



Original Article

## Prevalence of depressive symptoms and excessive daytime sleepiness in a cohort of Saudi doctors under training: A cross sectional study



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### المخلص

**أهداف البحث:** أظهرت الدراسات الحديثة ارتفاع معدلات الاكتئاب ومشاكل النوم خلال فترة التدريب للأطباء المقيمين. هدفت هذه الدراسة إلى تحديد مدى انتشار الاكتئاب والنعاس بين الأطباء المقيمين في تخصصات مختلفة في منطقتين في المملكة العربية السعودية، ووصف العوامل المؤثرة في الاكتئاب والنعاس.

**طرق البحث:** تم توزيع الاستبانة على الأطباء المقيمين في مدينة الملك عبد العزيز الطبية (منطقة الرياض) ومستشفى الملك فهد التخصصي ببريدة ومستشفى الولادة والأطفال ببريدة (منطقة القصيم). تم استخدام استبانة صحة المريض<sup>2</sup> لفحص الاكتئاب، واستخدام مقياس إيورث للنعاس لقياس النعاس.

**النتائج:** أكملت الاستبانة 181 من الأطباء المقيمين. وبلغ معدل انتشار أعراض الاكتئاب 93%، بينما أفاد 49% من الأطباء المقيمين بالشعور بالنعاس المفرط أثناء النهار. وكانت أعراض الاكتئاب أكثر شيوعاً بين الأطباء المقيمين بمدينة الملك عبد العزيز الطبية، مع معدل انتشار 94.5%. كما لوحظ أن هناك ارتباطاً كبيراً بين أعراض الاكتئاب والنعاس المفرط.

**الاستنتاجات:** تنتشر أعراض الاكتئاب والنعاس المفرط بشكل كبير بين الأطباء المتدربين في الدراسات العليا. ويعاني الأطباء المقيمون المصابون بالاكتئاب من

زيادة النعاس في وقت العمل. إن الانتشار الكبير لكل من أعراض الاكتئاب والنعاس يندرج بالخطر نظراً للتأثير السلبي على سلامة المرضى. لذلك فهناك حاجة ملحة لتحسين عافية الأطباء المقيمين من خلال برامج الرفاه المنظمة.

**الكلمات المفتاحية:** الاكتئاب؛ النعاس؛ سلامة المريض؛ متدربي التعليم الطبي العالي؛ برامج الرفاه

### Abstract

**Objectives:** Recent studies have highlighted an increasing prevalence of depression and sleep problems among physicians during their residency training in the medical field. The study aims to explore the prevalence of depressive symptoms and sleepiness among the residents of different medical specialties in the two regions of KSA and describe the factors that potentially cause depression and sleepiness.

**Methods:** A survey was distributed to the residents of King Abdulaziz Medical City in the Riyadh province, and to the residents of King Fahad Specialist Hospital Buraidah and Maternity and Children's Hospital Buraidah in the Qassim province. The Patients' Health Questionnaire-2 was used to determine the prevalence of depression and the Epworth Sleepiness Scale was used to measure sleepiness.

**Results:** One hundred and eighty-one residents completed the survey. While depressive symptoms were prevalent among 93% of the residents, 49% of the residents reported excessive daytime sleepiness. Depressive symptoms were more common in the residents of King Abdulaziz Medical City, with the prevalence being

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94.5%. There was a significant association between depressive symptoms and excessive sleepiness ( $p = 0.046$ ).

**Conclusion:** Depressive symptoms and excessive sleepiness are highly prevalent in postgraduate trainees. Residents with depression were found to be sleepier during their work. Given the negative effect on patient safety, the high prevalence of both depressive symptoms and sleepiness is alarming. There is an urgent need to improve residents' wellness through well-structured well-being programs.

**Keywords:** Depression; Graduate medical trainees; Patient safety; Sleepiness; Well-being program

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## Introduction

There is a growing international concern with regard to the high prevalence of depression, burnout, and stress among the residents of postgraduate training programs. These measures of resident well-being are the focus of many studies. Resident wellness has been found to be affected by long duty hours. In a recently published Saudi study on duty hours and burnout among residents, half of the trainees reported of working 60–79 h per week, with almost one-third of them reporting that they worked in excess of 80 h a week. Having used the Maslach Burnout Inventory as the survey tool, we found the rate of prevalence of burnout to be very high at 81%.<sup>1</sup> While there have been many studies of late on the burnout found among medical trainees in the Kingdom,<sup>1–3</sup> there are very few local studies on the prevalence of depression and sleepiness among residents.

