2-hours lessons based on the toolkit "Breaking the silence: Teaching the Next Generation About Mental Illness", middle and high-school versions (permission by NAMI Queens/Nassau, www.btslessonplans.org) (Wahl et al., 2011). Lessons included stories, discussion questions, and activities from the middle- and high- school packets: The Brain Game (a team competition in which one half the class vies with the other in answering review questions), a worksheet that asks student to label described behaviors as either normal or abnormal, and role playing on help-seeking. Furthermore, according to recommendations to convey recovery-oriented messages (Janoušková et al., 2017; Clement et al., 2010), a section of the NAMI toolkit was included, featuring stories of real individuals who are leading successful lives, despite their mental illness. In addition, prejudice toward a person living with mental illness was explored through reverse role-playing, using the cognitive-behavioral strategy called the Devil's advocate (Linehan, 2014), to promote awareness of complexities surrounding stigma. The EM intervention was considered as a "dis-peer"-led education intervention (i.e. instructors were slightly older than the group with whom they were working with) in which trained students of Medicine delivered the same program proposed to the EC group.

Each session of the second part of the intervention was delivered during regular school hours in each class, except for the AL group that received the assigned intervention during the extra-curricular time. The timetable for each session of the two intervention parts was planned by the schools' coordinators according to each class necessity and by balancing them across the different classes' slots.

2.4. Measures

Students were assessed during school hours at pre-intervention (one week prior to the first session of the intervention) and at post-intervention (after one week after the end of the intervention) with a set of questionnaires which included the following:

- Knowledge about Mental Illness test (KMI test) (Watson et al., 2004) that includes 13 true, false, and not sure items that have been used in a previous study as a measure of knowledge about mental illness. KMI score was computed as the frequency of correct responses.
- Attitudes about Mental Illness questionnaire (AMI questionnaire) (Wahl et al., 2012) that consists of 17 opinion statements on a 5-point Likert (categorical) scale assessing students' attitudes about mental illness (higher score indicating higher agreement). For simplification of results, we combined categories of responses (disagree, agree, unsure) and then computed the frequency of positive attitudes answers. Internal consistency measured by Cronbach's alpha was 0.71.
- Willingness to Interact with someone with a Mental Illness questionnaire, modified version for schools (hereafter named WIMI) (Watson et al., 2004), that consists of 8 items on a 5-point Likert (categorical) scale assessing desire for social distance. We combined categories of responses (disagree, agree, unsure) and then we added up answers indicating less desire for social distance. Consistency (Cronbach's alpha) was 0.90.
- revised Attribution Questionnaire (r-AQ-8 version, hereafter AQ) (Corrigan et al., 2005; Watson et al., 2004) that is a short version of the Attribution questionnaire (Corrigan et al., 2003) modified for use in the school setting to assess stereotypes on people with mental illness. The questionnaire comprises 8 items on a 9-point agreement (ordinal) scale. Items are posed in response to a brief vignette about Charlie, a new student who has been diagnosed with a mental illness. We used the total score produced by the sum of items with higher scores reflecting more stigmatizing views. Cronbach's alpha coefficient was 0.70.
- California Assessment of Stigma Change (CASC) (Corrigan et al., 2015) that is a short battery to measure improvements in the public stigma of mental illness after contact-based programs. For the purpose of this study, we used three measures: a 3-item scale assessing the beliefs about social worth of people with mental illness (the Empowerment Scale - ES), a 6-item scale that assesses willingness to seek out services from specialists, friends or family members, ministers or peers (the Care Seeking Questionnaire - CSQ), (higher scores representing higher psychological help seeking willingness), and a 3-item scale assessing views of recovery (Recovery scale - RS) (higher scores representing better views). Participants responded to each item of the battery on a 9-point Likert (ordinal) scale, the total scores of each scale were then computed. Cronbach's alpha coefficients were 0.80 for ES, 0.70 for CSQ, and 0.58 for RS.

All the scales were translated into Italian with using the back-translation method. We collected data on prior contact with someone with mental illness by using a yes or no question.

