Contents lists available at ScienceDirect

Psychiatry Research

The effects of a video-based randomized controlled trial intervention on depression stigma and help-seeking attitudes in university students

Virgínia Conceição [a,b,*], Inês Rothes [c,d], Ricardo Gusmão [a,b,e]

[a] *EPIUnit - Institute of Public Health, University of Porto, Portugal*
[b] *Laboratory for Integrative and Translational Research in Population Health (ITR), Porto, Portugal*
[c] *Faculty of Psychology and Education Science, University of Porto, Portugal*
[d] *Centre for Psychology, University of Porto, Portugal*
[e] *Department of Public Health and Forensic Sciences, and Medical Education, Faculty of Medicine, University of Porto, Portugal*

ARTICLE INFO

ABSTRACT

University students are a risk group for developing mental illness, but they do not receive the care they need because of hampered help-seeking induced by stigma. This study evaluates the effects of a video-based stigma reduction intervention and help-seeking attitudes promotion in university students. We randomly distributed a sample of university students among one control group (CG, $n = 188$) and two intervention groups (IG-1, $n = 222$ and IG-2, $n = 216$): IG-1 watched a contact-based video and IG-2 the same video plus a psychoeducational video. The study followed an experimental single-blind randomized control trial design with a pre-test before the intervention (M0), a post-test, and a follow-up test. We evaluated participants using a sociodemographic questionnaire, the Attitudes Toward Seeking Professional Psychological Help Questionnaire, the Depression Stigma Scale, the 9-item Patient Health Questionnaire, and the 7-item Generalized Anxiety Disorder. A total of 626 participants with a mean age of 19.85 (SD=1.48) responded to all evaluation moments. At M0, there were no differences between groups on stigma or help-seeking attitudes. Immediately after the intervention, stigma levels significantly decreased, and help-seeking attitudes significantly improved. These effects persisted for the next five months. Video-based depression stigma reduction intervention can be an essential tool to reduce depression stigma and improve help-seeking attitudes.

1. Introduction

University students are within the at-risk age for the manifestation of mental disorders, and depression is one of the most prevalent and persistent (Auerbach et al., 2016; Eisenberg et al., 2009), with a significant negative impact on academic productivity (Hysenbegasi et al., 2005).

Stigma is a social determinant of various public health inequalities (Hatzenbuehler et al., 2013), affecting career opportunities, social networking, and personal relationships (Morgan et al., 2021). In addition, personal views on the need and efficacy of a treatment can be associated with stigma (Busby Grant et al., 2016; Knickman et al., 2016; Schnyder et al., 2017) which represents one of the main barriers to help-seeking (Thornicroft et al., 2017).

Thus, the knowledge of procedures to reduce stigma is an essential tool to promote help-seeking attitudes and behaviours (Goh et al., 2021;

Kosyluk et al., 2021) and improve the wellbeing of people diagnosed with mental disorders and their caregivers (Morgan et al., 2021; World Health Organization, 2013).

Psychoeducation videos bear a long tradition in medical and psychiatric education, followed by empirical evidence of its effectiveness in creating emotional responses (Strasburger, 2016), empathy enhancement (Tippin and Maranzan, 2019) while promoting mental health literacy (Jones, 2014). In addition, the use of video-based interventions to reduce mental health stigma is considered adequate, low cost, easy to use, and a proper target for research (Janouskova et al., 2017) with educational benefits (Clement et al., 2012), summoning growing interest in research (Potts and Henderson, 2021; Walsh and Foster, 2021). Evaluating the effectiveness of video stigma reduction interventions in the current pandemic context assumes even higher importance (Rodriguez-Rivas et al., 2021).

Direct messages about the competence of real people living with

depression have proven effective in personal stigma reduction (Kroska and Harkness, 2021; Tergesen et al., 2021b; Tsoi et al., 2020). In addition, these interventions are also associated with indirect effects on wellbeing promotion, confidence increase, and greater openness to talk about their mental illness (Lindstrom et al., 2021).

However, the efficacy of different types of stigma-reduction interventions is usually ascertained only for short-term effects, frequently less than four weeks of follow-up (Mehta et al., 2015; Thornicroft et al., 2016). Furthermore, we do not know enough about the effect of different intervention approaches on different types of stigma (Thornicroft et al., 2016).

A recent systematic review (Waqas et al., 2020) identified five randomized controlled trials using filmed or video contact-based interactions with patients (Clement et al., 2012; Goncalves et al., 2015; Koike et al., 2018; Ranson and Byrne, 2014; Staniland and Byrne, 2013). Three of these studies aimed to reduce mental health stigma in middle school students (Goncalves et al., 2015; Ranson and Byrne, 2014; Staniland and Byrne, 2013) and one specifically addressed nurse students (Clement et al., 2012), and only one included participants from university schools (Koike et al., 2018). Two recent randomized controlled trials were specifically designed for medical students and the third for high-school students (Amsalem and Martin, 2021; Tergesen et al., 2021a; Wechsler et al., 2020). Most of these studies addressed intervention programs focusing on nonspecific mental illness, which present inferior results than interventions targeting stigma associated with a specific illness (Morgan et al., 2021).

In Portugal, studies addressing mental health stigma in universities are commonly observational, focus on health care students and general mental illness stigma reduction (Marques et al., 2011; Moreira et al., 2021; Oliveira et al., 2020; Querido et al., 2020; Telles-Correia et al., 2015; Vilar Queirós et al., 2021). These studies purport high levels of stigma in medical students' which seems to be reduced by attending mental health and psychiatry courses.

However, the general tendency to use samples of health care students when university students are the research population may not fully represent the whole student universe (Kassam et al., 2011; Papish et al., 2013; Tippin and Maranzan, 2019).

With this study, we aim: (a) to evaluate the effects of a video-based depression stigma reduction intervention in university students and its sustainability; (b) to evaluate the effect differences between a video-based contact intervention and a video-based contact plus psychoeducational information intervention; (c) to evaluate the effects of the stigma reduction intervention on help-seeking attitudes.

2. Methods

2.1. Participants

We contacted the first-year students of the University of Porto through institutional email, and we sent a reminder a week after the first email. Of the initial 1046 participants who accepted participating in the first phase of the study, we excluded 77 over 25 years old, resulting in 969 participants.

Using an online randomization tool, we numbered participants by order and randomly assigned them to three groups in a parallel design (Haahr and Haahr, 2010). The three group conditions were: Control group (CG), Depression stigma intervention group (IG-1), and depression stigma intervention with additional psychoeducational information group (IG-2).

2.2. Study design

The study followed an experimental single-blind randomized control trial (RCT) design with a pre-test before the intervention (M0, in February 2019) to establish baseline results, a post-test at the end of the intervention (M1, in May 2019), and a follow-up test 5 months after the

intervention (M2, in October 2019).

Our study followed the CONSORT Statement recommendations (Schulz et al., 2010) for the preparation of the trial findings, completing the 25-item checklist on how we designed, analyzed, and interpreted the trial (sup. file) and designed the flow diagram (Fig. 1) describing the progress of all participants throughout the trial.

This RCT is part of the ISRCTN registry with the id number ISRCTN970936.

