



Perceived Stress Among Nurses in Public Hospitals of the Northern Region of Morocco and Its Correlation with Their Social Anxiety: A Cross-Sectional Study

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Abstract

Background: Professional stress in healthcare workers, particularly among nurses, is a pressing issue globally, affecting their well-being and job performance.

Objectives: This study aimed to assess the level of perceived stress among nurses in the northern region of Morocco, identify related socio-demographic and professional factors, and analyze the correlation between perceived stress and social anxiety scores.

Methods: A cross-sectional study was conducted among 494 nurses in the northern region of Morocco in 2022. The sample size was estimated using Bernoulli sampling method. Participants were selected through stratified random sampling to ensure proportional representation across hospitals. Data were collected using a self-administered questionnaire based on Perceived Stress Scale (14 items version) (PSS14), the Liebowitz Social Anxiety Scale (LSAS) and a section covering socio-demographic and professional characteristics. Statistical analyses, including descriptive statistics, inferential tests, and regression analysis, were done using SPSS v.22 (IBM Corp, Armonk, NY, United States of America).

Results: The study findings showed that 87% of nurses experienced moderate levels of perceived stress, with a mean score of 28.14 ± 6.02 . In terms of social anxiety, a mean score of 53.17 ± 21.10 was noted. Risk factors associated with stress levels included gender ($t = -2.951$; $P = 0.003$), age ($F = 3.466$; $P = 0.032$) and nursing specialty ($F = 2.909$; $P = 0.021$). A moderate positive correlation was observed between perceived stress and social anxiety ($r = 0.350$, $P = 0.001$) with 12.2% of the variance in social anxiety can be explained by perceived stress ($R^2 = 0.122$).

Conclusions: The study stated that the majority of nurses had a moderate perceived stress and social anxiety in northern Morocco, with significant variations based on gender, age, and nursing specialty. A significant correlation was found between perceived stress and social anxiety. These findings underscore the need for targeted interventions to reduce stress and improve labor conditions for nurses.

Keywords: Occupational Stress, Nurses, Anxiety Disorders, Morocco

1. Background

Historically, occupational stress has long been recognized as a significant challenge to employee health and well-being, including for those in healthcare. The World Health Organization (WHO) defines workplace stress as "the response people may have when

presented with work demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope" (1). This stress can arise from factors such as poor work organization, lack of control over work processes, inadequate management, unsatisfactory working conditions, and insufficient support from colleagues and supervisors (1). In recent years, occupational stress has been associated with up to

90% of medical visits, leading the WHO to classify it as a global pandemic (2).

Occupational stress in the healthcare sector is a complex and multifaceted phenomenon, with nursing consistently ranked as one of the most stressful professions within this field (3). The National Institute for Occupational Safety and Health (NIOSH) in the USA classifies nursing among highly stressful occupations, underscoring the prevalence and economic burden of job-related stress (4). Occupational stress has emerged as a major global concern within the nursing profession, with prevalence rates ranging from 9.2% to 68.0% among nurses worldwide (5). Additionally, some studies indicate that 35.1% of nurses globally experience high levels of stress further emphasizing the severity of the issue (6). Research on nursing stress, which dates back to the 1960s, has consistently highlighted moderate to high stress levels in this profession, underscoring its persistent and widespread nature.

The inherent demands of nursing contribute significantly to stress. These demands include physical labor, the emotional burden of patient and family distress, long working hours, shift work, interpersonal challenges, and various other pressures central to the role (7). Moreover, Sociodemographic factors such as sex, age, work environment, and work experience could be correlated to work-related stress and burnout among professionals in medical settings (8, 9). The effects of this stress extend beyond the nurses' own health, potentially compromising the quality of care provided and placing both healthcare workers and patients at risk (7).

In addition to occupational stress, mental health challenges like anxiety disorders are prevalent among healthcare professionals. Social anxiety, a specific type of anxiety disorder is characterized by a marked fear of social situations where individuals may feel judged or negatively evaluated (10). This disorder can lead to avoidance behaviors and impair social or professional functioning, which is especially concerning in high-stakes environments like healthcare. Nurses, in particular, are frequently exposed to traumatic events such as patient suffering and death, which can intensify symptoms of anxiety (11). A study conducted in China involving 745 nurses demonstrates that challenging workplace conditions significantly contribute to anxiety, with a substantial proportion of nurses reporting such symptoms (12). Nursing requires intensive focus and independent thinking to make decisions related to patient health (13). Anxiety can disrupt critical decision-making processes and compromise the quality of nursing care (13). Work-

related anxiety disorders, including social anxiety, often manifest as phobias, fears of inadequacy, or generalized anxiety, further underscoring the link between occupational stress and mental health challenges in nursing (14).

