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Assessment of the Impact of Medical Studies on the Mental Health of Medical Students in Poland

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Abstract

Background

Medical education is consistently associated with elevated rates of psychological distress, yet data on Polish medical and health-science students remain limited. This study assessed the prevalence of mental health symptoms in this population, characterised the subgroups at greatest risk, and examined how symptom burden varies across the academic year.

Methods

A cross-sectional online survey was conducted among 186 students from 18 Polish medical universities. The instrument assessed 29 symptoms, formal psychiatric diagnoses, treatment, and 21 Likert-scale items addressing academic pressure, motivation and well-being. Subgroups were compared by sex, year of study, field of study and pre-existing mental health problems.

Results

Nearly all respondents reported at least one symptom (98.9%). The most frequent were stress and tension (87.1%), depressed mood (74.2%) and anxiety (72.6%). A formal diagnosis was present in 36.0%, suicidal ideation in 26.3%, and 47.8% had sought help. Symptoms worsened during exam period in most students (79.6%) and remitted over holidays in 54.3%. Women reported higher exam stress, perceived pressure and depressed mood than men. Diagnoses peaked in years three and four ($p = 0.006$). Pre-existing mental health problems emerged as the strongest correlate throughout, particularly when untreated by a specialist, predicting higher symptom counts, diagnoses and suicidal ideation (all $p < 0.001$). In multivariable models, suicidal ideation was independently predicted by male sex (aOR 3.56, 95% CI 1.25–10.11), years three to four (aOR 3.63, 95% CI 1.01–12.96), poorer sleep quality (aOR 0.57, 95% CI 0.37–0.87) and perceived impact of pressure (aOR 2.08, 95% CI 1.22–3.54), while university support was associated with lower odds of considering leaving studies (aOR 0.51, 95% CI 0.33–0.79). Fear-driven rather than reward-driven motivation was associated with a higher symptom burden.

Conclusions

Mental health symptoms affect the overwhelming majority of students in this population, and a limited set of factors delineates those at greatest risk. The findings support targeted measures: screening students with a pre-existing condition, closer monitoring during the middle clinical years, attention to sleep, and accessible institutional support offered before students begin to contemplate withdrawal.

1. Introduction

College students face many challenges such as academic pressure, time management difficulties, financial problems, and uncertainty about their future careers. They may also experience peer pressure, lack of motivation, and distractions from technology. These problems can lead to stress, anxiety, and other mental health issues that negatively affect students' academic performance and overall well-being. Medical students often experience even higher levels of stress due to demanding coursework, long study hours, intense competition, and the responsibility of learning skills that directly affect patients' lives [1]. The multitude of trials, including intense academic rigor, financial debt, sleep deprivation, lack of control, continual exposure to sickness and death, and training mistreatment, may explain the higher prevalence of psychological disorders within the medical student population compared to age-matched peers outside the field [2]. Medical culture tends to attract high-achieving and perfectionistic personality types, which are associated with components of burnout such as cynicism and emotional exhaustion, further compounding the mental health burden [2]. In a meta-analysis by Rohan Puthran et al. (2016) including 62,728 medical students, the global prevalence of depression was found to be 28.0% (95% CI 24.2–32.1%) [3]. Depression rates were highest in first-year students (33.5%) and decreased to 20.5% by the fifth year, showing a significant decline (B = -0.324, p-value = 0.005) [3]. The overall prevalence of suicidal ideation was 5.8% (95% CI 4.0-8.3%), while only 12.9% of depressed medical students sought treatment (95% CI 8.1–19.8%) [3]. A large systematic review and meta-analysis conducted by Rotenstein et al. (2016) examined the prevalence of depression and suicidal ideation among medical students worldwide [4]. The pooled prevalence of depression or depressive symptoms was 27.2% (95% CI: 24.7%-29.9%, I^2 = 98.9%), indicating that more than one in four medical students experience depressive symptoms during their training [4]. Additionally, the pooled prevalence of suicidal ideation was 11.1% (95% CI: 9.0%-13.7%, I^2 = 95.8%) [4]. The study also found that only 15.7% of students who screened positive for depression sought mental health treatment (95% CI: 10.2%-23.4%) [4]. Longitudinal studies included in the analysis showed that depressive symptoms increased during medical school, with a median absolute increase of 13.5% after the onset of medical training [4]. No statistically significant differences in depression prevalence were observed between preclinical and clinical students (p = 0.72) or between studies conducted in the United States and other countries (p = 0.78) [4]. Anxiety represents an equally significant concern among medical students. A meta-analysis by Quek et al. (2019) pooling data from 69 studies comprising 40,348 medical students found a global prevalence of anxiety of 33.8% (95% CI: 29.2–38.7%), a rate substantially higher than that observed in the general population [5]. Although no statistically significant differences in anxiety prevalence were found between preclinical and clinical students, the study highlighted that anxiety can negatively affect academic performance, dropout rates, and professional development [5]. Anxiety was not spread evenly across the globe: it was most prevalent among students in the Middle East (42.4%) and Asia (35.2%), compared with 27.5% elsewhere, a gap the authors linked in part to stronger cultural stigma around mental illness in those regions [5]. Mental health difficulties among medical students are not static; certain challenges move into the foreground as students face key transition points in their education. Students at the end of their first year tend to suffer the greatest deterioration of mental health, while those in clinical years are more likely to experience

increased anxiety, irritability, and emotional distress related to a perceived lack of control [2]. Research consistently shows that mental health deteriorates during medical school and may continue to decline when trainees enter the workforce [6]. These trajectories carry a heavy cost further down the line: in the United States alone, an estimated 400 physicians die by suicide each year [2]. A systematic review and meta-analysis by West et al. (2016), encompassing 15 randomised trials and 37 cohort studies involving 3,630 physicians, demonstrated that both individual-focused and organisational interventions can result in meaningful reductions in burnout, with overall burnout decreasing from 54% to 44% following intervention (difference 10%, 95% CI 5–14; $p < 0.0001$) [7]. These findings suggest that preventive strategies initiated during medical education may help reduce the long-term burden of burnout among future physicians [7]. Sleep disturbances represent another significant and often overlooked dimension of medical student health. A systematic review and meta-analysis by Binjabr et al. (2023), encompassing 109 studies with 59,427 medical students from 31 countries, revealed a pooled prevalence of poor sleep quality of 55.64% (95% CI: 51.45%-59.74%), with students sleeping on average only 6.5 hours per night, well below the recommended 7–9 hours [8]. Additionally, 33.32% of students experienced excessive daytime sleepiness [8]. Poor sleep quality has been shown to exacerbate mental health conditions such as depression, anxiety, and burnout, while also impairing cognitive function, academic performance, and clinical decision-making [8]. The relationship seems to run in both directions, as poor mental health worsens sleep just as poor sleep feeds back into it, and insufficient sleep has also been tied to higher burnout, lower motivation and a greater risk of dropping out of medical school [8]. Gender differences represent another important dimension of mental health in this population. A cross-sectional study by Stirparo et al. (2024) comparing medical students with working adults found that medical students exhibited significantly higher levels of anxiety and lower quality of life than their non-student counterparts [9]. Notably, many more students believed they had a mental disorder than actually carried a diagnosis (49.2% versus 27.9% in the control group), while rates of formally diagnosed disorders did not differ significantly between the two groups, pointing to a heavy load of subclinical symptoms that still drag down well-being [9]. Female students reported lower quality of life scores and higher anxiety levels compared to males, with clinical anxiety affecting 42.7% of female students versus 19.1% of male students ($p = 0.009$) [9]. These findings are consistent with data from Polish medical students, where female students displayed significantly higher levels of anxiety ($p = 0.004682$) and stress ($p = 0.000598$) compared to male students [10]. Beyond gender, social and contextual factors play a significant role in shaping mental health outcomes. A multicenter cross-sectional study by Mengesha et al. (2025), conducted among 450 medical students in Ethiopia, found a depression prevalence of 52% and an anxiety prevalence of 59.1% [11]. The study identified living alone, poor peer relationships, and poor academic performance as factors significantly associated with increased anxiety and depression [11]. Logistic regression further revealed that life satisfaction was a protective factor, with dissatisfied students being over twice as likely to develop anxiety symptoms compared to highly satisfied peers [11]. The year of study mattered too: fifth-year students were almost five times as likely to report anxiety as first-years, a jump the authors linked to the looming pressure of graduation and entering the job market