2.3. Materials

The videos' selection for the interventions occurred in three phases: assessing the potential videos, selecting the potential videos, and final choice.

We based the selection of potential videos on what the literature identified as necessary in a video-based intervention, such as the type of content (first-person description about depression experience), length (under 5 min), and sociodemographic aspects of the video participants (as similar as possible to the participants' characteristics) (Tay et al., 2018). This assessment resulted in five potential videos. Two independent researchers (VC and IR) selected one potential video each, resulting in two videos in the second phase. In the third and last phase of the selection process, the researchers met and agreed on the final video, resulting in a 2 min and 56 s long video developed by BBC 3, available on YouTube. This video was selected as an intervention tool and used in IG-1 and contained people sharing their personal experiences with depression. Finally, we performed the translation of the original English speech into Portuguese captions subtitling.

The video used on IG-2 comprises the first video plus a short psychoeducational information video developed by EAAD, the European Alliance Against Depression, and adapted by EUTIMIA, the Portuguese branch of EAAD. This second video is 2 min and 50 s long and is composed of animations illustrating psychoeducational information narrated in Portuguese.

URL to the final versions of both videos are available in the supplementary file.

At the end of the video, we presented information about available local mental health services for all study groups.

2.4. Measures

All participants answered the following structured questionnaires administered at every evaluation moment:

- A short sociodemographic questionnaire to assess sex and age.
- The Attitudes Toward Seeking Professional Psychological Help (ATSPPH) (Fischer and Turner, 1970) is a ten 4-point Likert scale developed in 1970. ATSPPH is the most used scale in mental health to assess help-seeking attitudes, showing excellent psychometric properties in its original form, and was translated and adapted for the Portuguese population in the context of the optimising Suicide Prevention Programs and Their Implementation in Europe (OSPI-Europe) (Coppens et al., 2013; Hegerl et al., 2009; Kohls et al., 2017). Results may vary between 0 and 30, and the higher results mean better help-seeking attitudes.
- The Portuguese version of The Patient Health Questionnaire (PHQ-9) (Monteiro et al., 2013) is a brief self-report tool and a multipurpose instrument for screening, diagnosing, monitoring, and measuring the severity of depression. The PHQ-9 is a widely used scale to evaluate depressive symptomatology, composed of nine 4-point Likert scale questions, with results varying between 0 and 27. The higher the total score, the more severe the symptomatology.
- The Portuguese version of the Generalized Anxiety Disorder (GAD-7) (Sousa et al., 2015) is a self-administered 7-item instrument to screen for generalized anxiety disorder. This scale has seven 4-point Likert scale questions, and the total score may range between 0 and 21, with higher scores meaning severe symptomatology.
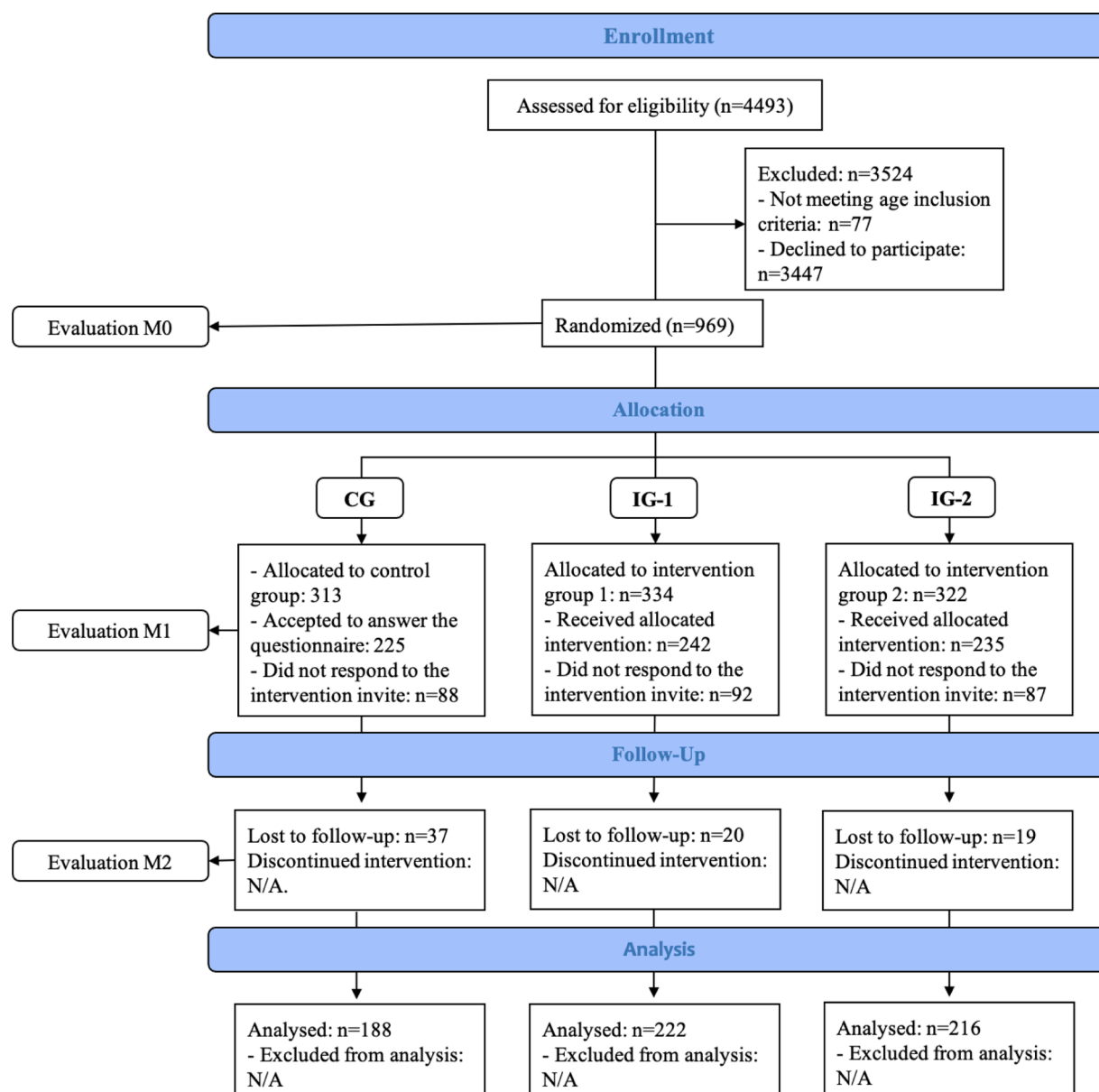- The Depression Stigma Scale (DSS) (Griffiths et al., 2004) was

Fig. 1. Participation flow diagram in line with the CONSORT model.

developed in Australia and used in different community samples. The scale distinguishes between personal and perceived stigma, and nine 5-point Likert scale items constitute each subscale. The Portuguese version of the Depression Stigma Scale (DSS) was the target of another study, submitted and under review (Conceição et al., 2021b), and has also been used in the OSPI-Europe intervention studies (Coppens et al., 2013; Hegerl et al., 2009; Kohls et al., 2017). In its Portuguese version, the DSS scale kept its original 18 items form, containing two different subscales. The first 9 items correspond to the Personal Depression Stigma Subscale, and items 10 to 18 correspond to the Perceived Depression Stigma Subscale.