Research has consistently shown that prolonged stress and anxiety disorders are associated with heightened activity in the amygdala, a key brain region involved in fear processing and threat detection (15, 16). This hyperactivity suggests that chronic stress can exacerbate social anxiety symptoms. However, despite this connection, previous studies have primarily examined stress and anxiety disorders in general, without specifically investigating the relationship between perceived stress and social anxiety.

In Morocco, non-medical health professionals, including nurses, constitute a significant portion (56%) of healthcare human resources, with a predominantly female workforce (60%) (17). Their crucial role, combined with the demanding nature of the profession requiring high cognitive, emotional, mental, and physical skills, predisposes nurses to elevated levels of professional stress.

Within the Moroccan context, few existing studies on nurse stress have primarily focused on the frequency and prevalence of the issue (18). Notably, there is a lack of studies quantifying perceived stress scores and the distribution of stress levels among nursing staff. The findings of these available studies, however, revealed high stress levels among nurses, further exacerbated by typical occupational constraints, staff shortages, poor work organization, a mismatch between work demands and recognition, and, in some cases, unfavorable working conditions (18).

Furthermore, there is a significant lack of research on occupational stress within healthcare establishments in the Tangier-Tetouan-Al Hoceima (TTA) region. This gap is particularly noteworthy, as the TTA region ranks third in economic contribution nationwide and holds strategic importance after the Casablanca-Settat and Rabat-Sale-Kenitra regions. Addressing this gap is essential for understanding the dynamics of occupational stress in this key region and its implications for healthcare quality. Additionally, exploring the relationship between perceived stress and social anxiety among nurses could provide novel insights into mental health challenges within the nursing profession and pave the way for further investigations into this relationship. A deeper understanding of these main outcomes may inform the development of targeted interventions aimed at improving both professional well-being and the quality of patient care.

This study is intended to pave the way for further investigations into this relationship, offering valuable insights for healthcare management and nursing mental health support programs.

2. Objectives

The present study aims to assess the levels of perceived stress and social anxiety among nurses in public hospitals of the northern region of Morocco using the Perceived Stress Scale (PSS14) and the Liebowitz Social Anxiety Scale (LSAS). Additionally, it seeks to examine the relationship between perceived stress and related sociodemographic and professional factors, as well as to explore the correlation between the perceived stress and the social anxiety scores.

3. Methods

3.1. Study Design and Sampling

A cross-sectional study was conducted with a quantitative approach based on the Bernoulli sampling method. The study was carried out between October and December 2022 in the far northwest of Morocco (35° 46' 01" north, 5° 48' 00" west). According to the Moroccan administrative division, the study region encompasses two prefectures; Tangier-Assilah and Mdiq-Fnideq, and six provinces: Al-Hoceima, Chefchaouen, Fahs-Anjra, Larache, Ouezzane, and Tetouan, with Tangier-Assilah serving as the regional capital. The region's targeted public healthcare infrastructure includes 17 hospitals, divided into 4 specialty hospitals and 13 provincial or regional hospitals. The total population of nurses working in these hospitals is 1014. The inclusion criteria were being a state-certified nurse and having worked for at least one year in the hospital as a full-time employee. Students and trainees in nursing were excluded.

The sample size was estimated using Bernoulli sampling (19), following the formula (Equation 1):

$$n = \frac{Z^2 P(1 - P)}{\Delta^2} \quad (1)$$

Where:

n = Sample size;

Z = Confidence interval according to the standard normal distribution;

P = Estimated proportion of the population that presents the characteristic;

Δ = Tolerated margin of error.

