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# Predictors of anxiety and depressive symptoms among Greek nurses

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## ABSTRACT

**Introduction:** The increasing needs of an aging population and the shortage of nursing personnel have a negative impact on the workload of nurses increasing the risk of developing anxiety and depressive symptoms. This research aims to evaluate the strength of occupational and demographic characteristics in predicting anxiety and depression among nurses.

**Methods:** In this cross-sectional study, a sample of 164 Greek nurses from three hospitals employed full-time participated. Anxiety and depression were measured using the validated Greek versions of the State-Trait Anxiety Inventory – State and Trait Y forms and the Centre for Epidemiological Studies Depression scale, respectively. The statistical analysis of the data was performed using the statistical program SPSS version 19.0. The statistical significance level was set up at 0.05.

**Results:** Younger nurses, unmarried, those without children, those with less work experience, and working in the general medical units were more vulnerable. The average number of patients per nurse during the day shift may not predict anxiety or depression scores. Strong positive correlation between state and trait anxiety ( $r [162] = 0.77, p < 0.001$ ), state anxiety and depression ( $r [162] = 0.62, p < 0.001$ ), and trait anxiety and depression ( $r [162] = 0.63, p < 0.001$ ) was revealed.

**Conclusion:** Anxiety and depression are prevalent among nurses. Demographic and working characteristics are strong predictors of anxiety and depression among nurses. Nursing managers should emphasize emotional interventions (cognitive behavioral therapy, training on emotional intelligence, strengthening coping skills, and development of high resilience) in supporting nurses at higher risk.

**Keywords:** Anxiety; depression; nurses; occupational predictors

## INTRODUCTION

Nurses are exposed to a variety of stressful situations in their work environment such as close contact with

vulnerable, sick, or dying patients and their relatives and interaction with peers, supervisors, doctors, and changing work shifts (1,2). About 27.3% of nurses exceeded the cutoff level for anxiety or depression based on the scale used (3). The workload of nurses in hospitals and other health-care settings is expected to increase due to the combined effect of the aging population and the global shortage of

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nurses. Aging population implies a constant rise in needs for health care and nursing personnel (4). The global shortage of nurses follows health budget cuts and/or increased turnover (5).

According to the international literature (6), 38% of nurses have depressive symptoms. Researchers found that younger and single nurses have higher depression scores, with marital status, job insecurity, lack of reward and surface acting (suppressing emotions), and the strongest predictors. A positive correlation of anxiety and depression with marital status, sleep problems, and levels of physical activity are referred (7). The type of medical unit, marital status, and years of occupation significantly predicted depression in Taiwan after analyzing responses from 314 nurses (8). In Australia, anxiety levels were positively correlated with younger nurses without a postgraduate degree (9).

The effect of shift work on nurses' health was examined in Norway and Greece with different results. Although a higher level of insomnia was reported by nurses who were working in night shifts, there were no significant associations with anxiety or depression (10). Trying to evaluate the impact of small breaks or "quick returns," researchers did not find any effect on anxiety or depression (11). Finally, shift work had a more severe impact on cognitive anxiety among females, in those with a chronic disease, and nurses with a second paid job (12). Considering somatic anxiety, shift work affected more negatively nurses belonging in large families and those with a chronic disease. Reviewing three studies (8,13,14) which investigated the possible effect of the type of medical unit (general, surgical, emergency, or intensive care) on anxiety and/or depression levels, results are non-conclusive. First, in the U.S., all nurses had increased levels of anxiety but not depression while there were no significant differences based on the type of medical unit (13). On the other hand, in Taiwan, the type of medical unit was a significant predictor of depression (8) while in Czech researchers, surveyed nurses employed in intensive care and the general units of Czech hospitals (14). There were no differences in depression scores concerning the medical unit; however, significantly higher anxiety was reported by nurses employed in the general compared to the intensive care units (14).

