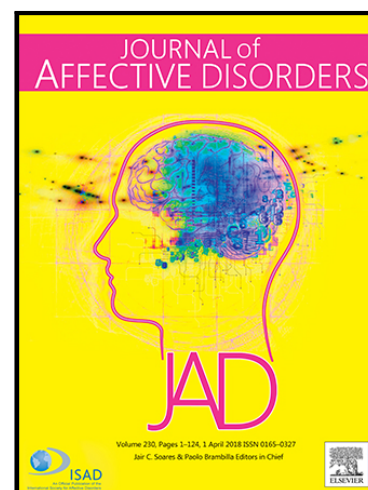


Accepted Manuscript

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PII: S0165-0327(18)32467-4
DOI: <https://doi.org/10.1016/j.jad.2019.02.023>
Reference: JAD 10515

To appear in: *Journal of Affective Disorders*

Received date: 19 October 2018
Revised date: 17 January 2019
Accepted date: 5 February 2019

Please cite this article as: Nikolina Jovanović , Julian Beezhold , Masaru Tateno , Elizabeth Barrett , Ilias Vlachos , Andrea Fiorillo , Cecile Hanon , Olga Kazakova , Alexander Nawka , Philippe Wuyts , Vanessa Wong , Szilvia Papp , Jasna Rujevic , Goran Racetovic , Adriana Mihai , João Gama Marques , Amit Malik , Ulrike Weisz , Teelia Rolko , Marija Rusaka , Nanna Platz Clausen , Elena Shmunk , Anja Podlesek , Depression and Suicidality among Psychiatric Residents in 22 Countries, *Journal of Affective Disorders* (2019), doi: <https://doi.org/10.1016/j.jad.2019.02.023>

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Highlights

- Depression rates among psychiatric residents were lower than previously reported data, while suicide ideation rates were similar to previous reports in this population.
- Poor working conditions such as long working hours and no clinical supervision are associated with experiencing depression during training
- Residents who are single and female report worse mental health during training

ACCEPTED MANUSCRIPT

Depression and Suicidality among Psychiatric Residents in 22 Countries

Nikolina Jovanović¹, Julian Beezhold², Masaru Tatenō³, Elizabeth Barrett⁴, Ilias Vlachos⁵, Andrea Fiorillo⁶, Cecile Hanon⁷, Olga Kazakova⁸, Alexander Nawka⁹, Philippe Wuyts¹⁰, Vanessa Wong¹¹, Szilvia Papp¹², Jasna Rujevic¹³, Goran Racetovic¹⁴, Adriana Mihai¹⁵, João Gama Marques¹⁶, Amit Malik¹⁷, Ulrike Weisz¹⁸, Teelia Rolko¹⁹, Marija Rusaka²⁰, Nanna Platz Clausen²¹, Elena Shmunk²², Anja Podlesek²³.

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Abstract

Background. Previous studies have highlighted risks for depression and suicide in medical cohorts, but evidence regarding psychiatric residents is missing. This study aimed to determine rates of depression, suicide ideation and suicide attempt among psychiatric residents and to identify associated individual, educational and work-related risk factors.

Methods. A total of 1980 residents from 22 countries completed the online survey which collected data on depression (PHQ-9), suicidality (SIBQ), socio-demographic profiles, training, and education. Generalized linear modeling and logistic regression analysis were used to predict depression and suicide ideation, respectively.

Results. The vast majority of residents did not report depression, suicide ideation or attempting suicide during psychiatric training. Approximately 15% ($n=280$) of residents met criteria for depression, 12.3% ($n=225$) reported active suicide ideation, and 0.7% ($n=12$) attempted suicide during the training. Long working hours and no clinical supervision were associated with depression, while more completed years of training and lack of other postgraduate education (e.g. PhD or psychotherapy training) were associated with increased risk for suicide ideation during psychiatric training. Being single and female was associated with worse mental health during training.

Limitations. Due to the cross-sectional nature of the study, results should be confirmed by longitudinal studies. Response rate was variable but the outcome variables did not statistically significantly differ between countries with response rates of more or less than 50%.