The central value of the confidence interval was considered as representative of the interval, i.e., 50%,

with a 95% confidence interval (Z-score = 1.96) and a Δ = 5%. Thus, the minimum effective sample size was estimated to be 385 nurses. To account for unfilled or incomplete questionnaires, the sample size was increased to 529 individuals. Participants were selected using stratified random sampling to ensure proportional representation from each hospital. This method aimed to accurately reflect the distribution of participants across the various hospitals included in the study. The sample size for each stratum was calculated using the following formula (Equation 2):

$$n_h = N_h \frac{n}{N} \quad (2)$$

Where:

n_h = is the sample size assigned to stratum (hospital);

N_h = is the population size in stratum (hospital);

n = is the total planned sample size;

N = is the total population size.

3.2. Survey Instruments

The survey instrument was a self-administered anonymous individual questionnaire. It was based on the French version of the PSS14 (20), the French version of the LSAS (21), and a section on socio-demographic and professional data with 10 variables. The questionnaire comprised 74 items in total. Given that French is the primary language of nursing education in Morocco, we opted for the French versions of both scales to ensure consistency and avoid linguistic bias.

3.2.1. Perceived Stress Scale

The PSS14 is a scale that measures the degree to which situations are appraised as stressful (22). Items are rated on a 5-point scale from "never = 0" to "very often = 4," with some items being reverse-scored (Items 4, 5, 6, 7, 9, 10, and 13) for potential bi-dimensionality of the scale. The PSS14 score ranges from 0 to 56, with higher scores indicating increased stress levels (22). For interpretation, the scores were classified into three levels: (0 - 18) as low stress, (19 - 36) as moderate stress, and (37 - 56) as high perceived stress. The French scale's reliability and internal consistency have been validated with Cronbach's α values ranging from 0.73 to 0.83 (23). While a previous Moroccan study validated the psychometric properties of the PSS-10 in Classical Arabic, no validation or adaptation of the PSS-14 exists in the Moroccan context. Therefore, to ensure its suitability for this context, we conducted reliability and validity assessments in the present study. The Intra Class Correlation (ICC) coefficient for the test-retest reliability

of the PSS14 was 0.82. As for Cronbach's alpha, it was 0.75 showing good reliability and stability.

3.2.2. Liebowitz Social Anxiety Scale

The LSAS is a scale that assesses social anxiety disorder symptoms, including fear levels and avoidance behaviors (24). It consists of 24 items, each rated on a Likert Scale from 0 (none/never) to 3 (severe/usually), allowing for the evaluation of both anxiety and avoidance in social contexts. The total score can reach up to 144, with higher scores indicating more severe social anxiety (24). Typically, scores from 0 - 29 are considered as no social anxiety, 30 - 49 as mild, 50 - 64 as moderate, 65 - 79 as marked, 80 - 94 as severe, and 95 - 144 as very severe (25). Studies have validated the French version of the LSAS, demonstrating good psychometric properties and structural validity in adult populations (26, 27). No prior psychometric adaptation or validation of the LSAS has been conducted for the Moroccan population. Given this, we performed reliability and validity assessments in this study. The ICC coefficient for the test-retest reliability of the LSAS, fear subscale and avoidance subscale were 0.92, 0.89 and 0.94 respectively. Regarding the Cronbach's alpha, it was 0.85 for the entire scale, 0.77 for the fear subscale and 0.71 for the avoidance subscale showing good reliability and stability.

3.3. Data Collection Procedure

A number of 529 questionnaires was collected from volunteer nurses, of which 494 were fully completed by the participants. Participants were selected through stratified random sampling to ensure proportional representation across hospitals. The response rate was 93%.

The data collection process involved collaboration with nursing supervisors at each hospital, who provided accurate staff lists and facilitated the distribution of study packets during the designated phase. The researcher personally explained the purpose of the study and clarified the meaning of each question to participants to ensure their full understanding.

Each study packet included the survey questionnaire, a motivation letter, and a consent form emphasizing voluntary participation. Based on a checklist, no more than one questionnaire was provided to each participant to prevent duplicates. For the PSS-14, participants rated the frequency of their recent experiences on a 5-point scale while for the LSAS, responses were recorded on a 3-point scale.

3.4. Data Analysis Process

Statistical analysis was performed with SPSS v.21 (IBM Corp, Armonk, NY, United States of America). Quantitative variables were expressed as means and standard deviations (SD), while qualitative variables were presented as percentages and frequencies.