[11]. The Polish context warrants particular attention. A study by Forycka et al. (2022) conducted among 1,858 Polish medical students found that 39.1% declared a need for psychological or psychiatric consultation, and 72% of the study population presented lower levels of resilience [12]. Low resilience was correlated with more severe burnout, poor well-being, reduced motivation, and higher usage of stimulants [12]. In that cohort, resilience was lowest among first- and sixth-year students, suggesting that the beginning and the end of training may be especially vulnerable points [12]. Among students already carrying a psychiatric diagnosis, 26.4% reported that their symptoms had worsened, and 28.6% described an increased use of alcohol, cigarettes or other stimulants [12]. A separate study by Pawlaczyk et al. (2020) comparing Polish and English-speaking first-year medical students at the same university found that Polish students presented with significantly increased overall stress levels ($p = 0.007858$) and depressive symptoms ($p = 0.030420$), and showed a marked increase in symptoms during the exam period which was not observed in the English-speaking group [10]. In the same sample, students who relied on mature defence mechanisms such as suppression, humour and anticipation reported lower stress, anxiety and depression, whereas immature mechanisms went together with higher levels of all three, and those striving for academic success under heavy stress and anxiety more often had thoughts of giving up their studies [10]. Substance use represents a further concern within this population. A study by Ayala et al. (2017) involving 855 medical students from 49 US colleges found that 91.3% consumed alcohol and 26.2% used marijuana in the past year, with consequences including cognitive deficits, compromised academic performance, and suicidal ideation [13]. Roughly one in three students (33.8%) reported drinking five or more units in a single sitting within the previous two weeks, and 40% did not know whether their school even had a substance-use policy [13]. Harris et al. (2015) found that alcohol was used as a coping mechanism by 41.7% of fourth-year students overall, with rates of 40.4% among dental students and 43.6% among medical students [14]. Research indicates that dysfunctional patterns of substance use established during medical school may persist into professional life [14–16]. The choice of coping strategies plays a central role in determining mental health outcomes [6,15]. In their cross-sectional study among 589 medical students in Vienna, Steiner-Hofbauer & Holzinger (2020) found that the most common stressor was performance pressure overload, reported by 92.1% of participants, and that 52.4% reached critical scores on depression screening [15]. Active coping and positive thinking were the only strategies significantly associated with lower stress and depression scores, while social support, though widely used, showed no significant effect on these outcomes [15]. Notably, critical depression screening scores were more common among second-year (preclinical) students than among sixth-years (59% versus 35.2%), a reminder that the preclinical years carry their own heavy psychological load [15]. Despite growing awareness of the mental health burden in medical education, help-seeking behavior remains consistently low. Students are often reluctant to seek professional support due to stigma, fears of compromised career progression, and a perceived expectation of invulnerability [2,6]. This reluctance is striking in practice: among fourth-year dental and medical students reporting frequent stress, only 13.5% had ever used professional counselling services during their studies [14]. When students do reach out, they tend to turn to peers rather than to health professionals or faculty [6].

Compounding this, medical students receive little formal training on how to access mental health support, despite being at disproportionate risk [2]. Yet those who do engage with care appear to benefit: an evaluation of a dedicated student mental health service reported significant reductions in distress, depression, anxiety and suicide risk, alongside improved functioning [2]. A review by Moir et al. (2018) emphasized the importance of active coping strategies, noting that students who adopt positive coping approaches report lower stress levels and are less likely to experience suicidal ideation [6]. The same review noted the downstream stakes of untreated illness, citing evidence that depressed doctors make around six times as many medication errors as their non-depressed colleagues[6]. The review also underscored the need for comprehensive institutional frameworks combining well-being curricula, peer-led support programs, and faculty-level initiatives to address psychological distress proactively rather than solely in a curative manner [6]. This distinction matters, because mental health support in medical education is currently delivered largely in a curative fashion, reaching only those students who already show symptoms, rather than being offered preventively to all [2]. A detailed understanding of the mental health status of medical students is essential to enable early identification and timely intervention for psychological difficulties. However, despite growing awareness, the mental health of medical students remains insufficiently explored, particularly in the context of multiple coexisting risk factors. Based on these considerations, the present study aimed to assess the impact of medical studies on the mental health of medical students in Poland. Specifically, we sought to evaluate the prevalence of depression, anxiety, and other mental health disorders, as well as to analyze lifestyle factors and coping strategies adopted by students. The findings of this study may contribute to a better understanding of the determinants of mental health among medical students and provide a basis for developing targeted interventions to support their psychological well-being and maintain optimal mental fitness.

2. Materials and methods

2.1 Study Design and Participants

A cross-sectional on-line survey was conducted among medical students enrolled in universities across Poland. Participation was voluntary and anonymous. Inclusion criteria were current enrollment in a medical program. Students who did not complete the survey in full were excluded. Data were collected using an online questionnaire created in Google Forms, distributed via university mailing lists, social media groups, and student associations. The baseline characteristics of the study group are shown in Table 1. This research was reviewed and approved by the Ethical Committee of the Medical University of Bialystok with recommendation number APK.002.143.2025. The study was conducted in accordance with the Declaration of Helsinki and all relevant guidelines and regulations. Informed consent was obtained electronically from all participants prior to completing the questionnaire.

2.2 Statistical Analysis

Data were exported from Google Forms to STATA version 18.0 for analysis. Descriptive statistics were calculated, and prevalence rates were reported with 95% confidence intervals. The Shapiro-Wilk test was

used to examine normal distribution. The data were expressed as means ± standard deviation (SD), or median and interquartile range (IQR) when appropriate. Comparisons between groups were performed using the Mann-Whitney U test or Kruskal-Wallis test for non-normally distributed and ordinal variables, and the t-test where the normality assumption was met. Multivariable logistic regression was used to identify independent predictors of key mental health outcomes, with results reported as adjusted odds ratios (aOR) with 95% confidence intervals (CI). A p-value of less than 0.05 was considered statistically significant.

3 Results

3.1 Sample

The final sample consisted of 186 students from 18 medical universities in Poland. Median age was 24 years (IQR 21–25). Most respondents were women (145, 78.0%); 38 (20.4%) were men and 3 (1.6%) identified as non-binary. Medical students made up 82.8% of the sample (n = 154); the remainder studied medicine, dentistry, physiotherapy, pharmacy, nursing, midwifery, cosmetology, emergency medicine, medical analytics, or were enrolled in doctoral programmes. The largest single group came from the Medical University of Białystok (n = 116, 62.4%), which reflects our recruitment base. Eighty-six students (46.2%) reported mental health problems before starting university, 35 had been under specialist care, 51 had not.

3.2 Symptoms during studies

Only two students out of 186 reported no psychological symptoms during their studies. The remaining 184 (98.9%) reported at least one. The median number of symptoms per student was 11 of 29 possible (IQR 6–14). Stress and tension was the most common symptom (87.1%), followed by depressed mood (74.2%), anxiety (72.6%), sleep problems (69.4%) and concentration difficulties (62.9%). Almost six in ten students reported guilt or worthlessness and irritability (both 59.1%), and 52.2% described depressive thinking. Forty-nine students (26.3%) reported suicidal thoughts and fourteen (7.5%) reported suicidal tendencies; combining these gives 50 students (26.9%) with any suicidal ideation or behaviour. Symptom prevalences are summarised in Table 2 and the top fifteen symptoms are shown in Fig. 1. Sixty-seven students (36.0%) had received at least one psychiatric diagnosis during their studies, most often depression (21.0%), an anxiety disorder (19.9%) or a sleep disorder (10.2%). Despite this, only 89 (47.8%) had ever sought specialist help. Forty-eight students (25.8%) were taking psychiatric medication, antidepressants being the most common. Forty-seven students (25.3%) had considered either dropping out (11.8%) or taking a leave of absence (13.4%). Symptoms followed the academic calendar. Most students (79.6%) said their symptoms worsened during exam sessions, and 54.3% said they improved during holidays (Fig. 2). Holiday remission was much less common among students who already carried a psychiatric diagnosis, only 46.3% of them reported relief during holidays, compared with 58.8% of those without a diagnosis ($\chi^2=18.63$, $p < 0.001$). In other words, when a disorder is already established, time off no longer fully reverses the symptoms.

3.3 Differences between women and men

Non-binary students (n = 3) were too few to analyse separately and were excluded from sex comparisons. Women reported significantly higher exam stress than men (median 4, IQR 4–5 vs. 4, 2–4; $p < 0.001$), greater impact of pressure on their mental health (5, 4–5 vs. 4, 3–5; $p = 0.009$), and higher levels of depressed mood (3, 3–4 vs. 3, 2–4; $p = 0.040$). Importantly, motivational items did not differ between women and men, parental motivation, household expectations and internal motivation looked the same in both groups (all $p > 0.10$). The sex difference is in stress experience, not in why students entered medicine.

3.4 Year of study

Students were grouped into four categories: years 1–2 (n = 63), years 3–4 (n = 29), years 5–6 (n = 86), and postgraduate (n = 8). Psychiatric diagnoses peaked in years 3–4 at 58.6%, compared with 22.2% in years 1–2 ($\chi^2=12.36$, $p = 0.006$). Specialist help-seeking and use of psychiatric medication followed the same shape ($p = 0.024$ and $p = 0.049$). Whether education was preparing students for their future career fell sharply across years (medians 3, 2, 2, 1.5; $p < 0.001$), and reports of decreasing motivation rose with year ($p = 0.004$). Years 3–4 appear to be the most vulnerable period, both for psychiatric morbidity and for disillusionment with the programme.

3.5 Field of study

Students of medicine or dentistry (n = 168) were compared with all other fields combined (n = 18). Medical/dental students reported stress and tension much more often (89.9% vs. 61.1%; $p = 0.001$) and were more likely to say their symptoms worsened in exam sessions (82.7% vs. 50.0%; $p = 0.004$). Their exam stress scores were also higher (median 4 vs. 3; $p = 0.006$). Despite that, they rated their outlook on a future career as slightly more positive than students from other fields (median 3, IQR 3–4 vs. 3, 2–3; $p = 0.031$). Higher stress and stronger professional commitment seem to coexist here.

