RESEARCH ARTICLE

# Effects of nomophobia on anxiety, stress and depression among Saudi medical students in Jeddah, Saudi Arabia

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## Abstract

**Objective:** To assess the prevalence of depression, anxiety and stress in medical students, and to analyse effects of demographics and nomophobia on depression, anxiety and stress.

**Method:** The descriptive cross-sectional study was conducted at the College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Jeddah, Saudi Arabia, from April 1 to May 23, 2019, and comprised male and female medical students aged 19-25 years. Data was collected using a demographic information form, the 21-item depression, anxiety and stress scale and the 20-item nomophobia questionnaire. Data was analysed using SPSS 20.

**Results:** Of the 230 students, 108(47%) were boys and 122 (53%) were girls. The overall mean age was 21.93±1.80 years. Anxiety, depression and stress was reported in 168 (74.6%), 158 (70.2%) and 127 (55.9%) of the students. Extremely severe anxiety, depression and stress were self-reported by 92 (40.9%), 38 (16.8%) and 16 (7.04%) students. There was a significant difference in the distribution of subjects within different levels of anxiety across gender ($p<0.05$). Higher anxiety and stress scores were observed in 78 (33.9%) students with severe nomophobia. Differences in the levels of anxiety and stress with regards to type of residence and nomophobia levels were significant ($p<0.05$).

**Conclusion:** There was high prevalence of depression, anxiety and stress associated with gender, nomophobia levels and residence type.

**Keywords:** Depression, Anxiety, Stress, Medical, Nomophobia. (JPMA 71: 854; 2021) **DOI: https://doi.org/10.47391/JPMA.983**

## Introduction

Mental health issues in medical students have been widely studied in recent years. These issues are usually manifested as depression, anxiety or stress (DAS) that negatively affect student's wellbeing and academic performance.[1] Studies have shown that lack of social support, poor coping behaviour, older age, ethnicity, belittlement, battling with low grades, curricular structure and portrayal of poor faculty role modelling behaviour are the main causative factors for DAS in medical students.[2-4] Modern psychosocial disorders due to smartphone addiction and excessive technological dependence also contribute to the prevalence of DAS, such as nomophobia.[5] Nomophobia is a term that was initially coined in 2008, during a survey by the United Kingdom post office and described as "the fear of being out of mobile phone contact".[6]

Previous studies on DAS in Saudi medical students showed a high prevalence associated with academic stress, smoking and major life events.[7,8] Psychological distress and depression was more frequently observed in female medical students and a strong correlation to physical problems was also noted.[7-11] Lack of personal interest in medicine, worrisome thoughts regarding future goals and continuous academic assessment also surfaced as key contributing factors of DAS among medical students in Saudi Arabia.[12]

There is a need of further research to endorse such findings. Also, factors like the impact of the constantly evolving learning environment, increasing dependence on technology and a rapidly progressing socio-economic / societal change on the prevalence of already reported DAS among medical students in the region need to be studied. The current study was therefore planned to assess DAS in undergraduate medical students, and to analyse effects of demographics and nomophobia on self-reported perceived DAS levels.

## Subjects and Methods

The descriptive cross-sectional study was conducted at the College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Jeddah, Saudi Arabia, from April 1 to May 23, 2019. After approval from the ethics review board of the King Abdullah International Medical Research Centre, the sample size was calculated with 5% margin of error, 95% confidence level with 50% response distribution using formula for known population on Raosoft online sample size calculator.[13] The sample was raised using convenience sampling technique, and the students were approached individually in their free timings. Those included were male

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and female medical students aged 19-25 years who were enrolled with the college and were willing to participate. Those who did meet the inclusion criteria were excluded. Data was collected after taking written informed consent from the subjects. .