Inferential statistics involved using appropriate statistical tests based on the nature of the variables. Student's *t*-test and one-way ANOVA were employed to compare stress levels across different groups, such as age and sex. When variances were not similar, as assessed by Levene's test, Welch's ANOVA was utilized. Post-hoc tests based on Bonferroni or Tukey corrections were employed to identify significant differences between group means when ANOVA (or a similar test) indicated a significant overall difference. For assessing the relationship between the perceived stress (PSS Score) and the social anxiety (LSAS Score), Pearson's correlation test was applied to determine the presence or absence of a significant linear relationship between the two scores. Subsequently, a linear regression analysis was performed to evaluate the relationship between the dependent variable (LSAS Score) and the independent variable (PSS Score), assessing both the strength and direction of their association. The level of statistical significance was set at a *P*-value < 0.05.

3.5. Ethical Consideration

In compliance with the Helsinki Declaration, authorization was initially obtained from the Regional Health Authorities and approval was granted from the Regional Committee of Bio-Ethics Oujda (CERBO protocol code 10/2022). Anonymous identification, data protection, and voluntary participation were ensured and explicitly communicated to participants at the beginning of the data collection. Additionally, all participants provided written consent to participate in the survey.

4. Results

The sample comprised female nurses (64.4%). A proportion of 86% of participants were under 40 years of age. Marital status was almost equally split between married (47.2%) and single (49%) individuals, with a small portion being divorced (3.4%) or widowed (0.4%). Regarding professional status, most participants were versatile nurses (58.1%), followed by mental health nurses (12.1%), midwives (7.3%), and anesthesia nurses (3.6%). The most common hospital units were the Emergency unit (12.8%), Radiology (8.7%), and Operating

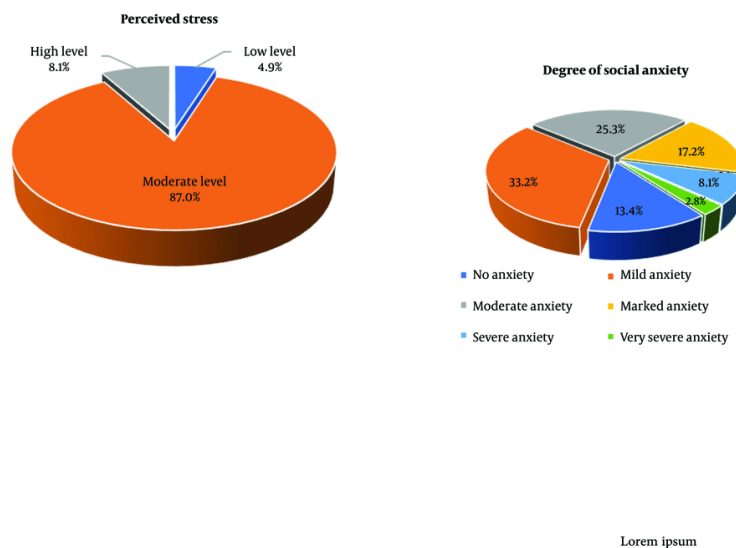


Figure 1. Level of perceived stress using Perceived Stress Scale (PSS14) and Level of social anxiety using Liebowitz Social Anxiety Scale (LSAS), among nurses (n = 494), northern region of Morocco, 2022

Block (8.5%). The majority of nurses (68.2%) had less than 10 years of experience.

4.1. Levels of Perceived Stress and Social Anxiety

The data showed that the mean score of the PSS14 was 28.14 (SD = 6.02), ranging from 9 to 52. Among the 494 participants, 87% reported a moderate level of stress. The detailed results presented in [Figure 1](#) indicate that the majority experienced moderate stress.

Regarding the LSAS survey, the mean score was 53.17 (SD = 21.10), ranging from 9 to 132. The data illustrate that 13.4% of participants did not suffer from social anxiety, while the remaining 86.6% exhibited varying degrees of anxiety. According to the results shown in [Figure 1](#), more than half of the participants experienced mild to moderate social anxiety. As for social fear and avoidance, the mean scores were 26.40 (SD = 11.71) and 27.07 (SD = 11.69), respectively.