2.5. Statistical analysis

Summary statistics were carried out through frequencies and percentages for discrete variables and by means and standard deviations (SDs) for continuous variables. The distributions of categorical variables were compared between the three intervention groups through χ^2 test. Depending on the variables' distribution (Gaussian or non-Gaussian) ANOVA or non-parametric Kruskal Wallis tests were used. Post-hoc analyses, to take into account multiple comparisons, were computed by Bonferroni correction.

Generalized Estimating Equations (GEE) models have been performed to evaluate scores differences between the three interventions through time. Different test/questionnaire scores were used as dependent variables (one for each model) and, as independent ones, the factors time (pre-post), intervention (groups: AL, EC, EM) and their corresponding interaction term. Possible confounders were added as independent variables, when necessary.

Changes in test/questionnaire scores were evaluated by the post-pre scores differences. Hereafter, the AQ was reversed in order to obtain coherent scores with the other measures in terms of interpretation. The relationship among all the scores changes was examined by the Pearson correlation coefficient.

Structural Equation Models (SEMs) (Kline, 2016) were used to evaluate the interrelationships between observed and any latent variables. SEM allows to handle complex relationships between one or more independent variables and one or more dependent ones simultaneously, as well as to detect latent structures of the data in a very flexible way. The goodness of fit of the model, to test if the hypothesized model is plausible for the empirical data, was checked by several measures: χ^2 test, relative χ^2 test (< 2.5 indicates good fit), the comparative fit index (CFI; ~ 1 indicates good fit), the root mean square error of approximation (RMSEA; < 0.05 indicates good fit), the Tucker–Lewis coefficient (TLI > 0.9 indicates good fit) and the Akaike information criterion (AIC).

Table 1
Socio-demographics and test scores at baseline by intervention group.

Characteristics	AL $N = 69$	EC $N = 72$	EM $N = 80$	p value
	n(%)	n(%)	n(%)	
Sex				
Female	58 (84.1%)	64 (88.9%)	51 (63.7%)	< **.001** (χ^2test)
Male	11 (15.9%)	8 (11.1%)	29 (36.3%)	
Prior contact with someone with mental illness				
Yes	35 (51.5%)	45 (62.5%)	45 (56.3%)	.417 (χ^2test)
No	33 (48.5%)	27 (37.5%)	35 (43.8%)	
	Mean (SD)	Mean (SD)	Mean (SD)	
Age in years	18.28 (0.73)	18.08 (0.52)	18.11 (0.66)	.160 (Anova F test)
KMI (correct responses)	8.36 (1.71)	8.57 (1.64)	8.64 (1.98)	.630 (Anova F test)
AMI (positive responses)	10.64 (2.81)	11.99 (2.19)	11.28 (2.60)	**.008** (Anova F test)*
WIMI (positive responses)	4.13 (2.66)	3.87 (2.22)	3.43 (2.64)	.251 (Kruskal-Wallis test)
ES	20.39 (4.24)	20.69 (4.29)	20.08 (3.86)	.652 (Anova F test)
RS	17.32 (5.00)	17.50 (4.55)	16.85 (4.04)	.653 (Anova F test)
CSQ	34.55 (6.98)	31.46 (9.39)	31.88 (9.18)	.071 (Anova F test)
AQ	24.51 (10.23)	20.90 (6.38)	23.25 (7.95)	**.033** (Anova F test)**

AL = Art-Lab; EC = Educational intervention by mental health Clinicians; EM = Educational intervention by students of Medicine; KMI = Knowledge about Mental Illness; AMI = Attitudes about Mental Illness; WIMI = Willingness to Interact with someone with Mental Illness; ES = Empowerment Scale; RS = Recovery Scale; CSQ = Care Seeking Questionnaire; AQ = Attribution Questionnaire.

* AL-EC ($p = .006$).

** AL-EC ($p = .032$).

Statistical significance was set at $p < .05$. Statistical analyses were carried out by using SPSS 25.0 and by package AMOS 21.0 (Arbuckle, 2012) for SEM.

3. Results

Data was collected from 242 students in spring 2016. Twenty-one subjects (9%) were excluded from analysis because they filled out questionnaire at pre-intervention but not at post-intervention. This lack of data is due to the students' absences from school during the assessment at post-intervention.