The data-collection tool had three parts. Part 1 comprised six items pertaining to demographic characteristics. Part 2 comprised the 21-item depression, anxiety and stress scale (DASS-21) which is the shorter version of the 42-item DASS-42.[14] There are sub-sets of 7 items in DASS-21 measuring depression, anxiety and stress on a 4-point Likert's scale ranging 0-3; 0 = 'did not apply to me at all', and 3 = 'applied to me very much or most of the time'. The items are scored individually and the total is derived by adding up the individual scores ranging 0–42. Scores obtained on the DASS-21 are multiplied by 2 to calculate the final score which is then interpreted. Depression is considered normal at 0-9; mild 10-13; moderate 14-20; severe 21-27; and very severe 28+. Anxiety is considered normal 0-7; mild 8-9; moderate 10-14; severe 15-19; and very severe (20+. Stress is considered normal 0-14; mild 15-18; moderate 19-25; severe 26-33; and very severe 34+.[14]

Part 3 comprised the 20-item nomophobia questionnaire (NMP-Q) scored on a 7–point Likert scale, where 1 = 'strongly disagree' and 7 = 'strongly agree'.[15] Total score ranges from 20-140. The interpretation cut-off points are; absence of nomophobia up to 20; mild nomophobia 21-59; moderate nomophobia 60-99; and severe nomophobia 100-140. Cronbach's alpha value of NMP-Q is 0.945.[15] Both the tools were translated into Arabic and pretested on a sample of 30 subjects. They showed good internal consistency with Cronbach's alpha value of 0.942 for NMP-Q and 0.945 for DASS-21.

Data was analysed using SPSS 20. Kolmogorov-Smirnov test showed that the data was normally distributed. Descriptive statistics were used, and categorical variable were expressed as frequencies and percentages. Comparative differences in the frequency within different DAS levels in male and female medical students were analysed using chi-square test. Independent sample t-test and analysis of variance (ANOVA) were used to analyse comparative differences in DAS scores in groups of students categorised on the basis of demographic features.

## Results

Of the 230 students, 108(47%) were boys and 122 (53%) were girls. The overall mean age was 21.93±1.80 years.

**Table-1:** Differences in mean scores of depression, anxiety and stress based on participants' characteristics.

| Variables | | | Depression | | | Anxiety | | | Stress | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n (%) | Mean±S.D | Ta/Fb | *p*-value | Mean±S.D | t*/F** | *p*-value | Mean±S.D | t*/F** | *p*-value |
| Gender | Male | 108 (47) | 17.4±9.81 | 1.753[a] | 0.081 | 16.5±9.03 | 0.829[a] | 0.408 | 18±8.77 | 0.713[a] | 0.477 |
| | Female | 122 (53) | 14.9±11.13 | | | 15.3±11.27 | | | 17.1±10.68 | | |
| Residence type | Urban | 207 (90.1) | 15.5±10.37 | -0.666[a] | 0.506 | 14.8±10.14 | -2.76[a] | 0.006 | 16.4±3.77 | -4.17[a] | 0.001 |
| | Rural | 23 (9.9) | 17.1±11.12 | | | 21.2±10.70 | | | 23.4±7.05 | | |
| Driving status | Yes | 78 (34.1) | 16.4±10.52 | 0.299a | 0.766 | 14.3±10.18 | -1.61[a] | 0.109 | 16.6±10.02 | -0.858[a] | 0.392 |
| | No | 152 (65.9) | 15.9±10.70 | | | 16.6±10.35 | | | 17.8±9.85 | | |
| Academic level | Pre-clinical phase | 118 (51.7) | 15.8±9.23 | -0.186[a] | 0.853 | 15.6±9.59 | -0.311[a] | 0.756 | 17.1±8.96 | -0.537[a] | 0.592 |
| | Clinical phase | 112 (48.3) | 16.1±11.83 | | | 16±10.96 | | | 17.8±10.75 | | |
| Social status | Single | 214 (93.4) | 16.2±10.69 | 1.308[b] | 0.273 | 15.7±10.33 | 0.735[b] | 0.481 | 17.4±9.99 | 0.371[b] | 0.690 |
| | Married | 16 (6.6) | 14.4±9.09 | | | 18.3±10.78 | | | 17.6±8.81 | | |
| | Others | | 32.0 | | | 24.0 | | | 26.0 | | |
| Nomophobia | Mild | 39 (17) | 16.9±9.11 | 1.830[b] | 0.163 | 16.2±9.78 | 6.336[b] | 0.002 | 15.7±8.66 | 6.04[b] | 0.003 |
| | Moderate | 113 (49.1) | 14.7±10.23 | | | 13.6±9.42 | | | 15.9±9.65 | | |
| | Severe | 78 (33.9) | 17.5±11.57 | | | 18.9±11.04 | | | 20.5±10.12 | | |