4.2. Relationship between Perceived Stress and Sociodemographic and Professional Factors

While examining the relationship between perceived stress and various socio-demographic and professional factors among nurses, the analysis revealed several interesting findings, which are presented in [Table 1](#). A statistically significant relationship was identified between gender and perceived stress levels. Women

perceived higher stress, with a mean score of 28.65, in contrast to men, who had a mean score of 27.12 ($P = 0.003$). Age also played a crucial role, with ANOVA results showing a significant variance in stress levels among different age groups ($P = 0.032$). Nurses aged between 21 - 30 and 31 - 40 reported higher stress (mean scores of 28.34 and 28.58, respectively) compared to those aged 41 - 65 (mean score of 26.37). Post-hoc analysis further clarified these differences, highlighting a clear distinction in stress levels between nurses under and over 40 years old.

However, some factors did not significantly influence stress levels. The analysis did not show statistically significant differences in stress based on family situation ($P = 0.641$). Although the divorced and unmarried groups showed marginally higher stress mean scores (29.53 and 28.30, respectively) than the married group (mean = 27.92).

The nursing specialty was significantly correlated with stress ($P = 0.021$). Mental health nurses (mean score of 30.40) exhibited higher stress levels compared to other nursing specialties. Subsequent post-hoc analysis revealed significant stress differences between mental health nurses and both versatile nurses and other specialties.

The hospital units within the hospital were not a significant factor, although some trends were noted in

Table 2. Linear Regression Applied to Stress and Social Anxiety Perceived by Nurses (n = 494), Northern Region of Morocco, 2022

Variables	Coefficients							
	Unstandardized Coefficients		Standardized Coefficients	t	P-Value	R ²	R ² Adjusted	SE
	A	SE	Beta					
Constant	18.650	4.263	-	4.375	0.000	0.122	0.121	19.788
PSS14 score	1.226	0.148	0.350	8.279	0.000			

Abbreviation: PSS14, Perceived Stress Scale (14 items version).

units like psychiatry, pediatrics, and the oncology unit, where higher levels of stress were observed.

4.3. Association between Perceived Stress and Social Anxiety

A significant positive correlation (Pearson's $r = 0.350$; $P = 0.001$) was found between perceived stress and social anxiety. This suggests that an increase in perceived stress is moderately associated with an increase in social anxiety.

The results of the regression analysis presented in Table 2 confirm this relationship. The coefficient of determination indicates that 12.2% of the variance in social anxiety can be explained by perceived stress alone.

The validity of the results is confirmed by the test of normality of the residuals. The values of the skewness (0.129) and kurtosis (-0.113) suggest a normal distribution. This is corroborated by QQ plots and histograms. Furthermore, the homoscedasticity of residuals was validated through graphical analysis, demonstrating a uniform dispersion around zero, affirming the stability of the variance of residuals.

5. Discussion

To our knowledge, this is the first study in Morocco using the PSS14 and LSAS, to assess the scores and levels of perceived stress among nurses and the correlation between perceived stress and social anxiety scores.

The mean PSS14 score in present study was 28.14 (SD = 6.02), indicating that a substantial majority (87%) of nurse's experience moderate levels of perceived stress. These findings align with other national and international studies that also report moderate stress levels among nurses. For instance, a study based on the job demand-control-support survey conducted in Morocco indicates that 11.46% of nurses are in a state of stress, with a strong psychological demand (28). These findings highlight a level of occupational stress that can affect nurses' performance and job satisfaction. Interventions or programs, such as mindfulness-based stress reduction training, can help reduce stress and

anxiety, as stated by a study among Moroccan nurses (29).

Globally, similar patterns of stress among nurses have been documented. Studies from various countries, including Jordan (30), China (31), Spain (32), Saudi Arabia (33), and Poland (34), have consistently reported moderate stress levels among nursing professionals. These findings highlight the prevalence of stress in the nursing profession across diverse healthcare systems and cultural contexts.

The relationship between perceived stress and gender found in the present study is noteworthy, with women experiencing significantly higher stress levels than men. These results are in line with several studies conducted in Morocco (28), the Kingdom of Saudi Arabia (8), and Nigeria (35), which also highlighted a significant association between female gender and higher levels of professional stress. These studies suggested that gender can be considered a risk factor for stress. In the Moroccan context, cultural traditions and expectations may explain this situation. Indeed, the traditional family structure demands that women assume a major responsibility for domestic tasks and child-rearing while bearing the burden of their employment. However, some contradictory studies (34, 36) reported an absence of a significant relationship between gender and perceived stress among nurses. The lack of relationship between gender and stress levels in the mentioned studies may be due to a larger number of women than men participants.

