

# Decrease in Stigma Towards Mental Illness in Portuguese Medical Students After a Psychiatry Course

## Redução do Estigma Face à Doença Mental Após Frequência de Aulas de Psiquiatria em Estudantes de Medicina Portugueses



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### ABSTRACT

**Introduction:** Stigma towards mental illness is considered a key obstacle to the provision of medical care to psychiatric patients. This is not only present in the general population but also among healthcare professionals. Therefore, medical students could be a target population for stigma prevention measures. The aim of this study is to assess the evolution of the attitudes of medical students from the Faculty of Medicine of the University of Coimbra towards psychiatric patients, before and after attending Psychology and Psychiatric courses.

**Material and Methods:** Students from the third and fourth years of the integrated Master's degree in Medicine in the Faculty of Medicine of the University of Coimbra were asked to complete four questionnaires. The surveys were distributed before and after the attendance of the courses.

**Results:** There was a statistically significant decrease of the stigma scores ( $p = 0.025$ ) between the two measurements (38.16 initially, 36.72 on the second moment). The baseline level of stigma was found to be negatively associated with empathy ( $r_p = -0.477$ ) and with the type of personality, with higher levels of openness to new experiences being associated with lower levels of initial stigma ( $r_p = -0.357$ ).

**Discussion:** Overall, the students' attitudes towards patients with mental illness were positive, with a decrease of the stigma value from the first to the second semester. This corroborates the hypothesis that education and contact with people with a mental condition could shape positive changes in attitudes and discrimination against those patients.

**Conclusion:** Our results emphasise the importance of implementing programs inside medical schools in order to reduce stigma among future doctors.

**Keywords:** Attitude; Mental Disorders; Portugal; Psychiatry; Social Stigma; Students, Medical

### RESUMO

**Introdução:** O estigma face às doenças mentais é considerado como um dos principais obstáculos à prestação de cuidados médicos a doentes psiquiátricos. Esta problemática não está presente apenas na população geral, mas também entre os profissionais de saúde. Assim, os estudantes de medicina podem ser uma população alvo para a introdução de medidas de prevenção de estigma. O objetivo deste estudo é avaliar a evolução das atitudes dos estudantes de Medicina da Faculdade de Medicina da Universidade de Coimbra (FMUC) face aos doentes psiquiátricos, antes e depois de frequentar as cadeiras de Psicologia e Psiquiatria.

**Material e Métodos:** Foram distribuídos quatro questionários aos alunos do terceiro e quarto anos do Mestrado Integrado em Medicina da FMUC antes e depois de frequentarem as unidades curriculares.

**Resultados:** Foi observada uma diminuição estatisticamente significativa dos valores de estigma ( $p = 0,025$ ) entre as duas medições (38,16 no primeiro momento, 37,72 no segundo). Foram ainda encontradas correlações inversas, quer entre o valor do estigma inicial e a empatia ( $r_p = -0,477$ ), como em relação ao tipo de personalidade, com maiores níveis de abertura à experiência originando níveis mais baixos de estigma ( $r_p = -0,357$ ).

**Discussão:** Em geral, as atitudes dos estudantes de Medicina relativamente aos doentes psiquiátricos foram positivas, com uma diminuição significativa do valor do estigma do primeiro para o segundo semestre. Estes resultados corroboram a hipótese de que a educação e o contacto com pessoas com uma patologia mental poderão modificar positivamente as atitudes e discriminação contra as mesmas.

**Conclusão:** Este estudo salienta a importância da implementação de programas nas Faculdades de Medicina com o intuito de reduzir o estigma entre futuros Médicos.

**Palavras-chave:** Atitude; Estigma Social; Estudantes de Medicina; Perturbações Mentais; Portugal; Psiquiatria

### INTRODUCTION

Mental and neurological disorders are one of the leading causes of morbidity and disability worldwide.<sup>1</sup> They affect one out of four people<sup>2</sup> and their prevalence and incidence are expected to rise in the following years.<sup>1,2</sup> Nevertheless, only one third of patients with mental and neurological disorders has access to medical care.<sup>2</sup> Many reasons can

contribute to this low rate of service use, such as financial, instrumental and attitudinal barriers,<sup>3</sup> but stigma and discrimination seem to have a leading role as an obstacle to the provision of mental health care for people with mental illness.<sup>2-7</sup>

Stigma can be defined as a combination of labelling,

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stereotyping, separation, loss of status and discrimination, that occur at the same time, whereby a person is associated with undesirable characteristics.<sup>8,9</sup> It is a “sign of disgrace or discredit that sets a person apart from others”.<sup>9</sup>

It has been demonstrated that stigma and discrimination against mental disorders is present all around the world<sup>5,6,10,11</sup> and that patients with mental illnesses are some of the most stigmatised and marginalised members of our society.<sup>1</sup> This occurs not only because these patients are often seen as potentially violent and dangerous,<sup>4,5</sup> but also because of beliefs that these diseases have a chronic course,<sup>9</sup> with a poor prognosis and ineffective treatments.<sup>7,12–14</sup>

The latest studies show that stigma towards psychiatric patients is observed not only in the general population but also among healthcare professionals<sup>5–7,9,10,15,16</sup>; with some studies reporting that physicians have the highest level of stigmatising attitudes compared with other healthcare professionals,<sup>15</sup> with negative impact on patient care.

