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## **What makes medical students choose their residencies? Association between mental health of medical students and their choices of future medical specialties**

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## **Abstract:**

**Background:** Excessive cognitive demands and chronic stress contribute to the occurrence of mental health problems among medical students. It may be hypothesized that the presence of such disturbances have an influence on their choices of post-graduate training programs.

**Objective:** The aim of the study was to evaluate the state of mental health of medical students and to assess if there is any association between the prevalence of mental health problems and their residency choices.

**Materials and methods:** 114 medical students were surveyed in terms of their residencies' choices and their mental health with the usage of validated psychological questionnaires.

**Results:** 74 (64,91%) of medical students needed psychiatric or psychological treatment at some stage in their lives. Intensity of risky alcohol consumption was positively correlated with the choice of surgery ( $p=.0000$ ) and negatively correlated with the choice of psychiatry ( $p=.0000$ ). The severity of depressive symptoms was positively correlated with emergency medicine choice ( $p=.0479$ ). Anxiety symptoms, eating disorders and autism spectrum severity symptoms were not significantly correlated with the choice of any medical specialty.

**Conclusions:** Medical students were found seriously affected by mental health problems, what to some extent seemed to impact their future career choices.

**KEYWORDS:** choice of residency, choice of medical specialty, medical students, mental health problems, medical specialty

## **Introduction**

Worldwide it takes about 10 years to educate a specialist in medicine. In Poland, as well as in other countries of the European Union, the process starts with 6-year-long medical studies. The next step is a postgraduate traineeship that lasts 13 months in Poland and when it is finished, a doctor can apply for a residency ([Ustawa o Zawodach Lekarza i Lekarza Dentysty.Pdf, n.d.](#)). Residency is a post-graduate training program based on clinical practice in a field of future specialty and it is usually a 5-year-long course. To become a specialist, a resident has to finish the course and pass a national exam. There are 77 various residencies in Poland that significantly differ one from each other ([Internetowa baza tekstów prawnych OpenLEX, n.d.](#)). Some specialties demand many manual skills, such as surgery or anesthesiology ([Schüpfer et al., 2003](#)). Others demand more theoretical knowledge, like

neurology, infectious diseases, toxicology, or genetics. Some require fast reasoning, like emergency medicine (Medford-Davis et al., 2018) and in others, a long observation is needed to perform a diagnosis, like in psychiatry (Plancke & Amariei, 2017).

Doubtlessly, great effort and endurance are necessitated to become a medical specialist. Taking into account the number of years spent in training and diversified work conditions in varied fields of medicine, residency choice seems to be a life decision of paramount importance.

It triggers significant questions about the factors that influence a medical student and make him or her choose a particular specialty. Literature search revealed that some include job safety, flexible working, creative ability, dealing with a preferred group of patients, and monthly income (Michalik et al., 2024). Moreover, the choice seems to be gender-biased (Asiri et al., 2023). At different stages of education, students have different preferences (Kaur et al., 2014). It has to be emphasized that during medical studies young people are often exposed to excessive academic demands, lack of means of subsistence, their first contact with death and suffering of patients, sleep deprivation, and often separation from their families (Dyrbye et al., 2006). Not surprisingly, depression and anxiety are more prominent among medical students in comparison to the general population (Karbownik et al., 2022). In these cognitively and emotionally demanding conditions, the personality of a future doctor is developing (Costa & McCrae, n.d.). There was a weak correlation found between the high empathy scores and interest in psychiatry among medical students (Harsch, 1989). Also psychiatrists presented higher mean empathy scores in comparison to other specialists (Hojat et al., 2002). Therefore, it is justified to assume that psychological features and life experiences of a medical student make an impact on her or his residency choice, even if it is not brought to the individual's attention. In the literature are numerous studies showing a connection between the choice of specialties and the presence of specific personality traits (Al-Alawi et al., 2017; Sievert et al., 2016). Personality by definition is a relatively stable trait (Gauffin et al., 2021). Therefore, it is justified to evaluate whether particular diseases or mental disorders, which may be temporary, also influence the choices among medical students.

