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Original Research

Depression Level Among Neurology Resident Doctors in the Faculty of Medicine, Universitas Indonesia

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ABSTRACT

Introduction: A resident doctor is a doctor who has graduated from medical school, has earned the title of "doctor" and is currently undergoing a specific specialization postgraduate program. Resident doctors are at high risk of experiencing stress and depression. Depression greatly affects the quality of medical services provided by residents.
Objective: This study aimed to determine the prevalence of depression, its relationship with various sociodemographic factors and several environmental factors, and its relation to the residency level of resident doctors in the Neurology Study Program, Faculty of Medicine, Universitas Indonesia.
Material and Methods: This research was an analytic observational study with a cross-sectional design. All neurology resident doctors of Universitas Indonesia had filling out a questionnaire containing sociodemographic data and the Beck Depression Inventory-II (BDI-II) via Google Form platform. Then, the data were analyzed using chi-square and regression analysis.
Result: In this study, 53 (66.2%) participants were females and 16 (33.8%) were males. Sixty-five participants were analyzed with 4 participants excluded. The overall prevalence of depression was 18.2%, with mild depression at 9.2% and moderate depression at 9.2%. Depression was more common in females than males (10.8% vs 7.7%). The residency level and supervisor support have a significant association with the incidence of depression.
Conclusion: Our study found that 18.4% of neurology resident doctors had depression. Residency level and senior/supervisor support were significantly associated with depression among resident doctors

Keywords: recidency; depression; BD I-II

INTRODUCTION

A resident doctor is a doctor who has graduated from medical school, has earned the title of "doctor" and is currently undergoing a specific specialization postgraduate program.[1] Resident doctors are at high risk of experiencing stress and depression due to the transition period they have to undergo and several aspects of the education process itself. These disturbances can impact personal life, academic performance, and the quality of healthcare service to patients.[2,3]

A study conducted in Brazil revealed that out of 606 resident doctors, depression symptoms appeared in 19% of residents and

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had a significantly negative correlation with quality of life.[4] This is also consistent with the prevalence of depression among resident doctors in Indonesia. In a study conducted in 2012, 13.75% of internal medicine resident doctors in Medan experienced depression..[5] Meanwhile, a study conducted at Cipto Mangunkusumo Hospital reported that the incidence of depression among resident doctors in the pediatric health science program is around 23.9%, with 53.6% experiencing mild depression, 35.71% experiencing moderate depression, and the remainder experiencing severe depression.[6]

Depression among resident doctors more commonly occurs in male residents aged 31-35 years, married, and are junior-level residents. The most frequently experienced type of depression is minor mood change at 9.1%, followed by borderline clinical depression, moderate depression, and severe depression..[7] Interestingly, a study in Saudi Arabia mentions that moderate depression is most commonly experienced by intermediate-level resident doctors as well as non-surgical resident doctors.[8] Another study found that lack of support from colleagues, senior resident doctors, and supervisors, as well as insufficient time for independent academic activities, and smoking are important risk factors associated with depression.[9] An interesting finding regarding the risk of depression among resident doctors was discovered in a study in India, where a family history of chronic illness, a history of parental loss, and failed romantic relationships are significant risk factors for depression among resident doctors.[10]

Long working hours are an independent risk factor for depression among resident doctors. A study in Japan aimed at investigating the relationship between long working hours and depression found that clinically significant depression symptoms were reported in 45.5% of resident doctors who worked 100 hours or more per week for at least 3 months. Moreover, working 80 to 99.9 hours per week was associated with a 2.83 times higher risk of depression compared to resident doctors working <60 hours per week. Furthermore, if resident doctors worked >100 hours per week, they were at a 6.96 times higher risk of experiencing depression symptoms.[11]

Depression greatly affects the quality of medical services provided by residents. Resident doctors experiencing depression are likely to make 6.2 times more medical errors per month compared to resident doctors who are not depressed.[12] Around 20% of medical errors are considered moderate to severe errors.[13] The decline in performance quality can be attributed to

excessive workload and fatigue experienced by resident doctors.[14]

As far as the researchers know, to date, there has been no study on depression conducted among resident doctors in the neurology program in Indonesia. Based on the information provided above and considering that resident doctors are at the forefront of specialized healthcare services in hospitals, we aim to determine the prevalence of depression, understand its relationship with various sociodemographic factors and environmental aspects, and its association with the residency level of resident doctors in the Neurology Program at the Faculty of Medicine, Universitas Indonesia (FK UI)

MATERIAL AND METHOD

Subject of study

The sample size in this study was calculated using the formula developed by Issac and Michele for a known population.[15] From this calculation, the minimum sample size for this study is 65 subjects. However, this study involves all neurology resident doctors at the University of Indonesia. The inclusion criteria for this study are resident doctors who are actively enrolled in the Neurology Program at the University of Indonesia and are willing to participate and sign the informed consent. Research subjects will be excluded if they have been diagnosed with major depressive disorder by a psychiatrist, are undergoing treatment prescribed by a psychiatrist, or are currently taking antidepressant medication or other psychotropic drugs.

