The comorbidity of depression and anxiety among Saudi Board Residents in different health training programs in Al-Ahsa, Saudi Arabia, 2024

Abstract

Introduction

Depression and anxiety disorders are among the most prevalent mental illnesses worldwide; they affect a person's functionality, causing long-term impairments. The prevalence of depression and anxiety in the general population is increasing, and healthcare providers are at risk of developing these mental illnesses, which impact the care provided to patients, the quality of life of the physicians, and the level of work productivity.

Aim

to examine the prevalence and factors associated with the comorbidity of depression and anxiety among training physicians in various health training programs under the Ministry of Health (MOH) in Al-Ahsa, Saudi Arabia.

Methods

This is a descriptive cross-sectional study conducted among training physicians in various health care training programs under the Ministry of Health in Al-Ahsa, Saudi Arabia. Data collected from different fields from a total of the study population 471 of a total population sampling. The data was collected through a validated self-administered questionnaire form. Data was analyzed using IBM SPSS Statistics for Windows, version 26 (IBM Corp., Armonk, NY, United States). Descriptive statistics were used to calculate the frequency and percentage of categorical variables.

Results

A total of 221 professionals were included in the data collection from a total population of 471. The majority, 157 (71.0%), were between 24 and 29 years old, and 111 (50.2%), were females. Around 131 (59.3%) were married, and 111 (50.2%) reported receiving up to 5 on-call shifts per month. A total of 160 (72.4%) were not exercising, 188 (85.1%) were non-smokers, 187 (84.6%) did not complain of chronic diseases, and 195 (88.2%) did not complain of psychiatric illness. The participants showed mild 35.3%, moderate depression 33%, and moderately-severe 6.8% or severe depression 12.2%. Severe depression was highest in General surgery and orthopedics specialties (50% both). The residents, 49.8% (n=110), had no or minimal anxiety; others showed mild 22.6%, moderate 12.7%, and severe depression 14.9%. Severe anxiety was highest in Orthopedics (50%) and Psychiatry specialties (33.3%). Comorbidity of depression and anxiety

37 was Hughes in Orthopedics, followed by Obstetrics and Gynecology, internal medicine, and
38 pediatrics.
39 **Conclusion**
40 The comorbidity of depression and anxiety are prevalent in residents with different level in
41 different specialities. Improving the mental health of training residents and providing new
42 interventions to prevent, recognize, and manage this issue in our community settings, especially
43 in high-risk specialties, will improve overall healthcare quality

44 **Keywords**: Comorbidity, Depression, Anxiety, Al-Ahsa, Training Physicians in Health Training

45 Programs, Ministry of Health (MOH)

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Introduction:

Depression

One of the most prevalent mental illnesses in the world, depression, can affect a person's functionality
and result in long-term impairments in all facets of life. Globally, depression affects up to 5% of the
population. The definition of depression is a chronically low mood that impairs many aspects of a
patient's functioning and is accompanied by a loss of interest in previously enjoyed activities.
Disturbances in sleep, focus, and appetite, constant weariness, guilt, and suicidal thoughts or attempts
are other signs of depression (1). Suicidal ideation is a comprehensive phrase used to describe a variety
of concepts, including thoughts and wants. It can be either passive or active, depending on whether the
patient has plans to commit suicide or not, as well as a desire to die (2). Although the exact etiology of
depression is still unknown, it is recognized to be influenced by several interrelated social,
psychological, and biological factors. Research has indicated that depression is hereditary; almost one-
third of all instances are thought to be inherited (1). Obesity, financial difficulties, a lack of social
support, experiencing stressful life events such as parental loss or a history of abuse during childhood,
having other medical conditions like multiple sclerosis, dissatisfaction with one's quality of life,
excessive workload at work, and burnout at work are all risk factors linked to depression (1, 3). Gender
is a significant risk factor; women are twice as likely as men to have depression. It was discovered that
the prevalence of depression in relation to gender varies by region in the Gulf and Saudi Arabia. In

Saudi Arabia, up to one-third of all high school female students suffer from depression, whereas in Oman, it only affects less than one-fifth of all female adolescents. This is also the case in Egypt (3). Research indicates that there is a major risk factor for depression associated with family history; those who have first-degree relatives with a diagnosis of depression are three times more likely to be affected than those who do not (4). Research has indicated that depression is quite common throughout the world, with an estimated 300 million people affected. The percentage of people who are identified and successfully receive treatment is still low, even though there are established guidelines for diagnosing depression and effective treatment programs are available (5).

Depression screening is crucial and vital. Depression is a very common and extremely incapacitating aspect of health care. Patient health questionnaires, such as the Patient Health Questionnaire-2 (PHQ-2) or the Patient Health Questionnaire-9 (PHQ-9), are frequently used by healthcare providers to screen for depression. Both have extremely sensitive and specific levels for identifying and evaluating the severity of depression in individuals (6,7). A popular self-administered tool for determining the severity of depression is the PHQ-9. Research has demonstrated that the PHQ-9 is a viable and trustworthy tool for screening for depression and determining its severity, having been developed over many years by numerous researchers (7). Nine items on the PHQ-9 are designed to test for signs of depression and disability over the course of the previous two weeks. There are four possible answers for each question, with a score ranging from zero (not at all) to three (almost every day), for a total of twenty-seven points that examine the existence and severity of depression (6). A score of 20–27 indicates that the screening for depression is positive and that it is severe; a score of 15–19 indicates that the depression is moderately severe; a score of 10–14 indicates that the depression is moderate; a score of 5–9 indicates that the depression is mild; and a score of 4–1 indicates that the depression is minimal. When it comes to screening for depression, PHQ-9 has a greater specific level than PHQ-2, while PHQ-2 has a similar sensitivity level. It is advised that everyone over the age of eighteen be eligible for a depression test, regardless of whether they have any risk factors for the condition (5).

Two interest and mood-related multiple-choice items on the PHQ-2 have a score range of 0 to 3, with a total score of three or above being regarded as a positive screening result (6,7). The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria for Major Depressive Disorder (MDD) must be checked to confirm the diagnosis whenever the screening result is positive (6). The DSM-5 states that a patient must exhibit at least five symptoms from all the criteria for an MDD

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diagnosis, with at least one of those symptoms having to be a loss of interest or a poor mood that has persisted for at least the previous two weeks. Sleep difficulty, poor attention, disturbed appetite, psychomotor agitation, low energy, guilt, and suicidal thoughts are some additional symptoms (6,8). Suicidal thoughts or attempts to ensure patient safety, together with interventions such as regular and close monitoring or even hospitalization when required, must be considered when evaluating patients with depressed symptoms (4). The DSM-5 for MDD is consistent with the diagnosis of depression and uses the total score result to determine how severe depression is (6,8).

Laboratory tests are useful in ruling out any potential medical condition that could mimic depression, even though they are not useful in diagnosing depression (4). A complete blood count (CBC), thyroid profile, analysis of iron and vitamin B12 levels for potential anemia, liver enzyme levels, and renal function tests are among the laboratory tests used to determine the patient's preferred medication based on their health (6).

There is a clear correlation between depression and substantial functional disability. All people with depression have functional impairment, according to studies, and almost two-thirds of all people with depression have a severe kind of impairment associated with the condition. It has been discovered that the functional impairment of people with depression is comparable to that of people with organic chronic diseases like diabetes or even cancer. Patients with depression are more likely to seek medical attention and be admitted to the hospital than people without depression. They are also more likely to attempt suicide and suffer from unemployment twice as frequently as people without depression. Because depression can worsen the condition of coexisting cardiovascular diseases, significantly increase mortality following myocardial infarction or unstable angina, and raise the risk of hypertension and stroke events, patients who suffer from depression are at an increased risk of mortality and mobility rate. The greatest important effect of depression on death rates has been shown to be suicide; research has shown that people with depression are eleven times more likely to attempt suicide than people without depression (9).

The true issue with depression is that the majority of those who experience it do not seek treatment; research indicates that as many as 60% of all individuals with depression do not seek treatment. The embarrassment associated with having mental illnesses or the stigma of not embracing them could be the cause of this (4). Some patients appear with a severe form of depression that requires inpatient therapy due to delusional thoughts, hallucinations, or suicidal thoughts, even though the most prevalent

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126 types are mild to moderate and can be safely treated as an outpatient. There are pharmacological, non-
127 pharmacological, or a combination of both types of depression treatment available. Treatment options
128 include electroconvulsive therapy (ECT), psychotherapies, and antidepressant drugs (10). Tricyclic
129 antidepressants, monoamine oxidase inhibitors, selective serotonin reuptake inhibitors (SSRIs), and
130 serotonin-norepinephrine reuptake inhibitors (SNRIs) are among the various classes of antidepressant
131 drugs; each group has a distinct degree of safety and side effects (11). Because SSRIs are safe,
132 effective, and have few, manageable side effects, they are regarded as the primary and first
133 pharmacological line for treating mild to moderate depression. Venlafaxine and duloxetine are
134 examples of SNRIs, while citalopram, sertraline, fluoxetine, and paroxetine are examples of SSRIs. As
135 the second-line therapeutic option if SSRIs are unable to produce improvement or a response, SNRIs
136 play a crucial role during treatment. Atypical antidepressants include, for instance, mirtazapine and
137 bupropion. When treating difficult-to-treat depression, atypical antidepressants can be administered
138 either alone or in combination (4). The treatment of severe forms of depression typically involves a
139 combination of pharmacological and non-pharmacological therapies, which can take the form of drugs
140 and psychological therapy (11). Clinical response and improvement with drugs often take four to six
141 weeks, which is why close follow-up is essential for continual monitoring and ensuring compliance
142 with the treatment plan. Psychological therapy can be undertaken as a stand-alone initial intervention
143 for patients with mild to moderate depression who prefer not to use medication. Pregnancy,
144 breastfeeding, or attempting to conceive are additional reasons to consider commencing treatment with
145 psychiatric therapy. Although there are other forms of psychological therapies, cognitive behavioral
146 therapy (CBT) is the most helpful for depression (10,11). Helping patients recognize and alter any
147 maladaptive beliefs or behaviors is the primary goal of cognitive behavioral therapy (4).