Conclusion. Depression rates among psychiatric residents in this study were lower than previously reported data, while suicide ideation rates were similar to previous reports. Poor working and training conditions were associated with worse outcomes. Training programmes should include effective help for residents experiencing mental health problems so that they could progress through their career to the benefit of their patients and wider society.

Key words: depression; suicide ideation; suicide attempt; psychiatry; residents; trainees.

Introduction

Physicians are at increased risk for experiencing depression and for dying by suicide compared to the general population. Studies have shown that depression affects up to 20% of medical doctors (Frank and Dingle, 1999), while the prevalence rates are higher among medical students – 27,2% (Rotenstein et al, 2016) and residents – 28.8 % (Mata et al, 2015). The prevalence of suicide ideation varies between 6.9% in medical specialists (Shanafelt, 2012) and 12% in medical residents (van der Heijden, 2008). The prevalence of suicide attempts among physicians is difficult to estimate with accuracy. The risk of completed suicide is up to 2.4 times higher than in the general population mainly due to physicians' greater knowledge of and better access to lethal means (Schernhammer et al., 2004). Dyrbye and colleagues (2014) explored the prevalence of depressive symptoms, suicide ideation and job-related burnout syndrome across career stages, and although differences were relatively small, training was identified as the peak time for distress among physicians.

The reasons for increased risk for depression and suicide during postgraduate medical training might be found in the interaction between pre-existing vulnerabilities among residents and high levels of job-related stress. Training is stressful due to long working hours, night shifts, inflexible schedules and a significant imbalance between professional experience and responsibility (Tyssen & Vlagum, 2002). This period of life (usually late 20s or early 30s) is also full of private life changes and developmental priorities in the lives of residents, such as marriage, parenthood, and estrangements from supportive networks due to shifts in the workplace (Tyssen & Vlagum, 2002). Furthermore, the field of psychiatry itself adds several very unique stressors, such as perceived stigma regarding this profession (from both within and outside medicine), particularly demanding therapeutic relationships, personal threats from violent patients, and patient suicide (Rossler, 2012). If present at the beginning of one's career, mental health problems such as depression and suicidality can be associated with a variety of negative consequences, including impaired clinical performance and patient care (Firth-Cozens, 1998) and significantly minimized residents' learning capacity and academic achievements (Girard and Hickam, 1991; Tyssen and Vlagum, 2002).

Awareness of these issues, the pressures of training, and the impact on service provision, led to an initiative from a group of European trainees involved as national representatives in the European Federation of Psychiatric Trainees and early career psychiatrists involved with the European Psychiatric Association to comprehensively study mental health problems among

psychiatry residents and to offer possible solutions. Therefore, the present study was created, aiming to explore the rates of depression, suicide ideation and suicide attempt in a large international sample of psychiatric residents.

Methods

This is a cross-sectional, multicountry survey. The participants were psychiatric residents, defined as a fully qualified medical doctor enrolled in a nationally recognised specialist training program in psychiatry. To achieve the most random sample possible, multi-level sampling was applied. While planning the study, we explored available avenues to access trainees' e-mail contacts. In 15 out of 22 countries all trainees were invited to participate in the study. If a centralised database of trainees was not available, other options were considered. In 6 countries (Belgium, France, Italy, Japan, Russia, South Africa), we were able to invite all trainees from at least three training institutions. While choosing participating institutions, trainee organisations acted to balance geographical and educational characteristics to ensure the most representative sample within local limitations. In one country (Hungary) all residents from the largest training institution in the country were invited. Participants were sent e-mail invitations to participate in the study by entering data via the online questionnaire directly into an anonymised, encrypted, secure database. The questionnaire was originally written in English and translated (with back translation) into local languages. In total 7625 residents from 22 countries were invited to participate in the study. Data was obtained from 1980 residents (the range of response rates in different countries was 17.8–65.6%). Details of the study protocol are described in Jovanovic et al. (2016).