In Greece, there is a big shortage of nurses with only 3.3 nurses per 1000 inhabitants (15) and a very low ratio of nurses to doctors at 0.6 (16). Despite a satisfactory index of 23.8 nursing graduates per 100.000 inhabitants (17), public hospitals face an even more intense shortage of nurses due to the negative impact of the socio-economic crisis, with 32% reduction in public spending on health from 2009 to 2013 (16) and no new hires at public hospitals during the past 5 years. Considering a constant reduction of nurses in public hospitals due to the lack of replacement of retired personnel, nursing workload follows increasing trends. The average number of patients per nurse was ranging on average from 11 in the morning to 16 in the afternoon and up to 26 during the night shifts. Moreover, working more than 5 days a week was common for the majority of respondents, especially those aged below 40 years, leaving them with not enough time and energy to spend on family and social life commitments (18). Assessing the impact of the serious financial crisis on nursing personnel, a prevalence of 25% and 16% for anxiety and depression symptoms, respectively, was indicated (19). The number of years as a professional nurse was related to symptoms of anxiety and depression. Mild anxiety levels were found among 213 Greek nurses employed in the emergency units of eight hospitals (20); however, almost 25% of the respondents reported a very severe sleep disturbance.

This research aimed at evaluating the strength of various occupational and demographical variables in predicting levels of anxiety (state and trait) and depression among nurses in hospitals of Greece. Also, considering that trait anxiety, as a measure of negative affectivity, may predict depression (21), it was hypothesized that trait anxiety would be a significant predictor of depression. This study is one of the few studies (20,22) exploring anxiety and depression among Greek nurses.

## METHODS

This is a cross-sectional study among nurses employed full time in three major (>150 beds for each) hospitals (medical, surgical, emergency, and intensive care unit) of Athens, Greece. A decision to target for a sample size of at least 120 respondents was based (20) for obtaining a statistical power of

80% with a moderate effect and level of statistical significance  $\alpha = 0.05$ . After data editing, a final set of 164 responses was used in the analysis of results.

To measure anxiety and depression, the following scales were used:

The State-Trait Anxiety Inventory (STAI) (23) is a self-administered tool for measuring state and trait anxiety. It consists of two forms (Y1 and Y2). The State Anxiety (Y1) form consists of 20 statements assessing how the respondent feels “right now, at this moment.” Scores for each statement range from 1 (“not at all”) to 4 (“very much”). In 10 of the items, the higher the score, the higher the level of state anxiety. The opposite applies for the remaining 10 items indicating an absence of anxiety and the score in these items is reversed. The total score for state anxiety is calculated by adding the scores of the 20 statements. State anxiety scores can range from 20 to 80. Similarly, the form of Trait Anxiety (Y2) also consists of 20 statements and examines how the respondent feels “in general” with scores ranging from 1 to 4. In 11 of the items, the higher the score, the more intense the levels of trait anxiety. For the remaining nine statements, a top score of 4 indicates no existence of trait anxiety, and therefore, the score in these items is reversed. The total score for trait anxiety is calculated by adding the scores of the 20 statements. The trait anxiety score can also range from 20 to 80. In this study, the Greek versions of Y forms of STAI were used (24).

Depression was evaluated using the scale of the Centre for Epidemiological Studies Depression (CES-D) (25) as translated and validated for Greek nurses in 2001 (26). It is a reliable and valid self-reporting scale for assessing the severity of depressive symptoms in the general population and patients. It consists of 20 statements assessing the somatic, psychological, and affective symptoms' frequency of occurrence during the week before the completion of the scale. For each statement, the score can range from 0 (rarely or none of the time, <1 day) to 3 (most or all of the time, 5-7 days). Statements numbered 4, 8, 12, and 16 assess positive feelings so the score is reversed. The higher the score, the more severe the symptoms of depression. The total score of depression is the sum of the scores of the 20 statements and can range from 0 to 60. Initially, when the CES-D scale was developed, a cutoff score of 16

was found to be appropriate to identify individuals with depression.