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Anxiety disorders

150 When a person encounters pressures, threatened situations, or topics where they must take action to
151 stop the threat from harming them, they experience normal anxiety. Anxiety is typically accompanied
152 by physical symptoms such as tightness in the chest and palpitations, as well as bewilderment and the
153 admission of fear. If normal anxiety continues to interfere with functioning, it may be unhealthy.
154 According to estimates, one in ten people will have impairment due to anxiety disorders, which are

very common (12). Anxiety disorder is the most prevalent mental health problem among all mental disorders. Anxiety disorders can present in several forms, including generalized anxiety disorder (GAD), agoraphobia, panic disorder, and different types of phobias, such as social phobia. Certain anxiety disorders, such as social phobia and generalized anxiety disorder, emerge during childhood. Conversely, other forms typically emerge throughout early adulthood or later, such as agoraphobia and panic disorder. Research indicates that the prevalence of anxiety disorders is estimated to be between twenty and thirty percent among individuals in early adulthood, while it affects up to ten to fourteen percent of those in later adulthood (13). Due to the predominantly chronic and substantially debilitating nature of anxiety disorders, they rank sixth among the most burdensome health-related conditions. Anxiety disorders result in substantial and profound impairment across various facets of patients' lives, adversely affecting their quality of life, occupational performance, physical functioning, overall psychological well-being, social interactions, and leading to increased healthcare utilization (14). Concerning the risk factors associated with anxiety disorders, there are several risks that are typically multifactorial and have been linked together. The primary risk factors include gender, exposure to stressors or stressful life events, the presence of chronic health conditions such as autoimmune diseases, a history of mental illnesses, current mental health issues, low socioeconomic status, residing in impoverished areas, and experiences of trauma during childhood, such as parental separation or loss. A significant risk factor for anxiety disorders, particularly generalized anxiety disorder (GAD), is the presence of a family history of mental health issues, especially among parents (15,16).

When comparing males and females regarding the association with anxiety disorders, female individuals face a risk of developing these disorders that is twice that of their male counterparts (17). Low self-esteem can be influenced by a variety of factors, including a challenging family environment, exposure to multiple traumatic events such as childhood sexual abuse, a significant family history of depression, and gender. These elements can have a direct impact on an individual's mental health, heightening the risk for anxiety disorders and major depressive disorder (MDD) (16). Some variables may help avoid or reduce the likelihood of acquiring anxiety disorders. These include receiving social support, learning healthy coping techniques for dealing with life's pressures, and elements relating to the good environment in which the person lives (18). Different types of anxiety illnesses have comparable symptoms. These symptoms include fear or worrying about situations or

185 objects that are caricatured as pathological due to their severity, being disproportionate to the threats,
186 and causing functional impairment that requires medical attention. Patients experiencing dread of
187 threatening circumstances or objects experience palpitations, chest tightness or pain, perspiration,
188 abdominal discomfort, restlessness, disorientation, and impaired focus (13). Other specific symptoms
189 of anxiety disorders include social fear or concern regarding performance, unexplained panic attacks
190 without a known trigger, and avoidance behaviors associated with threats. The prevalence of each type
191 of anxiety disorder that seeks medical assistance and visits primary health care clinics is six percent in
192 the case of GAD, thirteen percent in the case of panic disorder, whether with or without agoraphobia,
193 and approximately five percent in the case of social phobia (19). Anxiety disorders, like any other
194 mental illness, can result in a variety of comorbidities, which have a substantial impact on the patient's
195 quality of life. Some of these comorbidities include an increased risk of developing other mental
196 disorders, such as depression or substance misuse, a higher risk of developing new anxiety disorders
197 over time, and an increased risk of developing or worsening physical disorders (18). Depression is
198 recognized as the most prevalent mental illness among various mental disorders, often occurring
199 alongside anxiety disorders. Research indicates that around fifty percent to two-thirds of individuals
200 experiencing anxiety disorders also contend with depression. The correlation between anxiety
201 disorders and depression has resulted in a 3-5-fold increase in the incidence of depression among those
202 affected by anxiety disorders (13).

203 Health care should identify high-risk patients for anxiety disorders and establish the diagnosis to give
204 effective treatment to prevent disabilities and substantial life impairment. In general care, Generalized
205 Anxiety Disorder-7 (GAD-7) should be used to screen for anxiety disorders due to its 93% sensitivity
206 and 97% specificity. GAD-7 screens for anxiety disorders and assesses severity to allow doctors to
207 continue treatment if positive. Anxiety disorders can be screened using GAD-2 or GAD-7. The
208 screening methods differ in that GAD-7 is a seven-item scale and GAD-2 is a quick version of GAD-7
209 that contains only the first two questions, which are crucial to anxiety disorder screening. GAD-7 is a
210 self-administered survey based on the Diagnostic and Statistical Manual of Mental Disorders-IV
211 (DSM-IV) to identify anxiety disorders like GAD, social phobia, panic disorder, and post-traumatic
212 stress disorder (20,21). GAD-7 contains seven questions to evaluate patients for anxiety disorder
213 symptoms, limitations, and functional impairment over the past two weeks. The four options for each
214 question range from "not at all" to "nearly daily" and are scored from zero to three. A total score

between 5 and 10 indicates a mild anxiety disorder screening, 10-14 indicates a moderate screening, and 14 or more indicates a severe screening. GAD-7 survey is an established and reliable diagnostic tool for primary care and all general populations. Positive GAD-2 has only the first two questions with multiple-scoring answers. If the overall score is three or higher, further evaluation is needed (21).

When screening results show anxiety disorders, DSM-5 criteria should be used to confirm the diagnosis, which includes excessive worrying about almost everything for at least six months, with difficulty controlling these worries. Three of the six other symptoms—restlessness, poor focus, weariness, irritability, muscle tension, and sleep disturbance—must also be present. Patients' occupational and social impairments are used to confirm the diagnosis. All cases of anxiety disorder must rule out other psychological or physical issues to be diagnosed (22).

Various effective treatment options exist for anxiety disorders, demonstrating the ability to alleviate overall symptoms of anxiety and enhance the quality of patients' lives. There exist both pharmacological and non-pharmacological approaches for the treatment of anxiety disorders (13). A variety of psychological therapies, including cognitive behavioral therapy (CBT) and the self-help method, are available as first-line treatments for anxiety disorders. The most well-known method for treating anxiety disorders is cognitive behavioral therapy (CBT). CBT emphasizes the need to identify and replace unhealthy beliefs with more constructive ones, as well as the need to expose patients to real or imagined frightening stimuli to break destructive patterns of behavior. When psychological therapy fails to alleviate symptoms, when anxiety disorder is severe or persistent, or when another medical condition, such as depression and anxiety disorder, is present, pharmacological treatment may be considered as a first line of defense. It is possible to use medications from different classes, such as SSRIs and SNRIs (13, 19).

Among the SSRIs is sertraline, a medicine that works well for treating anxiety disorders alone but fails to alleviate symptoms when other mental health issues, including depression, are present. Three excellent choices for treating GAD include duloxetine, escitalopram, and venlafaxine. Another anxiolytic medicine is benzodiazepine, which is useful in treating most anxiety disorders but has adverse effects, including tolerance and reliance; hence, it is only used for limited periods of time with restrictions while monitoring. When dealing with issues like treatment resistance or co-morbidities, it is common practice to employ a hybrid approach that incorporates elements of both approaches (13).

244 The treatment strategy should consider the patient's previous successful treatment, preference for all

245 choices, other physical or psychological problems, age or gender, and future pregnancy planning (19).

246 Identifying risk factors and adhering to a clear guideline for detection and treatment are essential in the

247 prevention of anxiety disorders. Implementing effective prevention strategies is crucial, achievable

248 through the reduction of negative risk factors associated with anxiety disorders or the enhancement of

249 protective factors related to these disorders (23).

250 It has been discovered that anxiety and depression are closely connected and highly comorbid (24, 25).

251 Approximately one-fourth of patients with mental illnesses experience comorbidity of anxiety

252 disorders and depression. Anxiety is present in over eighty percent of patients with depression, while

253 depression is found in up to ninety percent of patients with anxiety disorders (24).

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Literature Review

257 We conducted a search of the PubMed database for prior studies. The determinants of prior studies

258 were in English, published within the last decade, and related to the comorbidity of depression and

259 anxiety among training physicians in various health training programs. Meta-analyses and systematic

260 reviews have been conducted to examine the global prevalence of depression among adolescents in

261 one study (26) and within general populations in two additional studies (27, 28). The studies indicated

262 that 34% of participants exhibited depressive symptoms, with a point prevalence of Major Depressive

263 Disorder (MDD) at 8%. The prevalence was found to be the highest in Africa, Asia, and the Middle

264 East (26). The prevalence of depression in general populations is increasing, potentially due to

265 changes in the calculation of depression rates, variations in help-seeking behavior, or shifts in

266 healthcare professionals' perceptions of the condition (27). In 2017, the global incidence of depressive

267 cases increased by 49.86 percent compared to 1990 (28). A systematic review was conducted to

268 examine the prevalence of anxiety disorders within the general population. This study estimated

269 301.39 million prevalent cases globally, indicating a 50% increase in anxiety disorders since 1990

270 (29). A global meta-analysis and systematic review was conducted among resident physicians to

determine the prevalence of depressive symptoms and depression. The study indicated a prevalence of 28.8%, with projections suggesting an increase over time (30).