Measures of depression and suicidality

To screen for self-reported symptoms of depression, the nine-item depression module from the Patient Health Questionnaire (PHQ-9) was used (Spitzer et al., 1999). This module scores the presence of each of the nine DSM-IV criteria from 0 ('not at all') to 3 ('nearly every day'). The tenth question assesses to what extent depressive symptoms make work, home, or social functioning difficult, with answers ranging from 0 ('not difficult at all') to 3 ('extremely difficult'). The PHQ-9 is a well validated and widely used tool for brief diagnostic and severity measurement of depression (Spitzer et al., 1999; Cameron et al., 2008). If at least 4 answers included scores 2 (more than half days) or 3 (nearly every day)

(including first two questions assessing anhedonia and depressed mood), screening for depression was considered positive. Adding up the responses to nine items results in PHQ-9 total score which can be used for describing directly the level of depression or can also be used to determine depression severity—mild (4–9), moderate (10–19) and severe depression (20–27).

The Suicide Ideation and Behaviour Questionnaire (SIBQ) is a short instrument with 10 questions in yes/no format assessing suicidality as a dimension that arises from death ideation (q1 - Have you ever thought it would be better if you die?) and active suicide ideation (q2 - Have you ever thought about dying by suicide?) to suicide behaviour (q3–q8) and attempt (q9 - Have you ever attempted suicide) (Marusic et al., 2007). The 10th question assesses desire for dying from attempting suicide with a 5-point Likert scale (from 1 – “I never wanted to die” to 5 – “I was determined to die”). In addition to that, participants also had to report for each question whether such thoughts or behaviour appeared during specialist training. In this paper we focused on death ideation (q1), suicide ideation (q2) and suicide attempt (q9).

Individual, educational and work-related predictors

We also collected data on three groups of predictors - individual (age, gender, relationship status, having children, psychiatry as first career choice), educational (completed years of training, postgraduate education other than training), and work-related (weekly working hours, daily rest and weekly clinical supervision) characteristics. Relationship status was dichotomized into being single (comprising being single, divorced, separated, and widowed), and being in a relationship (married or in a relationship).

Statistical analysis

Variables were characterized as an interval outcome variable (self-reported depression, i.e. PHQ-9 total score), categorical outcome variables (suicide ideation after starting specialist training, lifetime suicide attempt), categorical predictors (gender; relationship status; postgraduate education; supervision in clinical work; and psychiatry as a first career choice) and interval predictors (age, total number of working hours per week). We focused on suicidality during psychiatric training. Since most people who reported suicide ideation also reported death ideation, only the first variable was chosen for further analysis as creating both models would produce almost the same results. Number of suicide attempts during psychiatric

training was very small ($n=12$), so the final model analysed lifetime suicide attempts (including attempts before and after the start of training). Data was analysed using IBM SPSS Statistics software version 23. For PHQ-9 total score, the variability of country means represented only 2.1% of the total variance. Therefore, we decided to consider samples from different countries as a unitary group. As the frequency distribution of PHQ-9 total score was strongly positively asymmetrical, generalized linear modelling was used with a gamma distribution as the conditional distribution of an outcome variable and with the identity link function. Because 133 participants scored 0 points on PHQ-9, the value of 0.01 was added to the score of each participant to retain all data in the modelling. The hybrid method of parameter estimation and robust estimation of covariances were used. For predicting suicidal ideation after starting specialist training and lifetime suicide attempts, two separate binary logistic regression analyses were performed. All the predictors were entered in the regression models at the same time. A 5% alpha error rate was used as the limit of statistical significance of each predictor.