Occupational questions asked for the respondent's work experience, size, and type of medical unit, shift pattern (fixed or rotating), and the average number of patients per nurse. Demographics included gender, age, education, and marital status. Respondents spent approximately 15-20 minutes to complete the whole questionnaire. Ethical approval from the Management Board and Ethics Committees of the public hospitals was secured. The next step involved approaching nurses and communication of the scope and important information about the study. It was declared that participation is voluntary and anonymous, the respondents' right to withdraw at any time up to return the questionnaire and that the data will be used only for the research purposes. Completion and signing of the consent form were required by the nurses who decided to participate in the survey. All procedures were carried out following the standards of the 1964 Helsinki Declaration, as revised in 2000.

### Data analysis

The mean values and standard deviations were used to describe the quantitative variables. Absolute (N) and relative (%) frequencies were used to describe the qualitative variables. To test the relationship between the variables, the correlation coefficients of Spearman ( $r$ ) was used. After checking for normality using the Kolmogorov-Smirnov test, six outliers were identified and removed. The revised and final SPSS file with data from 164 nurses satisfied the test for checking normality and was used to produce the results. A correlations matrix for all demographics, occupational variables, state, trait anxiety, and depression was produced and used in the screening and selection of the final set of predictors to be considered in the main analysis. Categorical predictors with two levels; gender, hospital sector, and type of shift work, were treated as dummy variables, and those with more than two levels (education, marital status, and type of medical unit) were converted to dummy variables (27). Assessment of the strength of selected demographic and occupational variables, separately and in total, in predicting state, trait anxiety, and depression was performed using hierarchical multiple linear regression. Moreover, in examining predictors of depression, hierarchical

multiple linear regression evaluated how well can trait anxiety predicts depression after controlling for demographics and occupational predictors. The statistics of the data were processed with SPSS v. 22.0 for Windows. The level of statistical significance was set up at 0.05.

## RESULTS

The demographic and occupational characteristics of the participants are presented in Table 1.

Mean scores and standard deviations for the state, trait anxiety, and depression are presented in Table 2.

Beyond the mean score reported above for depression, originally on the development of the CES-D scale, a cutoff score of 16 was defined (25). In this study, 52 nurses out of 164 (31.7%) scored at or above 16 in the CES-D scale. However, Fountoulakis et al. (2001) reported that a preliminary cutoff score of 23/24 instead of 16 would be more accurate. Using a cutoff score of 23, a total number of 22 respondents (13.4%) scored at or above this level.

Examining the correlations among state, trait anxiety, and depression variables, results show that there is a very strong positive correlation between state and trait anxiety ( $r [162] = 0.77, p < 0.001$ ), between state anxiety and depression ( $r [162] = 0.62, p < 0.001$ ), and between trait anxiety and depression ( $r [162] = 0.63, p < 0.001$ ).

A correlation matrix of all possible predictors' variables was produced to identify pairs of variables with a very strong significant correlation (above 0.70) and take necessary actions to reduce the risk of multicollinearity. A table with the correlation coefficients of the revised list of predictors (including dummy variables) with the state, trait anxiety, and depression scores was prepared. Table 3 shows only the significant correlations found.

Hierarchical multiple linear regression analyses with two blocks were carried out to predict state anxiety and trait anxiety, using the final list of demographic and occupational predictors. The overall model for predicting state anxiety was significant explaining 24% of the variance in state anxiety scores. In the first block, the three dummy variables representing marital status were introduced together. In the second block, all remaining predictors were added.

On block 2, the result was significant and among all predictors used, four were found to be significant: Age, lyceum versus university degree, postgraduate degree versus University, and finally, surgical unit versus general medical unit (Table 4).

For predicting trait anxiety, the overall model was significant explaining 23% of the variance in trait anxiety scores. On block 1, the model was not significant and no variable was significant. On block 2, the result after adding all remaining demographic and occupational predictors was significant, and five predictors were found to be significant: Age, lyceum versus university, postgraduate degree versus university degree, and finally, emergency unit versus general medical unit and intensive care unit versus general medical unit (Table 5).