Three cross-sectional studies were conducted in South Korea among workers (31), Australian doctors (32), and in the U.S. on anesthesiology training physicians from their first year to their first year after graduation (33). The three studies focused on depression, revealing that individuals working over 69 hours per week exhibited a greater likelihood of experiencing moderate to severe depressive symptoms compared to those working 40 hours per week (31). About 60% of doctors who reported ever feeling significantly sad sought some type of professional care; privacy and confidentiality were the most often stated impediments to seeking help (32). Moreover, 32% and 12% have distress or depression, respectively, among anesthesiology residents. A higher chance of distress and depression was found to be associated with more hours worked per week (33). Findings regarding risk factors associated with depression indicated that employed women and individuals with lower income levels exhibited a more pronounced correlation between extended work hours and depressive symptoms (31), females had higher odds of seeking help, as did locally trained doctors and senior doctors (32), and the perception of workplace resource availability, and ability to maintain a work-life balance were associated with a lower overall risk of depression and distress (33). Variations in help-seeking behaviors were associated with medical specialties; psychiatrists exhibited a higher propensity to seek professional assistance, whereas surgeons, pathologists, and radiologists demonstrated a lower likelihood of seeking professional or medical help for depression (32). The prevalence of depression and anxiety among Brazilian medical residents was 46.9% and 56.6%, respectively. Risk factors such as anxiety, burnout, extended duty hours, lack of days off, prevalence of psychological abuse, and female gender were independently correlated with depression. Additionally, female gender, advanced age, prolonged work hours, work-life conflicts, unsupervised assistance, and depression were independently linked to anxiety. The findings were obtained from a cross-sectional study conducted in Brazil, focusing on medical residents in training programs (34). Two cross-sectional studies were conducted to study the prevalence of depression and anxiety among physicians in France (35) and in China (36). These studies showed similar results related to anxiety, in which 32.3% reported having an anxiety disorder, 8.1 % had an MDD, and less than one in five received psychotherapy or antidepressant medications in France (35). 25.67 % of physicians reported having anxiety symptoms, 28.13 % reported having depressed symptoms, and 19.01 % reported having both anxiety and

depression symptoms in China (36). Being a woman and drinking more coffee were directly linked to a higher rate of anxiety disorders. On the other hand, harassment, drinking alcohol, and not knowing how to deal with sickness well at first were all linked to major depression and anxiety disorders (35). Anxiety and depressive symptoms were related to long working hours (above 60 hours per week), frequent night shifts (twice or more per week), poor self-reported physical health, and irregular physical exercise (36). Anxiety disorders and depression were both positively correlated with each other, according to a cross-sectional study performed among emergency physicians in China (37).

Two cross-sectional studies were conducted in Saudi Arabia focusing on anxiety disorders, depression, and anxiety among adults aged 18 and older (38), including all medical residents (39). Variations in the prevalence of depression and anxiety among the targeted populations were observed, with findings indicating that 12.4% of the nationwide population in Saudi Arabia was at risk for GAD and 12.7% for MDD. In comparison, 65.8% of medical residents reported experiencing symptoms of depression, while 58.3% reported symptoms of anxiety. Diagnosis and treatment rates were notably low, with only 12.5% of individuals receiving treatment for anxiety and 0.5% for depression (38). Identified risk factors include female sex, lower income, and smoking, which are associated with both Generalized Anxiety Disorder (GAD) and Major Depressive Disorder (MDD). Participation in volunteer activities, regular physical exercise, and the pursuit of daily hobbies serve as protective factors within the general population. The residency degree (R5) and gender (female) were independently associated with anxiety symptoms. Family medicine specialty and female gender were independent predictors of depressive symptoms among medical residents (39). Two cross-sectional studies were conducted involving all medical residents in Saudi Arabia. The initial study was conducted in Jeddah (40), whereas the subsequent study took place in Makkah (41). The studies indicated that the prevalence of diagnosed depression among residents of Jeddah was 75%, categorized by severity: mild depression at 35.6%, moderate depression at 34.2%, and severe depression at 6% (40). In Makkah, the prevalence of anxiety was recorded at 39.5%, while the prevalence of depression was noted at 20.9% (41). Residents engaged in emergency and surgical programs exhibit a heightened risk of developing moderate to severe depression relative to other specialties. Contributing factors include extended work hours, age, sleep duration, and exposure to injustice, all of which elevate the overall risk of anxiety and depression among resident physicians (41). A recent cross-sectional study found a 10% prevalence of moderately severe to severe depression among residents in family medicine in Riyadh, with a significant

correlation between the severity of depression and burnout. A recent cross-sectional study conducted in Makkah examined the prevalence of anxiety disorders and depression among surgical residents and doctors. The findings revealed that 11.8% of surgeons reported a previous history of anxiety or depression, while 30.7% experienced anxiety and 27.5% experienced depression (42). Anxiety demonstrated a significant correlation with participation in the Saudi board program, working over nine hours, and experiencing work-related stress. Depression among surgeons is significantly associated with age, particularly between 50 and 59 years, in addition to factors such as career satisfaction and work-related stress (43). This study aimed to examine the prevalence and factors associated with the comorbidity of depression and anxiety among training physicians in various health training programs under the Ministry of Health (MOH) in Al-Ahsa, Saudi Arabia.

Materials and methods

Study design and setting

This descriptive cross-sectional study was conducted among training physicians in various health care training programs under the Ministry of Health from March to December 2024 in Al-Ahsa, in the eastern province region of the Kingdom of Saudi Arabia.

Sample size

Considering the variables and outcome of the study, assuming the expected 50% of the study population (471), comorbidity of depression and anxiety on training physicians in various health training programs under the Ministry of Health, with an allowable margin error of 5%, at a 95% confidence interval, a minimum sample size of 221 was calculated. After the random sampling, a total of 221 professionals from various fields were included in the data collection.

Data collection tools

The data was collected by a self-administered questionnaire form, sent by email, and/or WhatsApp. The questionnaire was filled out by the training physicians. The questionnaire was divided into four sections: Socio-Demographic section that included age, gender, nationality, marital status, having children, living with family, monthly income, residency year, training center, and having on-call as part of work. The second was the Lifestyle and medical history section that included exercise, smoking, current or history of chronic medical illnesses, current or history of psychiatric illnesses, ever receiving any professional psychological help, and previous

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360 knowledge about psychological support for trainees (Daem). The third was the Depression
361 assessment section that included the PHQ-9 screening instrument in both Arabic and English
362 versions. The PHQ-9 is a valid and reliable tool for measuring symptoms of depression in all
363 individuals, and the scores are divided into five categories: a score of <5 indicates minimal or no
364 symptoms of depression, a score of 5 to 9 indicates mild symptoms, a score of 10 to 14 indicates
365 moderate symptoms, a score of 15–19 indicates moderately severe symptoms, and of 20 or more
366 indicates severe symptoms. And finally, the fourth was the anxiety disorders assessment section
367 that included the GAD-7 screening instrument. Arabic and English versions of the questionnaire
368 were provided. The scores are classified into four categories: a score of <5 indicates no or
369 minimal anxiety symptoms, a score of 5 to 9 indicates mild symptoms, a score of 10 to 14
370 indicates moderate symptoms, and a score of 15 or more indicates severe symptoms.

371 *Data analysis*

372 Data was entered into Microsoft 365 (Microsoft® Corp., Redmond, WA, United States), and
373 analyses were carried out using IBM SPSS Statistics for Windows, version 26 (IBM Corp.,
374 Armonk, NY, United States). Descriptive statistics were used to summarize the data by
375 calculating the frequency and percentage of categorical variables. Pearson's Chi-squared test
376 revealed statistically significant differences in depression and anxiety prevalence regarding
377 sociodemographic data, lifestyle, and history of clinical and psychiatric illness ($p < 0.05$).

378 *Ethical consideration*

379 Official ethical approval was obtained from ????????????????????? Research Ethical
380 Committee (REC) with Reference No.: REC-? /? /???. Consent was accepted as a prerequisite for
381 data collection. All collected data were kept confidential and were used only for research.

382 *Budget*

383 This study was entirely self-funded by the researchers.

384

385 # Results

386 *Sociodemographic characteristics*

Overall, a total of 242 residents responded to the online survey. Of these, 21 respondents were excluded due to missing more than one entry in the questionnaire. The majority, 157 (71.0%), were between 24 and 29 years old. Nearly half of the respondents, 111 (50.2%), were females. Nearly all the residents included in the study, 220 (99.5%), were Saudis. Around 131 (59.3%) were married, and 123 (55.7%) were without children. A high proportion of the respondents were living with their families, 192 (86.9%), with a monthly income of 15,000-20,000 SAR, 186 (84.2%), and were satisfied with their income, 115 (52.0%). The best part of the shared residents was family medicine 89 (40.3%), in Primary health care (PHC) - Al-Ahsa Academy of Family Medicine 86 (38.9%), and in the first residence year 89 (40.3%). More than half of the respondents reported receiving up to 5 on-call shifts per month, 111 (50.2%). The full sociodemographic characteristics are summarized in [Table 1].

Table 1: Demographic data of the study respondents (n=221)

Demographics		Frequency (%)
Age	<24 Y	1 (0.5)
	24-29 Y	157 (71.0)
	30-34 Y	57 (25.8)
	35-39 Y	6 (2.7)
Gender	Males	110 (49.8)
	Females	111 (50.2)
Nationality	Saudi	220 (99.5)
	Non-Saudi	1 (0.5)
Marital status	Single	85 (38.5)
	Married	131 (59.3)
	Divorced	3 (1.4)
	I don't prefer to tell	2 (0.9)
Do you have children?	Yes	98 (44.3)
	No	123 (55.7)
Do you live with your family?	Yes	192 (86.9)
	No	29 (13.1)
Monthly income	< 15,000 SR	5 (2.3)
	15,000-20,000 SR	186 (84.2)
	> 20,000 SR	30 (13.6)

Are you satisfied with your current income?	Satisfied	115 (52.0)
	Neutral	78 (35.3)
	Unsatisfied	28 (12.7)
Training center in Al-Ahsa, Saudi Arabia	King Fahad Hospital-Al-Hofuf (KFHH)	58 (26.2)
	Maternity & Children's Hospital in Al-Ahsa (MCH)	45 (20.4)
	Primary health care (PHC) - Al-Ahsa Academy of Family Medicine	86 (38.9)
	Psychiatric Hospital in Al-Ahsa	3 (1.4)
	Al Jabr Eye and ENT Hospital in Al-Ahsa	8 (3.6)
	Prince Sultan Cardiac Center	3 (1.4)
	PHC Al Salhea	6 (2.7)
	Others	12 (5.4)
Specialty	Family medicine	89 (40.3)
	Preventive medicine	16 (7.2)
	Internal medicine	17 (7.7)
	Pediatric	17 (7.7)
	Obe & Gynae	27 (12.2)
	Cardiac surgery	3 (1.4)
	ICU	13 (5.9)
	General Surgery	4 (1.8)
	Neurosurgery	2 (0.9)
	Orthopedic	2 (0.9)
	Radiology	9 (4.1)
	Urology	7 (3.2)
	Dermatology	3 (1.4)
	Neurology	2 (0.9)
	ENT	7 (3.2)
	Psychiatry	3 (1.4)
Residency year	R1	89 (40.3)
	R2	52 (23.5)
	R3	44 (19.9)
	R4	26 (11.8)
	R5	10 (4.5)
Number of your on-calls per month	No on-call	48 (21.7)
	5 times or less per month	111 (50.2)
	> 5 times per month	62 (28.1)

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400 *Lifestyle and medical history characteristics*

A high proportion of the respondents, 160 (72.4%), were not exercising at least 150 minutes per week, and were non-smokers, 188 (85.1%). Most of the shared residents, 187 (84.6%), did not complain of any chronic diseases. The main reported diseases were G6PD and bronchial asthma, 8 (3.6%). Many of the participants, 195 (88.2%), did not complain of any psychiatric illness. The main reported disease was depression, 14 (6.3%). The bulk of them, 182 (82.4%), had not received professional psychological help. However, 128 (57.8%) have heard about SCFHS psychological support for trainees (Daem). The lifestyle and medical history are summarized in [Table 2].