Overall, 221 students (173 females and 48 males) completed intervention, 69 were assigned to the AL group, 72 to the EC group and 80 to the EM group. Table 1 shows demographic characteristics of the sample.

The three intervention groups were not different for prior personal experience with someone with a diagnosis of mental illness ($p = .417$). Almost all measures were not significantly different at baseline among the three study arms, except for the Attitudes about Mental Illness questionnaire, with post-hoc indicating higher scores in the EC group versus the AL group ($p = .006$), and for the Attribution Questionnaire (AQ), with post-hoc indicating higher scores in the AL group with respect to the EC one ($p = .032$).

3.1. Changes in knowledge and attitudes at post-intervention

Evaluation of scores differences between the three interventions across time was performed by GEE models. Considering that (i) Knowledge about Mental Illness (KMI test), attitudes about mental Illness (as measured with the AMI questionnaire and the AQ), and willingness to interact with someone with mental illness (WIMI questionnaire) scores were significantly different among students who had or not prior personal experience with people with mental illness, and that (ii) WIMI questionnaire and Empowerment scale scores were significantly different among males and females, GEE were performed by taking into account personal experience with people with mental illness and sex.

GEE results showed that, on average across interventions, all groups improved over time in the KMI test, AMI, WIMI, ES and CSQ questionnaires (see the significance of the time factor in Table 2). A tendency toward significance of the time factor was observed for the Recovery Scale and the AQ scale ($p = .055$ and .060, respectively).

Moreover, for knowledge on mental illness and care-seeking attitudes (KMI test and CSQ respectively), a significant interaction effect between the two time points and the intervention groups was found ($p < .001$ and .009 respectively). This means that for these two tests the three groups differed in terms of improvement during the study period. More in detail, post-hoc comparisons showed a greater improvement of KMI test scores in the EC and EM groups compared to the AL group ($p = .001$), and of CSQ scores in the EC group compared to the AL group ($p = .009$). Summarizing, all the tests changed across time, but only KMI and CSQ changed across time in a different way among the three intervention groups.

3.2. Relationships between knowledge, measurements of attitudes toward mental illness and intentional behaviors

In order to drive the specification of the SEM based on data structure, an explorative correlation analysis to highlight the interrelationship among all measured variables was performed considering the post-pre differences. Results are shown in Table 3. Change in willingness to interact with someone with mental illness (WIMI) was significantly associated with changes of all the rest of variables. Similarly, change in the Care Seeking Questionnaire showed significant association with changes of all variables, except for the Recovery Scale. Lastly, changes in both opinions about recovery and about empowerment (RS and ES), and attitudes about mental illness (both AQ and AMI) were all associated with each other.

3.3. Structural equation models

Interrelationships between knowledge about mental illness (KMI test) and all the other measurements of attitudes and intentional behaviors were carried out by SEM. In detail, we tried to verify whether changes in knowledge were associated with changes in attitudes and empowerment and, in turn, with the two outcomes of interest, WIMI and CSQ. For this purpose, different structural equation models were hypothesized. The first two explorative models (Fig 1S) included two latent constructs called *Attitudes toward people with mental illness* (defined through the two observed variables Attitudes about mental illness and Attribution Questionnaire) and *Empowerment* (defined through Empowerment Scale and Recovery Scale). The first considered the

Table 2
Pre and post-interventions descriptive statistics and results of Generalized Estimating Equations (with independent factors time, intervention, intervention x time) for all the test scores.