3.6 Pre-existing mental health problems

Of all the variables we examined, prior mental health problems showed the strongest associations with current status. Suicidal ideation or behaviour was reported by 51.0% of students who had pre-existing problems without specialist care, by 34.3% of those who had been under specialist care before studies, and by only 12.0% of students with no pre-existing problems ($\chi^2=27.31$, $p < 0.001$). The same pattern held for current psychiatric diagnosis (65.7%, 41.2%, 23.0%; $p < 0.001$), specialist help-seeking (82.9%, 54.9%, 32.0%; $p < 0.001$) and psychiatric medication use (62.9%, 29.4%, 11.0%; $p < 0.001$). Median symptom counts differed too (11, 14, 8; $p < 0.001$) (Fig. 3). Interestingly, motivational variables did not differ across these three groups. Parental motivation, household expectations, internal motivation, and satisfaction with the choice of studies were similar regardless of pre-existing problems. Only time management was worse in students with prior problems ($p = 0.019$). This suggests that the effect of pre-existing problems is direct, not mediated by a different motivational profile.

3.7 Correlations between mental health, academic and motivational variables

Spearman correlations are presented in Table 3 and Fig. 4. The variables most strongly correlated with overall symptom burden were the self-rated impact of pressure on mental health (ρ=+0.52, p < 0.001) and self-rated mood depression (ρ=+0.52, p < 0.001). Symptom burden also correlated positively with exam stress (ρ=+0.32), difficulty balancing study and personal life (ρ=+0.29), and insomnia (ρ=+0.24); and negatively with outlook on future career (ρ=−0.35), increasing motivation over time (ρ=−0.27), satisfaction with study choice (ρ=−0.27), sleep quality (ρ=−0.31), time management (ρ=−0.25), university support (ρ=−0.24) and feeling that achievements are appreciated (ρ=−0.21). All p < 0.01. Items reflecting external motivation earlier in life, parental motivation, household expectations did not correlate with current symptom burden (both p > 0.05). The relationship between current academic life and current symptoms is what matters here, not the original motivation to enter medicine.

3.8 Multivariable predictors

Four logistic regression models were fitted (Table 4, Figs. 5–8). Each adjusted for sex, age, year of study, pre-existing problems, sleep quality, exam stress, pressure impact, university support, number of symptoms and field of study, depending on the outcome. After listwise deletion N = 183 in each model. All four models were significant overall (p < 0.001); pseudo-R^2 ranged from 0.155 to 0.281. For suicidal ideation/behaviour (Model 1, pseudo-R^2=0.281), four predictors emerged. Being male was associated with higher odds (aOR 3.56, 95% CI 1.25–10.11; p = 0.017), as was being in years 3–4 (aOR 3.63, 1.01–12.96; p = 0.047). Better sleep quality lowered the odds (aOR 0.57 per 1-point increase, 0.37–0.87; p = 0.009), and so did absence of pre-existing problems (aOR 0.16, 0.05–0.54; p = 0.003). Perceived pressure impact increased the odds independently (aOR 2.08, 1.22–3.54; p = 0.007). For seeking specialist help (Model 2, pseudo-R^2=0.260), absence of pre-existing problems was strongly negatively associated with help-seeking (aOR 0.08, 0.03–0.26; p < 0.001 vs. those who had received specialist care before studies). Each additional symptom raised the odds by 19% (aOR 1.19, 1.08–1.31; p < 0.001). For considering leaving studies (Model 3, pseudo-R^2=0.155), two factors mattered: higher symptom count (aOR 1.14 per symptom, 1.04–1.24; p = 0.004) and lower university support (aOR 0.51 per 1-point increase, 0.33–0.79; p = 0.003). For any psychiatric diagnosis (Model 4, pseudo-R^2=0.166), being in years 3–4 (aOR 4.09, 1.34–12.43; p = 0.013) and having no pre-existing problems (aOR 0.10, 0.04–0.28; p < 0.001) were the strongest predictors.

3.9 Reward versus fear motivation

Ninety-nine students (53.2%) said they studied mainly out of fear of punishment, failing exams, parental disapproval, social judgement. The other 87 (46.8%) were driven mainly by the prospect of reward — good employment, financial stability, professional fulfilment. Fear-motivated students reported a higher symptom burden (median 12, IQR 7–16 vs. 9, 5–13; p = 0.003). Fear motivation did not, however,

differentiate suicidal ideation, psychiatric diagnosis, or specialist help-seeking (all $p > 0.10$). It seems to track subjective symptom load rather than diagnosed morbidity.

4. Discussion

The present study demonstrates a substantial burden of psychological symptoms among medical and health-science students in Poland. Almost all respondents reported at least one psychological symptom during their studies, and the median number of symptoms was 11 out of 29 assessed symptoms. This indicates that distress in this population is not limited to isolated complaints, but often appears as a broad symptom cluster involving affective, anxiety-related, cognitive, somatic, and behavioural dimensions. The most frequently reported symptoms were stress and increased tension, depressed mood, anxiety, sleep disturbances, and concentration or memory problems. This pattern suggests that medical education may affect several core areas of functioning at the same time: emotional regulation, sleep, cognitive efficiency, motivation, and social behaviour. The high prevalence of stress and tension, reported by 87.1% of students, confirms that perceived academic pressure is a central component of the student experience. However, the results also show that this pressure is not merely subjective discomfort. It was closely related to clinically relevant outcomes, including depressive mood, suicidal ideation, and consideration of leaving studies. The correlation analysis showed that the perceived impact of pressure on mental health was one of the strongest correlates of total symptom burden, with a Spearman correlation coefficient of $\rho = 0.52$. This relationship was also supported by the multivariable model, in which pressure impact independently predicted suicidal ideation or behaviour. Therefore, academic pressure appears to be more than a background stressor; it may function as a key mechanism linking medical studies with psychological deterioration. A particularly concerning finding was the frequency of suicidal ideation. Suicidal thoughts were reported by 26.3% of respondents, while suicidal tendencies were reported by 7.5%. When these categories were combined, more than one in four students reported suicidal ideation or behaviour. This result is clinically important because suicidal ideation in medical students may remain hidden due to stigma, fear of professional consequences, and the belief that future doctors should be able to cope independently. The regression analysis identified several independent predictors of suicidal ideation or behaviour: male sex, years 3–4 of study, poorer sleep quality, pre-existing mental health problems, and stronger perceived pressure impact. These findings suggest that suicidal risk in this population is multifactorial and cannot be explained by symptom count alone. The association between male sex and higher odds of suicidal ideation or behaviour deserves careful interpretation. Women reported higher exam stress, greater perceived pressure, and higher depressed mood, whereas male sex was independently associated with suicidal ideation or behaviour in the multivariable model. This apparent discrepancy may reflect different patterns of symptom expression and help-seeking. Female students may report emotional distress more openly, while male students may disclose fewer symptoms but present higher risk when distress reaches a critical level. However, the number of male participants was relatively small, so this result should be interpreted cautiously and verified in larger samples. Pre-existing mental health problems emerged as the strongest and most consistent risk factor across the study. Students who had mental health

problems before university, especially those who had not received specialist care, showed the worst outcomes. In this group, 51.0% reported suicidal ideation or behaviour, 65.7% had a psychiatric diagnosis, 82.9% had sought specialist help during studies, and 62.9% were taking psychiatric medication. These results suggest that untreated psychological vulnerability before entering university may be amplified by the demands of medical education. Importantly, motivational variables did not differ between students with and without pre-existing mental health problems, which suggests that the increased risk was not explained by weaker motivation, lower satisfaction with the study choice, or stronger parental pressure. Instead, prior mental health status appears to represent an independent vulnerability factor. The results also highlight the importance of academic stage. Psychiatric diagnoses peaked in years 3–4, where 58.6% of students reported at least one diagnosis, compared with 22.2% in years 1–2. This period was also associated with higher odds of suicidal ideation or behaviour and any psychiatric diagnosis in multivariable models. Years 3–4 may represent a critical transition point in medical education, when students are exposed to more clinically oriented learning, heavier academic demands, and increasing uncertainty about future professional identity. The decline in the feeling that education prepares students for their future career, together with increasing reports of reduced motivation, further suggests that middle years of study may be marked by disillusionment. This finding has practical implications: preventive interventions should not be limited to first-year adaptation programmes but should also target the transition into clinical or semi-clinical stages of training. Sleep quality was another clinically meaningful factor. Sleep disturbances were reported by 69.4% of respondents, making them one of the most common symptoms. Poorer sleep quality was correlated with higher symptom burden and independently predicted suicidal ideation or behaviour. This supports the interpretation that sleep is not simply a secondary symptom of distress but may also contribute to emotional dysregulation, poorer coping, and increased vulnerability to suicidal thoughts. In medical students, sleep disruption may result from long study hours, exam preparation, irregular schedules, stress-related insomnia, and difficulty separating academic duties from rest. Because sleep is modifiable, it represents an important target for intervention. The academic calendar pattern provides further evidence that study-related stress contributes to symptom fluctuation. Most students reported that symptoms worsened during exam sessions, while more than half reported improvement during holidays. This temporal pattern suggests that academic demands may intensify symptoms in a dose-dependent manner. However, students with a psychiatric diagnosis were less likely to experience holiday remission than those without a diagnosis. This distinction is important. For some students, symptoms may be reactive and partially reversible when academic stress decreases. For others, especially those with established psychiatric disorders, rest alone may be insufficient, and specialist treatment is needed. Universities should therefore differentiate between temporary stress reactions and more persistent psychopathology. The role of institutional support was especially visible in the model predicting consideration of leaving studies. Higher perceived university support was associated with lower odds of considering dropping out or taking a leave of absence. This suggests that institutional environment can influence whether students continue their education despite psychological burden. Unlike pre-existing mental health problems, which are individual-level vulnerabilities, university support is a modifiable institutional factor. Accessible counselling, clear information about available help, supportive