Depression among postgraduate trainees is a significant health problem, with the rate of prevalence being approximately 20%.<sup>4</sup> The risk of suicidal thoughts is also high among residents, with the risk rate among them being greater than among their peers in the population.<sup>4–6</sup> A recent meta-analysis and systemic review found the physicians screened positive for depressive symptoms to be at a higher risk with regard to committing medical errors.<sup>7</sup> A study of the residents of one of the hospitals in Eastern KSA found 63% of the residents reporting depressive symptoms, with 4.7% admitting to having suicidal thoughts.<sup>8</sup> Another single centre cross-sectional study, this time conducted in Western KSA, found depression to be identified among 76% of the residents.<sup>9</sup> In addition, a small study of 34 plastic surgery residents across the Kingdom also found high prevalence of depression among the respective residents (71%).<sup>10</sup>

Residents with sleep deprivation also carry a higher risk of making serious medical errors.<sup>11</sup> In a study of emergency medicine residents, it was observed that medical errors were reported in those residents who had mild or severe sleepiness.<sup>12</sup> In one of the previously mentioned studies

conducted in Eastern KSA, the overall prevalence of sleepiness was reported to be 52%.<sup>8</sup> More recently, in a study of the residents of Saudi Commission for Health Specialties' programs, a very high proportion of residents (86.3%) reported poor sleep quality. The prevalence of poor sleep quality was found to be highest in the residents aged 27–29 years. Sex and level of training were not found to be significantly correlated to poor sleep quality. The rate of poor sleep quality was highest among the residents in the anaesthesia programs, followed by the residents in the neurosurgery and paediatrics programs.<sup>13</sup>

The objectives of our study were to determine the prevalence of depressive symptoms and sleepiness among the residents of multiple specialities located in the different regions of the country, explore the factors affecting depression and sleepiness, and describe the relationship between depression and sleepiness.

## Materials and Methods

As a part of the paper-based questionnaire on the resident duty hours in KSA,<sup>1</sup> questions were asked on depressive symptoms and sleepiness. The Patient Health Questionnaire-2 (PHQ-2) was used for screening the residents for depression. The PHQ-2 is based on the original Primary Care Evaluation of Medical Disorders (PRIME-MD) instrument, a standardized tool of 26 questions used for the diagnosis of the commonly encountered mental health disorders in the primary care setting. The 2 questions from the PRIME-MD instrument related to depression that made the PHQ-2 are: (1) 'During the past month have you often been bothered by feeling down, depressed, or hopeless?'; and (2) 'During the past month have you often been bothered by little interest or pleasure in doing things?'. We used the answering of 'yes' to any of these 2 questions as a positive screen for depression, and this correlated well with the validated depression questionnaire (the Zung Depression Scale).<sup>14</sup> Other studies, both internationally and in KSA, have shown that the PHQ-2 has good sensitivity to detect depression in a primary care setting.<sup>15,16</sup> The Epworth Sleepiness Scale (ESS), a validated measurement of sleepiness, was used to measure sleepiness.<sup>17</sup> It is a simple self-administered questionnaire and consists of 8 questions (situations) where there are chances of being dozed, and each situation is scored from 0 (would never doze) to 3 (high chance of dozing).<sup>18</sup> Given the reference range of ESS to be 0–10 in normal subjects, we used the cut-off score of 11 to indicate excessive daytime sleepiness.<sup>19</sup> The higher the ESS score, the higher the person's level of daytime sleepiness.<sup>17</sup>

The survey questions were administered to the residents enrolled in the accredited postgraduate training programs going on in 2 different regions of the Kingdom: Riyadh (King Abdulaziz Medical City) and Qassim (King Fahad Specialist Hospital Buraidah and Maternity and Children's Hospital Buraidah). Residents from a variety of medical and surgical programs were surveyed during the 2013–2014 academic year. An invitation letter was sent to all the participants, and the completion of the survey implied consent. The responses remained anonymous. As an incentive to participate, the residents could voluntarily enter their names to win gift cards that could be used at a local bookstore. The study

received IRB approval from King Abdullah International Medical Research Center (KAIMRC), Riyadh (Ref. No. IRBC/055/12).