2.5. Ethical considerations

The study complies with the relevant national and institutional ethical standards on human experimentation and the Helsinki Declaration of 1975, as revised in 2008. The Institute of Public Health of the University of Porto ethics committee approved the research with the ID reference CE18096. All participants signed an informed consent digital

form according to the Helsinki and Oviedo Conventions.

2.6. Data analysis

We described age as a mean and standard deviation of years and sex distribution as counts and proportions. We carried out comparisons between means of sample and dropouts. We also tested differences between study groups using One-Way ANOVA with Dunnett's multiple comparisons test among groups.

We assessed the intervention's effect using repeated measures One-Way ANOVA with Bonferroni post-hoc test. We performed two different MANOVA analysis in order to evaluate the effects of the treatment: one ANOVA for repeated measures with the Personal Depression Stigma as the dependent variable, and a second different analysis with the Perceived Depression Stigma as the dependent variable.

We also analysed the effects of sex within groups, and depression and anxiety symptomatology were included in the models as covariates. We extracted partial eta squared and power values for each model and

variable.

We calculated the size effect of each model using Cohen's f^2 effect size measure, using the method described by Selya et al. (2012) (Selya et al., 2012).

We performed statistical analysis using SPSS 24.0, with a 95% confidence level.

3. Results

3.1. Participant characteristics

As described in Fig. 1, we included 626 participants in the analysis. Mean age and standard deviation are presented in table 1. Most of the participants were women: 380 (60.7%). Among intervention groups, the tendency was similar: 55.9% women in the CG, 55.9% in IG-1, and 66.9% in IG-2.

As shown in table 1, there were no statistically significant differences between participants and dropouts in the studied variables. They were also similar in terms of age and gender distribution.

Between groups, symptomatology differences were not significant in the baseline evaluation: $F_{(2, 623)}=0.30$, $p = 0.06$ in the depressive symptomatology; $F_{(2, 623)}=0.68$, $p = 0.51$ in anxiety symptomatology scale; $F_{(2, 623)}=1.03$, $p = 0.36$ in the personal stigma subscale; and $F_{(2, 623)}=0.54$, $p = 0.58$ in perceived stigma subscale.

3.2. Effects of the intervention on personal depression stigma scores

The Personal Depression Stigma scale showed good Cronbach's alpha throughout the evaluations, with α ranging between 0.801 and 0.857.

In Fig. 2, we can observe that both intervention groups experienced a significant decrease in the DSS personal stigma subscale.

There were no significant differences between the mean scores across groups ($F_{(2, 623)}=1.04$, $p = 0.36$) in the first evaluation moment. However, the difference was statistically significant in both evaluations after the intervention: $F_{(2, 623)}=30.83$, $p<0.001$ and $F_{(2, 623)}=16.46$, $p<0.001$, respectively. Dunnett's test post-hoc evaluation revealed that only the differences between the intervention groups and the control group were significant, as the means of both intervention groups were very similar after the intervention.

MANOVA assumptions were met, as Box's M (11.59) was not significant, ($p = 0.49$); Wilk's λ=0.95, F(4, 1226) = 7.85, $p < 0.001$; Mauchly's Test of Sphericity X2(2)=0.99, $p = 0.12$; and Greenhouse–Geisser ε = 0.99.

Tests between-subjects effects yielded a significant effect of time, $F_{(2, 614)}=58.13$, $p <0.001$, partial $\eta_p^2 =0.63$. This effect was qualified by a
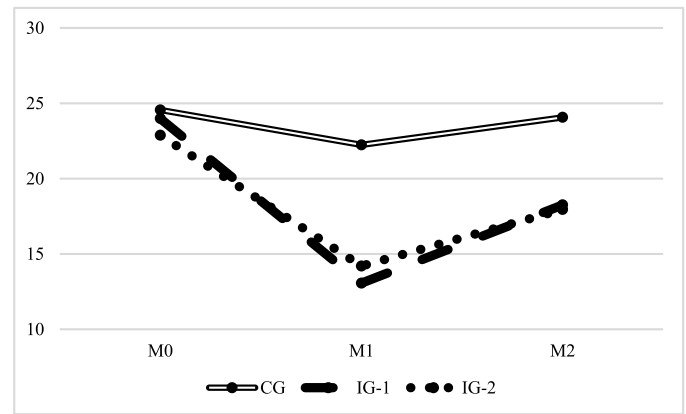

Fig. 2. Evolution of the personal depression stigma subscale according to the intervention group.

significant time x group interaction effect $F_{(4, 614)}=7.36$, $p <0.001$, partial $\eta_p^2 =0.48$.

To evaluate the nature of the differences between the three means across time, we performed the Bonferroni post-hoc test, and the comparisons between the control and both intervention groups obtained a $p<0.001$, but the comparison between the two intervention groups was not significant ($p = 0.99$).

As we can observe in Table 2, both intervention groups significantly decreased their personal depression stigma score at M1. Thus, even though the parameter estimate at M2 is not as high, it is still significant compared with the control group.

Whereas in CG, men presented a higher score in personal stigma, in both intervention groups, the differences were non-significant. At the baseline, men showed higher means in all condition groups (CG: $t_{(186)}=4.28$, $p<0.001$; IG-1: $t_{(220)}=3.45$, $p<0.01$; $t_{(214)}=4.29$, $p<0.001$), however, both in M1 and in M2, differences between sexes did not significantly differ in any of the intervention groups.

Cohen's f^2 effect size calculations indicated an R^2 of 0.36 and an $f^2=0.53$.

3.3. Effects of the intervention on perceived depression stigma scores

Cronbach alphas in the Perceived Depression Stigma Scale ranged between 0.832 and 0.859.

Mean scores did not significantly vary across groups in any evaluation moments, as illustrated in Fig. 3. At the moment of the first evaluation (M0), we obtained an ANOVA result of $F_{(2, 623)}=0.89$, $p = 0.43$; $F_{(2, 623)}=2.05$, $p = 0.13$ in the second evaluation (M1); and a $F_{(2,}$

Table 1

Differences between dropouts and sample in the main variables at the moment of the first evaluation.