communication from faculty, flexible procedures during mental health crises, and anti-stigma initiatives may reduce the likelihood that students interpret distress as a reason to abandon their studies. The findings concerning motivation add another important dimension. More than half of students reported that their studies were driven mainly by fear of punishment, failure, parental disappointment, or social judgement rather than by expected reward, professional fulfilment, or future stability. Fear-motivated students had a higher symptom burden than reward-motivated students. Although fear motivation was not significantly associated with psychiatric diagnosis or help-seeking, it was linked to subjective distress. This suggests that the motivational climate of medical education matters. A system based mainly on fear of failure, comparison, and negative consequences may maintain performance in the short term but increase psychological costs. In contrast, educational environments that strengthen autonomy, competence, feedback, and positive professional identity may protect student well-being. Field of study also influenced symptom patterns. Students of medicine and dentistry reported stress and tension more often than students from other health-related fields and were more likely to report symptom worsening during exams. This may reflect the specific intensity, competitiveness, and professional expectations associated with medical and dental training. Interestingly, despite higher stress, these students reported a slightly more positive outlook on their future career. This coexistence of high distress and strong professional commitment is important: many students remain invested in their future profession even while experiencing significant psychological burden. Therefore, interventions should not assume lack of motivation but rather support students who are motivated yet overwhelmed. The treatment gap remains one of the most important practical findings. Although 36.0% of students reported a psychiatric diagnosis and almost all reported psychological symptoms, only 47.8% had ever sought specialist help. This suggests that a large proportion of students manage symptoms without professional support. Barriers may include stigma, lack of time, limited access to confidential services, fear of documentation, financial concerns, or normalization of distress within medical culture. The fact that some students with psychiatric diagnoses had not received specialist help during their studies further emphasizes the need for low-threshold, confidential, and easily accessible support systems. Overall, the results suggest that mental health problems among Polish medical students are shaped by the interaction of individual vulnerability, academic pressure, sleep disruption, motivational climate, and institutional support. The strongest risk profile appears to include pre-existing untreated mental health problems, years 3–4 of study, poor sleep, high perceived pressure, and low perceived university support. These factors could be used to identify students requiring closer monitoring. At the same time, several of them are modifiable, which gives universities a clear direction for intervention. The findings support a layered prevention model. First, students entering medical education with previous mental health problems should be offered confidential screening and early support, particularly if they have never received specialist care. Second, additional monitoring should be introduced during years 3–4, when psychiatric diagnoses and suicidal risk appear to peak. Third, universities should address academic pressure not only by offering counselling but also by modifying the educational climate, assessment structure, feedback culture, and support during exam periods. Fourth, sleep hygiene and recovery should be treated as core components of student health rather than optional lifestyle advice. Finally, institutional support should be visible, practical, and proactive, because students may seek help only after symptoms

have already become severe. This study contributes to the understanding of medical student mental health in Poland by showing not only high symptom prevalence but also specific risk patterns. The results move beyond general statements that medical students are stressed and identify measurable predictors of clinically relevant outcomes. Future longitudinal studies should examine whether the same students worsen across academic years, whether interventions during the third and fourth years reduce later morbidity, and whether improving sleep, institutional support, and motivational climate can reduce suicidal ideation and dropout risk.

5. Limitations

This study has several limitations that should be considered when interpreting the results. First, the sample size, although adequate for the main comparisons, is relatively small and overrepresents one university (Medical University of Białystok, 62.4% of respondents). The findings may not generalise to all Polish medical schools or to other countries. Second, the study is open to selection bias: participation was voluntary, and students with greater (or, less plausibly, smaller) distress may have been more likely to respond. Third, family history of mental disorders was not assessed, which limits our ability to estimate the genetic versus environmental contribution to pre-existing vulnerability. Fourth, all outcomes were based on self-report, including the items used to identify psychiatric diagnoses; we did not have access to clinical records. Fifth, the cross-sectional design cannot establish causality although the within-student pattern of symptom intensification in exam sessions and remission in holidays provides one indirect line of causal evidence. Future research should follow the same cohort longitudinally through medical school and into postgraduate training to assess how mental health trajectories develop, and to identify critical periods more precisely than a cross-sectional design allows. A larger and more geographically representative sample would also strengthen the generalisability of the findings.

6. Conclusion

Polish medical students show very high rates of psychological symptoms, psychiatric diagnoses, and suicidal ideation, and a treatment gap that affects half of those affected. Pre-existing mental health problems are the strongest predictor of current status, particularly when those problems were never treated before university; years 3–4 are the period of peak psychiatric morbidity; and low perceived university support independently predicts students considering leaving studies. Medical schools and health authorities should implement systematic early detection of pre-existing vulnerability at admission, low-threshold mental health services available throughout the curriculum, targeted support during the third and fourth years, and institutional climate change that reduces stigma around help-seeking. Without action on these fronts, a high proportion of the next generation of Polish doctors will enter the workforce already burdened by untreated psychiatric morbidity.

Declarations

Competing Interests Statement

The authors declare that they have no competing interests.

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Author Contribution

AGATA KOLANEK A,D,E,FKAROLINA KACZMARCZYK A,B,E,FIZABELA ŚLINKO B,E,FDARIA METELKINA B,E,FEWA DRYL-JARMOC B,E,FGABRIELA KULIŚ B,E,FZUZANNA PANAS B,EKACPER KRAWCZUK B,FJAKUB DZIEMIANCZUK B,EMATEUSZ ZIMOWSKI B,FPIOTR KADYSZ B,FMATEUSZ CZAJKOWSKI B,FA – study design, B – data collection, C – statistical analysis, D – interpretation of data, E – manuscript preparation, F – literature review, G – sourcing of funding

Data Availability

The datasets generated and analysed during the current study are not publicly available due to the sensitive nature of the data and privacy and ethical restrictions, but are available from the corresponding author on reasonable request.

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Tables

Table 1 to 5 are available in the Supplementary Files section.