Table 2: Lifestyle and medical history of the study respondents (n=221)

Lifestyle and medical history		Frequency (%)
Are you exercising at least 150 minutes per week?	Yes	61 (27.6)
	No	160 (72.4)
Are you a smoker?	Yes	33 (14.9)
	No	188 (85.1)
Do you have a current or past history of chronic medical illnesses?	No	187 (84.6)
	HTN	5 (2.3)
	G6PD	8 (3.6)
	PCOS	3 (1.4)
	DM	5 (2.3)
	Asthma	8 (3.6)
	Thyroid	3 (1.4)
	Anemia	2 (0.9)
Do you have a current or past history of psychiatric illnesses?	No	195 (88.2)
	Depression	14 (6.3)
	Anxiety	7 (3.2)
	ADHD	1 (0.5)
	Bipolar	1 (0.5)
	Burnout	1 (0.5)
	Overthinking	1 (0.5)
	Panic disorder	1 (0.5)

	No	182 (82.4)
Have you ever received any professional psychological help?	Yes, from the outpatient clinic	15 (6.8)
	Yes, from a psychological care app	12 (5.4)
	Yes, from psychological support for trainees (Daem)	2 (0.9)
	Yes, from a relative or friend	6 (2.7)
	Yes, from others	4 (1.8)
Have you heard about SCFHS psychological support for trainees (Daem)?	Yes	128 (57.9)
	No	93 (42.1)

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Depression prevalence among Saudi residents

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According to the residents' response, only 12.7% (n=27) had no or minimal depression. However, many of the participants showed mild and moderate depression, 35.3% (n=78) and 33% (n=73) respectively. Moreover, some residents had moderately severe or severe depression, 6.8% (n=15) and 12.2% (n=27) respectively [Figure 1]. Depression prevalence varied across different demographic groups [Table 3]. Among residents aged 24–29 years (the highest frequency of the participants), 36.9% had mild depression, 15.2% had no or minimal depression, and 14.6% had moderate depression, while 6.4% and 10.8% exhibited moderately severe and severe depression, respectively. Regarding gender, moderately severe and severe depression were more common in females, 8.1% and 14.4% respectively. A greater number of females (35.1%) recorded mild depression, while the superiority of males (40%) showed no or minimal depression. The preponderance of Saudi residents had mild or minimal depression (35%, 33.2% respectively). The lowest percentage of severely depressed residents was the married ones (9.9%). Severely depressed residents were more likely to be divorced (33.3%) or single (14.1%). Having no children or living alone was accompanied by a higher rate of severe depression among the participants (15.4%, 20.7% respectively). More monthly income and salary satisfaction were accompanied by a lower rate of severe depression. Concerning the training center, the centers whose residents reported minimal depression were Prince Sultan Cardiac Center (66.7%), PHC Al-Salhea, and Al-Jabr Eye and ENT Hospital (50% both). The first and fourth years of residence were accompanied by the highest score of severe depression (16.9%, 15.4% respectively). More on-calls per month were accompanied by a higher rate of severe depression. Smoking and lack of regular exercise for 150 minutes per week were accompanied

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by a higher rate of severe depression (15.2%, 14.4% respectively). Healthy residents with no history of chronic disease or psychiatric illness and awareness about Daem SCFHS psychological support had a higher rate of minimal depression (35.8%, 35.9% and 41.4%) respectively [Table 3].

Fig.1: Depression prevalence among the Saudi board residents

27 (12.2%)
15 (6.80%)
73 (33.0%)
28 (12.7%)
78 (35.3%)

- No or minimal depression
- Mild depression
- Moderate depression
- Moderately severe depression
- Severe depression
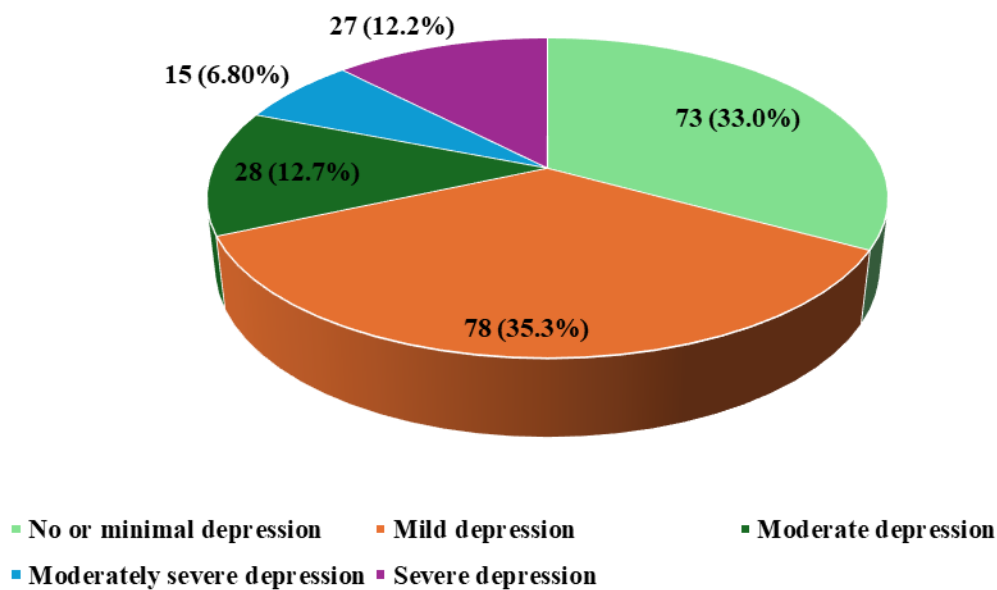
Table 3: Sociodemographic characteristics, lifestyle, medical history, and different levels of depression

Sociodemographic characteristics, lifestyle, and medical history		No or minimal depression	Mild depression	Moderate depression	Moderately severe depression	Severe depression	P value
		n (%)	n (%)	n (%)	n (%)	n (%)	
Age	<24 Y	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0.337
	24-29 Y	49 (31.2%)	58 (36.9%)	23 (14.6%)	10 (6.4%)	17 (10.8%)	
	30-34 Y	20 (35.1%)	19 (33.3%)	5 (8.8%)	5 (8.8%)	8 (14.0%)	
	35-39 Y	4 (66.7%)	1 (16.7%)	0 (0.0%)	0 (0.0%)	1 (16.7%)	
Gender	Males	44 (40.0%)	39 (35.5%)	10 (9.1%)	6 (5.5%)	6 (5.5%)	0.142
	Females	29 (26.1%)	39 (35.1%)	18 (16.2%)	9 (8.1%)	16 (14.4%)	
Nationality	Saudi	73 (33.2%)	77 (35.0%)	28 (12.7%)	15 (6.8%)	27 (12.3%)	0.765