It is essential to reduce stigma in order to bring positive changes in the acceptance and treatment of mental disorders.<sup>2</sup> Anti-stigma programs could be implemented in medical schools because it is believed that medical students' attitudes towards mentally ill patients are shaped during their training, offering an unique chance for intervention and stigma prevention.<sup>5,14,16</sup> We could also consider that the students of today will be the doctors of tomorrow<sup>14,16</sup> and, if mental illness stigma could be reduced now, these forthcoming physicians might positively influence future mental healthcare.<sup>16</sup>

Many studies have been conducted to investigate the impact of clinical clerkships on medical students' attitudes but results are controversial,<sup>5,9,17</sup> with some showing better behaviour after the clerkship and others demonstrating a negative impact on stigma among students. Further investigations led to the hypothesis that beliefs about mental illness could be influenced by different aspects, such as socio-cultural differences<sup>4,7,17</sup> and level of contact with psychiatric patients<sup>11</sup> and mental health care services.<sup>18</sup> Of great importance may also be the attitudes of tutors in medical schools, that could strongly influence the development of stigma in students.<sup>5,9</sup>

Consequently, it is extremely important to conduct research in different countries and different universities, in order to compare all these factors and find feasible solutions to this problem. In Portugal, some studies have been carried out,<sup>9,18</sup> but the only analysed variable was the difference between students of different years, with no assessment of beliefs and attitudinal changes before and after attending a Psychiatry course.

Each Medical School in each University in Portugal has different teaching methods. In the Faculty of Medicine of the University of Coimbra (FMUC), where this study took place, students have their first contact with Psychiatry during the first year. However, such interaction is minimal. Consistent contact with this medical specialty and its patients starts during the third year, where students attend the theoretical and practical classes of the Medical Psychology course.

They learn how to take a medical history based on the biopsychosocial model and have the chance to interview patients once a week. During the course of Neurosciences and Mental Health in the fourth year of the medical degree, in the class of Psychiatry, the pathophysiology of psychiatric diseases, and their treatment are taught. Besides the theoretical classes, students must attend weekly practical classes, where they have the chance to conduct interviews and to interact with patients with different mental illnesses.

The main purpose of this study was to assess the evolution of the attitudes of medical students from a Portuguese medical school – FMUC – towards psychiatric patients, before and after attending Medical Psychology and Psychiatry courses, and assess the impact of class attendance on shaping stigmatising attitudes. An additional goal was to understand if attitudes towards mentally ill people were associated with sociodemographic and personal characteristics, such as sex, personality and level of empathy, and if they were influenced by the type of class attended, by previous familiarity with mental illness or even by the preference for a future area of specialisation. These factors were assessed because they seem to affect the level of stigma,<sup>4,7,13</sup> with studies showing more negative attitudes among males,<sup>17</sup> younger people,<sup>19</sup> students that prefer surgical specialties<sup>17</sup> and people with no previous contact with patients with mental illness.<sup>4,17,20</sup> Given that the influence of such variables is not consensual,<sup>7,16</sup> these aspects were questioned so that they could be investigated in our environment.

## MATERIAL AND METHODS

### Study design and procedures

A prospective study was conducted among medical students from the third and the fourth years of the Integrated Master's degree in Medicine of FMUC, who had attended the courses of Medical Psychology and Neurosciences and Mental Health, respectively, during the first semester of the 2018/2019 academic year.

Students were asked to answer an assessment survey during the first class of each course, at the beginning of the first semester, and again at the beginning of the second semester, after attending the courses. The last four digits of the citizen card of each student were requested in order to match the first questionnaires with the ones answered at the beginning of the second semester while keeping the anonymity of the responses.

Participation was voluntary, and an informed consent form was signed by all the participants.

### Instruments

Surveys were a combination of four questionnaires: a sociodemographic form, the Mental Illness: Clinicians' Attitudes Scale (medical student version - MICA-2), the NEO-Five Factor Inventory (NEO-FFI-20) and the Toronto Empathy Questionnaire (TEQ).

### Sociodemographic questionnaire

The sociodemographic questionnaire collected data

about the participants such as age, sex, nationality, marital status, area of specialisation they intended to follow (medical or surgical) and previous contacts and personal experiences with mental illness.

### **Mental Illness: Clinicians' Attitudes Scale - medical student version (MICA-2)**

The MICA-2 questionnaire is a survey comprising 16 items, was developed to assess medical students' attitudes towards psychiatric patients,<sup>21</sup> and takes less than 10 minutes to be completed.<sup>16</sup> It is rated on a 6-point Likert scale, ranging from "strongly agree" to "strongly disagree",<sup>1,21</sup> with a higher overall score representing more stigmatising attitudes concerning mental illness and psychiatry.<sup>21</sup>

This scale was considered to be an adequate tool to compare attitudes of medical students towards patients with mental illness before and after an educational intervention.<sup>16,21</sup>

### **NEO-Five Factor Inventory (NEO-FFI-20)**

The NEO-Five Factor inventory scale is a reduced version of the Revised NEO Personality Inventory (NEO-PI-R); it is a useful instrument to evaluate the five personality dimensions (openness to experience, conscientiousness, extraversion, agreeableness, neuroticism) when personality is not the main study object.<sup>22</sup>

It has 20 items and is rated on a 5-point Likert scale, from 0 (strongly disagree) to 4 (strongly agree).