Method of study

Prior to the study period, all subjects were screened for eligibility based on their inclusion and exclusion criteria. Subsequently, research subject data were collected primarily using the Google Form platform, which was directly filled out by the research subjects. Research participants also completed the Beck Depression Inventory-II (BDI-II) questionnaire, which was included in the Google Form. The collected data were entered into the research data register for further analysis.

Statistical analysis

Data analysis was conducted using SPSS version 20. Categorical and nominal data were presented in the form of percentage and frequency graphs. Categorical and nominal data analysis was performed using the chi-square test with Fisher's exact test as an alternative if the chi-square test assumptions were not met. Regression analysis was conducted to determine the most important variables in the onset of depression.

RESULT

Demography

Sixty-nine neurology resident doctors were invited to participate. Four participants were excluded because they were diagnosed with major depressive disorder and/or had previously used psychotropic medication.

Depression prevalence

The prevalence of depression was very low compared to those who are not depressed. In this study, no neurology resident doctors experienced severe depression based on the BDI-II. In this study, only 18.4% of neurology resident doctors experienced depression. Of this number, only 50% experienced mild depression, and the rest experienced moderate depression. Approximately 81.5% of participating neurology residents in this study did not experience depression (Table 1).

Factors associated with depression

This study found that the level of residency and support from seniors/mentors were associated with the occurrence of depression among neurology resident doctors (p=0.044; p=0.049). Meanwhile, age (p=0.768), gender (0.245), support from colleagues (p=0.059), hours worked per week (p=0.850), and marital status (p=0.598) were not significantly associated with the occurrence of depression in neurology residents. The smoking variable could not be analyzed because participants in this study did not smoke (Table 2).

Risk factors of depression

From logistic regression, it was found that only the level of residency was a statistically significant risk factor for depression among neurology residents (OR: 0.036; 95% CI: 0.02-0.815; p=0.037). Meanwhile, other variables such as age, gender, hours worked per week, peer support, support from seniors/mentors, and marital status were not statistically significant risk factors for depression among neurology resident doctors.

Table 1. Demographic characteristics of neurology resident doctors

	No depression (%)	Mild	Moderate	Severe
N	53 (81.5)	6 (9.2)	6 (9.2)	0
Age				
≤ 30	29 (44.6)	4 (6.2)	2 (3.1)	0
>30	24 (36.9)	2 (3.1)	4 (6.2)	0
Sex				
Male	13 (20.0)	3 (4.6)	2 (3.1)	0
Female	40 (61.5)	3 (4.6)	4 (6.2)	0

Marital status				
Unmarried	22 (33.8)	2 (3.1)	2 (3.1)	0
Married	31 (47.7)	4 (6.2)	4 (6.2)	0
Smoker				
Yes	0 (0)	0	0	0
No	53 (81.5)	6 (9.2)	6 (9.2)	0
Level of recidency				
1st semester	8 (12.3)	2 (3.1)	1 (1.5)	0
2^{nd} – 3^{rd} semester	13 (20.0)	0 (0.0)	2 (3.1)	0
4^{th} – 5^{th} semester	10 (15.4)	3 (4.6)	3 (4.6)	0
$\geq 6^{th}$ semester	22 (33.8)	1 (1.5)	0 (0.0)	0
Working hours (hour/week)				
$\leq$ 48	7 (10.8)	1 (1.5)	0 (0.0)	0
48-64	27 (41.5)	3 (4.6)	4 (6.2)	0
>64	19 (29.2)	2 (3.1)	2 (3.1)	0
Colleague support				
Yes	52 (80.0)	5 (7.7)	5 (7.7)	0
No	1 (1.5)	1 (1.5)	1 (1.5)	0
Mentor support				
Yes	48 (73.8)	5 (7.7)	3 (4.6)	0
No	5 (7.7)	1 (1.5)	3 (4.6)	0

DISCUSSION

This study found that the prevalence of depression among neurology residents is much lower compared to residents who do not experience depression. There were no neurology resident doctors experiencing severe depression. Based on the BDI-II, approximately 18.4% of resident doctors experienced depression, with 50% of them experiencing mild depression, while the rest experienced moderate depression.