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	Non-Saudi	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Marital status	Single	25 (29.4%)	30 (35.3%)	11 (12.9%)	7 (8.2%)	12 (14.1%)	0.715
	Married	48 (36.6%)	46 (35.1%)	16 (12.2%)	8 (6.1%)	13 (9.9%)	
	Divorced	0 (0.0%)	1 (33.3%)	1 (33.3%)	0 (0.0%)	1 (33.3%)	
	I don't prefer to tell	0 (0.0%)	1 (50.0%)	0 (0.0%)	0 (0.0%)	1 (50.0%)	
Do you have children?	Yes	39 (39.8%)	34 (34.7%)	12 (12.2%)	5 (5.1%)	8 (8.2%)	0.232
	No	34 (27.6%)	44 (35.8%)	16 (13.0%)	10 (8.1%)	19 (15.4%)	
Do you live with your family?	Yes	68 (35.4%)	63 (32.8%)	25 (13.0%)	15 (7.8%)	21 (10.9%)	0.051
	No	5 (17.2%)	15 (51.7%)	3 (10.3%)	0 (0.0%)	6 (20.7%)	
Monthly income	< 15,000 SR	1 (20.0%)	2 (40.0%)	1 (20.0%)	0 (0.0%)	1 (20.0%)	0.808
	15,000-20,000 SR	58 (31.2%)	68 (36.6%)	23 (12.4%)	14 (7.5%)	23 (12.4%)	
	> 20,000 SR	14 (46.7%)	8 (26.7%)	4 (13.3%)	1 (3.3%)	3 (10.0%)	
Are you satisfied with your current income?	Satisfied	48 (41.7%)	38 (33.0%)	12 (10.4%)	8 (7.0%)	9 (7.8%)	0.010*
	Neutral	18 (23.1%)	33 (42.3%)	13 (16.7%)	5 (6.4%)	9 (11.5%)	
	Unsatisfied	7 (25.0%)	7 (25.0%)	3 (10.7%)	2 (7.1%)	9 (32.1%)	
Training center in Al-Ahsa, Saudi Arabia	King Fahad Hospital-Al-Hofuf (KFHH)	16 (27.6%)	21 (36.2%)	8 (13.8%)	3 (5.2%)	10 (17.2%)	0.134
	Maternity & Children's Hospital in Al-Ahsa (MCH)	5 (11.1%)	17 (37.8%)	8 (17.8%)	7 (15.6%)	8 (17.8%)	
	Primary health care (PHC) - Al-Ahsa Academy of Family Medicine	39 (45.3%)	28 (32.6%)	8 (9.3%)	4 (4.7%)	7 (8.1%)	
	Psychiatric Hospital in Al-Ahsa	1 (33.3%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	1 (33.3%)	
	Al Jabr Eye and ENT Hospital in Al-Ahsa	4 (50.0%)	2 (25.0%)	0 (0.0%)	1 (12.5%)	1 (12.5%)	
	Prince Sultan Cardiac Center	2 (66.7%)	0 (0.0%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	
	PHC Al Salhea	3 (50.0%)	2 (33.3%)	1 (16.7%)	0 (0.0%)	0 (0.0%)	
	Others	3 (25.0%)	7 (58.3%)	2 (16.7%)	0 (0.0%)	0 (0.0%)	
Residency year	R1	17 (19.1%)	35 (39.3%)	12 (13.5%)	10(11.2%)	15 (16.9%)	0.095
	R2	21 (40.4%)	21 (40.4%)	4 (7.7%)	3 (5.8%)	3 (5.8%)	
	R3	22 (50.0%)	10 (22.7%)	7 (15.9%)	1 (2.3%)	4 (9.1%)	
	R4	9 (34.6%)	9 (34.6%)	3 (11.5%)	1 (3.8%)	4 (15.4%)	
	R5	4 (40.0%)	3 (30.0%)	2 (20.0%)	0 (0.0%)	1 (10.0%)	
Number of your on-calls per month	No on-call	24 (50.0%)	16 (33.3%)	6 (12.5%)	0 (0.0%)	2 (4.2%)	0.008*
	5 times or less per month	38 (34.2%)	39 (35.1%)	14 (12.6%)	7 (6.3%)	13 (11.7%)	
	> 5 times per month	11 (17.7%)	23 (37.1%)	8 (12.9%)	8 (12.9%)	12 (19.4%)	
Are you exercising at least 150 minutes per week?	Yes	26 (42.6%)	26 (42.6%)	3 (4.9%)	2 (3.3%)	4 (6.6%)	0.023*
	No	47 (29.4%)	52 (32.5%)	25 (15.6%)	13 (8.1%)	23 (14.4%)	
Are you a smoker?	Yes	10 (30.3%)	13 (39.4%)	3 (9.1%)	2 (6.1%)	5 (15.2%)	0.915
	No	63 (33.5%)	65 (34.6%)	25 (13.3%)	13 (6.9%)	22 (11.7%)	
Do you have a current or past history of chronic medical	No	67 (35.8%)	66 (35.3%)	21 (11.2%)	12 (6.4%)	21 (11.2%)	0.183
	HTN	1 (20.0%)	1 (20.0%)	(40.0%)	0 (0.0%)	1 (20.0%)	
	G6pD	2 (25.0%)	0 (0.0%)	1 (12.5%)	3 (37.5%)	2 (25.0%)	

illnesses?							
	PCOS	0 (0.0%)	2 (66.7%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	
	DM	0 (0.0%)	2 (40.0%)	1 (20.0%)	0 (0.0%)	2 (40.0%)	
	Asthma	2 (25.0%)	4 (50.0%)	1 (12.5%)	0 (0.0%)	1 (12.5%)	
	Thyroid	0 (0.0%)	2 (66.7%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	
	Anemia	1 (50.0%)	1 (50.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Do you have a current or past history of psychiatric illnesses?	No	70 (35.9%)	71 (36.4%)	22 (11.3%)	12 (6.2%)	20 (10.3%)	0.101
	Depression	0 (0.0%)	3 (21.4%)	5 (35.7%)	2 (14.3%)	4 (28.6%)	
	Anxiety	2 (28.6%)	2 (28.6%)	1 (14.3%)	1 (14.3%)	1 (14.3%)	
	ADHD	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
	Bipolar	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
	Burnout	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	
	Overthinking	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	
	Panic disorder	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Have you ever received any professional psychological help?	No	67 (36.8%)	63 (34.6%)	22 (12.1%)	12 (6.6%)	18 (9.9%)	0.236
	Yes, from the outpatient clinic	3 (20.0%)	5 (33.3%)	1 (6.7%)	1 (6.7%)	5 (33.3%)	
	Yes, from the psychological care app	0 (0.0%)	5 (41.7%)	3 (25.0%)	2 (16.7%)	2 (16.7%)	
	Yes, from psychological support for trainees (Daem)	0 (0.0%)	1 (50.0%)	0 (0.0%)	0 (0.0%)	1 (50.0%)	
	Yes, from a relative or friend	2 (33.3%)	2 (33.3%)	2 (33.3%)	0 (0.0%)	0 (0.0%)	
	Yes (from others)	1 (25.0%)	2 (50.0%)	0 (0.0%)	0 (0.0%)	1 (25.0%)	
ave you heard about CFHS psychological support for trainees (Daem)?	Yes	53 (41.4%)	48 (37.5%)	17 (13.3%)	4 (3.1%)	6 (4.7%)	0.001*
	No	20 (21.5%)	30 (32.3%)	11 (11.8%)	11 (11.8%)	21 (22.6%)	

*= Significant (P-value is less than 0.05)

Specialty of the residents and different levels of depression

General surgery and orthopedics were the specialties encountered in severe depression (50% both), followed by internal medicine, Obe & Gynae, and Pediatrics (23.5%, 18.5% & 17.6%) respectively. No or minimal depression was observed mainly in residents of cardiac surgery, followed by preventive medicine (66.7% and 56.3%), respectively with no significant variation [Fig. 2 & Table 4].
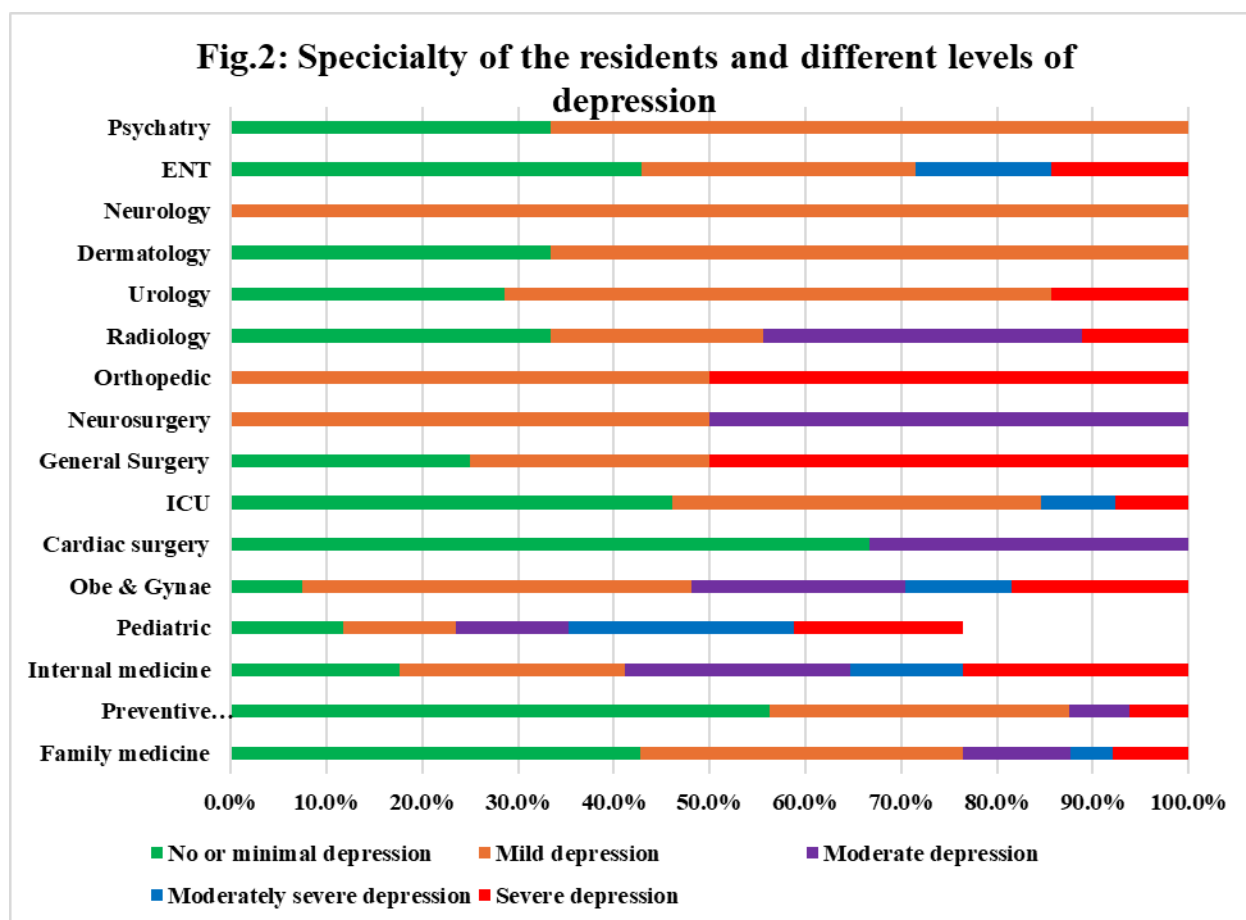
Fig.2: Specicialty of the residents and different levels of depression

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Table 4: Specialty of the residents and different levels of depression