For predicting depression, a hierarchical multiple linear regression with an additional (third) block was employed where trait anxiety was introduced for testing its strength in predicting depression scores after controlling for all other predictors. The overall model was significant with the model explaining 46% of the variance in depression scores. On block 1 which was created to isolate and add the three dummy variables of marital status, the model was not significant with married with children versus singles significant indicating that married nurses with children have lower scores of depression compared to singles. On block 2, the result after adding all remaining demographic and occupational predictors was significant, and among all predictors used, four were significant: Age, lyceum versus university degree, postgraduate degree versus university degree, and finally, emergency unit versus general medical unit. On block 3, the result with the placement of trait anxiety was significant and prediction of depression from trait anxiety after controlling for all demographic and occupational predictors was found to be significant (Table 6).

## DISCUSSION

The key objective of this study was to evaluate the strength of a set of selected demographic and occupational variables in predicting levels of anxiety and depression among nurses in three hospitals of Athens, Greece. Moreover, the strength of trait anxiety in predicting depression after controlling for demographic

**TABLE 1.** Demographic and occupational characteristics of the participants (n=164)

| Age   | Mean (SD) - 47.5 |
|---|------------------|
| Gender  | n (%)            |
| Males   | 28 (17.1)        |
| Females   | 136 (82.9)       |
| Marital status  |                  |
| Unmarried   | 62 (37.8)        |
| Married with children                                       | 15 (9.1)         |
| Married with no children                                    | 80 (48.8)        |
| Divorced/widowed  | 7 (4.3)          |
| Educational level   |                  |
| Lyceum  | 48 (29.3)        |
| Technological university                                    | 84 (51.2)        |
| University  | 3 (1.8)          |
| Postgraduate  | 29 (17.7)        |
| Hospital sector   |                  |
| Private   | 56 (34.1)        |
| Public  | 108 (65.9)       |
| Total professional experience (years)                       |                  |
| <1  | 12 (7.3)         |
| 1-5   | 20 (12.2)        |
| 6-10  | 31 (18.9)        |
| 11-15   | 37 (22.6)        |
| 16-20   | 23 (14)          |
| 21-25   | 12 (7.3)         |
| >25   | 29 (17.7)        |
| Duration of professional experience in the current hospital |                  |
| <1  | 18 (11)          |
| 1-5   | 31 (18.9)        |
| 6-10  | 35 (21.3)        |
| 11-15   | 28 (17.1)        |
| 16-20   | 19 (11.6)        |
| 21-25   | 13 (7.9)         |
| >25   | 20 (12.2)        |
| Type of shift work  |                  |
| Fixed shift   | 54 (33.1)        |
| Rotating shift  | 109 (66.9)       |
| Type of medical unit  |                  |
| Medical   | 99 (60.4)        |
| Surgical  | 36 (22)          |
| Intensive unit  | 18 (22)          |
| Emergency   | 11 (6.7)         |
| Size of medical unit (number of beds)                       |                  |
| 1-10  | 33 (20.4)        |
| 11-20   | 30 (18.5)        |

**TABLE 1. (Continued)**

|  |           |
|--|-----------|
| 21-30  | 68 (42)   |
| >30  | 31 (19.1) |
| Average number of night shifts per month                 |           |
| None   | 47 (31.8) |
| 1-3  | 14 (9.5)  |
| 4-6  | 46 (31.1) |
| 7-9  | 37 (25)   |
| >10  | 4 (2.7)   |
| Average number of patients per nurse during day shifts   |           |
| 1-3  | 21 (13)   |
| 4-6  | 30 (18.5) |
| 7-9  | 31 (19.1) |
| >10  | 80 (49.4) |
| Average number of patients per nurse during night shifts |           |
| 1-3  | 23 (17.2) |
| 4-6  | 15 (11.2) |
| 7-9  | 8 (6)     |
| >10  | 88 (65.7) |

**TABLE 2.** Mean scores and standard deviations for state anxiety, trait anxiety, and depression in the total sample (n=164)

| Symptoms                                 | Mean±SD     |
|--|-------------|
| State anxiety (theoretical range 20-80 ) | 37.45±11.32 |
| Trait anxiety (theoretical range 20-80)  | 38.63±9.59  |
| Depression (theoretical range 0-60 )     | 12.18±8.26  |

**TABLE 3.** Statistically significant correlations of predictors with the state, trait anxiety, and depression

| Predictor variables                    | State anxiety | Trait anxiety | Depression |
|--|---------------|---------------|------------|
| Age                                    | -0.20**       | -0.18*        | -0.20**    |
| Married with children versus unmarried |               | -0.16*        | -0.16*     |
| Lyceum versus university degree        | -0.28**       | -0.17*        |            |
| Postgraduate versus university degree  |               | -0.17*        | -0.19*     |
| Surgical versus general medical unit   | -0.16*        |               |            |
| Emergency versus general medical unit  |               | -0.16*        |            |

\*\*Correlation is significant at the 0.01 level (two tailed).