Figures

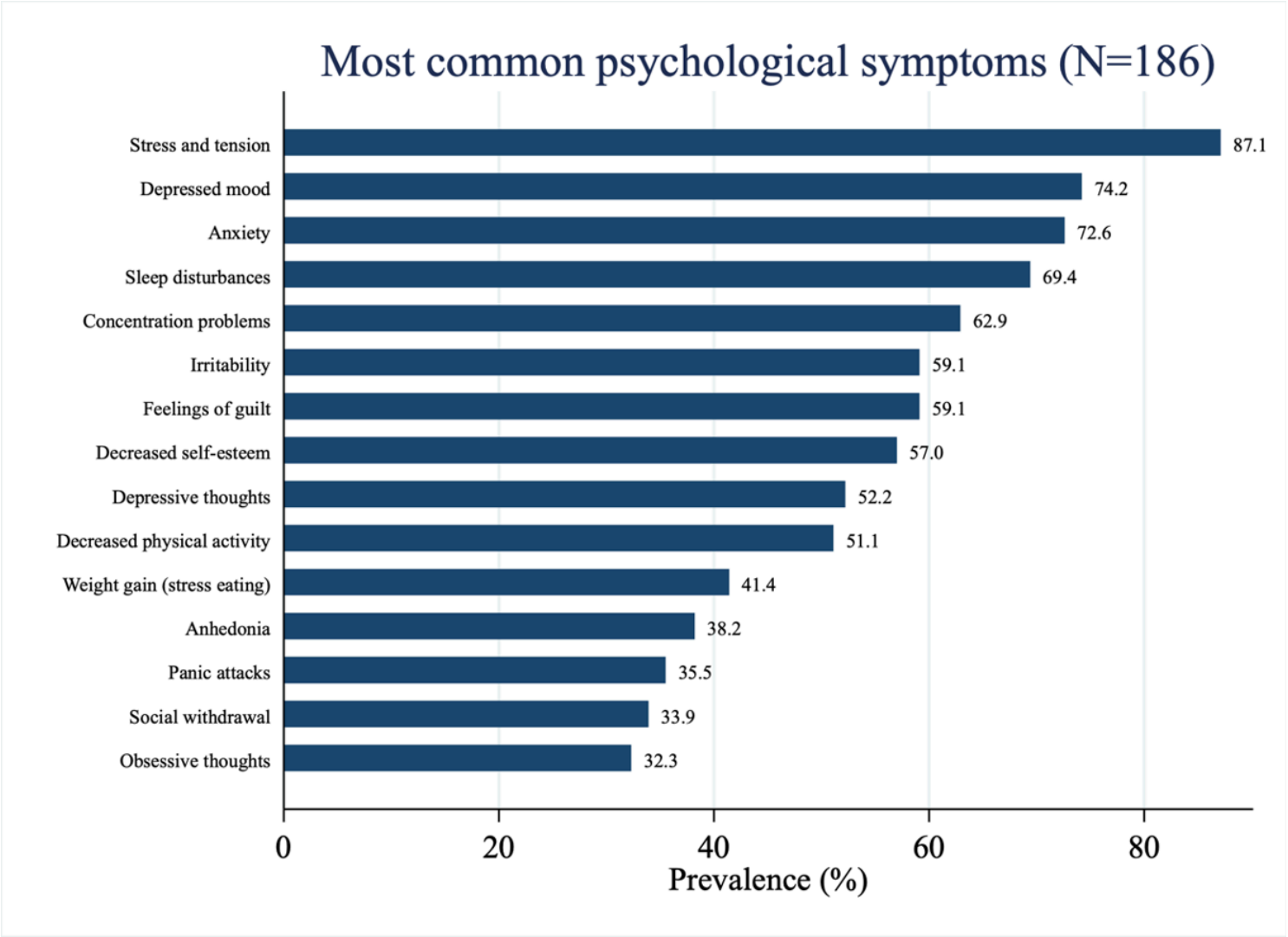


Figure 1

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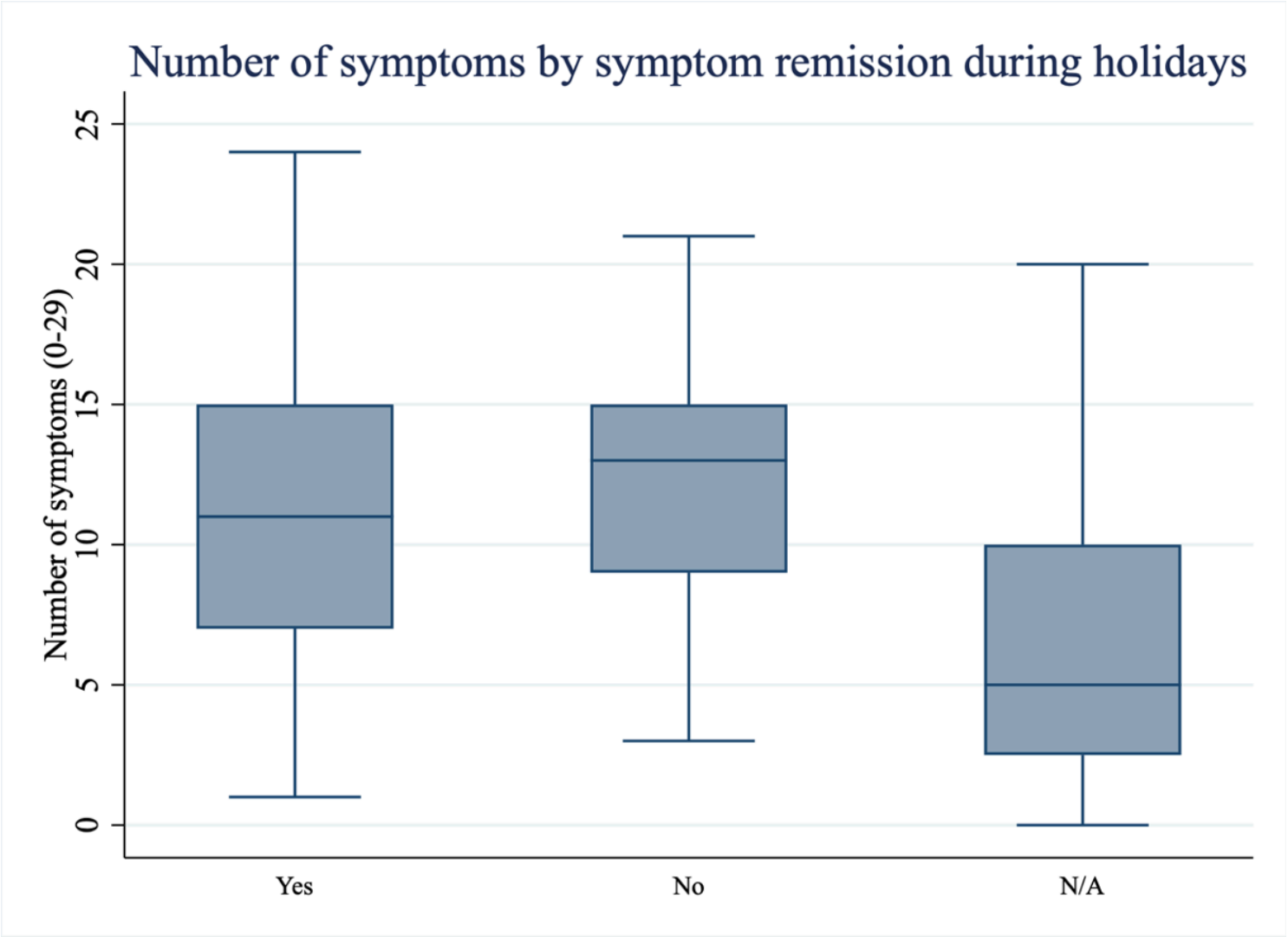


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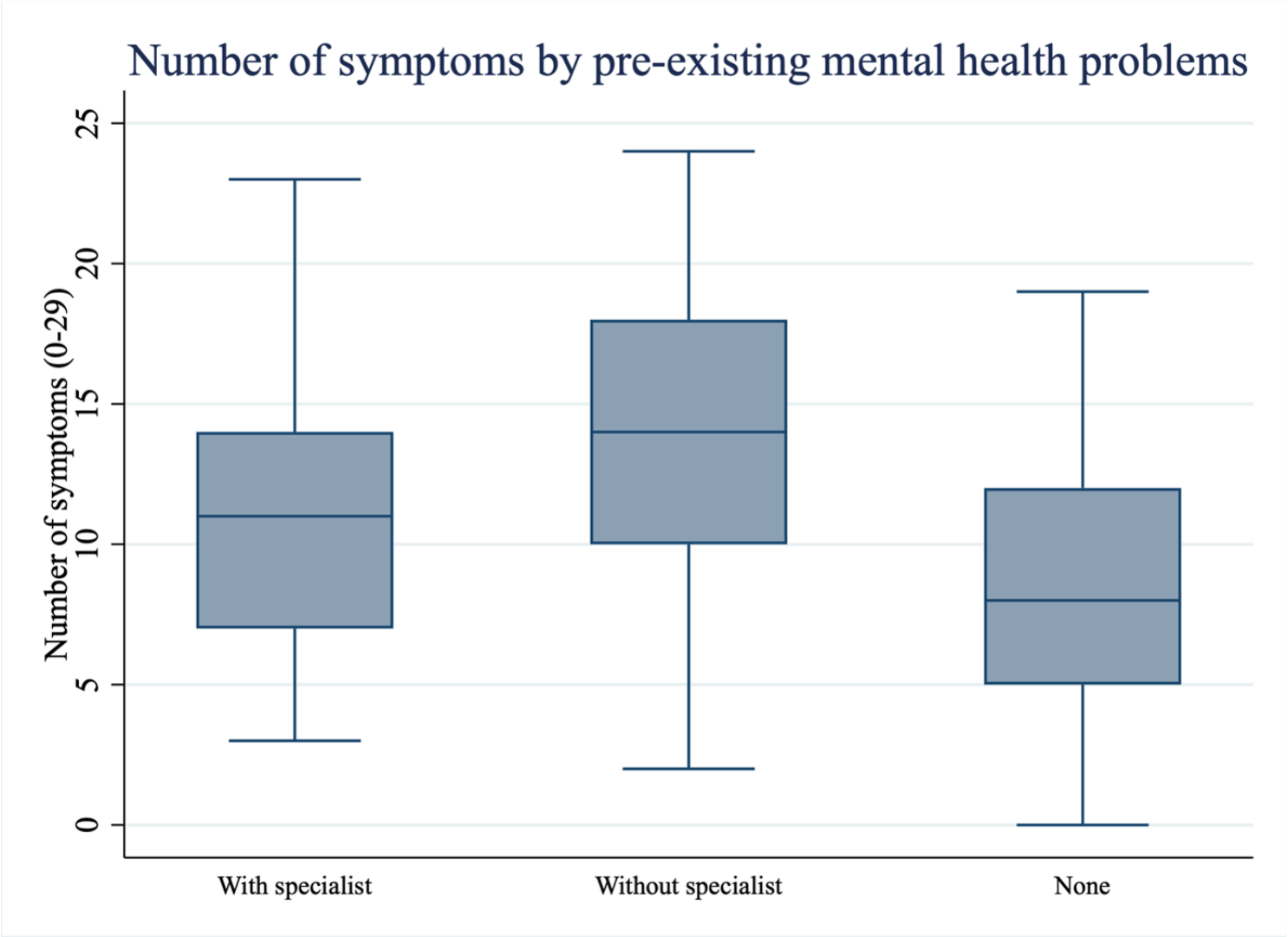