### **Toronto Empathy Questionnaire (TEQ)**

The TEQ is a 16-item scale assessing different features related with the theoretical facets of empathy.<sup>23</sup> Each one of these items is rated on a 5-point Linkert scale (0 = never, 4 = always), with a higher score indicating more "self-reported emotional concern".<sup>23,24</sup>

This instrument is quick and easily administrated, with high internal consistency, and it assesses interpersonal sensitivity by measuring the empathy of individuals.<sup>23</sup>

### **Statistical analysis**

Data were described according to its measurement levels, using absolute and relative frequencies whenever data were categorical or mean and standard deviation, median and quartiles whenever data were quantitative. Data distribution and adjustment to a Gaussian distribution was evaluated with the Shapiro-Wilk test.<sup>25</sup>

Parametric tests were applied if data were normally distributed or if data presented symmetric distribution and its deviation from the Gaussian curve was residual, due to the reasonable sample size. When these assumptions were met, the comparison of independent measures was performed applying the Student's *t*-test for two independent samples, while the comparison of paired measures was performed through the Student's paired *t*-test. On the other hand, when data presented large asymmetry and, thus, large deviations from a normal distribution, non-parametric tests (Mann-Whitney) were applied or Wilcoxon for the

comparison of two paired samples. Moreover, correlation was performed using, the Pearson's or Spearman's rank order coefficient, respectively, according to the same rules.

In order to ascertain the evolution of stigma and its interaction with demographic and personality characteristics, mixed repeated measures ANOVA or mixed repeated measures ANCOVA were applied, after evaluating its major assumptions of applications, such as the normal distribution of the residuals and homogeneity of variance-covariance matrices through the Box M test. As there are only two moments, the sphericity assumption is not needed.

Statistical analysis was performed using the SPSS Version 25 (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp) and was analysed at a 5% significant level.

### **Ethics**

This study was approved by the Ethics Committee of the Faculty of Medicine of the University of Coimbra.

## **RESULTS**

### **Sample characteristics**

In the first and second assessment points, the questionnaires were answered by 190 and 138 students, respectively. Paired evaluations were obtained for 101 students, which constituted the study's sample.

All participants were single and 73.3% were female. Their age ranged from 19 to 24 years, with a mean of 20.67 ± 0.88 years.

Most students attended the fourth year (64.4%), and the remaining were from the third year. Most respondents were Portuguese (97%), one was from Brazil, one from Venezuela and one from France.

Approximately 53.5% of the participants reported previous personal experience with mental illness: 74% of them through contact with relatives, 25.9% through friends suffering from a mental disorder and 12.9% admitting having suffered a mental disorder themselves.

Students who already knew the specialty they intended to pursue were similarly divided by medical (28.7%) and surgical specialties (27.7%). The remaining 43.6% did not know which one they wanted to follow.

### **Baseline stigma and sociodemographic and personal characteristics**

The mean values of the MICA-2 questionnaire in the initial evaluation were similar between females and males ( $p = 0.268$ ). They were also similar between the population of students who wanted to follow different specialties ( $p = 0.212$ ) and among students with and without prior contact with psychiatric patients ( $p = 0.259$ ) (Fig. 1).

When comparing the stigma among students attending Psychology or Psychiatry classes, a higher initial value was perceived in the ones having Psychiatry lessons, with an average difference of about 4 points that was statistically significant ( $p < 0.001$ ).

The estimates for the initial stigmatising attitudes

showed an inverse correlation with empathy ( $r_p = -0.477$ ;  $p < 0.001$ ). On the other hand, initial stigma seemed to be independent from the personality traits evaluated by the NEO-FFI-20 questionnaire, although medical students with greater openness to experience tended to have less stigma ( $r_p = -0.357$ ;  $p < 0.001$ ) in a very tenuous way (while statistically significant correlation between stigma and openness to new experiences was found, the values of the correlation coefficient showed that the strength of the association was very weak).

### Evolution of medical students' attitudes towards patients with mental illness

The baseline mean score of the MICA-2 questionnaire was 38.16, with a maximum possible score of 96, and a mean score at follow-up of 36.72. Between the two measurements, there was a statistically significant difference in these scores ( $p = 0.025$ ), with a loss of 1.5 points on average.

Each item in this survey was evaluated using the Wilcoxon test for paired data (Table 1) relating the mean values of every one of them in both time points, with three items showing a significant change in score in a positive way. The items 'People with a severe mental illness are dangerous more often than not' and 'General practitioners should not be expected to complete a thorough assessment for people with psychiatric symptoms because they can be referred to a psychiatrist' were reverse scored, with higher values indicating better students' attitudes. They scored 4.3 and 4.67, respectively, in the first time point, and that changed to 4.66 and 4.96 in the second. The other sentence with a positive evolution was 'The public does not need to be protected from people with a severe mental illness', from 3.63 to 3.37.