However, it is noteworthy that among resident doctors who did not experience depression based on the BDI-II, one resident doctor had suicidal ideation. This finding is consistent with a study conducted by Alrehaili et al., which found that approximately 15.8% of resident doctors experienced depression. Among resident doctors experiencing depression, it was also found that nearly half experienced mild depression, while the rest experienced moderate depression.[8]

Table 2. Factors associated with depression in neurology resident doctors

	No Depression (%)	Depression (%)	p
Age			0.768
≤ 30	29 (44.6)	6 (9.2)	
>30	24 (36.9)	6 (9.2)	
Sex			0.245
Male	13 (20.0)	5 (7.7)	
Female	40 (61.5)	7 (10.8)	
Marital status			0.598
Unmarried	22 (33.8)	4 (6.2)	
Married	31 (47.7)	8 (12.3)	
Smoker			
Yes	0 (0)	0 (0)	
No	53 (81.5)	12 (18.5)	
Level of recidency			0.044*
1st semester	8 (12.3)	3 (4.6)	
2^{nd} – 3^{rd} semester	13 (20.0)	2 (3.1)	
4^{th} – 5^{th} semester	10 (15.4)	6 (9.2)	
≥ 6^{th} semester	22 (33.8)	1 (1.5)	
Working hours (hour/week)			0.850
≤ 48	7 (10.8)	1 (1.5)	
48-64	27 (41.5)	7 (10.8)	
>64	19 (29.2)	4 (6.2)	
Colleague support			0.059
Yes	52 (80.0)	10 (15.4)	
No	1 (1.5)	2 (3.1)	
Mentor support			0.049*
Yes	48 (73.8)	8 (12.3)	
No	5 (7.7)	4 (6.2)	

The incidence rates and levels of depression obtained in this study are almost similar to those found in a study conducted in the pediatric health science program in the same center, where the incidence of depression based on the MDI questionnaire was 23.9%. Among the 23 participants who experienced depression, 15 had mild depression, 10 had moderate depression, and 3 had severe depression. The study also found that none of the factors investigated were statistically associated with the occurrence of depression. This may be due to the limited sample size, resulting in nonsignificant relationships between depression and various sociodemographic factors analyzed.[6] Another study explains that personal characteristics such as neurotic disorders can be predisposing factors for a doctor to experience depression, stress, and anxiety.[16]

The incidence of depression found in this study is also nearly similar to the incidence of depression among doctors in general. A study in South Africa found that 21.3% of doctors experienced depression and significantly correlated with the lack of clinical supervision support and inadequate hospital resources.[17] A recent systematic review and meta-analysis indicate that the prevalence of depression among doctors worldwide is around 28.8%, which is quite high compared to the general population. Factors such as excessive workload, long working hours, unsafe work environments, disrupted management plans, difficult relationships with senior doctors/staff, lack of sleep, frequent encounters with death, etc., contribute to the occurrence of depression among doctors.[18]

The age groups of <30 years and >30 years have the same proportion of depression, which is 9.2% of all participants. Age was also not found to be significantly associated with depression. In a study conducted by Ndukwu et al., there was also no significant relationship found between age and depression among resident doctors, but, this study found that the highest occurrence of depression was in the age range of 31-35 years.[7] Another study from Japan indicates no association between age and depression.[19] Older individuals have a lower proportion and severity of depression. This is because older people have developed coping mechanisms and can manage their depression better. Factors such as academic stress, fear of the future, substance abuse, are considered to contribute to the high prevalence of depression in young adults.[20]

Females have a higher proportion of depression compared to male resident doctors. However, gender is not statistically significant with the occurrence of depression. This finding is similar to recent studies that revealed depression among female resident doctors is significantly higher than among males.[21] However, other studies indicate that male resident doctors experience depression more than females (73.0% versus 27.0%).[7] Our study findings may be due to the fact that the proportion of female participants is much higher than males (72% versus 18%).