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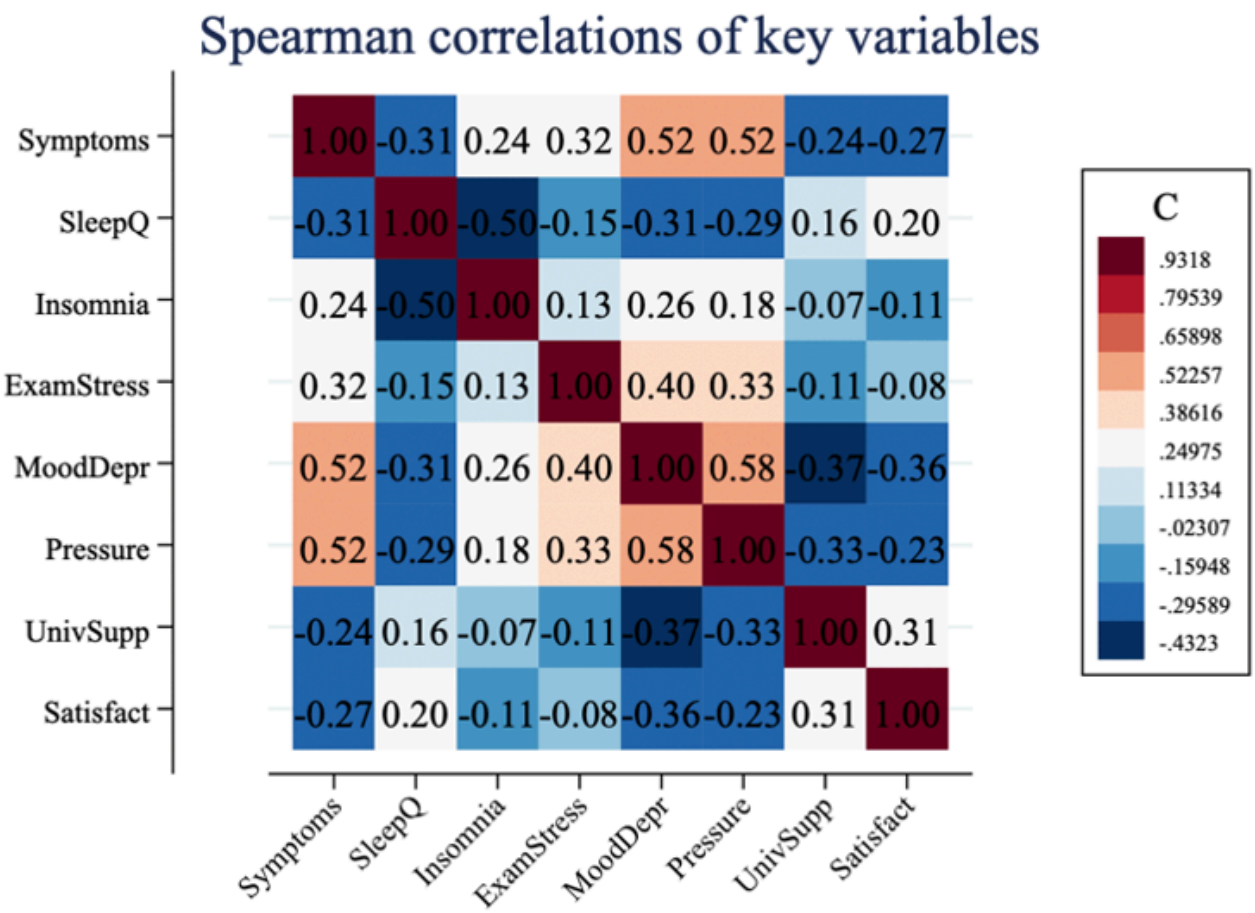


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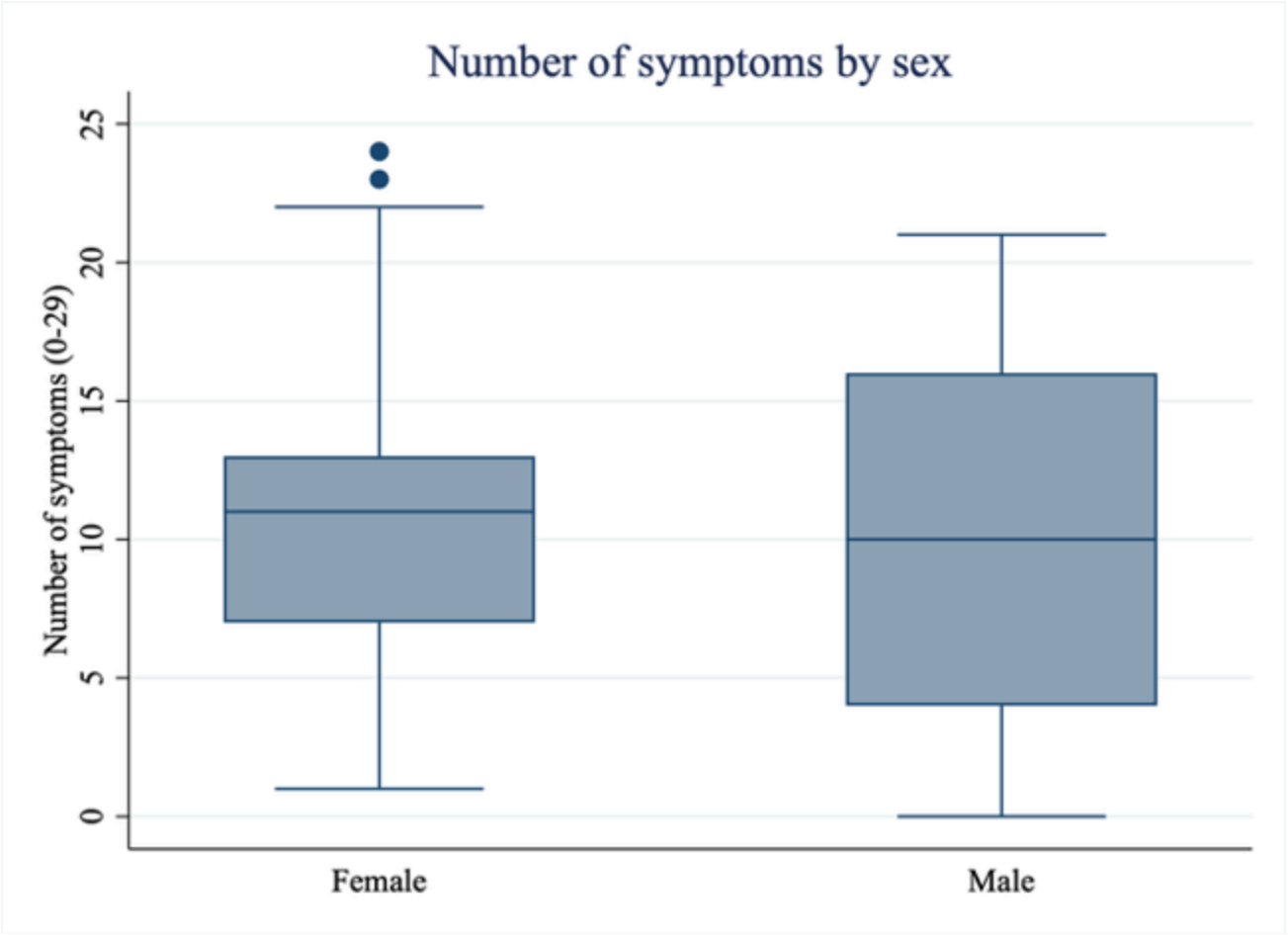