		TotalM (SD)	CGM (SD)	IG-1M (SD)	IG-2M (SD)
Age	Sample	19.85 (1.48)	18.96 (1.52)	18.94 (1.50)	18.68 (1.44)
	Dropouts	18.90 (1.50)	19.03 (1.73)	18.75 (1.24)	18.90 (1.45)
	t-test$_{(df)}$	$t_{(967)}=-0.52$, $p = 0.60$	$t_{(967)}=-0.37$, $p = 0.71$	$t_{(967)}=-1.04$ $p = 0.30$	$t_{(967)}=-1.29$, $p = 0.20$
PHQ-9	Sample	9.95 (7.04)	9.50 (6.86)	9,41 (6.90)	10,89 (7.26)
	Dropouts	9.64 (7.12)	9,61 (7.29)	9,33 (6.92)	9,99 (7.17)
	t-test$_{(df)}$	$t_{(967)}=0.66$, $p = 0.51$	$t_{(311)}=-0.13$, $p = 0.84$	$t_{(332)}=0.10$, $p = 0.92$	$t_{(320)}=1.05$, $p = 0.30$
GAD-7	Sample	9.64 (6.02)	9.27 (6.16)	9,14 (5.76)	9,37 (5.88)
	Dropouts	9.46 (5.98)	9,34 (6.12)	9,46 (5.71)	9,60 (6.13)
	t-test$_{(df)}$	$t_{(967)}=0.45$, $p = 0.65$	$t_{(311)}=-0.10$, $p = 0.92$	$t_{(332)}=-0.48$, $p = 0.63$	$t_{(320)}=0.15$, $p = 0.88$
Personal Depression Stigma	Sample	23.78 (12.00)	24.56 (12.48)	23,99 (12.11)	22,88 (11.45)
	Dropouts	23.61 (13.06)	24.33 (13.01)	23,69 (14.05)	22,69 (12.06)
	t-test$_{(df)}$	$t_{(967)}=0.19$, $p = 0.85$	$t_{(311)}=0.15$, $p = 0.88$	$t_{(332)}=0.20$, $p = 0.84$	$t_{(320)}=0.13$, $p = 0.84$
Perceived Depression Stigma	Sample	62.39 (16.72)	61.04 (17.85)	63,03 (16.99)	62,91 (15.38)
	Dropouts	60.01 (19.63)	58.31 (20.23)	60,34 (19.69)	61,66 (17.93)
	t-test$_{(df)}$	$t_{(967)}=1.91$, $p = 0.06$	$t_{(311)}=1.25$, $p = 0.21$	$t_{(332)}=1.29$, $p = 0.20$	$t_{(320)}=0.65$, $p = 0.52$

M=mean, SD=standard deviation; df=degrees of freedom. Significant results are in bold.
Total: Sample $n = 626$, Dropouts=343; CG: Sample $n = 188$, Dropouts $n = 125$; IG-1: Sample $n = 222$, Dropouts $n = 112$; IG-2: Sample $n = 216$, Dropouts $n = 106$.

Table 2
Effects of time and sex on Personal Stigma per group condition with depressive and anxiety symptomatology as covariates.

			B	95% CI	t	p	η_p^2	1-ß
		Intercept	21.56	18.70, 24.42	14.81	<0.001	0.39	1
Personal Stigma	M0	CG	Ref.					
		IG-1	0.53	−2.51, 3.59	0.35	0.73	0	0.06
		IG-2	−0.33	−3.24, 2.59	−0.22	0.83	0	0.05
		Male*CG	**7.91**	**4.34, 11.13**	**4.47**	**<0.001**	**0.03**	**0.99**
		Male*IG-1	**4.95**	**1.81, 8.09**	**3.10**	**<0.01**	**0.02**	**0.87**
		Male*IG-2	**6.91**	**3.52, 10.3**	**4.01**	**<0.001**	**0.03**	**0.97**
		Depression	−0.04	−0.17, 0.09	−0.65	0.52	0.001	0.09
		Anxiety	−0.01	−0.16, 0.16	−0.03	0.97	0	0.05
	M1	**Intercept**	**21.49**	**18.37, 24.06**	**13.55**	**<0.001**	**0.33**	**1**
		CG	Ref.					
		IG-1	**−8.28**	**−11.61, −4.95**	**−4.88**	**<0.001**	**0.21**	**0.99**
		IG-2	**−6.13**	**−9.31, −2.95**	**−3.77**	**<0.001**	**0.19**	**0.96**
		Male*CG	**4.23**	**1.19, 7.64**	**2.90**	**<0.01**	**0.02**	**0.85**
		Male*IG-1	0.77	−2.65, 4.19	0.44	0.66	0	0.07
		Male*IG-2	−2.8	−6.49, 0.89	−1.49	0.14	0.004	0.32
		Depression	−0.06	−0.19, 0.08	−0.79	0.42	0.001	0.13
		Anxiety	0.02	−0.15, 0.19	0.26	0.79	0	0.06
	M2	**Intercept**	**24.42**	**21.50, 27.34**	**16.43**	**<0.001**	**0.47**	**1**
		CG	Ref.					
		IG-1	**−5.38**	**−8.50, −2.26**	**−3.38**	**<0.01**	**0.16**	**0.92**
		IG-2	**−5.51**	**−8.48, −2.53**	**−3.63**	**<0.001**	**0.18**	**0.95**
		Men*CG	**3.77**	**1.59, 5.94**	**3.40**	**<0.001**	**0.03**	**0.85**
		Men*IG-1	−0.30	−3.43, 2.97	−0.14	0.89	0	0.05
		Men*IG-2	−0.35	−3.81, 3.10	−0.20	0.84	0	0.05
		Depression	0.06	−0.07, 0.19	0.85	0.95	0	0.05
		Anxiety	−0.13	−0.29, 0.03	−1.63	0.10	0	0.37

B=Parameter coefficients, Ref.=Reference category, CI=Confidence Intervals, η_p^2=partial eta squared, 1-β=Power.
Significant results in bold.
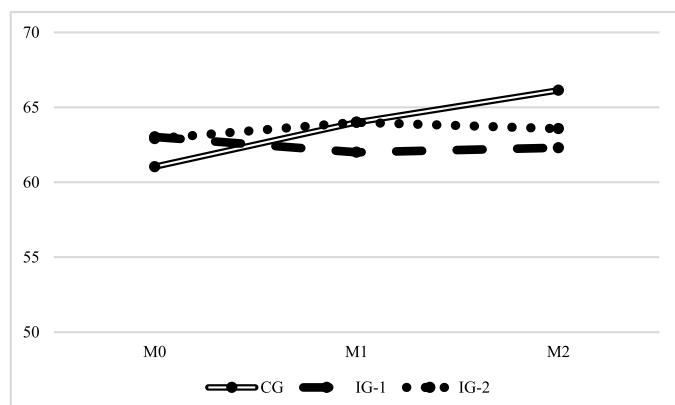
Fig. 3. Evolution of the DSS perceived stigma subscale according to the intervention group.

$_{623)}=2.69$, $p = 0.10$ in the last evaluation (M2).

MANOVA assumptions were met, as Box's M (12.52) was not significant, ($p = 0.37$); Wilk's λ=0.97, $F = 8.65$, $p < 0.001$; Mauchly's Test of Sphericity $X^2_{(2)}=6.31$, $p = 0.09$; and Greenhouse–Geisser ε = 0.98.

Tests between-subjects effects yielded a significant effect of time, $F_{(2, 614)}=10.95$, $p <0.001$, partial $\eta_p^2 =0.18$. This effect was qualified by a significant time x group interaction effect $F_{(4, 614)}=3.53$, $p <0.01$, partial $\eta_p^2 =0.12$.

To evaluate the nature of the differences between the three means across time, we performed the Bonferroni post-hoc test, and the comparisons between the control and both intervention groups were only significant for the IG-1 vs CG at M1, with $p<0.05$.