We used IBM SPSS Statistics for Windows, Version 22.0 (Armonk, NY), for statistical analysis. Categorical data were presented as frequencies and percentages. Quantitative variables were summarized by using descriptive statistics. To draw comparisons between the categorical variables, specialties, and geographical regions, a chi square or a Fisher's exact test was used. A test with a p-value of <0.05 was considered statistically significant via the use of a 2-tailed test.

## Results

A total of four hundred and twenty-five residents from three different hospitals were approached, and 181 residents (42.6%) completed the survey. Of the residents who completed the survey, 146 (81.6%) were from King Abdulaziz Medical City (KAMC), 136 (75.6%) were in non-surgical residency programs, 106 (58.6%) were female, and 93 (52%) were unmarried (Table 1).

Based on the residents responding 'yes' to at least one of the screening questions for depression on the PHQ-2, the prevalence of depressive symptoms among residents overall was 92.7%; 95% CI=(87.8–96.1%). A higher proportion of residents in KAMC reported depressive symptoms in comparison to the residents of the two hospitals in Qassim region, 94.5% vs. 84.4% (p-value 0.047). There were no significant differences in depressive symptoms based on sex, marital status, presence of children, specialty, or level of training (junior vs. senior resident) (Table 2).

The prevalence of excessive daytime sleepiness among residents via the use of an ESS score of 11 or above was 48.9%; 95% CI=(41.3–56.5%). There were no significant differences in sleepiness when comparisons were made based on sex, marital status, presence of children, institution, or specialty (surgical vs. non-surgical) (Table 3). Of the

**Table 1: Demographical data of the residents who completed the survey on depressive symptoms and sleepiness.**

Variables	n	Percentage
Gender	Male	75 41.4
	Female	106 58.6
Marital status	Married	86 48.0
	Unmarried	93 52.0
Presence of children	No	109 69.9
	Yes	47 30.1
Institution	KAMC	146 81.6
	Qassim*	33 18.4
Specialty	Surgical	44 24.4
	Non-Surgical	136 75.6
Level of training	R1	65 36.1
	R2	48 26.7
	R3	37 20.6
	R4	24 13.3
	R5	6 3.3

\*Qassim: King Fahad Specialist Hospital Buraidah and Maternity and Children's Hospital Buraidah

**Table 2: Factors associated with the depressive symptoms found in Saudi residents.**

Variable	Categories	Depressive Symptoms, n (%)*	P-value
Sex	Female	98 (94.2)	0.351
	Male	67 (90.5)	
Marital status	Married	79 (92.9)	0.872
	Unmarried	84 (92.3)	
Presence of children	Yes	43 (91.5)	0.662
	No	100 (93.5)	
Institution	Qassim	27 (84.4)	<b>0.047</b>
	KAMC	137 (94.5)	
Specialty	Surgical	39 (90.7)	0.572
	Non-surgical	125 (93.3)	
Junior vs. senior resident	Junior resident	102 (92.7)	0.963
	Senior resident	62 (92.5)	

\*Responding 'yes' to at least one of the screening questions on the PHQ-2. Bold value indicates P < 0.05.

**Table 3: Factors associated with sleepiness among Saudi residents.**

Variable	Categories	Sleepiness, n (%)	P-value
Sex	Female	37 (48.5)	0.917
	Male	50 (49.3)	
Marital status	Married	47 (54.7)	0.176
	Unmarried	40 (44.4)	
Presence of children	Yes	25 (53.2)	0.492
	No	50 (47.2)	
Institution	Qassim	16 (51.6)	0.789
	KAMC	71 (49.0)	
Specialty	Surgical	21 (48.8)	0.970
	Non-surgical	65 (48.5)	

residents who reported sleepiness, 84 (96.6%) screened positive for depression in Riyadh and 78 (88.6%) screened positive for depression in Qassim (p-value 0.046).

## Discussion

We present a multi-centre, multi-specialty survey of the depressive symptoms and sleepiness found among the residents in KSA. A vast majority of residents screened positive for depressive symptoms and almost half of the residents had excessive daytime sleepiness. There was a significant association with positive screening for depressive symptoms and sleepiness.