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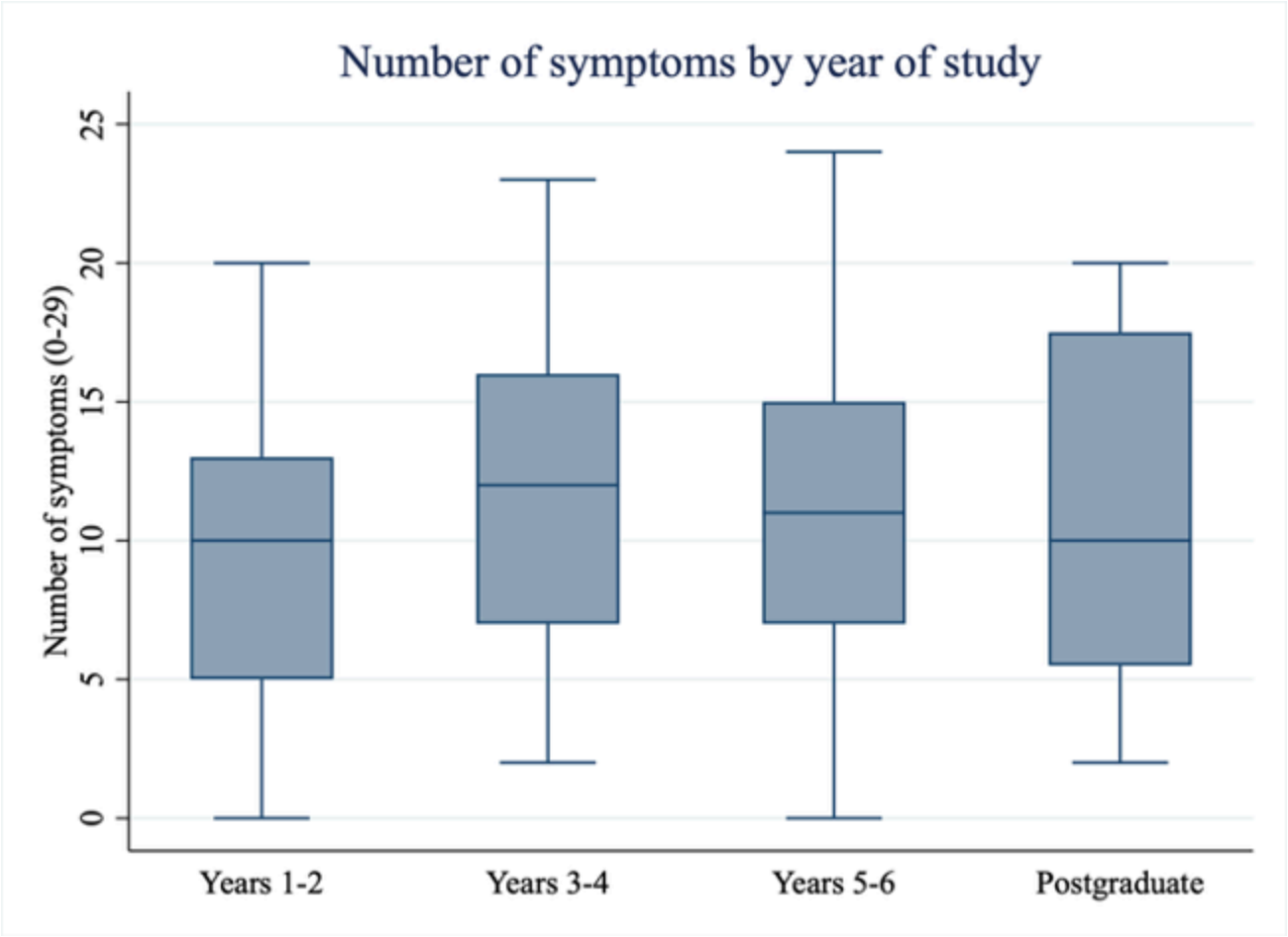


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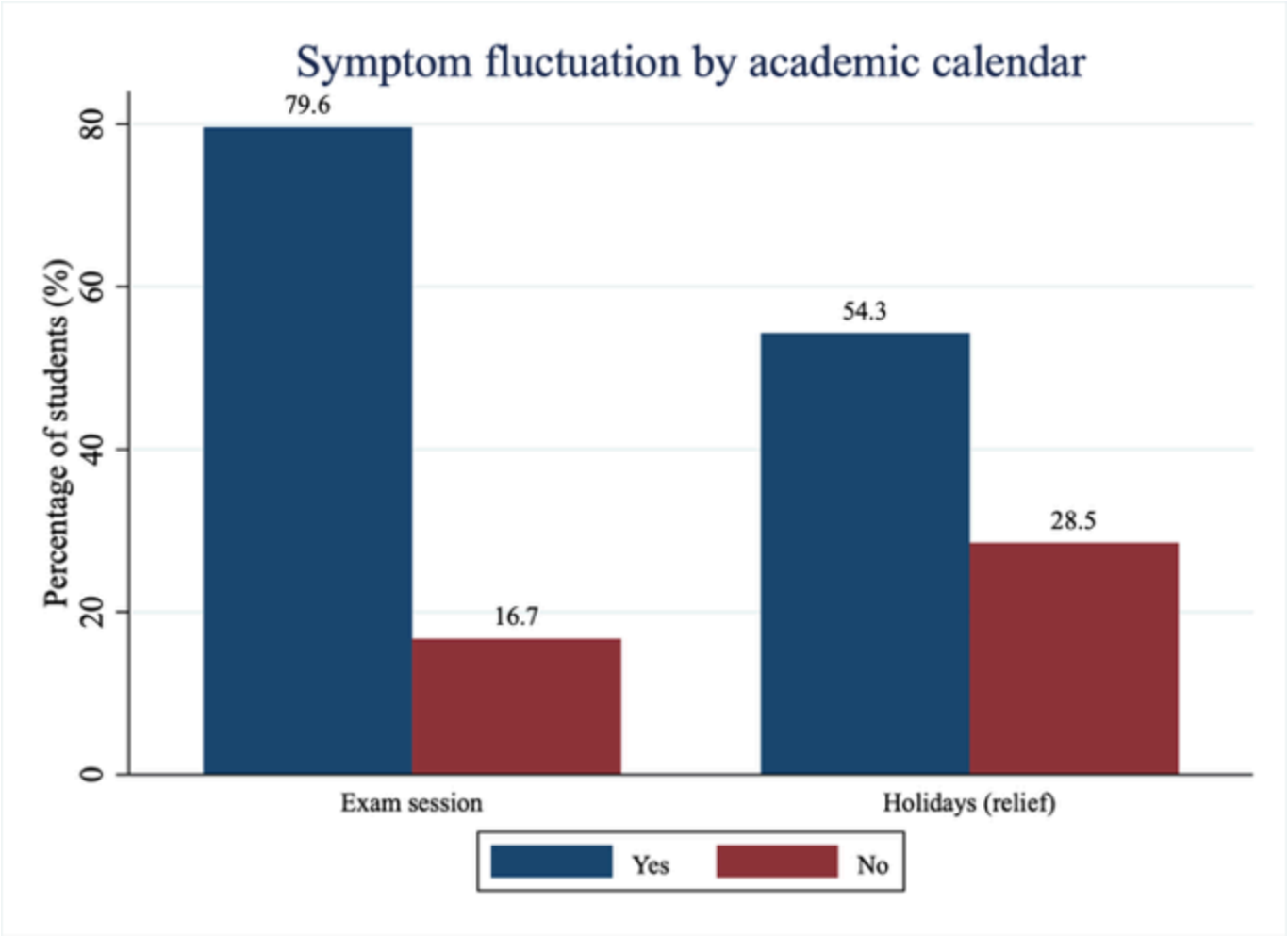


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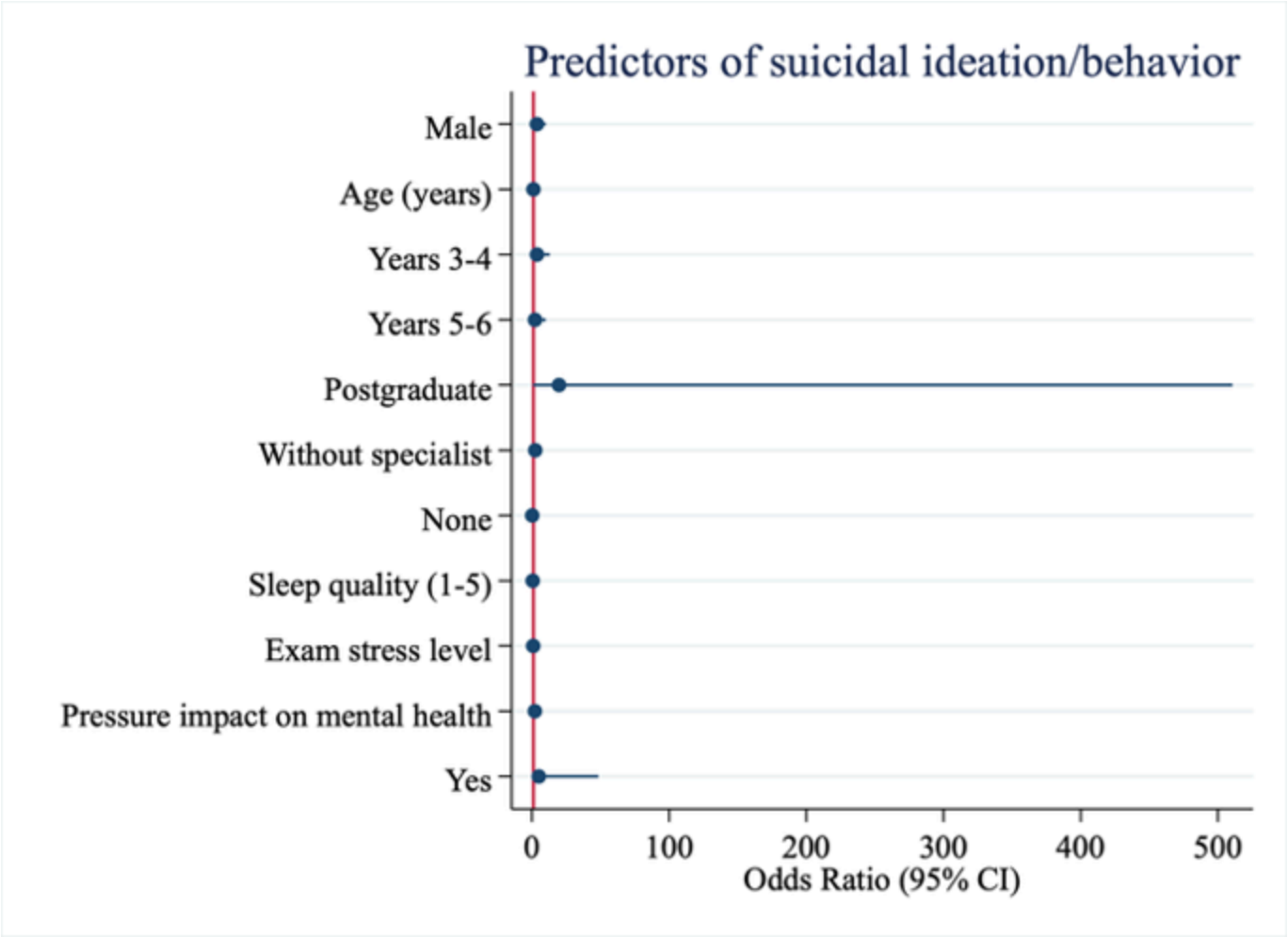