By analysing the evolution of these attitudes in each gender, we found that, in females, there were statistically significant changes between the two time points (Fig. 2). However, although reduction was statistically significant for the female gender, there was no interaction between

**Table 1** – Comparison of MICA-2 mean and median response items between the first and the second application of the questionnaires (Wilcoxon p-values)

MICA	Moment 1		Moment 2		P*
	Mean (SD)	Median [Q1 - Q3]	Mean (SD)	Median [Q1 - Q3]	
1. I just learn about psychiatry because it is in the exam and would not bother reading additional material on it	4.52 (1.29)	5 [4 - 6]	4.32 (1.42)	5 [3 - 6]	0.091
2. People with a severe mental illness can never recover enough to have a good quality of life	5.04 (0.9)	5 [5 - 6]	5.10 (0.89)	5 [5 - 6]	0.481
3. Psychiatry is just as scientific as other fields of medicine	1.53 (0.86)	1 [1 - 2]	1.63 (0.98)	1 [1 - 2]	0.302
4. If I had a mental illness, I would never admit this to any of my friends because I would fear being treated differently	4.28 (1.18)	4 [3 - 5]	4.36 (1.15)	4 [4 - 5]	0.585
5. People with a severe mental illness are dangerous more often than not	<b>4.30 (0.89)</b>	<b>4 [4 - 5]</b>	<b>4.66 (0.89)</b>	<b>5 [4 - 5]</b>	<b>0.001</b>
6. Psychiatrists know more about the lives of people treated for a mental illness than do family members of friends	3.57 (1.21)	3 [3 - 5]	3.62 (1.26)	4 [3 - 5]	0.758
7. If I had a mental illness, I would never admit this to any of my colleagues for fear of being treated differently	3.58 (1.08)	4 [3 - 4]	3.75 (1.21)	4 [3 - 5]	0.208
8. Being a psychiatrist is not like being a real doctor	5.65 (0.57)	6 [5 - 6]	5.71 (0.52)	6 [5 - 6]	0.300
9. If a consultant psychiatrist instructed me to treat people with a mental illness in a disrespectful manner, I would not follow their instructions	1.86 (1.24)	2 [1 - 2]	1.79 (1.18)	1 [1 - 2]	0.652
10. I feel as comfortable talking to a person with a mental illness as I do talking to a person with a physical illness	3.31 (1.27)	3 [2 - 4]	3.11 (1.19)	3 [2 - 4]	0.093
11. It is important that any other doctor supporting a person with a mental illness also assesses their physical health	1.60 (0.65)	2 [1 - 2]	1.58 (0.67)	1 [1 - 2]	0.752
12. The public does not need to be protected from people with a severe mental illness	<b>3.63 (1.07)</b>	<b>4 [3 - 4]</b>	<b>3.37 (1.21)</b>	<b>3 [3 - 4]</b>	<b>0.031</b>
13. If a person with a mental illness complained of physical symptoms (such as chest pain), I would attribute it to their mental illness	4.89 (0.87)	5 [4 - 6]	4.93 (0.83)	5 [4 - 6]	0.723
14. General practitioners should not be expected to complete a thorough assessment for people with psychiatric symptoms because they can be referred to a psychiatrist	<b>4.67 (1.23)</b>	<b>5 [4 - 5]</b>	<b>4.96 (1.01)</b>	<b>5 [4 - 6]</b>	<b>0.025</b>
15. I would use the terms 'crazy', 'nutter', 'mad' etc. to describe people with a mental illness who I have seen in my work	5.32 (0.99)	6 [5 - 6]	5.31 (0.99)	6 [5 - 6]	0.790
16. If a colleague told me they had a mental illness, I would still want to work with them	2.05 (0.99)	2 [1 - 2]	1.96 (0.95)	2 [1 - 2]	0.357