[a]Independent t-test; [b]ANOVA test; SD: Standard deviation

**Table-2:** Severity of depression, anxiety and stress across gender.

| | | Normal | Mild | Moderate | Severe | Extremely Severe | Total | p-value |
|---|---|---|---|---|---|---|---|---|
| Stress | Male | 43(41%) | 18(17.1%) | 22(21%) | 15(14.3%) | 7(6.7) | 105 | |
| | Female | 57(46.7%) | 9(7.4%) | 25(20.5%) | 22(18%) | 9(7.4%) | 122 | 0.241 |
| | Total | 100 | 27 | 47 | 37 | 16 | 227 | |
| Anxiety | Male | 17(16.5) | 11(10.7%) | 19(18.4%) | 13(12.6%) | 43(41.7%) | 103 | |
| | Female | 40(32.8%) | 5(4.1%) | 16(13.1%) | 12(9.8%) | 49(40.2%) | 122 | 0.03 |
| | Total | 57 | 16 | 35 | 25 | 92 | 225 | |
| Depression | Male | 22(21.4%) | 18(17.5%) | 28(27.2%) | 18(17.5) | 17(16.5%) | 103 | |
| | Female | 45(36.9%) | 17(13.9%) | 26(21.3%) | 13(10.7%) | 21(17.2%) | 122 | 0.104 |
| | Total | 67 | 35 | 54 | 31 | 38 | 225 | |

**Table-3:** Differences in mean scores of depression, anxiety and stress scale-21 (DASS-21) items related to gender and levels of nomophobia.