Results

Study participants

The study included 1980 residents, mostly females ($n = 1153$, 59.1%), married or in a relationship ($n = 1401$, 71.8%) and without children ($n = 1309$, 67.1 %). Mean age was 31.96 years ($SD = 5.27$ years). Participants started their training at a mean age 28.45 years ($SD = 4.50$ years) and completed on average 2.91 years of training at the time of study ($SD = 2.13$ years). Half of the sample was engaged in some form of postgraduate education other than psychiatry training ($n = 1092$, 55.2%) such as having a scientific master's degree ($n = 525$), being a scientific master's degree student ($n = 27$), having a PhD ($n = 82$), being a PhD student ($n = 117$), or having completed/being in psychotherapy training ($n = 439$). Regular clinical supervision was available for the majority of participants ($n = 1741$, 89.2%), ranging from one hour ($n = 722$, 36.9%) to five hours per week ($n = 110$, 5.6%). However, 211 residents (10.8%) reported not having any supervision for their clinical work. For the vast majority, psychiatry was their first career choice ($n = 1561$, 80%) and this decision was made mostly after medical school ($n = 946$). Participants reported 54.2 ($SD = 16.2$) working hours per week which were divided between the workplace ($M = 48.09$ hours, $SD 14.33$ hours) and doing work assignments at home ($M = 5.92$ hours, $SD = 7.05$ hours). The majority of participants were able to get rest, as recommended by the European Work Time Directive

(EWTD) (Directive 2003/88/E, 2003), such as 11 hours continuous rest a day ($n = 1024$, 52.5%), a day off each week ($n = 1615$, 82.7%) and a 20-minute rest break every 6 hours ($n = 1279$, 65.5%).

Insert Table 1 about here

Depression

The majority of residents did not meet PHQ-9 criteria for depression ($n = 1492$, 84.2%), while 280 residents (15.8%) met criteria for depression, mostly of mild severity ($n = 148$, 52.9%). The median PHQ-9 score was 4 (range 0–27). The highest depression prevalence rates were reported by residents in Latvia (50%), Hungary (32%), Hong Kong (27%), and South Africa (25%). In five countries, the reported rates were below 10%, namely Belarus (7%), Greece (7%), Ireland (7%), Denmark (6%), and Estonia (5%). See also Tables 1 and 2.

Regression analyses were performed on a subset of participants who had complete data on the studied predictors and outcome variables ($n = 1772$). For this subsample, the mean value of PHQ-9 total score was 4.90 ($SD = 4.88$). Results of the generalized linear regression for predicting the PHQ-9 total score are shown in Table 3. The model fitted the data well, $\chi^2(1763) = 1761.19$, value/df = 0.999. Altogether, the predictors statistically significantly improved the fit of the model against the intercept-only model, likelihood ratio $\chi^2(8) = 33.43$, $p < .001$. The PHQ-9 total score was statistically significantly positively related to total weekly working hours, no supervision in clinical work, being single, and being female.

Insert Table 2 about here

Insert Table 3 about here

Suicide ideation and attempts

In the studied subsample ($n = 1772$) the majority of residents did not report experiencing suicide ideation or attempting suicide since the start of their psychiatric training ($n=1535$, 86.6%). There were 188 participants (10.3 %) who reported death ideation, 225 participants (12.3%) who experienced active suicide ideation (reported thoughts about committing suicide) and 12 participants (0.7%) who attempted suicide. Please see Table 1. The prevalence of active suicide ideation was the highest in South Africa (31.6%), Hungary (22.9%) and

Hong Kong (22%). No participants from Latvia or Russia reported active suicide ideation. Those who attempted suicide ($n=12$) were asked how strong was their wish to die, with answers as follows: I didn't wish to die at all ($n = 0$), My wish to die was small ($n = 0$), My wish to die was ambivalent ($n = 2$, 16.7%), My wish to die was strong ($n = 7$, 58.3%), My wish to die was definite ($n = 3$, 25.0%). Table 2 shows rates of death thoughts, suicide ideation and suicide attempts before and during specialist training. Total of 57 residents (3.2%) attempted suicide in their lifetime.