		PRE mean (SD)	POST mean (SD)	Intervention *p* value	Time *p* value	Intervention x time *p* value
KMI	AL	8.36 (1.71)	8.88 (1.77)	**.002**[*]	**<.001**[*]	**<.001**[*]
	EC	8.57 (1.64)	10.46 (1.45)			
	EM	8.64 (1.98)	9.79 (1.65)			
AMI	AL	10.64 (2.81)	12.03 (3.24)	**.005**[*]	**<.001**[*]	.836[*]
	EC	11.99 (2.19)	13.22 (2.09)			
	EM	11.28 (2.60)	12.43 (2.77)			
WIMI	AL	4.13 (2.66)	4.37 (2.69)	.558[*,#]	**.007**[*,#]	.623[*,#]
	EC	3.87 (2.22)	4.26 (2.34)			
	EM	3.43 (2.64)	4.12 (2.89)			
ES	AL	20.39 (4.24)	21.01 (4.49)	.577[#]	**<.001**[#]	.120[#]
	EC	20.69 (4.29)	21.94 (3.73)			
	EM	20.08 (3.86)	21.94 (3.63)			
RS	AL	17.32 (5.00)	17.87 (3.90)	.783	**.055**	.711
	EC	17.50 (4.55)	17.75 (3.98)			
	EM	16.85 (4.04)	17.69 (3.93)			
CSQ	AL	34.55 (6.98)	33.59 (7.41)	.378	**.042**	**.009**
	EC	31.46 (9.39)	34.32 (8.73)			
	EM	31.88 (9.18)	33.18 (10.06)			
AQ	AL	24.51 (10.23)	23.38 (8.87)	.071[*]	.060[*]	.257[*]
	EC	20.90 (6.38)	20.85 (6.35)			
	EM	23.25 (7.95)	21.54 (7.54)			

AL = Art-Lab; EC = Educational intervention by mental health Clinicians; EM = Educational intervention by students of Medicine; KMI = Knowledge about Mental Illness; AMI = Attitudes about Mental Illness; WIMI = Willingness to Interact with someone with Mental Illness; ES = Empowerment Scale; RS = Recovery Scale; CSQ = Care Seeking Questionnaire; AQ = Attribution Questionnaire.
Post-hoc Interactions:.
KMI: EC and EM improved more than AL ($p < .001$).
CSQ: EC improved more than AL ($p = .013$).
[*] Adjusted for personal experience with people with mental health problems.
[#] Adjusted for sex.

Table 3
Correlations between all the measures (pre-post change) ($N = 221$).

	KMI	AMI	WIMI	ES	RS	CSQ	AQ
KMI	–						
AMI	.128	–					
WIMI	.160[*]	.293[**]	–				
ES	.185[**]	.285[**]	.354[**]	–			
RS	−.040	.152[*]	.203[**]	.317[**]	–		
CSQ	.135[*]	.213[**]	.215[**]	.265[**]	.128	–	
AQ[$]	−.109	−.357[**]	−.327[**]	−.359[**]	−.291[**]	−.175[**]	–

KMI = Knowledge about Mental Illness; AMI = Attitudes about Mental Illness; WIMI = Willingness to Interact with someone with Mental Illness; ES = Empowerment Scale; RS = Recovery Scale; CSQ = Care Seeking Questionnaire; AQ = Attribution Questionnaire.
[*] $p < .05$;.
[**] $p < .01$.
[$] The AQ scores have been reversed.

effect of knowledge about mental illness on *Attitudes toward people with mental illness* and in turn on *Empowerment*, while the second tested the effect of knowledge about mental illness on *Empowerment* and in turn on the *Attitudes toward people with mental illness* in order to evaluate a possible causal effect between the two latent factors. Since the two models were equivalent in terms of fitting, estimates and explained variability of the two outcomes (see Figure 1S), we tried to fit one comprehensive model with just one latent construct defined through all the four above mentioned observed scales (Fig. 1).

The number of distinct parameters to be estimated was 22, including covariance parameters between variables for improving the model fit. Model fit indices showed a good fit of the data ($\chi 2 = 9.36$, df = 13, $p = .746$; relative $\chi 2 = .72$, CFI = 1.000; TLI = 1.036, RSMEA = 0.000 [90% CI 0.000–0.048] and AIC = 53.36).

The latent construct, *General attitudes toward people with mental illness*, was well defined by its indicators (observed variables) and the main contribute was given by the ES and the AQ with factor loadings (λ) respectively equal to .64 and .60.