The intervention did not affect DSS perceived depression stigma, as we can observe in Table 3, but depressive and anxiety symptomatology showed a significant yet small effect on perceived depression stigma in M1; in M2, only depressive symptomatology had a significant expression. These differences did not appear to be expressed as mean

differences according to the intervention group in any evaluation moments, as we did not obtain any significant results in the ANOVA results in any evaluation moments. The results obtained for the anxiety symptomatology were: $F_{(2, 623)}=0.68$, $p = 0.51$, in M0; $F_{(2, 623)}=0.76$, $p = 0.44$ in M1; and a $F_{(2, 623)}=1.52$, $p = 0.05$ in the M2 evaluation. Depressive symptomatology difference results were: $F_{(2, 623)}=2.97$, $p = 0.05$, in M0 evaluation; $F_{(2, 623)}=0.51$, $p = 0.60$ in M1; and a $F_{(2, 623)}=0.95$, $p = 0.38$ in the M2 evaluation.

Cohen's f^2 effect size for this model presented an R^2 of 0.17 and an $f^2=0.10$.

3.4. Effects of the intervention on help-seeking attitudes

The Attitudes Toward Seeking Professional Psychological Help Cronbach's alpha varied between 0.753 and 0.804 in the three evaluation moments.

We did not observe significant differences between the mean scores of the help-seeking attitudes across groups in the first evaluation ($F_{(2, 623)}=0.65$, $p = 0.52$), as illustrated in Fig. 3. After the intervention, the mean scores increased in both intervention groups, and the differences between groups became significant: $F_{(2, 623)}=5.07$, $p<0.01$ in the second evaluation, and $F_{(2, 623)}=19.99$, $p<0.001$ in the last evaluation. Dunnett's test post-hoc evaluation revealed that only the differences between the intervention groups and the control group were significant, as the means of both intervention groups were very similar after the intervention.

At the second evaluation, we verified a promotion of help-seeking attitudes in every group, as presented in Fig. 4.

As expressed in table 2, the intervention had a significant effect on help-seeking attitudes. In the M1 evaluation, all groups present a positive effect on help-seeking attitudes. At the M2 moment, only intervention groups still presented a positive effect on help-seeking attitudes. While in the M0 evaluation, men had a lower mean, there were no differences between sexes in the following evaluations. Depression and anxiety symptomatology covariates also had a significant effect on the help-seeking attitudes outcome.

Table 3
Effects of time and sex on Perceived Stigma per group condition with depressive and anxiety symptomatology as covariates.

			B	95% CI	t	p	η_p^2	1-ß
		Intercept	58.23	54.15, 62.31	28.01	<0.001	0.56	1
Perceived Stigma	M0	CG	Ref.					
		IG-1	2.41	−1.95, 6.78	1.09	0.27	0.002	0.19
		IG-2	2.24	−1.94, 6.21	1.05	0.29	0.002	0.18
		Male*CG	−3.27	−7.86, 1.11	−2.35	0.14	0.004	0.31
		Male*IG-1	−5.79	−10.65, 0.94	−1.89	0.19	0.004	0.32
		Male*IG-2	−1.91	−6.78, 2.96	−0.77	0.44	0.001	0.12
		PHQ-9	0.03	−0.16, 0.21	0.27	0.79	0	0.06
		GAD-7	0.05	−0.14, 0.69	0.32	0.09	0.001	0.05
	M1	**Intercept**	**62.39**	**50.50, 66.29**	**31.49**	**<0.001**	**0.62**	**1**
		CG	Ref.					
		IG-1	**−5.48**	**−9.47, −1.51**	**−2–71**	**<0.01**	**0.12**	**0.77**
		IG-2	−3.56	−7.73, 0.60	−1.70	0.09	0.07	0.38
		Male*CG	−3.92	−8.57, 0.72	−1.66	0.09	0.005	0.38
		Male*IG-1	−1.64	−5.91, 2.64	−0.75	0.45	0.001	0.12
		Male*IG-2	**−6.23**	**−10.86, −1.61**	**−2.65**	**<0.01**	**0.004**	**0.32**
		PHQ-9	**0.36**	**0.18, 0.53**	**4.04**	**<0.001**	**0.26**	**0.98**
		GAD-7	**0.26**	**0.16, 0.27**	**3.55**	**<0.01**	**0.17**	**0.85**
	M2	**Intercept**	**67.48**	**62.99, 71.97**	**29.53**	**<0.001**	**0.59**	**1**
		CG	Ref.					
		IG-1	−1.55	−6.36, 3.25	−0.64	0.52	0.001	0.09
		IG-2	−1.93	−6.53, 2.66	−0.83	0.41	0.001	0.13
		Men*CG	1.61	−3.75, 6.96	0.59	0.55	0.001	0.09
		Men*IG-1	−3.75	−8.69, 1,18	−1.49	0.14	0.004	0.32
		Men*IG-2	0.06	−5.27, 5.38	0.02	0.98	0	0.05
		PHQ-9	−0.25	−0.45, −0.05	−2.47	<0.05	0.01	0.70
		GAD-7	−0.05	−0.20, 0.30	0.39	0.70	0	0.07

B=Parameter coefficients, Ref.=Reference category, CI=Confidence Intervals, η_p^2=partial eta squared, 1-*β*=Power.
Significant results in bold.
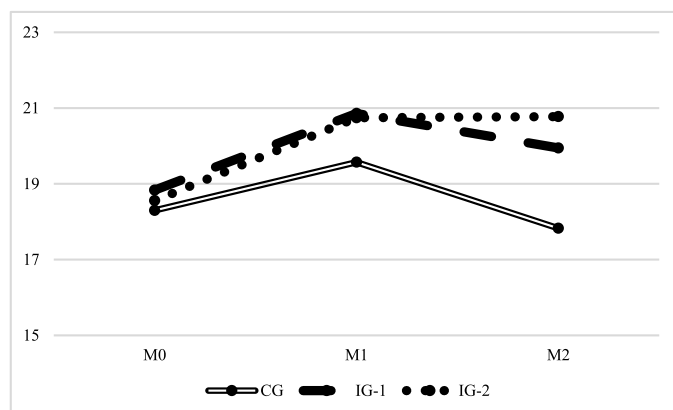
Fig. 4. Evolution of the help-seeking attitudes mean scores according to the intervention group.

Cohen's f^2 effect size calculations indicated an R^2 of 0.36 and a Cohen's f^2 of 0.04.

4. Discussion

The main findings of the study show video-based contact intervention as a promising tool for personal depression stigma reduction, sustainably and significantly improving help-seeking attitudes.

Despite international research on the effects of stigma reduction interventions (Büchter and Messer, 2017; Janouskova et al., 2017; Mehta et al., 2015; Potts and Henderson, 2021; Thornicroft et al., 2016; Walsh and Foster, 2020), in Portugal, there was a lack of studies on depression stigma reduction interventions, and the only one published addressed the general population (Coppens et al., 2013; Hegerl et al., 2009; Kohls et al., 2017).

This study was the first RCT in Portugal to evaluate the effects of a depression stigma reduction intervention, which can be helpful when planning stigma reduction campaigns and mental help-seeking behaviours promotion. Furthermore, we intended to narrow the knowledge gap in the Portuguese population (Gronholm et al., 2017), specifically in university students from all study areas (Oliveira et al., 2020).