In comparison to the other local studies on depression found among residents,<sup>8–10</sup> our study found an even higher prevalence of depressive symptoms, with approximately 93% of the residents screening positive in the PHQ-2 questionnaire. We believe the difference in findings is due to the instrument used to estimate the prevalence of depression. Our study used a 2-item PHQ-2, which should be viewed as a screening tool as it has a low level of specificity.<sup>4</sup> Nonetheless, as confirmed by the other local studies, there

is a very high prevalence of depression among the Saudi residents. This is a concerning finding as the depressed residents are at a higher risk of committing suicide and making medical errors.<sup>4-6,20</sup> There were no significant differences in depressive symptoms based on sex, marital status, presence of children, specialty (surgical vs. non-surgical), or level of training (junior vs. senior resident). While a recent study from Oman found higher prevalence of depression among the female residents,<sup>21</sup> the findings of other local studies have demonstrated conflicting association.<sup>8-10</sup> In a systematic review of the prevalence of depression and depressive symptoms found among the resident physicians, no clear associations were found between the non-surgical and surgical residents, and junior versus senior residents.<sup>4</sup> In our study, the residents training in the larger tertiary care centre (King Abdulaziz Medical City) reported higher depressive symptoms than the residents of the two smaller hospitals in the Qassim region. While we are not aware of any specific literature that has compared the prevalence of depression in larger versus smaller centres, we postulate that this difference may be because of the increased work pressure and hierarchy in the training experienced at a large academic centre.

Excessive daytime sleepiness was reported in almost half of the residents, and there were no significant differences in sleepiness when comparing sex, marital status, institution, and surgical versus non-surgical specialty. Our study findings are similar to the published literature in which 52% of the residents in Eastern KSA experienced sleepiness.<sup>8</sup> In another study that used a different instrument to assess sleep quality, 86% of the residents reported poor sleep quality, and increased number of on calls and shift work were found to be the major risk factors associated with this.<sup>13</sup> We found a significant association between sleepiness and depression, with 97% of the residents who reported sleepiness screening positive for depression. This is consistent with the findings of the study conducted in Eastern KSA, showing an association between these two measures of well-being.<sup>8</sup>

Our study findings are consistent with the findings of local and international reports that demonstrated high rates of depressive symptoms and sleepiness among the postgraduate trainees. In these times of the COVID-19 pandemic, physician trainees have reported increased stress and burnout.<sup>22</sup> Moving forward, there is a pressing need to develop organized programs that address the well-being of residents. Physician-directed interventions can reduce the symptoms of mental health.<sup>23</sup> A residency-integrated wellness program in neurosurgical residents was found to have a positive impact on the well-being of residents.<sup>24</sup> Aside from the mentorship programs that have started in several residencies, we are aware of one specific organizational-based program for resident well-being in KSA. The 'Daem service' was recently introduced by the Saudi Commission for Health Specialties. This service is used to support the trainees experiencing psychological pressures or professional burnout. Trainees will be required to contact the Saudi Commission and receive the academic and psychological support.<sup>25</sup> While further details are yet to be announced about this service, it looks promising in promoting the well-being of residents.

Our study has many strengths. It was the first multi-centre study in the region that described the depressive symptoms

and sleepiness found among the postgraduate trainees. We carried out a survey of the residents of three hospitals located in two geographical regions. In addition, the survey included the residents of multiple specialties and different levels of training. The main limitation of our study is that the screening mechanism we used for depression was a self-report inventory (PHQ-2) that comprised of two screening questions. Ideally, those who screened positive for depressive symptoms on the PHQ-2 should have had a more detailed questionnaire or a diagnostic clinical interview for assessing depression.

## Conclusion

There is a high prevalence of depressive symptoms and sleepiness among the Saudi postgraduate trainees. A large national study of residents is needed to further study the prevalence of depression and sleepiness, and assess their relationship with the other resident well-being measures such as burnout. Organized and sustainable initiatives to improve the well-being of residents are needed to ensure that the residents take care of their own health in addition to taking care of the health of their patients.

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## Conflict of interest

The authors have no conflicts of interest to declare.

## Ethical approval

This study obtained ethical approval from the IRB at KAIMRC (Ref. No. IRBC/055/12) dated 15th May, 2015.

## Authors' contribution

TH and MD designed the study and were involved in data collection, data analysis, and manuscript writing. EM made contributions toward data analysis. FA was involved in data collection. NA was involved in data collection and the drafting of the manuscript. All the authors have critically reviewed and approved the final draft, and are responsible for the content and similarity index of the manuscript.

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