Age was also significantly associated with occupational stress. Nurses younger than 40 years old experienced higher stress levels than their older counterparts. This indicates that younger groups are more exposed to stress than older nurses. The current results is consistent with the findings of previous studies that have reported a similar association (37, 38). Several factors may contribute to this difference. In Morocco, newly qualified nurses typically secure employment in national hospitals shortly after completing their three-year training. This swift integration into the National Healthcare System, which,

like many others worldwide, suffers from a shortage of human resources (39), often results in demanding workloads, extended hours, and responsibilities that may exceed their experience and skills. In contrast, older nurses are generally more accustomed to work hazards, patient deaths, and suffering. However, these findings contradict a research study conducted in Ethiopia in 2022 (40), which reported an absence of statistically significant differences. This discrepancy may be attributed to contextual and systemic differences between the two countries. Variations in healthcare system structure, workload distribution, training programs, and cultural expectations could influence the stress levels experienced by nurses.

Regarding family situation, no statistically significant differences were found. A similar result has been reported in the literature (38). However, it is important to note that divorced and unmarried nurses presented higher mean PSS14 scores than married nurses in the present study. This could suggest a possible higher level of perceived stress among divorced and single individuals compared to married nurses. In Arab-Muslim countries such as ours, the concept of marriage is intrinsically tied to stability and balance, owing to its significant role in providing social, financial, and emotional support to the married couple. This support could consequently mitigate the stress arising from their professional lives. Far from Arab and Muslim countries, a study conducted in Trinidad and Tobago (41) also revealed that marital status significantly affected stress in nurses, showing that single healthcare workers had a significantly higher incidence of depression, anxiety, and stress relative to their married colleagues.

The number of children did not significantly impact stress levels. This result is supported by a study conducted in the United States of America (42). However, it is contradicted by another study conducted in Ethiopia (40) indicating that nurses who did not have children reported being 54% less stressed than those who did. This may be because raising children increases the workload for these nurses.

Nursing specialty was significantly associated with perceived stress, with mental health nurses exhibiting higher levels compared to versatile nurses and those in other specialties. This result may be attributed to the nature of the role of mental health nurses, who spend more time with patients presenting mental difficulties, weak communication skills, and violent behaviors. Supporting this, a 2020 study involving 539 mental health nurses from three tertiary psychiatric hospitals in Beijing (9) reported that psychiatric nurses

consistently report considerably higher levels of stress and may face an elevated risk of developing depression and anxiety. On the other hand, hospital units were not significantly associated with stress, which aligns with a previous study involving 932 nurses working in the biggest teaching hospital in Malaysia (43). However, trends were noted in psychiatry, pediatrics, and oncology units, which presented higher perceived stress levels and occupied, respectively, the first three places for the most stressful hospital units in this study. This finding is corroborated by previous works, notably a Moroccan study in 2021 (28) and another study conducted in Jordan in 2016 (30), which found that nurses working in psychiatric units experienced the highest levels of stress, followed by those in oncology units, intensive care units, and emergency rooms. These hospital units are considered high-stress environments due to the complexity and intensity of the treatments they require.

Also, the current study found no significant correlation between stress and professional experience or position of responsibility. As for the last factor, the finding is consistent with a study conducted among 115 nurses working in two teaching hospitals in Iran (44). Regarding experience, this research findings were similar to those of two previous studies (34, 40) indicating the absence of a statistically significant correlation between years of professional experience and the mean stress scores. However, other studies have reported a significant relationship between stress and professional experience, with some showing a positive correlation (45) and others a negative one (38). This divergence of results could be due to variations in sample composition in terms of sex/ratio and age distribution, the cultural context of each research, or differences in the data collection tools employed.

The current investigation data demonstrate a statistically significant moderate correlation between perceived stress and social anxiety. Using linear regression, this study showed that perceived stress accounts for about 12.2% of the variance in social anxiety, suggesting a relationship between these two factors. The association between professional stress and anxiety disorders has also been documented in previous researches (14, 46). Work-related anxiety disorders can lead to phobias, social anxiety, generalized anxiety, fears related to inadequacy, or hypochondriac anxiety (14).