\*Correlation is significant at the 0.05 level (two tailed)

and occupational predictors was investigated. It was hypothesized that age, years of working experience, marital status, and workload as estimated by the

(Contd...)



**TABLE 4.** Hierarchical multiple linear regression of state anxiety scores as the criterion variable on to demographic and occupational predictor variables

| Block | Predictor variables                                       | Beta  | t     | p      |
|-------|---|-------|-------|--------|
| 1     | Married with children versus singles                      | -0.13 | -1.53 | 0.127  |
|       | Divorced or widowed versus singles                        | -0.05 | -0.57 | 0.57   |
|       | Married with no children versus singles                   | -0.00 | -0.05 | 0.96   |
| 2     | Gender  | -0.06 | -0.81 | 0.417  |
|       | Age   | -0.22 | -2.18 | 0.031  |
|       | Lyceum versus university degree                           | -0.38 | -4.67 | <0.001 |
|       | College versus university degree                          | -0.03 | -0.42 | 0.675  |
|       | Postgraduate versus university degree                     | -0.24 | -3.02 | 0.003  |
|       | Size of medical unit                                      | -0.04 | -0.44 | 0.660  |
|       | Type of shift work  | 0.05  | 0.63  | 0.529  |
|       | Hospital sector   | 0.01  | 0.09  | 0.925  |
|       | Average number of patients per nurse during the day shift | -0.08 | -0.75 | 0.454  |
|       | Surgical unit versus general medical unit                 | -0.18 | -2.21 | 0.029  |
|       | Emergency unit versus general medical unit                | -0.14 | -1.85 | 0.067  |
|       | Intensive care unit versus general medical unit           | -0.18 | -1.58 | 0.117  |

$R^2=0.02$ , adjusted  $R^2=0.00$ , ANOVA:  $F(3,156)=0.88$ ,  $p=0.452$  for block 1;  $\Delta R^2=0.23$ , ANOVA:  $F(12,144)=3.60$ ,  $p<0.001$  for block 2;  $R^2=0.24$ , adjusted  $R^2=0.16$ , ANOVA:  $F(15,144)=3.09$ ,  $p<0.001$  whole model.

**TABLE 5.** Hierarchical multiple linear regression of trait anxiety scores as the criterion variable on to demographic and occupational predictor variables

| Block | Predictor variables                                       | Beta  | t     | p      |
|-------|---|-------|-------|--------|
| 1     | Married with children versus singles                      | -0.16 | -1.88 | 0.062  |
|       | Divorced or widowed versus singles                        | 0.03  | 0.39  | 0.699  |
|       | Married with no children versus singles                   | -0.01 | -0.15 | 0.881  |
| 2     | Gender  | -0.01 | -0.18 | 0.856  |
|       | Age   | -0.21 | -2.10 | 0.038  |
|       | Lyceum versus university degree                           | -0.30 | -3.61 | <0.001 |
|       | College versus university degree                          | -0.04 | -0.50 | 0.614  |
|       | Postgraduate versus university degree                     | -0.21 | -2.56 | 0.011  |
|       | Size of medical unit                                      | -0.05 | -0.46 | 0.646  |
|       | Type of shift work  | 0.09  | 1.11  | 0.268  |
|       | Hospital sector   | 0.13  | 1.35  | 0.178  |
|       | Average number of patients per nurse during the day shift | -0.21 | -1.90 | 0.060  |
|       | Surgical unit versus general medical unit                 | -0.10 | -1.27 | 0.206  |
|       | Emergency unit versus general medical unit                | -0.23 | -2.93 | 0.004  |
|       | Intensive care unit versus general medical unit           | -0.26 | -2.34 | 0.021  |