The aim of this study is to evaluate the state of mental health of medical students and to assess if particular disturbances of mental health make an impact on their future medical specialty choice.

## Materials and Methods

### Participants

The participants of the study were medical students from several universities in Poland. Participation in the study was voluntary and anonymous. All participants were informed about the course of the research and gave their consent to participate. The study was approved by the Ethics Committee at the Medical University of Łódź, opinion number RNN/153/23/KE. The inclusion criteria for the study were: agreement for participation in the study; age over 18 years old; the status of a medical student.

### Methodology and Procedure

The condition for joining the study was to express informed consent for participation. The study was conducted from October 2023 to March 2024 – at that time an online questionnaire was available. The questionnaire included open and closed questions based on validated questionnaires and authors' questions concerning students' psychiatric treatment and mental health disturbances. Participants were also asked to list their three most preferred medical specialties that they would undertake in the future.

Basic sociodemographic data about the participants was collected, such as age, gender and year of medical studies.

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### Methods of data analysis

Data was tested to assess the completion of all individual statistical tests assumptions. The data was analyzed using STATISTICA 9.0. The following questionnaires were used to assess mental health of the participants: the Beck Depression Inventory (BDI-II), General Anxiety Disorder-7 (GAD-7), Drug Use Disorders Identification Test (DUDIT), Alcohol Use Disorder Identification Test (AUDIT), Eating Attitudes Test (EAT-26), and The Autism-Spectrum Quotient (AQ). Three specialties, indicated by medical students as the most preferred, were divided into ten different categories in order to prepare data for the analysis process. The categories included: internal medicine, pediatrics, surgery, psychiatry, family medicine,

anesthesiology and intensive care, gynecology and obstetrics, radiology, emergency medicine, and the last category was other specialties.

The Chi-squared test was used to assess whether gender affects the choice of certain medical specialties. Moreover, the Mann–Whitney U test was also used in order to assess whether being a student from 4th to 6th year of medical studies affects certain medical specialties choices. Such division derives from the organization of medical studies in Poland – in the curricular material from 4th year of medical studies clinical classes with patients are prominent. Therefore, students were divided into two groups: the first group included students from 1st to 3rd year of medical studies, and the second group included students from 4th to 6th year. The value of  $p$  was set at  $<0.05$ . Spearman's rank correlation test was used to identify the correlation between the severity of certain mental health disturbances and the choice of medical specialties. The correlation coefficient was denoted by 'r.'

## **Results**

### **Characteristics of the study sample**

114 medical students took part in the study and 0 questionnaires (0,00%) dropped out during the course of the study. All questionnaires included complete responses and all of them were evaluated.

Medical students were aged between 19 and 28. The mean age of the participants was 23,45 years,  $\pm SD=(1,67)$ . Most of them, 78 (68,42%), were female. More socio-demographic details are introduced in Table 1.

55 (48,25%) of participants reported having attempted suicide or having suicidal thoughts during their life. 29 (25,44%) of medical students committed self-harm. It may be due to having current or past psychiatric or psychological treatment, which 74 (64,91%) of the students reported.

Out of 114 participants, 38 (33,33%) scored  $\geq 14$  points on the Beck's Depression Inventory (BDI-II), indicating experiencing at least mild depressive symptoms during the course of the study (Zawadzki et al., n.d.). The average score obtained on the BDI-II questionnaire by medical students was: 11,18 points ( $SD\pm 8,94$ ) out of 63 possible points.

The average score obtained in the General Anxiety Disorder-7 Scale (GAD-7) questionnaire was 7,30 points ( $SD\pm 5,41$ ). 36 (31,58%) of the participants were experiencing at least mild

anxiety symptoms during the course of the study, which resulted in scoring  $\geq 10$  out of 21 possible points in the GAD-7 ([Spitzer et al., 2006](#)).