\* Wilcoxon test for paired data

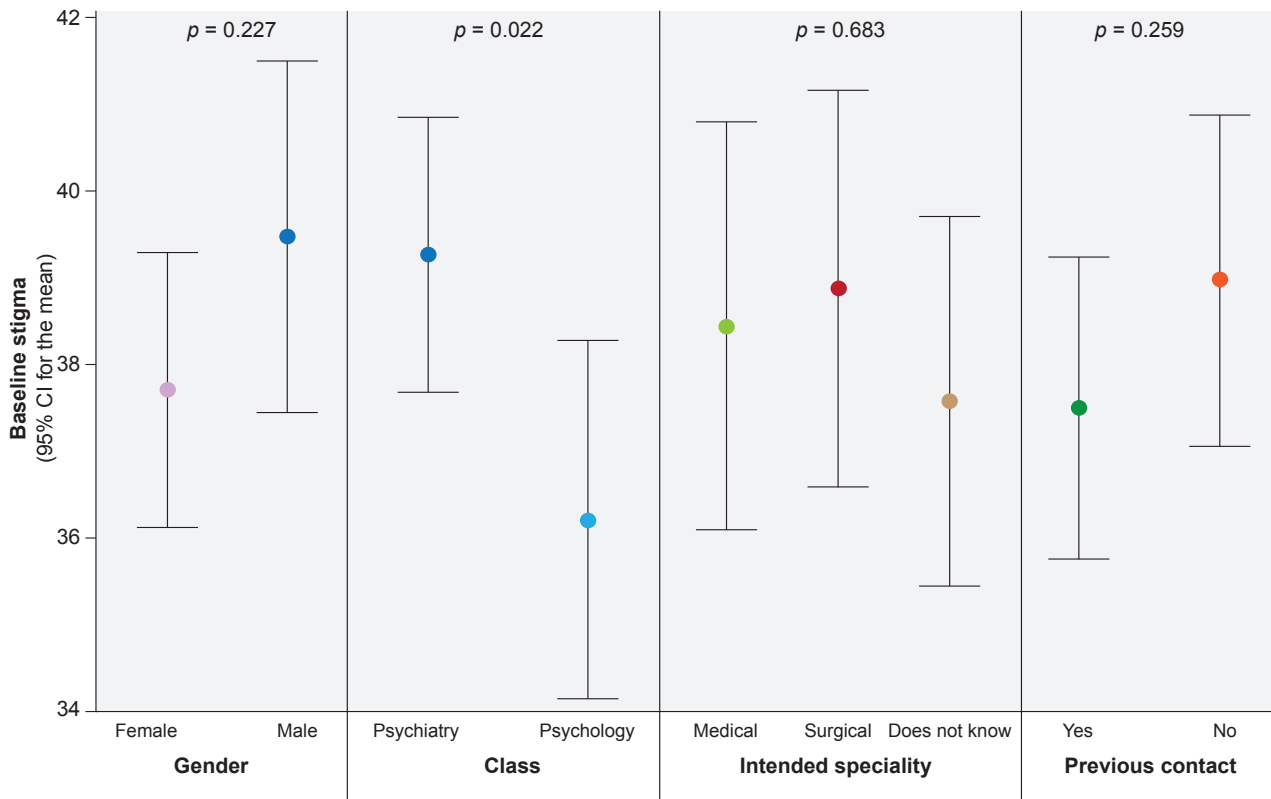


Figure 1 – Average and 95% confidence intervals for the average of the initial stigma according to gender, class, intended speciality and previous contact with patients with mental illness

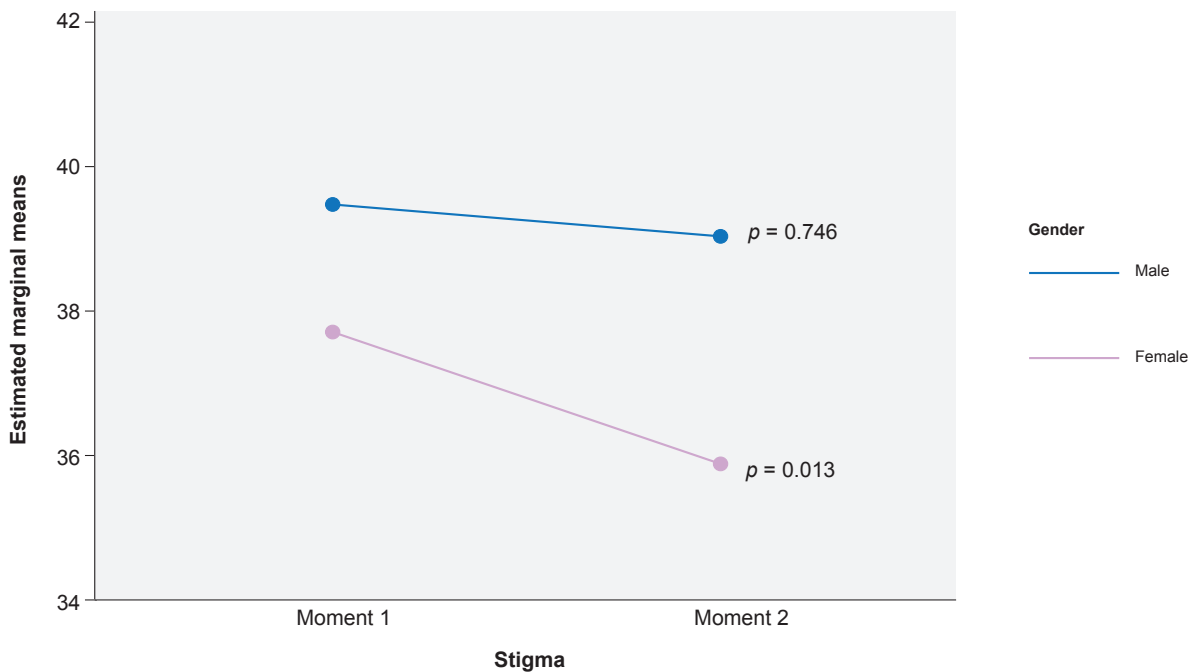


Figure 2 – Evolution of the stigma values (estimated marginal means) in each gender

gender and the evolution of stigma ( $p = 0.344$ ) indicating that medical students had a similar evolution of this parameter between the two time points.