\* $R^2=0.03$ , adjusted  $R^2=0.01$ , ANOVA:  $F(3,156)=1.50$ ,  $p=0.218$  for block 1;  $\Delta R^2=0.20$ , ANOVA:  $F(12,144)=3.15$ ,  $p=0.001$  for block 2;  $R^2=0.23$ , adjusted  $R^2=0.15$ , ANOVA:  $F(15,144)=2.87$ ,  $p\leq 0.001$  whole model

average number of patients per nurse would be the strongest predictors of anxiety and depression. Also, it was hypothesized that trait anxiety would be a significant predictor of depression in this study.

The results for the state, trait anxiety, and depression are moderate. The mean score of state anxiety

(37.45) is close to 41.4 of another study (28) with trait anxiety mean scores the same (38.6) in both studies. The low state anxiety of our study is justified by the more general sample used compared to the very specific and demanding (nurses in renal units) examined in the above study. Based on our

**TABLE 6.** Hierarchical multiple linear regression of depression as the criterion variable on to trait anxiety and demographic and occupational predictor variables

| Block | Predictor variables                                       | Beta  | t     | p      |
|-------|---|-------|-------|--------|
| 1     | Married with children versus singles                      | -0.21 | -2.44 | 0.016  |
|       | Divorced or widowed versus singles                        | -0.13 | -1.62 | 0.107  |
|       | Married with no children versus singles                   | -0.02 | -0.29 | 0.77   |
| 2     | Gender  | 0.02  | 0.24  | 0.810  |
|       | Age   | -0.24 | -2.37 | 0.019  |
|       | Lyceum versus university degree                           | -0.24 | -2.88 | 0.005  |
|       | College versus university degree                          | -0.07 | -0.92 | 0.358  |
|       | Postgraduate versus university degree                     | -0.24 | -2.97 | 0.003  |
|       | Hospital sector   | 0.18  | 1.84  | 0.068  |
|       | Type of shift work  | 0.01  | 0.07  | 0.943  |
|       | Size of medical unit                                      | 0.01  | 0.09  | 0.925  |
|       | Average number of patients per nurse during the day shift | -0.15 | -1.34 | 0.183  |
|       | Surgical unit versus general medical unit                 | -0.09 | -1.04 | 0.299  |
|       | Emergency unit versus general medical unit                | -0.22 | -2.83 | 0.005  |
|       | Intensive care unit versus general medical unit           | -0.16 | -1.44 | 0.153  |
|       | Trait anxiety   | 0.56  | 8.02  | <0.001 |
| 3     |   |       |       |        |

$R^2=0.05$ , adjusted  $R^2=0.03$ , ANOVA:  $F(3,156)=2.50$ ,  $p=0.062$  for block 1;  $\Delta R^2=0.18$ , ANOVA:  $F(12,144)=2.73$ ,  $p=0.002$  for block 2;  $\Delta R^2=0.24$ , ANOVA:  $F(1,143)=64.37$ ,  $p<0.001$  for block 3;  $R^2=0.46$ , adjusted  $R^2=0.40$ , ANOVA:  $F(16,143)=7.73$ ,  $p<0.001$  whole model

review in studies worldwide, nurses are a group with a higher prevalence of affective disorders; therefore, it is expected that this difference will apply also for Greek nurses.

Results fully confirmed our hypothesis on age as a significant predictor of both anxiety and depression and partially confirmed the marital status as a significant predictor for depression. Young age can be a significant predictor of anxiety and depression. This finding is in line with the previous studies (7,29) which found a positive correlation between age and anxiety. This may be since older nurses use their work experience and their family support (from children and spouses) as a shield against anxiety and depression.

Moving to examine the results by gender, based on our knowledge from data and findings in the general population, the prevalence of affective disorders is higher among females; however, this was not found in this study. For males employed in the human service sector, the risk of stress and depression is relatively higher compared to females (30). Female nurses from various sectors experience more anxiety than men (31) while other researchers (22) did not find any association.