Results of the logistic regression for predicting the presence of active suicide ideation during the specialization training are shown in Table 4. Even though the model for predicting suicide ideation was statistically significant, $\chi^2(8) = 31.97, p < 0.001$, Nagelkerke $R^2 = 0.05$, the overall prediction accuracy did not increase from the null model (93%) to the model with predictors. The odds for suicide ideation during the specialization training were higher for participants who were single, those with a larger number of completed years of training, and those with no postgraduate training. The model for predicting lifetime suicide attempt based on the studied predictors was not statistically significantly different from the null model, $\chi^2(8) = 3.72, p = 0.881$, Nagelkerke $R^2 = 0.01$.

Insert Table 4 about here

Discussion

Main findings are:

- The vast majority of psychiatric residents in our study did not report experiencing depression, suicide ideation and suicide attempts during psychiatric training.
- Approximately 15% of residents met criteria for depression (mostly mild form), 12.3 % participants reported active suicide ideation, and 0.7% attempted suicide during training.
- The PHQ-9 total score was statistically significantly positively associated with total weekly working hours, no supervision in clinical work, being single, and being female.
- The odds for suicide ideation during the specialization training were higher for participants who were single, those with more completed years of training, and those with no other postgraduate training.
- The finding that working conditions influence depression rates, even if other influential factors (such as personal and educational characteristics) are controlled for, might indicate

that interventions such as limited working hours and regular supervision could represent a way of reducing depression and protecting the residents.

As mentioned, 15.8 % of psychiatric residents in our study met criteria for depression. This is significantly lower than what two international meta-analyses reported in samples of medical students (27.2%) (Rotenstein et al, 2016) and residents (28.8 %) (Mata et al, 2015). Our finding was also lower than what was found in a sample of US medical specialists (40.4%) (Shanafelt, 2012). We found that 12.3 % of the sample reported experiencing suicide ideation during training. This finding is similar to what was found in a large Dutch sample of medical residents (12%) (van der Heijden, 2008) and higher than reports from the US medical specialists (6.9%) (Shanafelt, 2012). Our findings are higher than reports from the general population, either concerning the lifetime prevalence in six European countries (7.8%) (Bernal et al., 2007) or the 12-months prevalence in the US general population (6.6 %) (Shanafelt, 2012). History of lifetime suicide attempts was reported by 2.9% of residents in our study. The prevalence of completed suicides is 1% in the general population, with 2.4% among female and 1.7% among male physicians (Schernhammer et al, 2004). Since suicide attempt rates can be 5-10 times higher than completed suicide rates, our finding seems to be lower than what could be expected based on these estimations.

Working conditions such as long working hours and no supervision in clinical work were found to be associated with depression among residents in our study. In previous studies investigating the effect of working hour limitations, it was found that residents who reported working more than 80 hours per week had higher rates of job-related burnout (69.2%) compared with 38.5% after the time restriction (Martini, 2006). The finding that working conditions influence depression rates, even if other influential factors (such as personal and educational characteristics) are controlled for, might indicate that interventions such as limited working hours and regular supervision could represent a way of reducing depression among psychiatric residents. Interestingly, our findings show that residents with more years of completed psychiatric training and those with no other postgraduate training (such as PhD or psychotherapy training) were associated with increased odds for suicide ideation during training. This might indicate that more exposure to psychiatric work and/or training conditions as such can have a negative impact on residents. This finding may also indicate that additional training (such as psychotherapy training which usually includes personal

therapy) might introduce some sort of balance in residents' work life as well as additional resources to protect them against developing suicide ideation.

Two personal characteristics - being female and being single - were also associated with worse mental health. Both characteristics are well established suicide risk factors (Schernhammer et al, 2004). Two U.S. studies have shown that female physicians experience a greater increase in depressive symptoms compared with men during their internship year (Guille et al, 2017); however overall depression rates tend to be similar to the general population (Frank & Ding, 1999). The latter study showed that depression was more common among female physicians who were single. Our findings are supportive of these studies and might indicate that additional interventions are required for residents who are female and/or single, e.g. initiatives to alleviate conflict between work and family life for female colleagues or interventions to help single colleagues build good and supportive social networks.