We designed our research targeting to improve the effects of depression stigma reduction interventions (Janouskova et al., 2017), foster knowledge on effects of sustainability (Büchter and Messer, 2017; Thornicroft et al., 2016); and widen the knowledge replicability to all university schools beyond health and medical schools (Clement et al., 2012; Janouskova et al., 2017; Yamaguchi et al., 2013).

Personal depression stigma significantly decreased in both intervention groups, with no differences between them. Thus, even though five months after the intervention, the personal depression stigma means have slightly increased compared with the evaluation right after the intervention, the effects of the intervention were still significant. Furthermore, the intervention also reduced the differences in personal depression stigma observed between sexes at the baseline moment. Previous literature (Boerema et al., 2016; Griffiths et al., 2014) has reported men to have higher personal depression stigma scores than women, so we find the intervention's effects as a potentially beneficial tool to decrease the gap between sexes.

Perceived stigma was not affected by the intervention in any of the groups. Other authors reported difficulties understanding the effects of stigma reduction interventions in perceived stigma (Griffiths et al., 2014).

In our study, the benefits of psychoeducational information in literacy promotion are unquestionable. Nevertheless, the video-based contact information was just as effective with or without the additional information, similarly to results reported in other studies (Maunder and White, 2019). However, more research is needed to understand better the effectiveness differences between these two types of stigma reduction intervention.

Thus the benefits of contact-based intervention have not been consensual in the literature (Walsh and Foster, 2021) and are reported as having more effect than education-based interventions (Tergesen et al., 2021b; Tsoi et al., 2020). Our study confirmed the beneficial effects of

video-based contact intervention with medium-term effects, addressing the lack of literature evaluating longer-lasting intervention effects (Mehta et al., 2015).

Koike and colleagues' work (Koike et al., 2018) shares similarities with our study, presenting several differences. Our study included a larger sample (626 vs 218), and their video was much longer than ours (10 min vs 60 min), with a follow-up intervention every two months against a single intervention on our side. Even though their intervention was a mental illness stigma generic intervention, the video mostly contained information about schizophrenia and obsessive-compulsive disorder. The follow-up interventions contained interviews about schizophrenia, major depression, panic disorder, and obsessive-compulsive disorder. Our study did not have follow-up interventions, and the primary intervention was focused on one single diagnosis, which has been described in the literature as presenting better results (Morgan et al., 2021). We believe our study is more focused, more straightforward to implement, and likely equivalent long-lasting effects.

Our intervention was also effective in promoting help-seeking attitudes, and its effects were visible five months after the intervention. This positive relationship between stigma reduction and help-seeking promotion is consonant with the results of previous studies (Goh et al., 2021; Kosyluk et al., 2021); however, the short length and the delivery easiness of our intervention may represent a significant advantage.

In future research, the actual effects of the intervention in help-seeking could aid in evaluating, for instance, how the intervention affected help-seeking behavior in participants with different levels of depressive and anxiety symptomatology.

The study presents several limitations. Only 969 of the 4493 students contacted accepted to participate in our study, corresponding to a 21.7% participation rate. We cannot preclude self-selection bias, and maybe some participants were motivated by personal reasons, facilitating the attitudes change. Even though the control group controlled this limitation, we could not collect data on non-response to better control for a protential selection bias. Another limitation is the 35% dropout rate. However, we did not find significant differences in the main variables between our sample and the dropouts in any group. Also, all groups were comparable at the beginning of the experiment, so we avoided sampling bias. As previously described in the baseline paper (Conceição et al., 2021a), the baseline sample was considered representative of the University of Porto's students' universe.

On the other hand, sample anonymization guarantees the students their participation, and raw data would not be possible to share with the university, reducing the potential for providing socially desirable responses.

Stigma reduction video interventions were reported to be promising among young people, and in some studies, were considered more effective than other types of interventions (Janouskova et al., 2017). However, there is a consensus on the necessity of longer follow-ups (Mehta et al., 2015; Thornicroft et al., 2016) and more evidence on mental illness specificity, by diagnosis, for instance (Morgan et al., 2021).

Our study is the first to examine the potential benefits of a video anti-stigma intervention in university students in Portugal, using an easy-to-use tool that effectively reduced personal depression stigma and improved help-seeking attitudes. Our intervention tool assumes particular importance in a time when pivoting as much as possible to online services is so crucial for pandemic prevention (Rodriguez-Rivas et al., 2021).

CRediT authorship contribution statement

Virgínia Conceição: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft. **Inès Rothes:** Conceptualization, Investigation, Writing – review & editing. **Ricardo Gusmão:** Conceptualization, Methodology, Validation, Writing – review & editing, Supervision.

Declaration of Competing Interest

None.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2021.114356.

References

Amsalem, D., Martin, A., 2021. Reducing depression-related stigma and increasing treatment seeking among adolescents: randomized controlled trial of a brief video intervention. J. Child Psychol. Psychiatry.

Auerbach, R.P., Alonso, J., Axinn, W.G., Cuijpers, P., Ebert, D.D., Green, J.G., Hwang, I., Kessler, R.C., Liu, H., Mortier, P., Nock, M.K., Pinder-Amaker, S., Sampson, N.A., Aguilar-Gaxiola, S., Al-Hamzawi, A., Andrade, L.H., Benjet, C., Caldas-de-Almeida, J. M., Demyttenaere, K., Florescu, S., de Girolamo, G., Gureje, O., Haro, J.M., Karam, E. G., Kiejna, A., Kovess-Masfety, V., Lee, S., McGrath, J.J., O'Neill, S., Pennell, B.E., Scott, K., Ten Have, M., Torres, Y., Zaslavsky, A.M., Zarkov, Z., Bruffaerts, R., 2016. Mental disorders among college students in the World Health Organization World Mental Health Surveys. Psychol. Med. 46 (14), 2955–2970.

Boerema, A.M., Zoonen, K., Cuijpers, P., Holtmaat, C.J., Mokkink, L.B., Griffiths, K.M., Kleiboer, A.M., 2016. Psychometric properties of the dutch depression stigma scale (DSS) and associations with personal and perceived stigma in a depressed and community sample. PLoS One 11 (8), e0160740.

Büchter, R.B., Messer, M., 2017. Interventions for reducing self-stigma in people with mental illnesses: a systematic review of randomized controlled trials. Ger. Med. Sci. 15, Doc07.

Busby Grant, J., Bruce, C.P., Batterham, P.J., 2016. Predictors of personal, perceived and self-stigma towards anxiety and depression. Epidemiol. Psychiatr. Sci. 25 (3), 247–254.

Clement, S., van Nieuwenhuizen, A., Kassam, A., Flach, C., Lazarus, A., de Castro, M., McCrone, P., Norman, I., Thornicroft, G., 2012. Filmed v. live social contact interventions to reduce stigma: randomized controlled trial. Br. J. Psychiatry 201 (1), 57–64.

Conceição, V., Rothes, I., Gusmão, R., 2021a. Depression stigma predictors and its effects on help-seeking attitudes in college students.