Medical students, who scored  $\geq 20$  points in part A of the Eating Attitudes Test (EAT-26) questionnaire and/or they gave a positive answer to at least one of the questions in part B, were treated as experiencing clinically significant symptoms of eating disorders ([EAT-26 Interpret Scoring Test-11-1-17.Pdf, n.d.](#)). Such people were 38 (33,33%). Out of 78 possible, the average score obtained in the study group in part A of the EAT-26 questionnaire was 8,67 points (SD $\pm$ 9,52).

According to the evaluation of Drug Use Disorders Identification Test (DUDIT) ([Pape et al., 2022](#)), a positive screen on the DUDIT questionnaire was defined as a score  $\geq 6$ . Such results were achieved among 5 (4,39%) of the volunteers. In the study group, the average score was 0.97 points (SD $\pm$ 3.47) out of 44 possible points. When it comes to the Alcohol Use Disorders Identification Test (AUDIT) questionnaire, medical students' average score was 4.30 points (SD $\pm$ 4.29) out of 40 possible. In this case, a clinically relevant cut-off point was defined as scores  $\geq 8$  ([Saunders et al., 1993](#)). Such a result was achieved by 20 (17,54%) of the students.

### **Medical students' preferences for future residencies**

The next part of our results regards the medical specialties, which the medical students would prefer to perform in the future. The study group was asked to indicate three residencies that they most want to undertake after graduation. Internal medicine was indicated as preferred the most often, because by 62 (54.39%) medical students. At the other extreme was emergency medicine, which would be chosen by only 4 (3.51%) participants. Detailed division of specialties and percentage of students who indicated a given specialty as one of three most preferred medical specialties is presented in Table 2.

The Spearman's correlation rank was performed in order to find if there is any correlation between the severity of mental health problems and the most preferred medical specialties choices. Interestingly, the positive, statistically significant ( $p=.0000$ ) correlation between the AUDIT score and the choice of surgery as one of the most preferred medical specialties ( $r=.408$ ) was revealed. Moreover, it was revealed that there is a weak positive correlation between the DUDIT score and the choice of surgery as one of the most preferred medical specialties ( $r=.161$ ) which has borderline significance ( $p=.0865$ ). In contrast, the AUDIT total score and choice of psychiatry were weakly negatively correlated ( $r=-.189$ ) which is also

statistically significant ( $p=.0000$ ). Choosing emergency medicine is weakly positively correlated ( $r=.186$ ) with the severity of depressive symptoms ( $p=.0479$ ). The severity of symptoms of generalized anxiety disorder, eating disorders and autism features were not significantly correlated with the choice of any medical specialization. More details regarding the residencies that were preferred by the medical students and the severity of mental health problems are introduced in Table 3.

The Mann–Whitney U test revealed that students of 4-6 years of medical studies are more determined to become surgeons ( $p=.0002$ ) as well as they would prefer to choose one of the “other” specialties ( $p=.0234$ ) in comparison to students of 1-3 years. The category “others” included: neurology, dermatology, ophthalmology, otolaryngology, pathology, forensic medicine, nuclear medicine, infectious diseases, aviation medicine, clinical genetics, medical rehabilitation, public health, clinical pharmacology, sports medicine. The rest of preferred medical specialties were not significantly associated with the year of medical studies.

The Chi-squared test revealed that surgery was the only medical specialty whose choice had been affected by gender and this specialty was less popular among women in comparison to men ( $p=.0000$ ). In the case of pediatrics, the relationship was of borderline importance ( $p=.0998$ ) and its choice seemed to be more popular among women. The rest of medical specialties, the most preferred to be performed in the future among medical students, were not significantly associated with gender.