This study has both strengths and limitations. In terms of strengths, we were able to recruit the largest sample of psychiatric residents to this date. In most countries included in the study, no previous information on training conditions from the residents' perspective or residents' mental health is available. Although there was a similar response rate to extant data from other studies utilising online surveys, the response rate varied across participating countries (range 17.8–65.6%; overall 26%). However, a sensitivity analysis revealed that the outcome variables did not statistically significantly differ between countries with response rates of more or less than 50%, which strengthens the representativeness of our results (Jovanovic et al., 2016). In terms of limitations, it may be argued that the sample was biased, for example that more depressed residents lacked the motivation to participate in the survey. All information rely on self-reporting only, but considering the nature of the topic and the level of stigmatisation around physicians' mental health problems (Meyers, 2010), we believe that any other approach compared to the one used in our study (anonymised online survey) would prevent people from revealing their true feelings. The study did not collect data on participants' diagnosed psychiatric disorders which could have potentially improved interpretation of our findings. Finally, due to the cross-sectional nature of this study, we were not able to explore whether these variables are related to each other prospectively.

Mental health disorders of medical students and doctors has been a largely unacknowledged area for decades mainly due to stigma related to this topic. More recently a number of media reports of young doctors dying by suicide or leaving the profession prematurely due to

experiencing psychological distress, have raised concerns among the public and professional organisations that this might be an unrecognised epidemic that can lead to impaired clinical performance and patient care. As mentioned at the beginning of this paper, training can be challenging for a number of reasons. However, there can also be positive periods when residents gain skills and competencies, and is likely a hugely formative period in the career and indeed life of individuals. From the perspective of residents, resident organisations, those responsible for leading and developing training and ensuring competencies, there is an onus to ensure residents are able to make the most of the experiences. Training bodies need to consider this, while at the same time supporting residents in maintaining or even improving their wellbeing. Our finding that the majority of our sample was not depressed or suicidal might also be beneficial for the image of psychiatry and potentially attract medical graduates considering this career.

Conclusion

With shortages of qualified psychiatrists, most countries today cannot afford to lose residents for reasons such as poor training conditions and the development of mental health problems that might be anticipated. Residents experiencing depression and/or suicide ideation should be offered effective help so that these problems would not leave long-term negative consequences on their wellbeing and professional skills and knowledge they are supposed to acquire during the training. More discussion is needed on how to address these challenges and help residents to progress through their career to the benefit of their patients and wider society. This study was created to provide a basic understanding of associations between individual, educational and training characteristics, and mental health of psychiatric residents. Future studies are needed to expand our knowledge in this area and provide additional evidence regarding potential resilience-promoting factors.