| DASS-21 declarative statements | | | | Levels of nomophobia | | |
|---|---|---|---|---|---|---|
| | Gender | Mean±SD | *p*-value | | Mean±SD | *p*-value |
| | Male | 1.7±0.72 | 0.001 | Mild/Moderate | 1.2±0.86 | 0.15 |
| I found it hard to wind down (a) | Female | 1.1±0.99 | | Severe | 1.4±1.06 | |
| | Male | 1.9±0.77 | 0.001 | Mild/Moderate | 1.4±1.02 | 0.18 |
| I was aware of dryness of my mouth (b) | Female | 1.3±1.15 | | Severe | 1.6±1.12 | |
| | Male | 1.7±0.77 | 0.001 | Mild/Moderate | 1.2±0.89 | 0.32 |
| I couldn't seem to experience any positive feeling at all (c) | Female | 1±0.97 | | Severe | 1.4±1.06 | |
| | Male | 1.7±0.81 | 0.001 | Mild/Moderate | 1.2±1 | 0.74 |
| I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion (b) | Female | 1±1 | | Severe | 1.2 | 1.01 |
| | Male | 1.9±0.78 | 0.001 | Mild/Moderate | 1.7±0.91 | 0.92 |
| I found it difficult to work up the initiative to do things (c) | Female | 1.5±0.96 | | Severe | 1.7±0.95 | |
| | Male | 1.7±0.76 | 0.003 | Mild/Moderate | 1.4±1.29 | 0.15 |
| I tended to over-react to situations (a) | Female | 1.3±1.34 | | Severe | 1.6±0.91 | |
| | Male | 1.7±0.73 | 0.001 | Mild/Moderate | 1.2±0.96 | 0.28 |
| I experienced trembling (e.g. in the hands) (b) | Female | 1±1.02 | | Severe | 1.3±1 | |
| | Male | 1.8±0.77 | 0.001 | Mild/Moderate | 1.4±1.02 | 0.04 |
| I felt that I was using a lot of nervous energy (a) | Female | 1.4±1.15 | | Severe | 1.7±1.05 | |
| | Male | 1.9v0.75 | 0.001 | Mild/Moderate | 1.4±1.06 | 0.37 |
| I was worried about situations in which I might panic and make a fool of myself (b) | Female | 1.2±1.12 | | Severe | 1.6±1.02 | |
| | Male | 1.8±0.88 | 0.001 | Mild/Moderate | 1.3±1.08 | 0.94 |
| I felt that I had nothing to look forward to (c) | Female | 1±1.11 | | Severe | 1.3±1.11 | |
| | Male | 1.6±0.73 | 0.053 | Mild/Moderate | 1.5±0.91 | 0.54 |
| I found myself getting agitated (a) | Female | 1.4±1.04 | | Severe | 1.4±0.98 | |
| | Male | 1.7±0.78 | 0.001 | Mild/Moderate | 1.3±0.98 | 0.24 |
| I found it difficult to relax (a) | Female | 1.2±1.07 | | Severe | 1.5±1.01 | |
| | Male | 1.8±0.8 | 0.001 | Mild/Moderate | 1.4±1.01 | 0.62 |
| I felt down-hearted and blue (c) | Female | 1.2±1.11 | | Severe | 1.5±1.11 | |
| | Male | 1.7±0.79 | 0.001 | Mild/Moderate | 1.4±0.99 | 0.99 |
| I was intolerant of anything that kept me from getting on with what I was doing (a) | Female | 1.2±1.03 | | Severe | 1.4±0.95 | |
| | Male | 1.7±0.78 | 0.001 | Mild/Moderate | 1.2±0.98 | 0.20 |
| I felt I was close to panic (b) | Female | 1.1±1.04 | | Severe | 1.4±1 | |
| | Male | 1.7±0.8 | 0.001 | Mild/Moderate | 1.3±0.98 | 0.91 |
| I was unable to become enthusiastic about anything (c) | Female | 1±1.03 | | Severe | 1.3±1.06 | |
| | Male | 1.5±0.77 | 0.001 | Mild/Moderate | 1.1±1.03 | 0.94 |
| I felt I wasn't worth much as a person (c) | Female | 0.9±1.1 | | Severe | 1.1±1.08 | |
| | Male | 1.6±0.73 | 0.009 | Mild/Moderate | 1.3±0.94 | 0.35 |
| I felt that I was rather touchy (a) | Female | 1.2±1.07 | | Severe | 1.4±1.02 | |
| | Male | 1.6±0.77 | 0.001 | Mild/Moderate | 1.3±0.98 | 0.61 |
| I was aware of the action of my heart in absence of physical exertion (.sense of heart rate increase, heart missing a beat) (b) | Female | 1.1±1.12 | | Severe | 1.4 | 1.11 |
| | Male | 1.5±0.77 | 0.001 | Mild/Moderate | 1.2±0.99 | 0.31 |
| I felt scared without any good reason (b) | Female | 1±1.09 | | Severe | 1.3±1.04 | |
| | Male | 1.7±0.86 | 0.001 | Mild/Moderate | 1.2±1.06 | 0.61 |
| I felt that life was meaningless (c) | Female | 0.9±1.11 | | Severe | 1.2±1.14 | |

SD Standard deviation; a: Stress b: Anxiety c: Depression.

There was no relation of demographic features with depression ($p>0.05$), while type of residence and nomophobia had significant association with anxiety and stress ($p<0.05$) (Table 1).

In terms of gender, there were no significant differences related to depression and stress ($p>0.05$), but in terms of anxiety, 40(32.8%) female students were normal compared to 17(16.5%) male students ($p<0.05$) (Table 2).