To identify more vulnerable groups of nurses, examining the results of our study, beyond age, it was found that education level is a significant predictor for both anxiety and depression. Specifically, the lower level of education (lyceum) or the higher level (postgraduate degree) was significant predictors of anxiety and depression compared to the university degree. In a similar survey (22) in Greece, results were found, as far as the University Degree is concerned, and it may be explained by the sense of responsibility of a postgraduate holder. Regarding lyceum graduates, this finding can be attributed to the lack of professional development goals.

Furthermore, the type of medical unit was also a significant predictor of anxiety and depression. This is in line with findings from others (8,14) who reported that the type of general medical unit is a predictor of anxiety. Although for nurses in the intensive care and emergency units, sample sizes are quite small, it should be noticed that the demanding units are staffed by relatively more experienced and/or highly educated nurses (32). Moderate levels of anxiety among nurses in the emergency unit were found (20) commenting that mild anxiety could be useful in such units to offer employees the necessary energy and motivation to fight and handle difficult issues fast and effectively.



Bonding with the family and children could function as a means of expressing daily thoughts and feelings actively and positively shifting away from depression. A different approach to this phenomenon has to do with the construct of resilience. Researchers (33) sought to understand the role of resilience as protecting nurses in intensive care units from post-traumatic stress disorder, anxiety, depression, and burnout. They found that a high 22% were characterized as very resilient. Resilience can be increased through the strengthening of social networks for support and by training and learning of various psychological and other characteristics such as optimism and sense of humor, physical exercise, and coping skills.

Type of shift work was not a significant predictor of anxiety or depression. Regarding a study (12) where females were found more susceptible to the negative effects of shift work, mean scores in our study did not reveal any difference, but a statistical comparison of gender with the type of shift work would require a higher sample size for males to be performed.

It was quite surprised not to see a significant prediction of anxiety or depression by the average number of patients per nurse in a day shift. A close look at the results shows that our hypothesis was quite successful considering the increasing scores of anxiety and depression as we start from 1 to 3 patients per nurse and we move to 4-6 and then to 7-9 patients per nurse. Based on a study (18), the average number of patients per nurse in Greek hospitals is very high exceeding 10-12 in the day shifts compared to around 6-7 in other European countries.

The hypothesis that the workload, as estimated by the average number of patients per nurse in day shifts, would significantly predict anxiety and depression was not supported. However, it is encouraging that a model with demographic and occupational variables could significantly predict the outcome in the state, trait anxiety, and depression. Although mean scores are at moderate levels for anxiety, a key finding is that one in three nurses scored at or above 16, the standard cutoff score used abroad for CES-D.

It was also found that the trait anxiety is a significant predictor of depression after controlling for all other predictors used in the study. Nurses with stronger negative affectivity, as expressed by trait anxiety, scored higher on the depression scale.

The strong correlation among trait anxiety and depression and predictive value of trait anxiety was supported by findings in the literature (34,35) stating that trait anxiety scale measures depression as well as anxiety. Therefore, it could present an opportunity for implicitly assessing depressive symptoms among nurses concerning the individual and overcoming any fears for been stigmatized or having issues at work if found depressed.

A key limitation of the study is the cross-sectional design, not allowing to reach conclusions regarding any causal relationships. Preferably, longitudinal studies could provide a better understanding of the relationship between work-stress-anxiety and depression and they can also offer the opportunity to make interventions and test outcomes compared to controls. Furthermore, a limitation exists concerning the low amount of variances in anxiety and depression explained by the predictor variables (excluding trait anxiety prediction on depression).

## CONCLUSION

The findings of this study show that nurses are at a serious risk of developing anxiety and depression in a highly stressed and demanding workplace. More vulnerable are the younger, less experienced, those with no children. Further research should focus on improving understanding of the role of personality and workplace relationships in the development of anxiety and depression and also by assessing the impact of cognitive and emotional interventions such as cognitive behavioral therapy, training on emotional intelligence, strengthening of coping skills, and development of high resilience to support nurses.

## CONFLICTS OF INTEREST

The authors declare no conflicts of interest relating to the material presented in this article.

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