Table 1 – Study participants

Country	Participants	Response rate	Age	Gender (F)	Completed years of training	Weekly working hours	PHQ-9 score ^a	Depression ^{a,b}	Death ideation ^c	Suicide ideation ^c	Suicide attempt ^c
	<i>N</i> (%)	%	<i>M</i> (<i>SD</i>)	<i>n</i> (%)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Austria	81 (4.1)	26.8	35.2 (6.1)	52 (64)	3.6 (2.6)	62.4 (17.5)	7.4 (4.8)	16 (20)	5 (6.4)	5 (6.4)	0
Belarus	14 (0.7)	37.8	25.1 (1.1)	12 (86)	1.3 (1.01)	38.9 (23.6)	5.8 (4)	1 (7)	1 (7.1)	1 (7.1)	0
Belgium	28 (1.4)	21.8	28.4 (3.4)	24 (86)	2.2 (1.3)	63.6 (10.1)	5.0 (3.6)	3 (11)	2 (7.1)	3 (10.7)	0
Bosnia and Herzegovina	20 (1.0)	50.0	33.6 (3.4)	14 (70)	2.2 (1.2)	55.5 (18.1)	5.6 (4.4)	3 (15)	2 (10.5)	2 (10.5)	0
Croatia	56 (2.8)	52.8	31.9 (3.6)	39 (70)	1.7 (1.3)	59.0 (13.5)	5.9 (4.9)	12 (21)	1 (1.8)	1 (1.8)	0
Czech Republic	43 (2.2)	37.7	29.9 (2.7)	25 (58)	4.1 (2.2)	55.3 (15.3)	6.2 (5.4)	5 (12)	7 (17.5)	7 (17.5)	0
Denmark	64 (3.2)	41.3	39.8 (6.9)	49 (77)	1.8 (1.4)	42.7 (13.5)	5.2 (4.5)	4 (6)	3 (4.9)	4 (6.6)	0
Estonia	28 (1.4)	65.1	29.4 (4.1)	22 (79)	1.8 (1.3)	50.9 (19.9)	5.3 (3.9)	3 (5)	3 (11.5)	3 (11.5)	0
France	134 (6.8)	35.9	27.5 (2.2)	92 (69)	1.9 (1.2)	55.5 (13.3)	5.6 (4.8)	19 (14)	9 (6.8)	11 (8.3)	1 (0.8)
Greece	58 (2.9)	17.8	34.2 (2.9)	22 (38)	2.9 (1.2)	66.4 (21.6)	4.8 (3.8)	4 (7)	2 (4.1)	4 (8.2)	0
Hong Kong	44 (2.2)	30.9	27.8 (2.5)	33 (75)	2.7 (1.9)	57.2 (7.8)	7.8 (5.6)	12 (27)	8 (19.5)	9 (22)	0
Hungary	37 (1.9)	45.7	29.8 (5.2)	29 (78)	2.04 (1.5)	61.4 (10.9)	8.2 (6.5)	12 (32)	8 (22.9)	8 (22.9)	0
Ireland	101 (5.1)	26.6	34.1 (5.1)	48 (48)	3.6 (2.5)	54.1 (11.7)	5.1 (4.9)	10 (10)	9 (9.5)	9 (9.5)	2 (2.1)
Italy	118 (6)	65.6	30.4 (3.8)	91 (77)	1.9 (0.9)	50.5 (12.2)	4.6 (4.1)	8 (7)	8 (7)	8 (7)	0
Japan	95 (4.8)	41.5	31.8 (4.8)	31 (33)	3.6 (2.5)	72.3 (27.1)	6.2 (5.4)	12 (13)	8 (8.8)	8 (8.8)	0
Latvia	8 (0.4)	40.0	30.0 (6.2)	8 (100)	1.5 (1.3)	58.8 (22.0)	9.6 (6.8)	4 (50)	0	0	0
Portugal	66 (3.3)	36.5	29.3 (2.7)	44 (67)	2.4 (1.6)	47.9 (13.0)	6.1 (5.9)	10 (15)	5 (7.9)	6 (9.5)	0
Romania	106 (5.4)	18.8	29.4 (3.1)	83 (78)	2.8 (1.3)	56.9 (16.1)	6.4 (4.7)	16 (15)	10 (10.6)	10 (10.6)	1 (1.1)
Russia	25 (1.3)	31.6	24.4 (0.9)	14 (56)	1.4 (0.5)	42.2 (10.5)	4.8 (5.0)	3 (12)	0	0	0
Slovenia	23 (1.2)	51.1	39.8 (6.9)	21 (91)	2.2 (1.5)	49.2 (11.2)	5.7 (5.1)	4 (17)	1 (4.3)	2 (8.7)	0
South Africa	20 (1.0)	42.5	31.8 (5.9)	11 (55)	2.0 (1.5)	65.6 (10.5)	9.7 (5.9)	5 (25)	6 (31.6)	6 (31.6)	0
UK	811 (41.0)	20.5	33 (5.2)	413 (51)	3.4 (2.3)	51.0 (13.5)	6.1 (5.8)	114 (14)	90 (12.4)	118 (16.3)	8 (1.1)
Total	1980 (100.0)	26.0	31.9 (5.3)	1177 (59.5)	2.9 (2.1)	54.2 (16.2)	6.0 (5.3)	280 (15.8)	188 (10.3)	225 (12.3)	12 (0.7)

^a Complete data (all PHQ-9 questions answered) was obtained from 1772 participants.