The evolution of the medical students' attitudes showed no interaction with the desired speciality ( $p = 0.285$ ). How-

ever, for students initially undecided about the speciality they wanted to pursue, there were statistically significant changes in mean stigma values ( $p = 0.004$ ) (Fig. 3).

Considering previous contact with patients with mental illness, a statistically significant interaction was not found

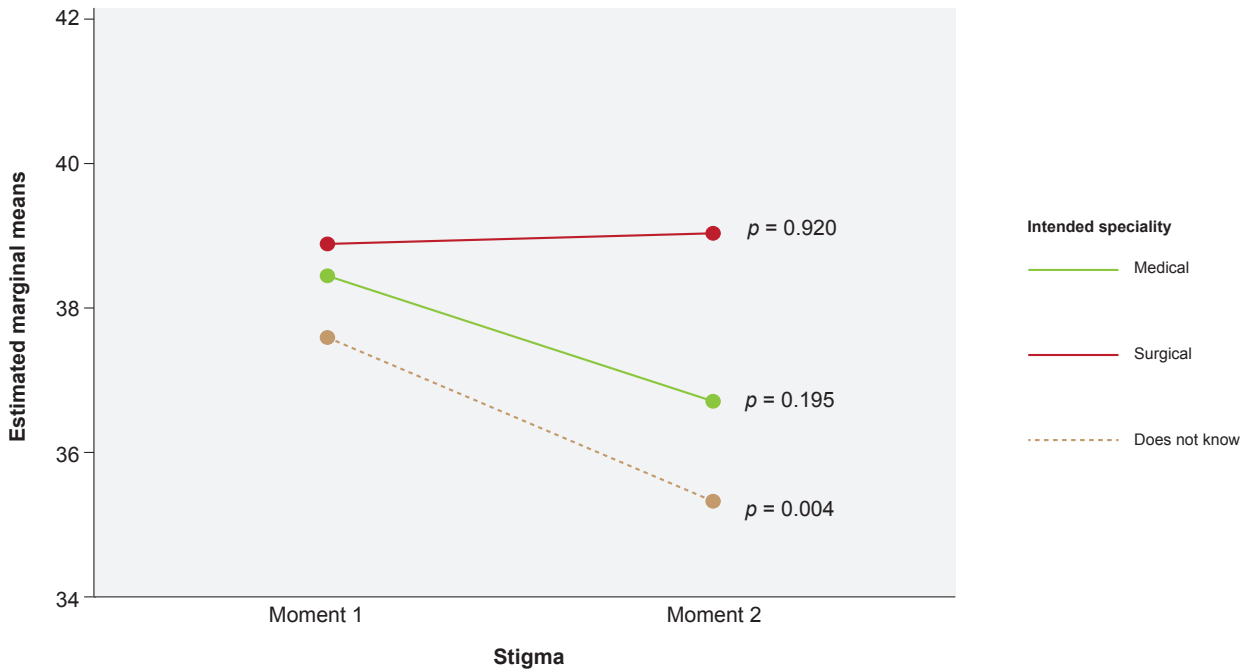


Figure 3 – Stigma evolution (estimated marginal means) according to students' desired specialty