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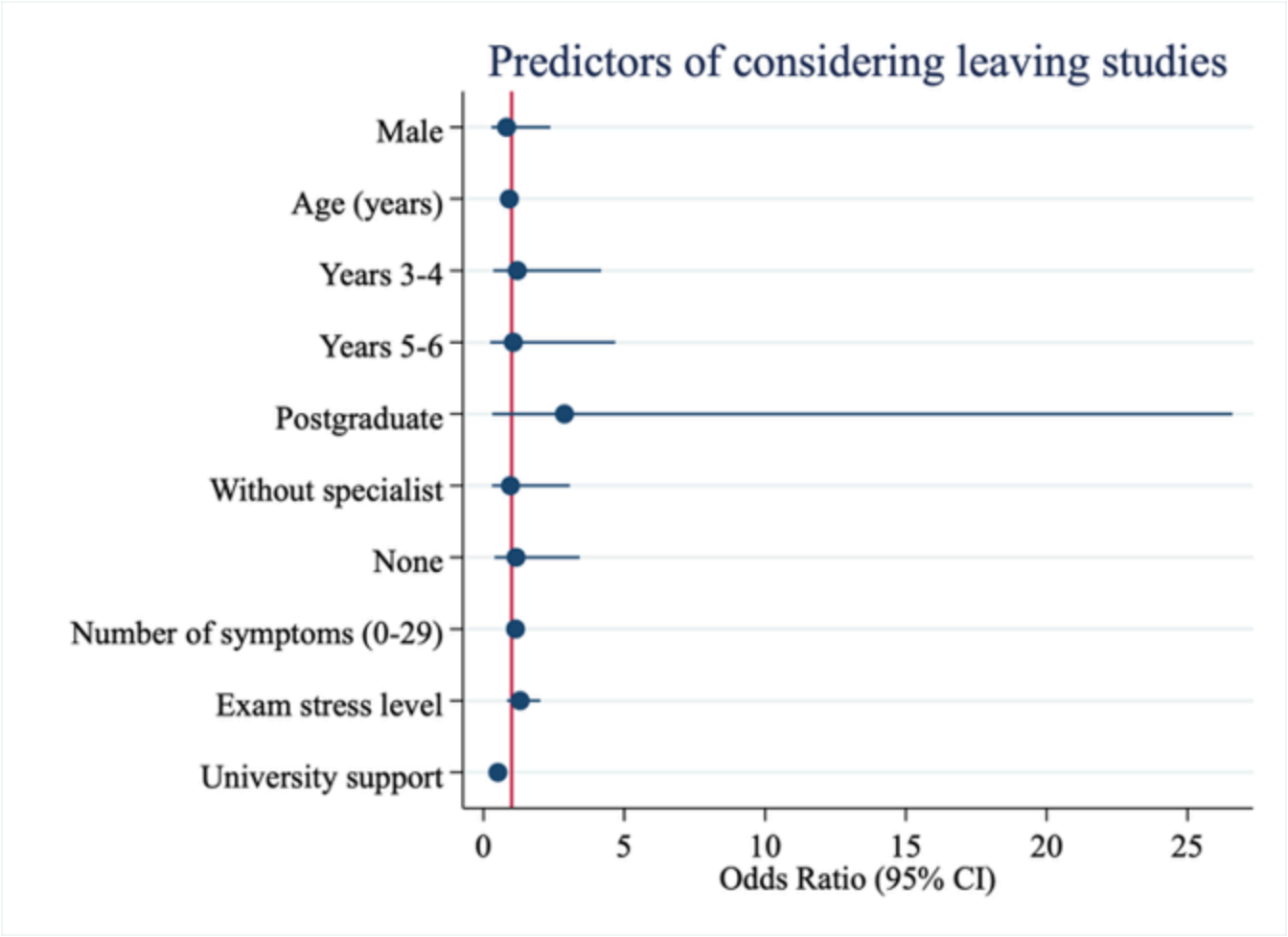


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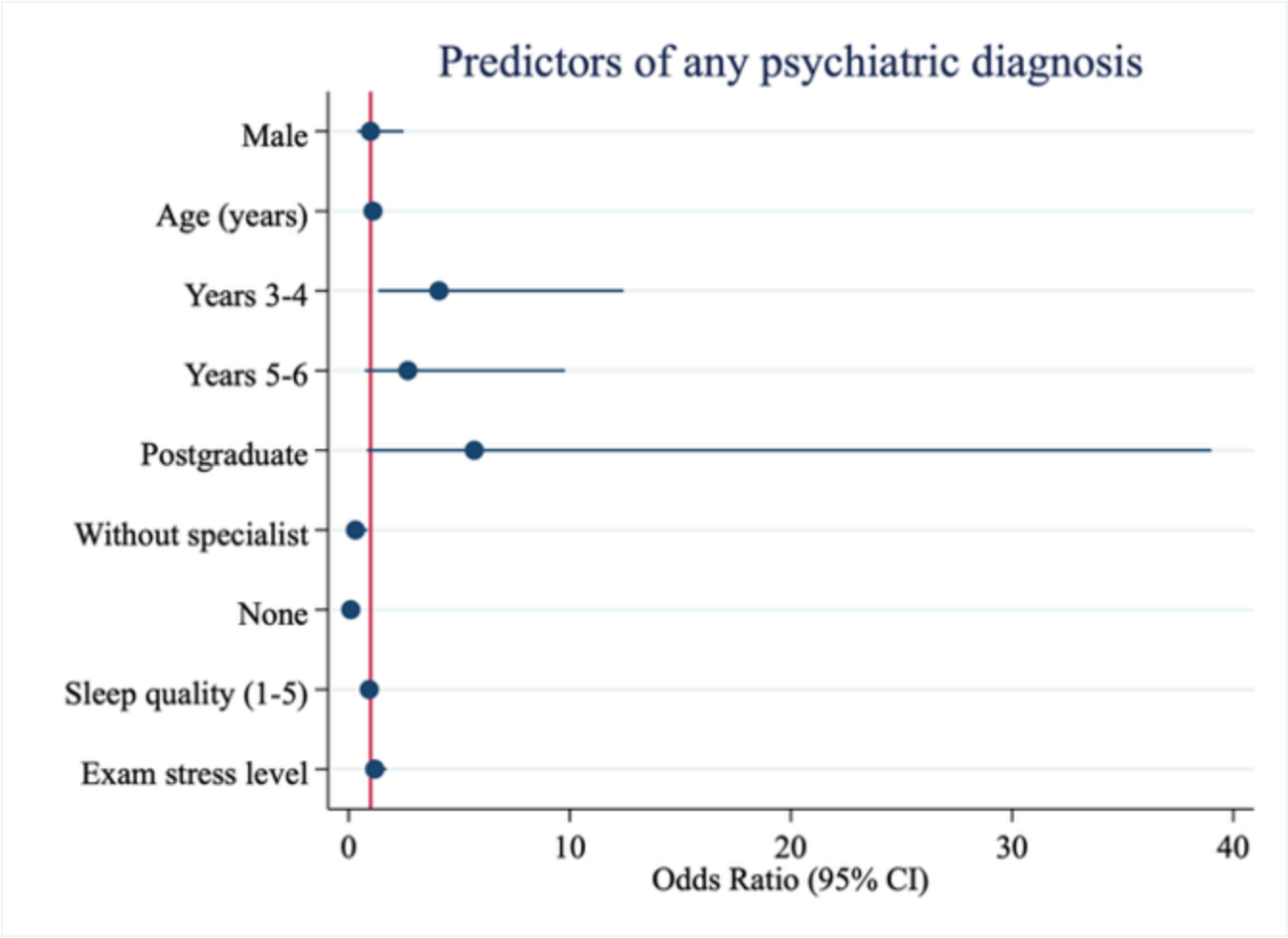


Figure 10

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Supplementary Files

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