^b Participants were considered 'depressed' if at least four questions on PHQ-9 received scores 2 (More than half the days) or 3 (Nearly every day), including first two questions assessing depressed mood and anhedonia.

^c Based on SIBQ, all reports related to the period after starting psychiatric training

Table 2 – Depression, suicide ideation and suicide attempts among study participants

Depression (PHQ-9)	<i>n</i>	%
Screen positive for depression ^a	280	15.8
- Mild depression ^b	148	52.9
- Moderate depression ^b	40	14.3
- Severe depression ^b	92	32.8
Suicidality (SIBQ)		
Before training		
- Death ideation (q1)	327	18.5
- Suicide ideation (q2)	271	15.3
- Suicide attempt (q9) ^c	45	2.5
After training		
- Death ideation (q1)	188	10.6
- Suicide ideation (q2)	225	12.3
- Suicide attempt (q9) ^c	12	0.7

^a Participants were considered 'depressed' if at least four questions on PHQ-9 received scores 2 (More than half the days) or 3 (Nearly every day), including first two questions assessing depressed mood and anhedonia.

^b In those screened positive for depression, severity was assessed using the PHQ-9 total score – mild depression (4–9), moderate depression (10–19) and severe depression (20–27)

^c Lifetime suicide attempt rate was calculated as a sum of suicide attempts before and during psychiatric training, $n=57$, 3.2%.

Table 3 – Results of generalized linear modeling for predicting PHQ-9 total score ($N = 1772$)

Predictors	<i>b</i>	<i>SE(b)</i>	Wald ^a	<i>p</i>
Intercept	4.201	1.091	14.833	< .001
Age (yrs)	−0.032	0.028	1.300	.254
Gender (female)	0.772	0.235	10.813	.001
Completed training (yrs)	−0.036	0.063	0.335	.563
Relationship status: single	1.092	0.286	14.583	< .001
Total weekly working hours	0.028	0.008	14.102	< .001
No postgraduate education	0.217	0.239	0.827	.363
No clinical supervision	0.812	0.354	5.277	.022
Psychiatry was 1st choice	−0.620	0.331	3.509	.061

^a *df* = 1.

Table 4 – Results of binary logistic regression for predicting suicidal ideation during the specialization training

Predictors	<i>b</i>	<i>SE(b)</i>	Wald ^a	<i>p</i>
Intercept	-2.813	0.886	10.080	< .001
Age (yrs)	-0.049	0.024	4.356	.037
Gender (female)	0.287	0.198	2.100	0.147
Completed training (yrs)	0.184	0.045	16.714	< .001
Relationship status: single	0.545	0.198	7.607	.006
Total weekly working hours	0.010	0.007	2.493	.114
No postgraduate education	0.469	0.191	6.003	.014
No clinical supervision	0.095	0.253	0.141	.708
Psychiatry was 1st choice	0.142	0.256	0.307	.580

^a *df* = 1.

Contributors

NJ, JB and AF designed and co-ordinated the study. AP designed data analysis strategy. AP and NJ analysed data. MT, EB, IV, AF, CH, OK, AN, PW, VW, SP, JR, GR, AM, JGM, AM, UW, TR, MR, NPC, ES were national study co-ordinators and data guarantors. All authors contributed to writing of the report and approved the final version before submission.

Declaration of interests

We declare no competing interests.

Funding

None.

Aknowledgements

We would like to thank Professor Norman Sartorius for continuous support of this project. We are also grateful to colleagues who supported the study Dr Umberto Volpe, Dr Silvia Ferrari, Dr Martina Rojnic Kuzman, Dr Alina Vaida, Dr Ana Moscoso, Dr Olivier Andlauer, Dr Greg Lydall, Dr Raphael Psaras, Dr Amra Delic, Dr Marina Losevich, Dr Pirika Crepin, Dr Igor Kuvshinov, Dr Eva Loibl-Weiß, other members of the European Federation of Psychiatric Trainees (EFPT) and of the European Psychiatric Association–Early Career Psychiatrists Committee (EPA–EECP).

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