	Specialty	No or minimal depression	Mild depression	Moderate depression	Moderately severe depression	Severe depression	P value
		n (%)	n (%)	n (%)	n (%)	n (%)	
Specialty	Family medicine	38 (42.7%)	30 (33.7%)	10 (11.2%)	4 (4.5%)	7 (7.9%)	0.208
	Preventive medicine	9 (56.3%)	5 (31.3%)	1 (6.3%)	0 (0.0%)	1 (6.3%)	
	Internal medicine	3 (17.6%)	4 (23.5%)	4 (23.5%)	2 (11.8%)	4 (23.5%)	
	Pediatric	2 (11.8%)	2 (11.8%)	2 (11.8%)	4 (23.5%)	3 (17.6%)	
	Obe & Gynae	2 (7.4%)	11 (40.7%)	6 (22.2%)	3 (11.1%)	5 (18.5%)	
	Cardiac surgery	2 (66.7%)	0 (0.0%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	
	ICU	6 (46.2%)	5 (38.5%)	0 (0.0%)	1 (7.7%)	1 (7.7%)	
	General Surgery	1 (25.0%)	1 (25.0%)	0 (0.0%)	0 (0.0%)	2 (50.0%)	
	Neurosurgery	0 (0.0%)	1 (50.0%)	1 (50.0%)	0 (0.0%)	0 (0.0%)	
	Orthopedic	0 (0.0%)	1 (50.0%)	0 (0.0%)	0 (0.0%)	1 (50.0%)	
	Radiology	3 (33.3%)	2 (22.2%)	3 (33.3%)	0 (0.0%)	1 (11.1%)	

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Urology	2 (28.6%)	4 (57.1%)	0 (0.0%)	0 (0.0%)	1 (14.3%)
Dermatology	1 (33.3%)	2 (66.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Neurology	0 (0.0%)	2 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
ENT	3 (42.9%)	2 (28.6%)	0 (0.0%)	1 (14.3%)	1 (14.3%)
Psychiatry	1 (33.3%)	2 (66.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

* = Significant (P-value is less than 0.05)

Anxiety prevalence among Saudi residents

According to the residents' response, nearly half, 49.8% (n=110), had no or minimal anxiety. However, the other half showed mild, moderate, and severe depression, 22.6% (n=50), 12.7% (n=28), and 14.9% (n=33) respectively [Figure 3]. Anxiety prevalence varied across different demographic groups [Table 5]. Among residents aged 24–29 years (the highest frequency of the participants), 50.3% had no or minimal anxiety, 21.7% had mild anxiety, and 12.7% had moderate anxiety, while 15.3% exhibited severe anxiety. Regarding gender, moderate and severe anxiety were more common in females, 15.3% and 19.8% respectively. A greater number of males (54.5%) recorded minimal anxiety, while the superiority of females (45%) showed no or minimal anxiety. The preponderance of Saudi residents had minimal or mild anxiety (50%, 22.3% respectively). The lowest percentage of residents with severe anxiety was the single ones (10.6%), followed by married, then divorced residents (16.8% and 33.3%), respectively. Having children or living alone was accompanied by a higher rate of severe anxiety among the participants (15.3%, 20.7% respectively). More monthly income and salary satisfaction were accompanied by a lower rate of severe anxiety. Concerning the training center, the centers whose residents reported no or minimal anxiety were Prince Sultan Cardiac Center (100%), Primary health care – Al-Ahsaa Academy of Family Medicine (57%), PHC Al-Salhea, and Al-Jabr Eye and ENT Hospital (50% both). The fourth and the years of residence were accompanied by the highest score of severe anxiety (23.1%, 19.1% respectively). More on-calls per month were accompanied by a higher rate of severe anxiety. Smoking and lack of regular exercise for 150 minutes per week were accompanied by a higher rate of severe anxiety (18.2% and 18.8% respectively). Healthy residents with no history of chronic disease or psychiatric illness and

awareness about Daem SCFHS psychological support had a higher rate of minimal anxiety

(51.3%, 53.3% and 57% respectively) [Table 5].

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Fig.3: Anxiety prevalence among the Saudi board residents
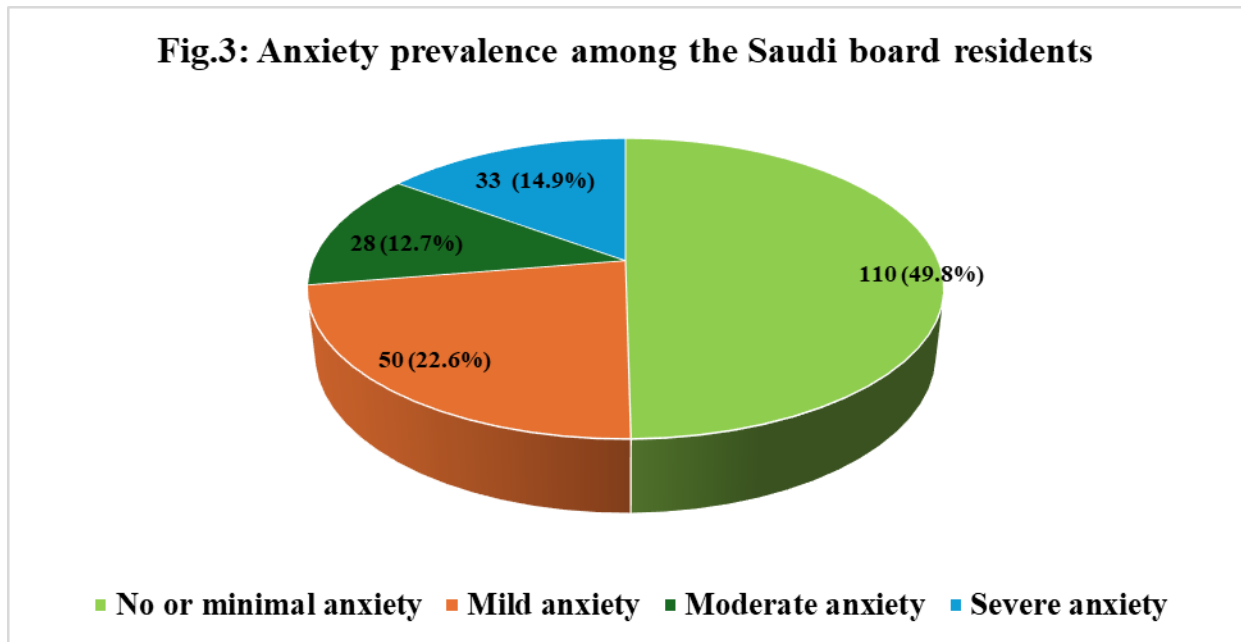
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482 **Table 5: Sociodemographic characteristics and different levels of anxiety**

Sociodemographic characteristics, lifestyle, and medical history		No or minimal anxiety	Mild anxiety	Moderate anxiety	Severe anxiety	P value
		n (%)	n (%)	n (%)	n (%)	
Age	<24 Y	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0.338
	24-29 Y	79 (50.3%)	34 (21.7%)	20 (12.7%)	24 (15.3%)	
	30-34 Y	26 (45.6%)	15 (26.3%)	8 (14.0%)	8 (14.0%)	
	35-39 Y	5 (83.3%)	1 (16.7%)	0 (0.0%)	0 (0.0%)	
Gender	Males	60 (54.5%)	28 (25.5%)	11 (10.0%)	11 (10.0%)	0.087
	Females	50 (45.0%)	22 (19.8%)	17 (15.3%)	22 (19.8%)	
Nationality	Saudi	110 (50.0%)	49 (22.3%)	28 (12.7%)	33 (15.0%)	0.329
	Non- Saudi	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)	
Marital status	Single	38 (44.7%)	23 (27.1%)	15 (17.6%)	9 (10.6%)	0.278
	Married	70 (53.4%)	27 (20.6%)	12 (9.2%)	22 (16.8%)	
	Divorced	1 (33.3%)	0 (0.0%)	1 (33.3%)	1 (33.3%)	
	I don't prefer to tell	1 (50.0%)	0 (0.0%)	0 (0.0%)	1 (50.0%)	
Do you have children?	Yes	54 (55.1%)	18 (18.4%)	11 (11.2%)	15 (15.3%)	0.437

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	No	56 (45.5%)	32 (26.0%)	17 (13.8%)	18 (14.6%)	
Do you live with your family?	Yes	102 (53.1%)	36 (18.8%)	27 (14.1%)	27 (14.1%)	0.001*
	No	8 (27.6%)	14 (48.3%)	1 (3.4%)	6 (20.7%)	
Monthly income	< 15,000 SR	3 (60.0%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	
	15,000-20,000 SR	93 (50.0%)	42 (22.6%)	23 (12.4%)	28 (15.1%)	0.527
	> 20,000 SR	14 (46.7%)	8 (26.7%)	5 (16.7%)	3 (10.0%)	
Are you satisfied with your current income?	Satisfied	70 (60.9%)	23 (20.0%)	8 (7.0%)	14 (12.2%)	
	Neutral	29 (37.2%)	22 (28.2%)	15 (19.2%)	12 (15.4%)	0.012*
	Unsatisfied	11 (39.3%)	5 (17.9%)	5 (17.9%)	7 (25.0%)	
Training center in Al-Ahsa, Saudi Arabia	King Fahad Hospital-Al-Hofuf (KFHH)	28 (48.3%)	17 (29.3%)	5 (8.6%)	8 (13.8%)	
	Maternity & Children's Hospital in Al-Ahsa (MCH)	17 (37.8%)	9 (20.0%)	10 (22.2%)	9 (20.0%)	
	Primary health care (PHC) - Al-Ahsa Academy of Family Medicine	49 (57.0%)	15 (17.4%)	10 (11.6%)	12 (14.0%)	
	Psychiatric Hospital in Al-Ahsa	1 (33.3%)	0 (0.0%)	0 (0.0%)	2 (66.7%)	0.29
	Al Jabr Eye and ENT Hospital in Al-Ahsa	4 (50.0%)	2 (25.0%)	1 (12.5%)	1 (12.5%)	
	Prince Sultan Cardiac Center	3 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
	PHC Al Salhea	3 (50.0%)	3 (50.0%)	0 (0.0%)	0 (0.0%)	
	Others	5 (41.7%)	4 (33.3%)	2 (16.7%)	1 (8.3%)	
Residency year	R1	36 (40.4%)	21 (23.6%)	15 (16.9%)	17 (19.1%)	
	R2	28 (53.8%)	16 (30.8%)	6 (11.5%)	2 (3.8%)	
	R3	29 (65.9%)	5 (11.4%)	3 (6.8%)	7 (15.9%)	0.065
	R4	10 (38.5%)	6 (23.1%)	4 (15.4%)	6 (23.1%)	
	R5	7 (70.0%)	2 (20.0%)	0 (0.0%)	1 (10.0%)	
Number of your on-calls per month	No on-call	31 (64.6%)	11 (22.9%)	2 (4.2%)	4 (8.3%)	
	5 times or less per month	55 (49.5%)	26 (23.4%)	12 (10.8%)	18 (16.2%)	0.036*
	> 5 times per month	24 (38.7%)	13 (21.0%)	14 (22.6%)	11 (17.7%)	
Are you exercising at least 150 minutes per week?	Yes	33 (54.1%)	19 (31.1%)	6 (9.8%)	3 (4.9%)	
	No	77 (48.1%)	31 (19.4%)	22 (13.8%)	30 (18.8%)	0.027*
Are you a smoker?	Yes	13 (39.4%)	9 (27.3%)	5 (15.2%)	6 (18.2%)	
	No	97 (51.6%)	41 (21.8%)	23 (12.2%)	27 (14.4%)	0.643
Do you have a current or past history of chronic medical illnesses?	No	96 (51.3%)	45 (24.1%)	21 (11.2%)	25 (13.4%)	
	HTN	1 (20.0%)	1 (20.0%)	2 (40.0%)	1 (20.0%)	
	G6pD	2 (25.0%)	0 (0.0%)	2 (25.0%)	4 (50.0%)	
	PCOS	3 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0.028*
	DM	1 (20.0%)	1 (20.0%)	0 (0.0%)	3 (60.0%)	
	Asthma	3 (37.5%)	2 (25.0%)	3 (37.5%)	0 (0.0%)	
	Thyroid	2 (66.7%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	
	Anemia	2 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Do you have a current or past history of psychiatric illnesses?	No	104 (53.3%)	44 (22.6%)	22 (11.3%)	25 (12.8%)	
	Depression	3 (21.4%)	3 (21.4%)	4 (28.6%)	4 (28.6%)	0.052
	Anxiety	2 (28.6%)	2 (28.6%)	1 (14.3%)	2 (28.6%)	