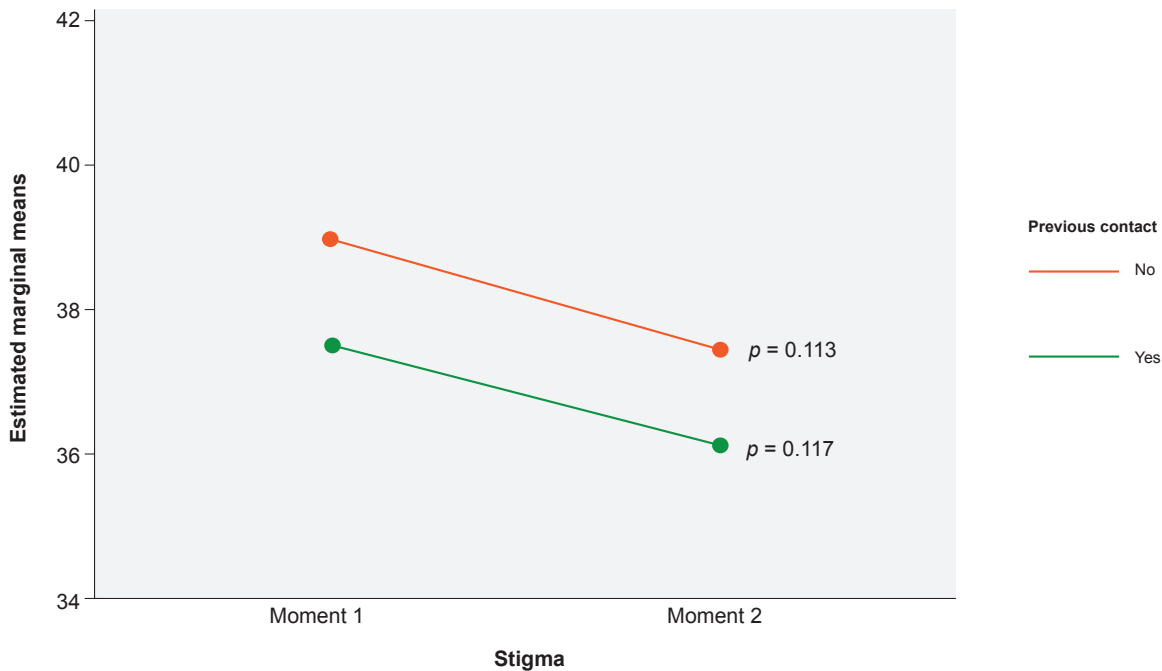


Figure 4 – Evolution of the stigma values (estimated marginal means) in students with and without previous contact with patients with mental illness

between this and the evolution of stigma values ( $p = 0.912$ ) (Fig. 4).

The initial stigma value depended on the class attended and was associated with empathy and openness to new experiences. The analysis of stigma regarding the type of class was adjusted to these variables.

It was observed that the evolution of stigma occurs differently for students who had Psychology or Psychiatry

( $p = 0.004$ ), with a statistically significant decrease in mean values of stigma in students who had Psychiatry ( $p = 0.001$ ), and a slightly increased mean, although not statistically significant, in students who had the curricular unit of Psychology (Fig. 5). Nevertheless, there was no interaction between stigma evolution and empathy ( $p = 0.466$ ) or openness to new experiences ( $p = 0.719$ ).

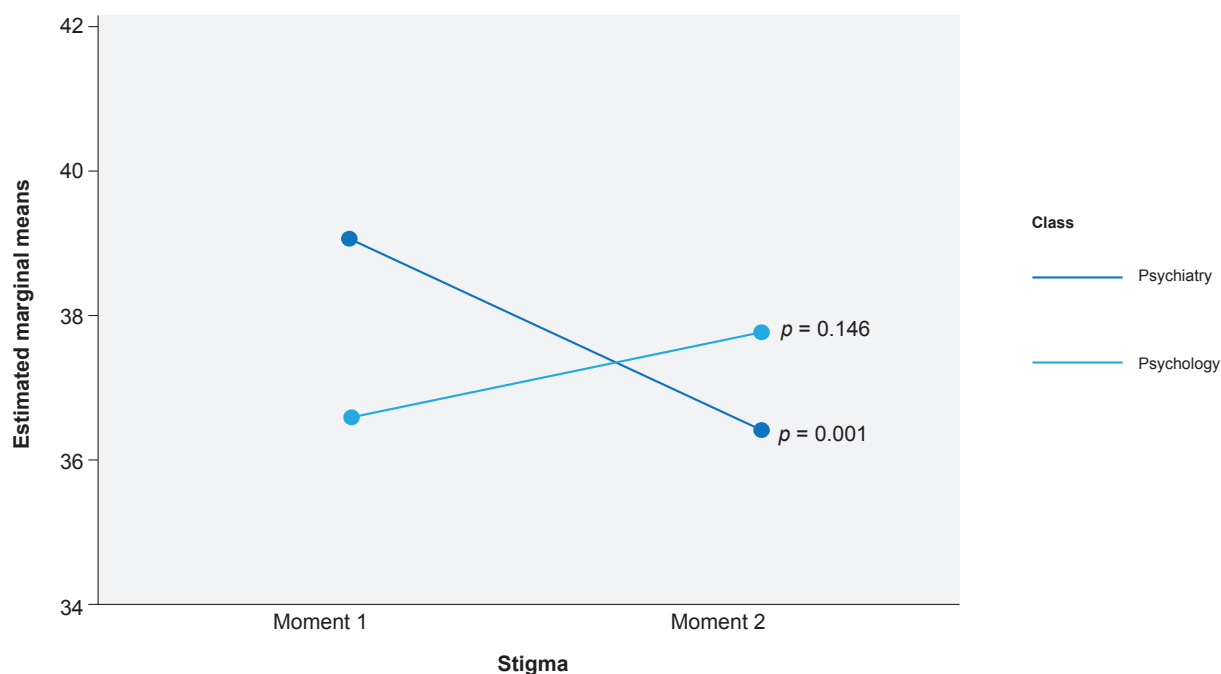


Figure 5 – Evolution of the stigma values (estimated marginal means) in students who attended Psychiatry and Psychology classes

## DISCUSSION

The current study set out to investigate the evolution of the stigma of medical students towards patients with mental illness, before and after attending Psychology and Psychiatry courses.

Attitudes towards psychiatric patients were measured by the MICA-2 questionnaire. The baseline and subsequent scores presented different values, with the second time point of the survey distribution having a lower score, demonstrating a statistically significant improvement in medical students' attitudes and, thus, less stigma. These results were consistent with other studies,<sup>1</sup> with some authors suggesting that education and contact with people with a mental condition shaped positive changes in terms of students' discrimination attitudes<sup>1,5,13,18,20</sup> – 'contact theory'.