Knowledge about mental illness was significantly associated with the latent construct *General attitudes toward people with mental illness* (linear model coefficient $\beta = .27$) showing that an increase in knowledge is associated with an increase in positive attitudes toward people with mental illness. Moreover, the *General attitudes toward people with mental illness* was positively and significantly associated with the two outcomes of interest, WIMI ($\beta = .54$) and CSQ ($\beta = .38$) and explains the 29% and the 14%, respectively, of their corresponding variability. Knowledge about mental illness had a weak positive and indirect effect (through *General attitudes toward people with mental illness*), on the two outcomes (Table 4). All β coefficients were statistically significant ($p <= .002$).

In order to evaluate a possible effect of the three intervention groups on the detected inter-relationships among the data, the SEM was then fitted in the three arms separately (Figure 2S, supplementary materials). The same hypothesized data structure was confirmed for all the three intervention groups (AL group: $\chi^2 = 9.22$, $p = .756$; EC group: $\chi^2 = 15.83$, $p = .259$; EM group: $\chi^2 = 15.98$, $p = .250$).

4. Discussion

Our study showed that all the three types of intervention - albeit to different extents - were effective in increasing knowledge and changing attitudes toward people with mental illness, willingness to interact with them, perceptions of their empowerment and students' openness to seek psychological help. This is in line with previous studies using different approaches and school settings that showed a small but positive impact in general mental health knowledge and attitudes scores among high school students (Kutcher et al., 2015; Mcluckie et al., 2014; Wei et al., 2013). Interestingly, we found that the type of intervention did not influence the outcomes, except for a notable increase in the EC and EM groups in knowledge about mental illness and in the EC group vs AL

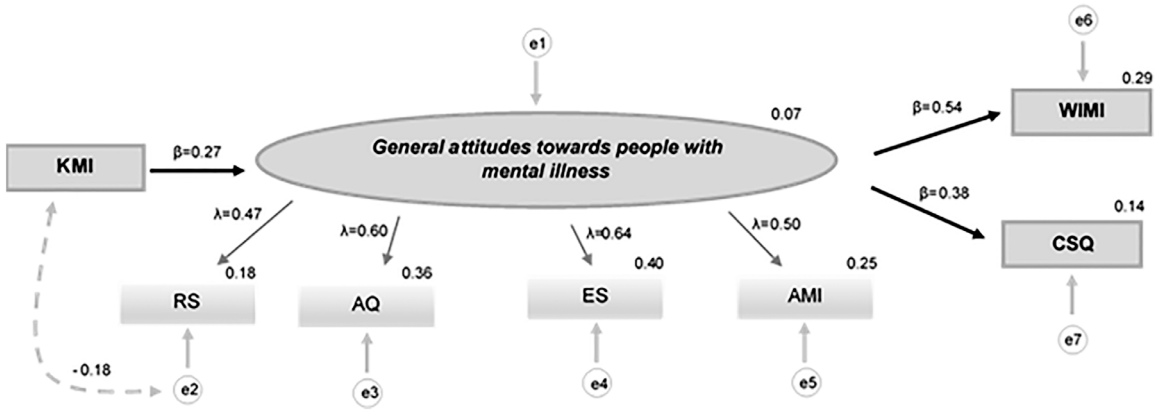

Fig. 1. Structural equation model. The rectangles represent the observed variables; the elliptic circles symbolize the latent variables. White circles represent variables error. Standardized estimates. λ_s are the factor loadings of the latent construct, β_s are the linear model coefficients.
Goodness of fit indices. $\chi^2 = 9.36$, df = 13, $p = .746$; relative $\chi^2 = .72$, CFI = 1.000; TLI = 1.036, RSMEA = 0.000 [90% CI 0.000–.048]; AIC = 53.36.

group on care seeking intentions. Different gains on knowledge among subgroups might be due to a dose-effect bias, as the AL group didn't receive the same amount of information as the other two groups. The higher impact of the EC group on care-seeking intentions is relevant, as feelings of fear about help-seeking or the source of help itself were found to be key barriers to mental health help-seeking in youth (Gulliver et al., 2010). It is likely that prolonged contacts with psychologists would reduce mistrust toward specialists in case of need and, in general, this could improve awareness about mental health problems and the consequent need for help.