Marital status was not significantly associated with depression in this study. Married resident doctors had a higher proportion of depression compared to single doctors (12.3% vs. 6.2%). This is similar to a study conducted by Pasqualucci et al., which found that marital status is not a risk factor for depression among resident doctors.[4] However, this is in stark contrast to other studies stating that marital status is closely associated with the occurrence of

depression among resident doctors, with married resident doctors having a lower risk of experiencing depression. Married individuals may find comfort and share other burdens with their partners, which can help reduce the occurrence of depression in this group.[7] Compared to married individuals, singles or those who are divorced/widowed are consistently associated with poorer mental health throughout their lives. In the 30-year-old age group, marriage appears to be better than other relationship statuses for mental well-being, as it tends to be associated with a reduced risk of depressive symptoms and higher self-esteem.[22]

In this study, the level of residency was found to be statistically significant for depression. Additionally, regression analysis also concluded that the higher the level of residency, the lower the risk of experiencing depression. Residents of 6th semester or higher had the lowest risk of experiencing depression. The findings in this study are similar to research conducted in Mexico, which found that earlier residency had the highest risk of depression, approximately 3-4 times higher than the senior.[23] Some studies concluded no correlation of level of study with depression.[4,8,24] Various studies identify a pattern where resident doctors at higher levels of residency are usually better able to handle the pressures and responsibilities of their environment compared to those at lower levels of residency.[25]

Long working hours are an independent risk factor for depression among resident doctors. A study in Japan found that approximately 45.5% of resident doctors who worked 100 hours or more per week for at least 3 months became depressed. Additionally, working 80 to 99.9 hours per week was associated with a 2.83 times higher risk of depression compared to resident doctors working <60 hours per week. Furthermore, if resident doctors worked >100 hours per week, they were at a 6.96 times higher risk of experiencing depression symptoms.[11] Another study in Saudi Arabia indicates that resident doctors working >40 hours per week are at a higher risk of experiencing depression compared to those working <40 hours per week. Resident doctors working 49–64 hours per week and more than 64 hours per week each have a 2.21 and 2.37 times greater risk of experiencing depression, respectively.[26]

There is negative correlation between the length of working hours and sleep hours.[11] Lack of sleep can activate the sympathetic nervous system and β-adrenergic signaling, which in turn releases neurotransmitters and activates inflammation mediated by nuclear factor kappa B (NF-κB). The gene

expression of inflammation by NF-κB increases the levels of inflammatory cytokines, such as Interleukin-6 (IL-6) and Tumor Necrosis Factor (TNF). These inflammatory cytokines are highly correlated with the development of depressive disorders. Additionally, disrupted REM sleep can lower the levels of monoamines. Low levels of monoamines lead to depressive symptoms.[27]

The results of this study indicate that there is a relationship between support from seniors, supervisors, or mentors and depression among resident doctors. Peer support or colleague support is not significantly associated with depression. This may be because the proportion of resident doctors experiencing depression and feeling supported by senior/teaching staff and those who do not feel supported is quite balanced, as seen in Table 2. However, the proportions differ significantly for colleague support variable. This is different from the findings of a study conducted in Pakistan, where support from peers or colleagues was significantly associated with the occurrence of depression among resident doctors. Supervisor or senior support was not associated with depression.

Support from various sources serves as an additional coping mechanism for the pressures experienced by resident doctors during their training. Resident doctors will feel more comfortable and have a positive outlook when receiving this support. Additionally, support from seniors/teaching staff in the form of clear tasks and guidance for resident doctors is associated with a decreased risk of depression occurrence. Some previous studies have concluded that clearer tasks and roles received by resident doctors from seniors/staff lead to lower stress levels.[25,28]

The strength of this study lies in the use of the Beck Depression Inventory questionnaire to assess the level of depression. The Beck Depression Inventory is the most used and widely accepted tool for measuring depression and has been validated for use in the Indonesian language version.

This study had several limitations that may render the results not statistically significant. Firstly, the sample size in this study might not be large enough. Therefore, for further research, it is advisable to conduct multicenter studies involving more neurology resident doctors. Secondly, because Indonesia is a religious country, religiosity should also be analyzed, which was not included as a variable analyzed in this study.[29] Thirdly, measurement bias may occur because this study was conducted by the teaching staff of the neurology program itself. This could lead

resident doctors to be reluctant to fill out the BDI-II questionnaire according to their actual conditions. Further research could be conducted by independent institutions.

CONCLUSION

Our study found that 18.4% of neurology resident doctors had depression. Residency level and senior/supervisor support were significantly associated with depression among resident doctors.

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