Two out of the three items of the MICA-2 questionnaire that contributed to the improvement of final scores were the ones related with the perceived dangerousness of the patients. This represents a major improvement since one of the main characteristics attributed to psychiatric patients is their potential for aggressiveness and violence.<sup>7,12–14</sup> A better understanding of this misinterpretation is a way to fight stigma, since it is believed that the perception of the violence perpetrated by psychiatric patients comes from the way they show their symptoms.<sup>7</sup> Therefore, managing and controlling the diseases could reduce this prejudice.<sup>1,7</sup>

Although the aforementioned 'contact theory' could also explain that students with a personal contact with mental illness had less stigma,<sup>5,12</sup> this was not observed in this study. However, this corroborates other findings.<sup>16</sup> In fact, some authors defend that it's not the contact with patients with mental illness that reduces the stigma, but rather the better knowledge about their diseases<sup>7</sup>. It is also known that con-

tacting with psychiatric patients does not mean having more information about the characteristics of their illnesses. This could also justify the differences between the students that attended the classes of Psychology and Psychiatry, with the former having a slight increase in stigma values (not statistically significant) after attending the course and the latter showing a significant decreased evolution. Psychiatry courses convey the pathophysiology and treatment of each psychiatric disease, while Psychology courses focus on the communication with patients and not the disease itself. Furthermore, the fact that third year students had lower stigma compared to fourth year students, in the first measurement, might decrease the margin for improvement after the Psychology course.

An association between stigma values and gender was not found, even though females had a significant decrease on the follow-up assessment.

Some studies describe lower levels of stigma between students who want to follow a medical specialty compared to those that want to follow a surgical specialty,<sup>17</sup> but that was not observed in our data. Instead, we found a statistically significant improvement in the values of the students who did not know, when they filled the surveys, the specialty they intended to follow. We could speculate that the level of uncertainty of these students could be related with a more open-minded attitude and, thus, greater ability to accept improvements in terms of stigma.

Personality type had no impact on the evolution of medical students' attitudes, although students with more openness to new experiences had, in the first measurement, lower levels of stigma (a correlation not observed in the second time point). Similar findings were also reported in other studies.<sup>10,11</sup> Higher levels of openness to new experiences

are associated with better knowledge, which depends on studying and accepting new information.<sup>10</sup> People with more information about mental illness have less stigmatising attitudes, as discussed earlier. With stigma being, in these students, lower in the first time point, there might be less of an opportunity for improvement,<sup>10</sup> which may explain the lack of association between stigma and levels of openness to new experiences in the second time point.

The baseline level of empathy was found to be negatively associated with stigma, with higher levels of empathy resulting in lower levels of stigma. This could be explained by the fact that empathy can be defined as “the ability to understand another person’s feelings, experiences, etc.”<sup>26</sup> This association was not maintained in the second time point. Since the levels of stigma were already lower for students with more empathy, it could be more difficult for them to achieve changes.

### Study limitations

One of the study limitations was the sample size. The attendance of theoretical classes of both courses is not mandatory, and students tend to attend classes more frequently at the beginning of the semester, limiting the number of answers possibly obtained. To avoid this, the second time point of distribution of the questionnaires took place not during the final classes of the first semester, but in the beginning of the second semester. However, the attrition rate was still significant.

The lack of matching between the first and second semester answered questionnaires was also a limitation. As the confidentiality of the participants needed to be maintained, only the last four digits of the citizen card were asked, but some students did not want to share them. So, despite the larger number of answers obtained, it was not possible to use them all because of the lack of information needed to match the questionnaires from the first and the second time point.

Finally, it is believed that the changes in the attitudes of medical students against people with mental illness tend to decrease with time.<sup>1,6,20</sup> With the second measurement taking place in the beginning of the second semester, almost one and a half months after finishing the classes, the results may not be representative of real change.

### CONCLUSION

This study showed that attitudes of a sample of Portuguese medical students towards psychiatric patients improved after the attendance of Psychiatry classes but not after Psychology courses.

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As understanding about the pathophysiological mechanisms involved in mental illness as well as their treatment basis seem to be important in changing students’ beliefs and attitudes towards patients with mental illness, efforts should be applied to provide them as early as possible.

Implementing anti-stigma programs inside medical schools could be an effective strategy to reduce or even eliminate stigma among future doctors. Psychology and Psychiatry courses should take an active part in these programs.

Further research could be developed to assess students’ attitudes towards mental health patients throughout the rest of their medical training.

### AUTHORS CONTRIBUTION

RVQ: Draft and circulation of the questionnaires. Contribution to the design the work. Analysis and interpretation of data. Draft of the paper and critical review.

VS: Draft of questionnaires. Contribution to the design and draft of the work. Analysis and interpretation of data. Critical review and final approval of the version to be published.

NM: Draft of questionnaires. Contribution to the design and draft of the work. Analysis and interpretation of data. Draft of the paper, critical review and final approval of the version to be published.

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### PROTECTION OF HUMAN SUBJECTS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration issued by World Medical Association updated in 2013.

### DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients’ data publication.

### COMPETING INTERESTS

All authors declare no conflicts of interest.

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