It is also relevant that in our study both para-social and social contacts were beneficial in improving knowledge and attitudes about mental illness. This is in line with other evidence supporting that indirect social contact interventions were comparable to those delivering educational messages through direct contact (Stuart, 2006). Personal testimony from a person with a diagnosis of mental illness may influence the process of stigmatization in both positive and negative ways. Some authors (Chen et al., 2016) pointed out that contact-based interventions should be delivered by speakers in recovery that may act as a role model to embody recovery characteristics. Differently, in our study, direct contact was delivered by people in course of recovery. This is in line with intergroup contact theory proposing that the contact benefit is enhanced when a person moderately disconfirms prevailing stereotypes of the ingroup by the outgroup (Corrigan and Watson, 2007; Reinke et al., 2004). Notably, results showed that this type of contact did not reinforce stigma in students as all three interventions were equal in promoting positive outcomes. Moreover, another aspect to consider is the age of the target group. It is likely that, in our case, the upper secondary students were a target group tailored to receive a contact intervention. This is in line with Schachter et al. (2008) findings that suggested using direct contact in middle and late adolescent age ranges and education stand-alone strategy in childhood and early adolescent age ranges. Furthermore, with regard to timing of the inclusion of the contact component, in our study, students were prepared in advance by receiving psycho-education prior to experiencing contact, which occurred at a later time, in the second part of the program. This is in line with a previous study (Chan et al., 2009) that found adding social contact to education more effective than education alone, only when the contact was presented after, and not prior, to the education component. Further studies should explore to which extent the type of contact, how it is delivered (combined with education or not, in school programs or out-of-school educational activities) and stages of adolescence may influence the impact of anti-stigma programs in reducing negative attitudes. Moreover, a dose-response effect might be present. Indeed, some previous studies (Pinto-Foltz et al., 2011; Saporito et al., 2011) found that one-session knowledge-contact interventions were insufficient to produce meaningful changes on stigma and MHL. Further studies should also compare shorter vs longer interventions in order to reduce students' negative attitudes toward mental illness.

Given that different types of interventions reached similar gains, we investigated in the whole study sample whether changes in knowledge and attitudes' variable would reflect changes on students' intentional behaviors. Firstly, SEM results confirmed that an increase in knowledge predicts an increase in positive attitudes toward mental illness. This is in line with the results found by Milin et al. (2016), albeit the magnitude of this association was lower in our study (7% of the explained variability of *General attitudes toward people with mental illness*).

Table 4
Direct and indirect effect on General attitudes toward Mental Illness, WIMI, and CSQ.

	DIRECT		INDIRECT	
	KMI	General attitudes toward people with mental illness	KMI	General attitudes toward people with mental illness
General attitudes toward people with mental illness	.269 ($p = .001$)	–	–	–
AMI	–	.498 ($p < .001$)	.134	–
AQ[$]	–	.600 ($p < .001$)	.161	–
ES	–	.636 ($p < .001$)	.171	–
RS	–	.466 ($p < .001$)	.125	–
WIMI	–	.538 ($p < .001$)	.144	–
CSQ	–	.380 ($p < .001$)	.102	–

KMI = Knowledge about Mental Illness; AMI = Attitudes about Mental Illness; WIMI = Willingness to Interact with someone with Mental Illness; ES = Empowerment Scale; RS = Recovery Scale; CSQ = Care Seeking Questionnaire; AQ = Attribution Questionnaire. *P* values available only for direct effects.
[$] The AQ scores have been reversed.