Conceição, V., Rothes, I., Severo, M., Griffiths, K., Hegerl, U., Gusmão, R., 2021b. Psychometric properties of the Depression Stigma Scale in the Portuguese population and its association with gender and depressive symptomatology. medRxiv, 20194167, 2020.2009.2014.

Coppens, E., Van Audenhove, C., Scheerder, G., Arensman, E., Coffey, C., Costa, S., Koburger, N., Gottlebe, K., Gusmao, R., O'Connor, R., Postuvan, V., Sarchiapone, M., Sisask, M., Szekely, A., van der Feltz-Cornelis, C., Hegerl, U., 2013. Public attitudes toward depression and help-seeking in four European countries baseline survey prior to the OSPI-Europe intervention. J. Affect. Disord. 150 (2), 320–329.

Eisenberg, D., Downs, M.F., Golberstein, E., Zivin, K., 2009. Stigma and help seeking for mental health among college students. Med. Care Res. Rev. 66 (5), 522–541.

Fischer, E.H., Turner, J.L., 1970. Orientations to seeking professional help: development and research utility of an attitude scale. J. Consult. Clin. Psychol. 35 (1), 79–90.

Goh, C.M.J., Shahwan, S., Lau, J.H., Ong, W.J., Tan, G.T.H., Samari, E., Kwok, K.W., Subramaniam, M., Chong, S.A., 2021. Advancing research to eliminate mental illness stigma: an interventional study to improve community attitudes towards depression among University students in Singapore. BMC Psychiatry 21 (1), 108.

Goncalves, M., Moleiro, C., Cook, B., 2015. The Use of a Video to Reduce Mental Health Stigma Among Adolescents. Adolesc. Psychiatry 05, 1-1.

Griffiths, K.M., Carron-Arthur, B., Parsons, A., Reid, R., 2014. Effectiveness of programs for reducing the stigma associated with mental disorders. A meta-analysis of randomized controlled trials. World Psychiatry 13 (2), 161–175.

Griffiths, K.M., Christensen, H., Jorm, A.F., Evans, K., Groves, C., 2004. Effect of web-based depression literacy and cognitive-behavioural therapy interventions on stigmatizing attitudes to depression: randomized controlled trial. Br. J. Psychiatry (185), 342–349.

Gronholm, P.C., Henderson, C., Deb, T., Thornicroft, G., 2017. Interventions to reduce discrimination and stigma: the state of the art. Soc. Psychiatry Psychiatr. Epidemiol. 52 (3), 249–258.

Haahr, M., Haahr, S., 2010. RANDOM.ORG.

Hatzenbuehler, M.L., Phelan, J.C., Link, B.G., 2013. Stigma as a fundamental cause of population health inequalities. Am. J. Public Health 103 (5), 813–821.

Hegerl, U., Wittenburg, I., Arensman, E., Van Audenhove, C., Coyne, J.C., McDaid, D., van der Feltz-Cornelis, C.M., Gusmao, R., Kopp, M., Maxwell, M., Meise, U., Roskar, S., Sarchiapone, M., Schmidtke, A., Varnik, A., Bramesfeld, A., 2009. Optimizing suicide prevention programs and their implementation in Europe (OSPI Europe): an evidence-based multi-level approach. BMC Public Health 9, 428.

Hysenbegasi, A., Hass, S.L., Rowland, C.R., 2005. The Impact of Depression on the Academic Productivity of University Students. J. Ment. Health Policy Econ. 8 (3), 145–151.

Janouskova, M., Tuskova, E., Weissova, A., Trancik, P., Pasz, J., Evans-Lacko, S., Winkler, P., 2017. Can video interventions be used to effectively destigmatize mental illness among young people? A systematic review. Eur. Psychiatry 41, 1–9.

Jones, E., 2014. Neuro psychiatry 1943: the role of documentary film in the dissemination of medical knowledge and promotion of the UK psychiatric profession. J. Hist. Med. Allied Sci. 69 (2), 294–324.

Kassam, A., Glozier, N., Leese, M., Loughran, J., Thornicroft, G., 2011. A controlled trial of mental illness related stigma training for medical students. BMC Med. Educ. 11 (1), 51.

Knickman, J., Krishnan, R., Pincus, H., 2016. Improving Access to Effective Care for People With Mental Health and Substance Use Disorders. JAMA 316 (16), 1647–1648.

Kohls, E., Coppens, E., Hug, J., Wittevrongel, E., Van Audenhove, C., Koburger, N., Arensman, E., Szekely, A., Gusmao, R., Hegerl, U., 2017. Public attitudes toward depression and help-seeking: impact of the OSPI-Europe depression awareness campaign in four European regions. J. Affect. Disord. 217, 252–259.

Koike, S., Yamaguchi, S., Ojio, Y., Ohta, K., Shimada, T., Watanabe, K., Thornicroft, G., Ando, S., 2018. A randomized controlled trial of repeated filmed social contact on reducing mental illness-related stigma in young adults. Epidemiol. Psychiatr. Sci. 27 (2), 199–208.

Kosyluk, K., Marshall, J., Conner, K., Macias, D.R., Macias, S., Michelle Beekman, B., Her, J., 2021. Challenging the Stigma of Mental Illness Through Creative Storytelling: a Randomized Controlled Trial of This Is My Brave. Community Ment. Health J. 57 (1), 144–152.

Kroska, A., Harkness, S.K., 2021. Information vs. inspiration: evaluating the effectiveness of mental illness stigma-reduction messages. Soc. Sci. Res. 96, 102543.

Lindstrom, G., Sofija, E., Riley, T., 2021. Getting better at getting better": how Sharing Mental Health Stories Can Shape Young People's Wellbeing. Community Ment. Health J.

Marques, A.J., Barbosa, T., Queiros, C., 2011. P03-270 - Stigma in mental health: perceptions of students who will be future health professionals. European Psychiatry 26, 1439.

Maunder, R.D., White, F.A., 2019. Intergroup contact and mental health stigma: a comparative effectiveness meta-analysis. Clin. Psychol. Rev. 72.

Mehta, N., Clement, S., Marcus, E., Stona, A.C., Bezborodovs, N., Evans-Lacko, S., Palacios, J., Docherty, M., Barley, E., Rose, D., Koschorke, M., Shidhaye, R., Henderson, C., Thornicroft, G., 2015. Evidence for effective interventions to reduce mental health-related stigma and discrimination in the medium and long term: systematic review. Br. J. Psychiatry 207 (5), 377–384.

Monteiro, S., Torres, A., Pereira, A., Albuquerque, E., Morgadinho, R., 2013. Preliminary validation study of a portuguese version of the patient health questionnaire (PHQ-9). European Psychiatry 28.

Moreira, A.R., Oura, M.J., Santos, P., 2021. Stigma about mental disease in Portuguese medical students: a cross-sectional study. BMC Med. Educ. 21 (1), 265.

Morgan, A.A.-O., Wright, J., Reavley, N.J., 2021. Review of Australian initiatives to reduce stigma towards people with complex mental illness: what exists and what works? Int. J. Ment. Health Syst. 15, 1752–4458 (Print).