## Discussion

Factors that influence the choice of residency were subjects of research. Personal and social characteristics, such as age, gender, place of origin, life events, stage of training, career stage and past exposure to medicine seemed to play a role in the decision process (Boyle et al., 2014; Vohra et al., 2019). However, according to our best knowledge, there were no studies regarding mental health disturbances of medical students and the associations of such issues with the future choices of career. Our study seems to be the first that explores such questions.

Depression, as highlighted before, appeared to impact a significant proportion of medical students (Honney et al., 2010). Nowadays, even 27% of medical students experience

depressive symptoms ([Jin et al., 2022](#)). According to our study at least two-thirds (64,91%) of medical students reported current or past psychiatric or psychological treatment. Medical students and doctors less often sought help to manage their own psychiatric problems ([Hankir et al., 2014](#)), so even such a great number may be plausible. Similarly, the group of residents seems to be seriously affected by this disease. Data indicates that over 30% of residents might have suffered from depression ([Peterlini et al., 2002](#)). Among them, emergency medicine residents seemed to be a prominent group, because over one-fourth of them met the criteria for depression ([Lee et al., 2022](#)). Also in our study, emergency medicine choice among medical students appeared to be positively correlated with the severity of depressive symptoms.

Mood disorders appeared to drive some students to develop harmful coping strategies such as alcohol and drug use ([Moore et al., 2022](#)). Even older studies revealed that medical students can be at high risk of substance use as a method of coping with the pressure and stress they are exposed to ([Roncero et al., 2015](#)). These substances help them to manage stress better and potentially increase their well-being in the mechanism of activating the neural circuitry of reward and pleasure ([Candido et al., 2018](#)). There were studies dedicated to evaluate the substance and alcohol use among medical students ([Flaherty & Richman, 1993](#); [Petroianu, n.d.](#)), but with no relation to their future career choices.

There were several studies regarding the subject of alcohol consumption among different medical specialists. For example, among surgeons alcohol use disorders were slightly more frequent or at the same rate in comparison to the general population ([Juntunen et al., 1988](#); [Oreskovich, 2012](#)). Alcohol consumption was strongly associated with surgeons' distress ([Oreskovich, 2012](#)). Our study presented the positive correlation between choosing surgery as a future medical specialty and the AUDIT scores among medical students, which may be partially in line with those studies. However, it should be underlined that there were significant differences between the life conditions that experienced the group of medical students who declared a will to become surgeons in our research and the groups of practicing surgeons. Nevertheless, it might be hypothesized that the medical students who would prefer to become surgeons, which is a high-risk profession, mostly due to the danger of infections and injuries, also present some tendencies to risky behaviors. Therefore, they might neglect the risk of alcohol use, which can result in higher AUDIT scores among them.



When it comes to psychiatry, French interns in psychiatry were found to have higher rates of alcohol use disorder and they reported increased substance use behavior than interns in other specialties (Fond et al., 2018), which is opposite to our results conducted on medical students' representation. However, it may be caused by cultural differences, also because in France wine is often consumed to accompany main meals (Hill & Laplanche, 2010). Moreover, psychiatry residents seemed to be more exposed to stress than medical students, therefore they might have been more vulnerable to cope with stress by drinking alcohol (Li et al., 2023). Nevertheless, according to our research, the medical students who have declared a will to become psychiatrists presented lower AUDIT total scores ( $r=-.189$ ,  $p=.0000$ ). It may lead to the conclusion that in the group of medical students who were particularly interested in psychiatry, the awareness of harmful effects of substance and alcohol misuse can be greater. During clinical classes of psychiatry the negative consequences of addictions could have been observed even more frequently than in other subjects. This could have been a potential discouragement of alcohol consumption which would explain the results of our study.

When it comes to gender differences, from matriculation to graduation women were less likely to be interested in surgery and more likely to be interested in pediatrics (Burkhardt et al., 2021). It remains in line with our study. Female surgeons experienced conflicts related to double standards and expectations that they conformed to gender over professional forms (Dossett et al., 2020). Perhaps it may be the reason why this specialty was revealed as affected by gender and why women were less willing to become surgeons. However, this hypothesis would require a more in-depth interview among medical students.