Mean values of DASS-21 and NMP-Q were also compared along gender lines (Table 3).

## Discussion

The results showed that 67 (29.8%) participants did not have depression, but 'extremely severe depression' was

noted in 38(16.9%). Compared to a previous study in Saudi medical students reporting 45% mild to moderate depression,[16] the prevalence rate of depression in the current study 158 (70.2%) was alarmingly high. However, another study across different medical colleges in Saudi Arabia reported even higher prevalence rate of depression at 66.6% in males and 87.6% in females.[17] The current study indicated higher prevalence of depression in male medical students compared to females which is contrary to earlier reports. [9-11,18]

Although prevalence of mild to severe depression was higher in male students, frequency of extremely severe depression was higher in female students. However, this difference was not statistically significant. Lack of initiative or motivation in medical students is directly related to their well-being, academic performance and learning strategies.[19] Motivational strategies employed in medical schools can help reduce depression in students and contribute to their well-being. Peer support programmes are also beneficial in reducing depression and improving mental health in medical students.[20] There was no significant difference in severity of depression across different groups of students divided on the basis of residence type, academic levels, social / driving status and nomophobia.

Stress levels were assessed in 127 (55.9%) participants with a lower prevalence in female medical students. Although frequency of stress was higher in male students, most of them had mild to moderate levels of stress, whereas frequency of severe to extremely severe levels was comparatively higher in female students in the current study. A study in Saudi Arabia showed that 'worries regarding exam grades' contributed to stress in medical students.[12] Absence of effective stress coping strategies can further complicate and affect their clinical practice. High prevalence of stress is also reported in Saudi medical graduates or junior doctors during their internship.[17,21] Stress reduction techniques based on mindfulness are very effective for reducing stress in medical students.[22] The idea of 'well-being curriculum' in medical school is also pushed forward, which involves learning on subject matters related to exercise, sleep, problem-solving, capability to manage stress and worrisome thoughts.[23] The current study showed that stress scores were significantly different in groups of students with different residential status ($p<0.05$) and levels of nomophobia ($p<0.05$). Stress scores were higher in students residing in rural areas (23.4±7.5) compared to urban areas (16.4±3.77). This can be related to the travelling time required for them to attend classes and complete clinical hours. Stress levels were higher in students with severe nomophobia. This finding is in line with earlier studies.[24] It is also important to consider that students with severe nomophobia display responses of behavioural disengagement in stressful confrontations.[25] Anxiety items in DASS-21, related to dryness in mouth and fear of getting panicked, were reported with highest mean scores in male students. Anxiety levels in medical students are reported to be associated with gender, academic stress, internet addiction and self-esteem.[1,26] In addition to this existing knowledge, the current study showed higher scores of anxiety in medical students with severe nomophobia, whereas the difference in anxiety score with regards to levels of nomophobia was highly significant ($p<0.05$). Based on the findings, the current study rejected the null hypothesis and accepted the alternative hypothesis.

The current study has a few limitations. It is a single-centre study, and the data collected was through self-reporting questionnaires which have low construct of interest and are considered a product of sociological, psychological, experiential, linguistic and contextual variables.[27] Further studies in a longitudinal frame are required to see the effects of specific features of nomophobia on DAS.

Skilled therapists in the wellness centre available for students on the campus site should address cases of nomophobia in collaboration with student advisory units. Cognitive behavioural therapy should also be provided at the wellness centre. Faculty members should be trained to identify traits of nomophobia in their students and direct them to the wellness centre.

Awareness programmes highlighting perils of nomophobia should be organised in medical schools. Students should be provided with the knowledge and the tools to self-diagnose nomophobic tendencies. Mental health wellness campaigns, like 'Digital detox challenge', and 'No phone zone', should be initiated for the students.

## Conclusion

There was a high prevalence of DAS in medical students. A large number of respondents had severe anxiety which is directly proportional to severity of nomophobia.

**Disclaimer:** None.

**Conflict of interest:** None.

**Source of Funding:** None.

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