	ADHD	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)	
	Bipolar	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)	
	Burnout	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	
	Overthinking	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	
	Panic disorder	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Have you ever received any professional psychological help?	No	100 (54.9%)	36 (19.8%)	22 (12.1%)	24 (13.2%)	0.058
	Yes, from the outpatient clinic	3 (20.0%)	5 (33.3%)	2 (13.3%)	5 (33.3%)	
	Yes, from a psychological care app	2 (16.7%)	5 (41.7%)	2 (16.7%)	3 (25.0%)	
	Yes, from psychological support for trainees (Daem)	0 (0.0%)	0 (0.0%)	1 (50.0%)	1 (50.0%)	
	Yes, from a relative or friend	3 (50.0%)	3 (50.0%)	0 (0.0%)	0 (0.0%)	
	Yes (from others)	2 (50.0%)	1 (25.0%)	1 (25.0%)	0 (0.0%)	
ave you heard about CFHS psychological upport for trainees (Daem)?	Yes	73 (57.0%)	30 (23.4%)	11 (8.6%)	14 (10.9%)	0.014*
	No	37 (39.8%)	20 (21.5%)	17 (18.3%)	19 (20.4%)	

= Significant (P-value is less than 0.05)

Specialty of the residents and different levels of anxiety

Orthopedics and Psychiatry were the specialties encountered in severe anxiety (50% and 33.3% respectively), followed by pediatrics (29.4%). On the other hand, all cardiac surgery and neurology residents (100%) showed no or minimal anxiety, followed by radiology and psychiatry residents (77.8% and 66.7%), respectively, with no significant variation [Fig. 4 & Table 6].

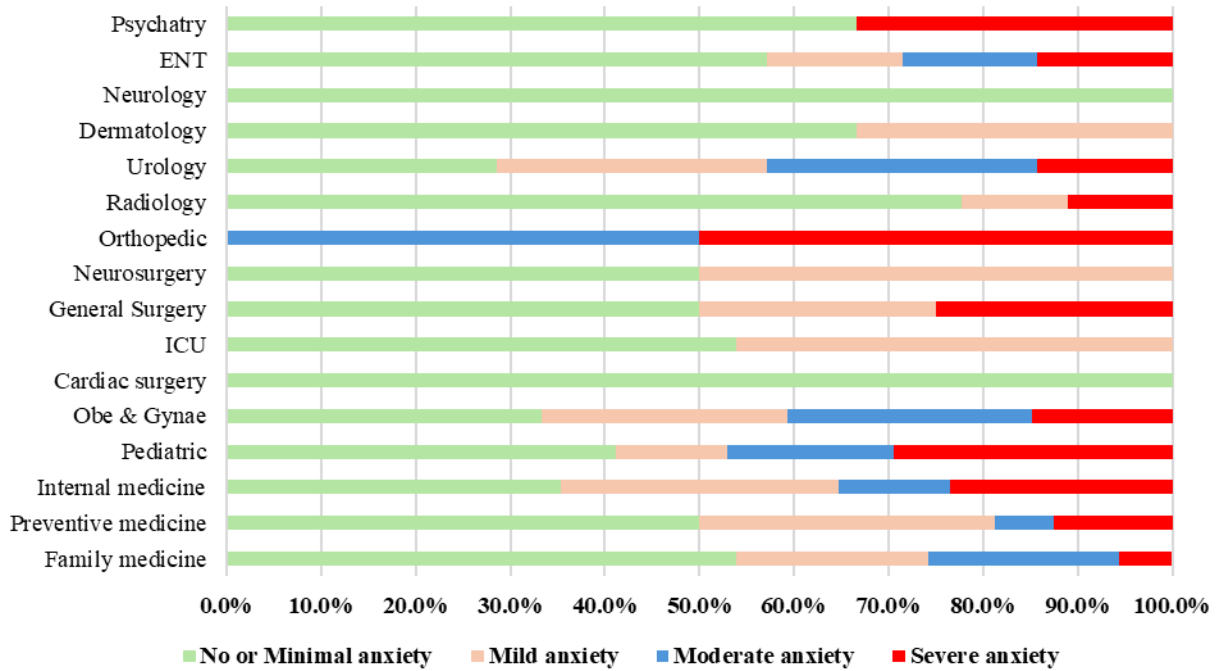Fig. 4: Specialty of the residends and different levels of anxiety

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491   **Table 6: Specialty of the residents and different levels of depression**

Specialty		No or minimal anxiety n (%)	Mild anxiety n (%)	Moderate anxiety n (%)	Severe anxiety n (%)	P value
Specialty	Family medicine	48 (53.9%)	18 (20.2%)	18 (20.2%)	5 (5.6%)	0.653
	Preventive medicine	8 (50.0%)	5 (31.3%)	1 (6.3%)	2 (12.5%)	
	Internal medicine	6 (35.3%)	5 (29.4%)	2 (11.8%)	4 (23.5%)	
	Pediatric	7 (41.2%)	2 (11.8%)	3 (17.6%)	5 (29.4%)	
	Obe & Gynae	9 (33.3%)	7 (25.9%)	7 (25.9%)	4 (14.8%)	
	Cardiac surgery	3 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
	ICU	7 (53.8%)	6 (46.2%)	0 (0.0%)	0 (0.0%)	
	General Surgery	2 (50.0%)	1 (25.0%)	0 (0.0%)	1 (25.0%)	
	Neurosurgery	1 (50.0%)	1 (50.0%)	0 (0.0%)	0 (0.0%)	
	Orthopedic	0 (0.0%)	0 (0.0%)	1 (50.0%)	1 (50.0%)	
	Radiology	7 (77.8%)	1 (11.1%)	0 (0.0%)	1 (11.1%)	
	Urology	2 (28.6%)	2 (28.6%)	2 (28.6%)	1 (14.3%)	
	Dermatology	2 (66.7%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	

	Depression	Anxiety		
Neurology	2 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
ENT	4 (57.1%)	1 (14.3%)	1 (14.3%)	1 (14.3%)
Psychiatry	2 (66.7%)	0 (0.0%)	0 (0.0%)	1 (33.3%)

Specialty of the residents and comorbidity of depression and anxiety

Orthopedics was the specialty encountered in the highest percentage of comorbidity of depression and anxiety (100%), followed by neurosurgery, Obe & Gynae, internal medicine, and pediatrics. On the other hand, cardiac surgery showed the least comorbidity of both depression and anxiety, followed by preventive medicine [Fig. 5 & Table 7].