For the purpose of the statistical analysis, we divided the participants into two groups: the first group included students from 1st to 3rd years of medical studies and the second group included students from 4th to 6th years. Surgical residents seemed to make their career choices earlier than their resident colleagues in other specialties, even before entering medical school (Hochberg et al., 2014). Our findings suggest in turn that students during the second-half of their study time were more determined to become surgeons as well as to choose more niche specialties, such as dermatology, forensic medicine, nuclear medicine or infectious diseases, that were listed in the questionnaire in the category "others".

## **Limitations**

The study sample included only Polish students, so taking into account cultural differences and various work conditions in different countries, the research may not reflect the general tendencies among medical students, but local associations. Moreover, the study was performed on the small group of volunteers, which increases the risk of selection bias. 74 (64,91%) of the study participants reported that they had experienced current or past psychiatric or psychological treatment. This result appalls and raises many questions about mental health of Polish medical students, but also seems to be suspiciously high. It might lead to the conclusion that students who had experienced mental health disturbances were more likely to volunteer in the study regarding such issues. The study results may have been also affected by the response bias. The used questionnaires concerned sensitive and intimidating issues, therefore the tendency for participants to respond inaccurately or falsely to questions can be expected. Moreover, motivations to perform a certain medical specialty vary significantly and this research could have been completed by usage of qualitative methods, such as in-depth interviews with the participants. Finally, the popularity of certain medical specialties may be temporary and it changes over the years which restrict the ratiocination about stable tendencies.

## **Conclusions**

The present study revealed some associations between the future choice of certain medical specialties among medical students and the presence of mental health problems in this group. Firstly, the state of mental health of medical students seems to be alarming – out of 114 participants, 38 (33,33%) presented at least mild depressive symptoms, according to the BDI-II and among 36 of the participants (31,58%) the result of GAD-7 questionnaire indicated for at least mild anxiety symptoms. When it comes to the residency choices, it was revealed the positive correlation between choosing surgery and the AUDIT and DUDIT scores, with statistical significance and borderline significance, respectively. In contrast, the AUDIT total score and psychiatry choice appeared to be negatively correlated. Emergency medicine choice was weakly positively correlated with the severity of depressive symptoms. Students of 4-6 years of medical studies were more determined to become surgeons and this speciality was

less popular among women. The generalized anxiety disorders, eating disorders and autism spectrum severity symptoms were not significantly correlated with the choice of any medical specialty. To understand the mechanisms standing behind these associations, further research is needed. It could be conducted on a representative study sample and completed by the usage of qualitative methods. Moreover, the results of our research in the matter of medical students' mental health raise serious concerns and suggest that institutional help in terms of prophylaxis and treatment is needed. Strengthening of institutional systems of career consulting for medical students should also be considered. Such precautions could prevent the scenario in which young people start their careers as anxious, depressed or addicted doctors and burn-out rapidly. It seems intuitive to say that the health-care system needs healthy professionals.

Number of participants	114
Age (mean $\pm$ SD)	23,45 $\pm$ 1,67
Gender, (N, %)	
Male	36 (31,58%)
Female	78 (68,42%)
Year of study (N, %)	
1	1 (0,88%)
2	12 (10,53%)
3	5 (4,39%)
4	12 (10,53%)
5	48 (42,11%)
6	36 (31,58%)

Table 1. Socio-demographic characteristic of the study sample (N=114). SD, Standard deviation.