The present study data support the hypothesis that professional stress can interfere with social anxiety. However, other factors not included in this model can also contribute to social anxiety, since stress explains only 12.2% of the variance in social anxiety.

The stress and social anxiety levels of nurses found in this study, along with those from the study conducted in Kenitra Hospital (28), should alert policymakers to the mental health of caregivers and the urgent need to establish a program focusing on the mental and social health of nursing professionals. An educational measure can be introduced as a training module to be inserted in the nursing curriculum. This module should contain stress coping methods and social anxiety management competencies as soft skills to be delivered in the first, second, and third years of nursing curriculum at the Higher Institutes of Nursing Professions and Technical Sciences in Morocco.

In parallel, these results should encourage researchers to conduct further studies on this topic in other regions to gain a deeper understanding of the overall situation regarding the well-being and occupational conditions of nurses and other health professionals in Morocco.

Despite the valuable contributions of this study, some limitations are acknowledged. Firstly, the cross-sectional design of the study may limit our ability to establish causality between identified factors and levels of stress. Longitudinal studies would be required to ascertain the directionality and causality of these relationships. Secondly, self-reporting may have introduced a degree of social desirability bias. However, appropriate measures such as test-retest validation of the data collection tools were implemented to mitigate its impact. Finally, the study's focus on a specific geographical area, while beneficial for in-depth regional analysis, limits the generalizability of the findings to other contexts. Different cultural, socio-economic, and healthcare system factors in other regions or countries might influence the levels and determinants of professional stress differently.

5.1. Conclusions

The findings of this study reveal that a large majority of nurses experience a moderate level of stress. Several risk factors influencing stress levels among nurses have been identified. Notably, gender plays a crucial role, with female nurses experiencing more stress than their male counterparts. Age is also a significant factor, with younger nurses facing more stress. The study further highlights that versatile nurses and mental health nurses experience higher stress levels. Contrary to expectations, marital status, the number of children, and professional experience did not significantly influence stress levels.

In addition, nearly three-quarters of nurses in the sample reported mild to moderate social anxiety. Given

the importance of interpersonal communication in nursing care, addressing social anxiety among nurses is crucial for their mental health and professional development. Further research and interventions targeting cognitive distortions and interpersonal skills may be beneficial in reducing social anxiety in this population.

The current study findings also demonstrate a significant correlation between perceived stress and social anxiety. This relationship highlights the need to address the impact of stress on social and mental well-being, as chronic stress and social anxiety can mutually reinforce each other. Further research is essential to develop effective preventive strategies and improve the work environment for nurses.

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Footnotes

Authors' Contribution: Study concept and design: A. R. C., N. B., and N. R.; Acquisition of data: A. R. C.; Analysis and interpretation of data: A. R. C., M. L. L. L., N. R., and N. B.; Drafting of the manuscript: A. R. C. and N. R.; Critical revision of the manuscript: A. R. C., N. B., M. L. L. L., and N. R.; Statistical analysis: A. C. R., A. E. (Abdelmoumine, El Hajjam), M. L. L. L., and N. R.; Administrative and technical support: A. E., N. B. and N. R.; Study supervision: N. B. and N. R.

Conflict of Interests Statement: The authors declared no conflict of interests.

Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication. The data are not publicly available due to privacy and national restrictions.

Ethical Approval: This study was authorized by the Regional Health Authorities and approved under the ethical approval code of the Regional Committee of Bioethics, Oujda (CERBO protocol code 10/2022).