Fig.5: Specialty of the residents and percent of depression and anxiety
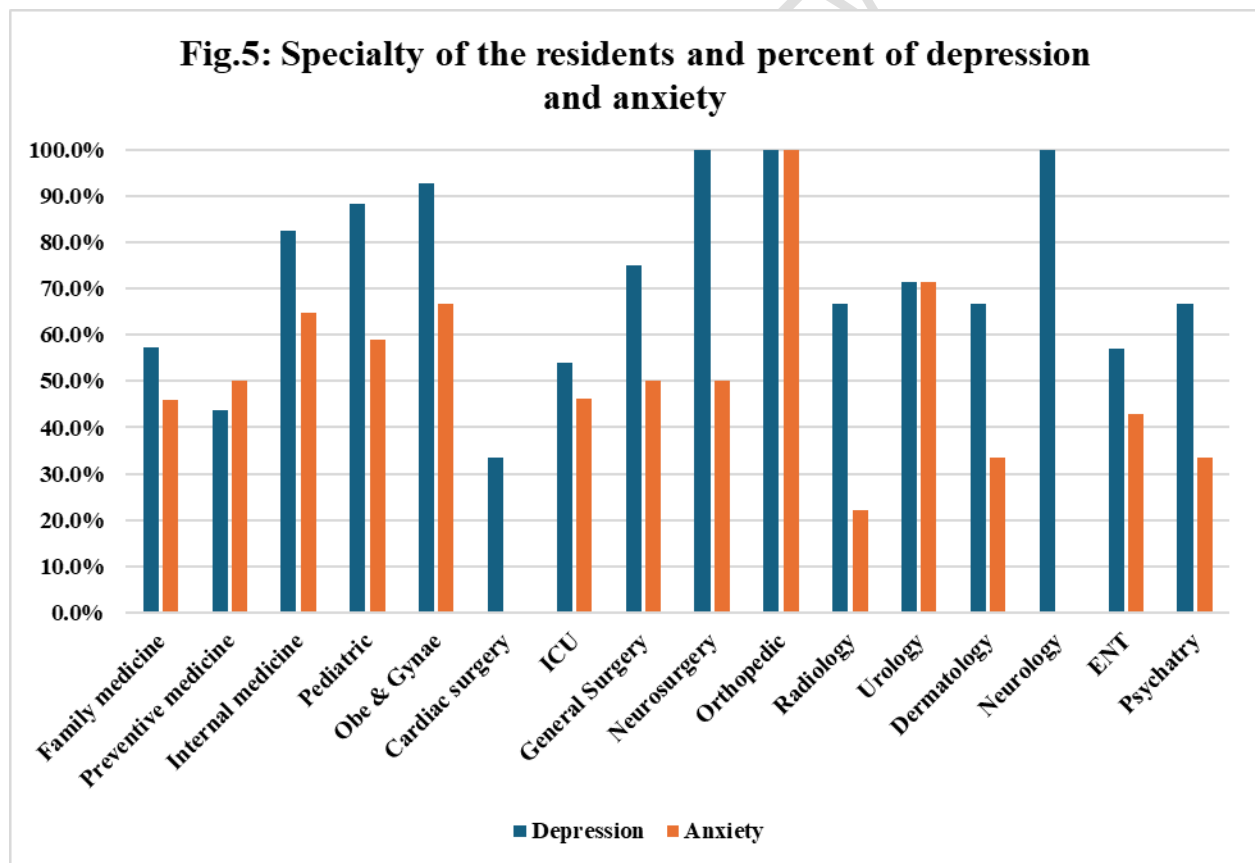
Table 7: Specialty of the residents and comorbidity of depression and anxiety

	Depression	Anxiety

Family medicine	57.3%	46.1%
Preventive medicine	43.8%	50.0%
Internal medicine	82.4%	64.7%
Pediatric	88.2%	58.8%
Obe & Gynae	92.6%	66.7%
Cardiac surgery	33.3%	0.0%
ICU	53.8%	46.2%
General Surgery	75.0%	50.0%
Neurosurgery	100.0%	50.0%
Orthopedic	100.0%	100.0%
Radiology	66.7%	22.2%
Urology	71.4%	71.4%
Dermatology	66.7%	33.3%
Neurology	100.0%	0.0%
ENT	57.1%	42.9%
Psychiatry	66.7%	33.3%

501

Discussion

In the present study, the prevalence of depression, anxiety, and burnout among Saudi board residents and their possible association with predictor variables were assessed. The PHQ-9 and GAD-7 measures are useful for detecting anxiety and depression in this population, while not being diagnostic assessments. This study explored anxiety and depression levels among the Saudi board residents, highlighting the profound impact of sociodemographic characteristics, medical history, and lifestyle on mental health. A sample size of 221 participants revealed the prevalence of depression and anxiety (from mild to severe) of 67% and 50.8% respectively, significantly higher than reported by previous Saudi studies (44,45).

Sociodemographic differences in mental health

Our results indicated that female Saudi residents reported significantly higher anxiety and depression rates than their male counterparts, consistent with earlier studies (46-48). Women are more likely to experience anxiety and depression during times of stress, possibly because of the various roles they play in society, such as juggling caring and professional obligations (49,50). Furthermore, women may be more vulnerable to chronic stress due to biological processes like the impact of sex hormones on stress management (51). This contradicts the results of other

518 research on medical students in Jeddah, which found no significant differences in depression
519 rates between genders (52).

520 Our findings showed that unmarried people were more likely to experience depression and
521 anxiety than married people. This corresponds to a previous study that used nationally
522 representative of approximately 541 million adults, de-identified individual-level data from
523 seven countries: the United States, the United Kingdom, Mexico, Ireland, Korea, China, and
524 Indonesia. The study included 106,556 cross-sectional and 20,865 longitudinal participants. The
525 period of follow-up varied from four to eighteen years (53).

526 The current study found that higher income and its associated satisfaction were linked to lower
527 rates of both depression and anxiety. These results were in line with a previous study that
528 revealed that low-income workers are more vulnerable to depression and anxiety (30).
529 .

530 The current study uncovered a significant disparity in the prevalence of depression and anxiety
531 among inhabitants of various training centers. Moreover, more on-call duties were accompanied
532 by more depression and anxiety. This was previously clarified as potentially referring to varying
533 levels of support in the workplace. The safeguarding of laborers' health has emerged as a global
534 concern. To enhance the mental health of employees, it is necessary to provide continuous
535 management and global attention, as mental disorders can be prevented in the workplace (54).
536 Moreover, workers who reported higher levels of work and interpersonal stress were more likely
537 to experience feelings of defeat, which in turn led to an increase in depression and anxiety
538 symptoms. This mediation effect was more pronounced for individuals with reduced levels of
539 social support (55). Furthermore, Poor work ability and work stress are associated with anxiety
540 and depression in healthcare professionals (56).

541 *Residents' specialty and variation in mental health*

542 The current study showed a clear disparity in the prevalence of depression and anxiety among
543 inhabitants of various training specialties. The highest risk was in orthopedic, neurosurgery, and
544 Obstetrics & Gynaecology specialties, and the lowest was in cardiac surgery and preventive
545 medicine. These results were in line with a previous study that found that about 30% of Saudi
546 surgeons suffer from comorbidity of depression and anxiety (43). The high risk of comorbidity

29

547 of depression and anxiety among orthopedic residents was previously observed in a systematic
548 review, which mentioned that Depression and anxiety are highly prevalent among orthopedic
549 residents, with significant levels of psychological distress affecting nearly one-third of this
550 population (57). Globally, depending on the tool used, the prevalence of depression or depressed
551 symptoms among resident physicians ranged from 20.9% to 43.2%, with the overall estimate
552 rising with each passing year (29). Moreover, Anxiety was assessed to be 17% and depression to
553 be 45% during COVID-19. highest rates of depression in pediatrics, internal medicine, and
554 anesthesiology. Pediatrics and internal medicine have the highest levels of anxiety (58).

555 *Lifestyle and medical history differences in mental health*

556 The present work revealed that regular exercise, at least for 150 minutes per week, was
557 accompanied by a lower rate of depression and anxiety among the participants. The same
558 findings were observed by Martin-Del-Campo et al. (2023), who found that moderate physical
559 activity was associated with lower depression, anxiety, and stress in healthcare workers during
560 the COVID-19 pandemic. They attributed these results to the increases in serotonin, dopamine,
561 and norepinephrine levels (59). Also, other research found that healthcare workers' mental health
562 can be enhanced by working out at home using a variety of fitness applications and little to no
563 equipment. To assess interest, adoption, adherence, and the mental, physical, and financial
564 impacts of the suite of applications, larger efficacy trials are required, in which all healthcare
565 workers from an organization are given more opportunity to use them. Such studies could point
566 to a low-cost, high-reward strategy that health care networks could implement, integrated with
567 wellness initiatives, to lessen the rising mental health issue in healthcare. This may be due to the
568 promotion of brain-derived neurotrophic factors (BDNF), which support brain health, or due to
569 endorphin release, which improves mood and reduces pain perception, or stress hormone
570 regulation, which reduces the cortisol levels (60). Moreover, one of the main causes of
571 depression is a sedentary lifestyle and inactivity. Sport and physical activity provide a potential,
572 evidence-based alternative for the prevention and treatment of depression because of their
573 widespread accessibility, substantial and clinically meaningful benefits, and near-complete lack
574 of side effects. Therefore, in order to improve mental health, health professionals should support
575 any increase in physical activity. Exercise is a safe and affordable way to treat depression, so
576 interventions aimed at encouraging and maintaining its use should be given much more thought

577   in clinical practice. It could also be a desirable choice for public health promotion and long-term

578   mental health care systems around the world (61).

579   The current study elucidated that smoking among the participants has no role in minimizing the

580   rate of depression or anxiety. This contradicts the results of other research, which found that the

581   correlation between mental illness and smoking is evident, as individuals with mental health

582   conditions exhibit both increased prevalence and greater intensity of smoking behaviors (62).

583   The present study concluded that healthcare workers with a pre-existing history of chronic or

584   psychiatric disease had more than double the risk of depression and anxiety. The same results

585   were recorded by a prospective cohort study of nurses (2020–2022) in China reported that a

586   history of diabetes and hypertension significantly increased anxiety and depressive symptoms

587   (63). Previous research observed that anxiety and depression prevalence are strongly influenced

588   by chronic illnesses. Increased prevalence of these mental health conditions is linked to

589   cardiovascular disease, COPD, cancer, neurological disorders, including multiple sclerosis and

590   Parkinson's, and chronic pain conditions like fibromyalgia and arthritis. Patients with various

591   chronic conditions need to have their mental health addressed. Furthermore, the psychological

592   effects of chronic illnesses may be influenced by gender (64). Additionally, the trend we

593   observed, which indicated that females diagnosed with psychological disorders had a higher

594   prevalence of depression than males, is consistent with previous research that indicates that a

595   history of psychiatric disorders substantially influences the prevalence of depression (65).

Conclusion

597   Although depression and anxiety are prevalent in healthcare professionals, they are also

598   prevalent in residents, irrespective of their specialty. These conditions are frequently referred to

599   as "invisible diseases" due to their challenging identification and diagnosis. A significant

600   determinant of anxiety in this study was gender, as females consistently exhibited a higher

601   prevalence of anxiety than their male counterparts. Numerous studies, both domestically and

602   internationally, have also documented this trend. The levels of anxiety and depression were

603   substantially correlated with lifestyle factors and health-related concerns, particularly the history

604   of chronic diseases and psychiatric disorders. This investigation illustrated the correlation

between anxiety symptoms and depressive symptoms in residents who receive assistance at their place of employment. The safeguarding of inhabitants' health has evolved into a worldwide concern. To enhance the mental health of inhabitants, it is necessary to provide continuous management and global attention, as mental disorders can be prevented in the workplace. To address the constraints of the current investigation, additional longitudinal and clinical investigations are required.

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