Medical specialty	The number (percentage) of students who indicated a particular medical specialty as one of three specialties, which they most want to perform in the future.
Internal medicine	62 (54.39%)
Pediatrics	34 (29.82%)
Surgery	30 (26.32%)
Psychiatry	32 (28.07%)
Family medicine	17 (14.91%)
Anesthesiology and intensive care	16 (14.04%)
Gynecology and obstetrics	8 (7.02%)
Radiology	12 (10.53%)
Emergency medicine	4 (3.51%)
Others*	36 (31.58%)

Table 2. The medical students were asked to indicate three medical specialties, which they would prefer to perform in the future. The table presents the number (percentage) of students who indicated a particular medical specialty.

\*The category “others” included: neurology, dermatology, ophthalmology, otolaryngology, pathology, forensic medicine, nuclear medicine, infectious diseases, aviation medicine, clinical genetics, medical rehabilitation, public health, clinical pharmacology, sports medicine.

Specialty/Questionnaire	Beck Depression Inventory (BDI-II)	General Anxiety Disorder-7 (GAD-7)	Drug Use Disorders Identification Test (DUDIT)	Alcohol Use Disorder Identification Test (AUDIT)	Eating Attitudes Test (EAT-26)	The Autism-Spectrum Quotient (AQ)
Internal medicine	r=.009 p=.9272	r=.032 p=.7328	r=-.063 p=.5030	r=.017 p=.8554	r=-.020 p=.8294	r=-.129 p=.1709
Pediatrics	r=-.094 p=.3204	r=.074 p=.4336	r=-.043 p=.6519	r=-.152 p=.1057	r=.082 p=.3851	r=-.012 p=.8995
Surgery	r=.148 p=.1153	r=-.062 p=.5123	r=.161 <b>p=.0865</b>	r=.408 <b>p=.0000</b>	r=-.005 p=.9540	r=.014 p=.8830
Psychiatry	r=-.050 p=.5939	r=.055 p=.5645	r=.059 p=.5304	r=-.189 <b>p=.0435</b>	r=.070 p=.4617	r=.010 p=.9176
Family medicine	r=-.026 p=.7873	r=-.049 p=.6037	r=-.090 p=.3429	r=-.007 p=.9429	r=-.032 p=.7362	r=-.014 p=.8805
Anesthesiology and intensive care	r=.049 p=.6033	r=.061 p=.5173	r=-.087 p=.3600	r=.120 p=.2041	r=-.080 p=.3994	r=.061 p=.5212
Gynecology and obstetrics	r=.081 p=.3900	r=.043 p=.6474	r=-.059 p=.5341	r=-.019 p=.8373	r=.116 p=.2204	r=.139 p=.1389
Radiology	r=.054 p=.5674	r=-.101 p=.2837	r=-.073 p=.4374	r=-.043 p=.6506	r=-.130 p=.1686	r=.147 p=.1198

Specialty/Questionnaire	Beck Depression Inventory (BDI-II)	General Anxiety Disorder-7 (GAD-7)	Drug Use Disorders Identification Test (DUDIT)	Alcohol Use Disorder Identification Test (AUDIT)	Eating Attitudes Test (EAT-26)	The Autism-Spectrum Quotient (AQ)
Internal medicine	r=.009 p=.9272	r=.032 p=.7328	r=-.063 p=.5030	r=.017 p=.8554	r=-.020 p=.8294	r=-.129 p=.1709
Emergency medicine	r=.186 <b>p=.0479</b>	r=.122 p=.1942	r=-.041 p=.6662	r=.105 p=.2658	r=.031 p=.7472	r=.017 p=.8542
Others*	r=-.042 p=.6580	r=-.012 p=.9013	r=.129 p=.1730	r=-.086 p=.3657	r=.081 p=.3944	r=.128 p=.1746

Table 3. The Spearman's correlation rank between the severity of mental health problems and medical specialties choices. Statistically significant correlations ( $p < .05$ ) are bold.

\*The category "Others" includes: neurology, dermatology, ophthalmology, otolaryngology, pathology, forensic medicine, nuclear medicine, infectious diseases, aviation medicine, clinical genetics, medical rehabilitation, public health, clinical pharmacology, sports medicine.

#### Disclosures

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