Secondly, we found that 29% of propensity to interact with someone with mental illness and 14% of help-seeking intentions were explained by *General attitudes toward people with mental illness*. These findings are in line with previous studies that assessed the impact of school-based interventions on social distance measures (Ng and Chan, 2002; Pinfold et al., 2005a) and, furthermore, they suggest that these improvements may be promoted by knowledge acquisition and reduction of negative attitudes toward mental illness. Moreover, these findings are consistent with other studies suggesting that stigma toward mental illness is a predictor of help-seeking intentions among adolescents (Nearchou et al., 2018; Yap et al., 2011). Notably, subgroup analyses revealed that the SEM model was confirmed also in the AL, EC and EM groups separately. Overall, SEM results supported the view that, regardless of the types of intervention used, carefully structured interventions may positively influence behavioral intentions among adolescents. On the one hand, students may reduce their desire for social distance, with a potential positive impact on their behavior toward real people with mental difficulties which they might come across with during their life experience; on the other hand, students could be more able to seek for help from close people or specialists in case of need, that is a relevant preventative purpose. Lastly, regarding the *General attitudes toward mental illness* variable, the main contributors to this latent construct were the ES and the AQ questionnaires, indicating views of empowerment and attitudes toward peers with a mental illness as key aspects to take into account when developing interventions to tackle stigma of mental illness among adolescents. This is interesting, as evidence highlighted a negative relationship between self-stigma and empowerment in people with mental health problems (Lanfredi et al., 2015; Livingston and Boyd, 2010). Looking at this association from the perspective of an adolescent audience, it seems that interventions able to improve in particular more positive views of empowerment and attitudes toward someone more similar for age and role (a student), might have in turn a positive impact on willingness to interact with someone with a mental illness or to seek a preferred form of psychological help in case of need.

Some limitations should be underlined. Due to pragmatic constraints that occur when conducting a real-world intervention, randomization couldn't be implemented. Moreover, this study did not include a follow-up assessment, further studies should examine whether the impact of anti-stigma intervention is maintained across time. Furthermore, the present study group may not be representative of the overall population of secondary school, as three schools were human sciences oriented lyceums and one was a scientific oriented lyceum. Another limit could regard the baseline differences of AMI and AQ among intervention groups. However, our interest was to evaluate the changes between pre and post intervention scores for each arm, therefore baseline differences were properly taken into account in our longitudinal analysis. We used a comprehensive battery to assess different aspects of stigma and attitudes toward mental illness, however, we cannot exclude a social desirability bias. Moreover, the variability in the two study outcomes (WIMI and CSQ) could be explained by other factors that were not addressed in this study, such as for example self-stigma dimension (Vogel et al., 2007a, 2010; Shomerus et al., 2009) or one's social network attitudes toward mental illness or sources of psychological help (Vogel et al., 2007b). However, our findings are in line with a recent meta-analysis (Koller and Stuart, 2016) indicating that only a low proportion of the variation in behavioral intent scores was predicted on the basis of the attitudes scores.

This study supports the use of anti-stigma interventions for increasing knowledge and positive attitudes toward mental illness in school settings. In particular, positive change in general attitudes toward mental illness may act as a predictor for more positive changes also in behavioral intentions, and potentially foster the prevention and early detection of mental health problems among upper secondary students.

Declaration of Competing Interest

The authors report no conflict of interest.

Acknowledgments

We are grateful for the financial support provided by the Fondazione della Comunità Bresciana onlus of Brescia (Italy). We would like to acknowledge the collaboration of the following schools located in Brescia (Italy): Liceo Scientifico di Stato Annibale Calini, Istituto Maddalena di Canossa, Liceo delle scienze umane Fabrizio De André, Liceo Veronica Gambara. Invaluable assistance in coordinating the program in each school was provided by Massimo Patelli, Chiara Baronchelli, Margherita Leone, Palmira Filippini and Monica Taraschi. We are also immensely grateful to Guido Uggeri, master of art of the "Bottega dell'Arte" for his expertise and capacity to instill his knowledge with great humanity, and the Associazione Sasso nello Stagno for supporting the Art-Lab and DeePression exhibition. We would also like to show our gratitude to the members of SISM Segretariato Italiano Studenti in Medicina – Brescia who voluntary conducted dispeer-education interventions in the schools. We also would like to thank Prof Albano Morandi for delivering the DeePression exhibition venue. Lastly, we wish to thank all of the artists from the "Bottega dell'Arte" and the students who volunteered to take part to the study.

Funding

The study was co-funded with the Fondazione della Comunità Bresciana onlus(grant "Cultura" 2015, http://www.fondazionebresciana.org/wp-content/uploads/2012/05/cultura-2015.pdf)

Compliance with Ethical standards

The protocol of the current study has been approved by the Comitato Etico delle Istituzioni Ospedaliere Cattoliche (CEIOC) of Brescia. The authors declare that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the 1964 Declaration of Helsinki and its later amendments.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2019.112581.

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