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Table 1. Relationship Between PSS14 and Related Factors Among Nurses (n = 494), Northern Region of Morocco, 2022

Parameter	No.	PSS14 (Mean ± SD)	Statistical Test	P-Value
Sociodemographic characteristics				
Gender ^a			$t = -2.951^a$	0.003
Men	176	27.12 ± 5.44		
Women	318	28.71 ± 6.25		
Age (y) ^a			$F = 3.466^a$	0.032
21-30	284	28.34 ± 6.153		
31-40	143	28.58 ± 5.733		
41-65	67	26.37 ± 5.791		
Family Situation			$F = 0.862$	0.461
Single	242	28.3 ± 6.28		
Married	233	27.92 ± 5.87		
Divorced	17	29.53 ± 3.66		
Widowed	2	23.5 ± 6.36		
Number of children			$F = 1.692$	0.168
0	312	28.15 ± 6.048		
1	54	28.91 ± 5.122		
2	90	28.47 ± 6.453		
≥ 3	38	26.21 ± 5.667		
Professional characteristics				
Specialty ^a			$F = 2.909^a$	0.021
Versatile Nursing	287	27.92 ± 6.058		
Mental health nursing	60	30.4 ± 6.344		
Midwife	36	28.78 ± 5.723		
Anesthesia nursing	18	27.5 ± 6.732		
Other	93	27.26 ± 5.357		
City of work			$F = 0.541$	0.842
Tetouan	69	28.74 ± 4.871		
Tangier	189	28.25 ± 6.571		
Al-Hoceima	30	29.03 ± 7.43		
Assilah	30	27.73 ± 4.258		
Larache	27	26.56 ± 6.687		
Chefchaouen	30	27.07 ± 5.656		
Ouezzane	31	28.55 ± 6.01		
Kser elkbir	28	28.07 ± 7.576		
Mdiq	30	27.63 ± 3.899		
Fnideq	30	28.3 ± 4.728		
Hospital			$F = 1.478$	0.113
Saniat Rmel Provincial Hospital	30	27.27 ± 4.127		
Errazi Tetouan Psychiatric Hospital	19	31.63 ± 5.795		
Ben Karrich Pulmonology and Phthysiology Center	20	28.2 ± 3.874		
Mohamed V Tangier	39	27.0 ± 5.211		
Duke of Tovar Hospital	30	29.3 ± 8.12		
Al Kortobi Hospital	32	27.22 ± 5.278		
Mohamed VI Mdiq	30	27.63 ± 3.899		
Assilah Hospital	30	27.73 ± 4.258		
Errazi Tangier Psychiatric Hospital	20	30.35 ± 3.36		
Regional Oncology Center	29	29.24 ± 7.958		
Mohammed VI Tangier	39	27.72 ± 7.373		
Hassan II Hospital	30	28.3 ± 4.728		

Parameter	No.	PSS14 (Mean ± SD)	Statistical Test	P-Value
Mohamed V Chefchaouen	30	27.07 ± 5.656		
Lalla Meriem Hospital	27	26.56 ± 6.687		
Abu kasem zehraoui	31	28.55 ± 6.01		
Mohammed V ALHouceima	30	29.03 ± 7.43		
Ksar el Kebir Provincial Hospital	28	28.07 ± 7.576		
Hospital unit			F = 1.166	0.283
Emergency	63	28.06 ± 6.71		
Intensive care	28	27.43 ± 5.581		
Surgery	23	26.35 ± 6.443		
Oncology	17	29.71 ± 7.614		
Nephrology	19	26.21 ± 4.928		
Traumatology	28	28.18 ± 4.974		
Cardiology	14	26.93 ± 7.022		
Pediatrics	15	30.8 ± 4.57		
Hematology	12	28.58 ± 8.723		
Medicine	37	28.57 ± 6.719		
Radiology	43	27.28 ± 5.945		
Laboratory	41	27.17 ± 4.893		
Physiotherapy	6	29.00 ± 2.966		
Psychiatry	39	30.97 ± 4.688		
Maternity	35	28.63 ± 5.735		
Operating room	42	27.64 ± 5.414		
Pulmonology	24	28.58 ± 7.372		
ENT	2	27.5 ± 2.121		
Gastroenterology	4	24.75 ± 7.632		
Morgue	2	29 ± 1.414		
Professional experience (y)			F = 0.274	0.844
1 - 2	126	28.55 ± 6.259		
2 - 5	136	28.01 ± 6.137		
6 - 10	75	28.15 ± 6.358		
> 10	157	27.94 ± 5.57		
Position of responsibility			t = -0.486	0.627
Yes	95	27.87 ± 5.689		
No	399	28.21 ± 6.096		

Abbreviations: PSS14, Perceived Stress Scale (14 items version).

^a Indicates variables with statistically significant differences (P-value < 0.05).