Oliveira, A.M., Machado, D., Fonseca, J.B., Palha, F., Silva Moreira, P., Sousa, N., Cerqueira, J.J., Morgado, P., 2020. Stigmatizing attitudes toward patients with psychiatric disorders among medical students and professionals. Front. Psychiatry 11, 326.

Papish, A., Kassam, A., Modgill, G., Vaz, G., Zanussi, L., Patten, S., 2013. Reducing the stigma of mental illness in undergraduate medical education: a randomized controlled trial. BMC Med. Educ. 13 (1), 141.

Potts, L.C., Henderson, C., 2021. Evaluation of anti-stigma social marketing campaigns in Ghana and Kenya: time to Change Global. BMC Public Health 21 (1), 886.

Querido, A.I.F., Tomás, C.C., Carvalho, D.R.S.d., Gomes, J.M.F., Cordeiro, M.S.S., 2020. Impacto de uma intervenção no estigma em saúde mental e ansiedade intergrupal. Acta Paulista de Enfermagem 33.

Ranson, N.J., Byrne, M.K., 2014. Promoting peer acceptance of females with higher-functioning autism in a mainstream education setting: a replication and extension of the effects of an autism anti-stigma program. J. Autism Dev. Disord. 44 (11), 2778–2796.

Rodriguez-Rivas, M.E., Cangas, A.J., Fuentes-Olavarria, D., 2021. Controlled Study of the Impact of a Virtual Program to Reduce Stigma Among University Students Toward People With Mental Disorders. Front. Psychiatry 12, 632252.

Schnyder, N., Panczak, R., Groth, N., Schultze-Lutter, F., 2017. Association between mental health-related stigma and active help-seeking: systematic review and meta-analysis. Br. J. Psychiatry 210 (4), 261–268.

Schulz, K.F., Altman, D.G., Moher, D., Fergusson, D., 2010. CONSORT 2010 changes and testing blindness in RCTs. Lancet 375 (9721), 1144–1146.

Selya, A.S., Rose, J.S., Dierker, L.C., Hedeker, D., Mermelstein, R.J., 2012. A Practical Guide to Calculating Cohen's f2, a Measure of Local Effect Size, from PROC MIXED. Front. Psychol. 3.

Sousa, T.V., Viveiros, V., Chai, M.V., Vicente, F.L., Jesus, G., Carnot, M.J., Gordo, A.C., Ferreira, P.L., 2015. Reliability and validity of the Portuguese version of the Generalized Anxiety Disorder (GAD-7) scale. Health Qual. Life Outcomes 13, 50.

Staniland, J.J., Byrne, M.K., 2013. The effects of a multi-component higher-functioning autism anti-stigma program on adolescent boys. J. Autism Dev. Disord. 43 (12), 2816–2829.

Strasburger, V.C., 2016. Children, Adolescents, and the Media: ten Mistakes We've Made and How to Fix Them. Clin. Pediatr. (Phila) 55 (6), 509–512.

Tay, J.L., Tay, Y.F., Klainin-Yobas, P., 2018. Effectiveness of information and communication technologies interventions to increase mental health literacy: a systematic review. Early Interv. Psychiatry 12 (6), 1024–1037.

Telles-Correia, D., Gama Marques, J., Gramaça, J., Sampaio, D., 2015. Stigma and Attitudes towards Psychiatric Patients in Portuguese Medical Students. Acta Médica Portuguesa Vol 28 (No 6) (2015): November-December.

Tergesen, C.L., Gurung, D., Dhungana, S., Risal, A., Basel, P., Tamrakar, D., Amatya, A., Park, L.P., Kohrt, B.A., 2021a. Impact of service user video presentations on explicit and implicit stigma toward mental illness among medical students in Nepal: a randomized controlled trial. Int J Environ Res Public Health 18 (4).

Tergesen, C.L., Gurung, D., Dhungana, S., Risal, A., Basel, P., Tamrakar, D., Amatya, A., Park, L.P., Kohrt, B.A., 2021b. Impact of service user video presentations on explicit and implicit stigma toward mental illness among medical students in Nepal: a randomized controlled trial. Int J Environ Res Public Health 18 (4).

Thornicroft, G., Chatterji, S., Evans-Lacko, S., Gruber, M., Sampson, N., Aguilar-Gaxiola, S., Al-Hamzawi, A., Alonso, J., Andrade, L., Borges, G., Bruffaerts, R., Bunting, B., de Almeida, J.M., Florescu, S., de Girolamo, G., Gureje, O., Haro, J.M., He, Y., Hinkov, H., Karam, E., Kawakami, N., Lee, S., Navarro-Mateu, F., Piazza, M., Posada-Villa, J., de Galvis, Y.T., Kessler, R.C., 2017. Undertreatment of people with major depressive disorder in 21 countries. Br. J. Psychiatry 210 (2), 119–124.

Thornicroft, G., Mehta, N., Clement, S., Evans-Lacko, S., Doherty, M., Rose, D., Koschorke, M., Shidhaye, R., O'Reilly, C., Henderson, C., 2016. Evidence for effective interventions to reduce mental-health-related stigma and discrimination. Lancet 387 (10023), 1123–1132.

Tippin, G.K., Maranzan, K.A., 2019. Efficacy of a Photovoice-based video as an online mental illness anti-stigma intervention and the role of empathy in audience response: a randomized controlled trial. J. Appl. Soc. Psychol. 49 (6), 381–394.

Tsoi, O.Y.Y., Chan, S.K.W., Chui, A.H.C., Hui, C.L.M., Chang, W.C., Lee, E.H.M., Henderson, C., Chen, E.Y.H., 2020. Effect of brief social contact video compared with expert information video in changing knowledge and attitude towards psychosis patients among medical students. Early Interv Psychiatry 15 (2), 278–285.

Vilar Queirós, R., Santos, V., Madeira, N., 2021. Decrease in stigma towards mental illness in portuguese medical students after a psychiatry course. Acta Médica Portuguesa Vol 34 (No 13) (2021): Ahead of Print 34DO - 10.20344/amp.13859.

Walsh, D.A.B., Foster, J.L.H., 2020. A call to action. A critical review of mental health related anti-stigma campaigns. Front Public Health 8, 569539.

Walsh, D.A.B., Foster, J.L.H., 2021. A call to action. A critical review of mental health related anti-stigma campaigns. Front Public Health 8 (990).

Waqas, A., Malik, S., Fida, A., Abbas, N., Mian, N., Miryala, S., Amray, A.N., Shah, Z., Naveed, S., 2020. Interventions to reduce stigma related to mental illnesses in educational institutes: a systematic review. Psychiatr. Q. 91 (3), 887–903.

Wechsler, D., Schomerus, G., Mahlke, C., Bock, T., 2020. Effects of contact-based, short-term anti-stigma training for medical students : results from a randomized controlled trial. Neuropsychiatr 34 (2), 66–73.

World Health Organization, 2013. Mental Health Action Plan 2013-2020, pp. 1–44.

Yamaguchi, S., Wu, S.I., Biswas, M., Yate, M., Aoki, Y., Barley, E.A., Thornicroft, G., 2013. Effects of short-term interventions to reduce mental health-related stigma in university or college students: a systematic review. J. Nerv. Ment. Dis. 201 (6), 490–503.