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Dysfunctional psychological responses among Intensive Care Unit nurses: a systematic review of the literature

Respostas psicológicas disfuncionais em enfermeiros de Unidades de Cuidados Intensivos: uma revisão sistemática da literatura

Respuestas psicológicas disfuncionales en enfermeros de Unidades de Cuidados Intensivos: una revisión sistemática de la literatura

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ABSTRACT

Objective: To systematically review evidence on dysfunctional psychological responses of Intensive Care Units nurses (ICUNs), with focus on anxiety and depressive symptoms and related factors. **Method:** A literature search was performed in CINAHL, PubMed and Scopus databases, from 1999 to present, along with a critical appraisal and synthesis of all relevant data. The following key words, separately and in combination, were used: "mental status" "depressive symptoms" "anxiety" "ICU nurses" "PTSD" "burnout" "compassion fatigue" "psychological distress". **Results:** Thirteen quantitative studies in English and Greek were included. The results suggested increased psychological burden in ICUNs compared to other nursing specialties, as well as to the general population. **Conclusions:** Studies investigating psychological responses of ICUNs are limited, internationally. Future longitudinal and intervention studies will contribute to a better understanding of the phenomenon.

DESCRIPTORS

Nursing, Team; Intensive Care; Anxiety; Depression; Burnout, Professional; Review.

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INTRODUCTION

The Intensive Care Unit (ICU) is considered to be a stressful work environment for nurses, since a growing body of evidence suggests several work-related stress sources[1,2]. Prolonged work-related stress has been linked with psychological disturbances that affect nurses' physical and mental health status[1,3], along with altered professional performance, mediated through emotional exhaustion, vicarious trauma, fatigue, and professional burnout[4,5]. Work-related stress has also been found to be associated with anxiety and depressive symptoms in critical care nurses (CCNs)[4]. Anxiety and depressive symptoms at work may result in behavioural alterations such as apathy, irritability, anger, careless behaviour or absenteeism [5]. Finally, depressive symptoms among nurses have been linked with a higher number of patient falls and medication errors, as well as with lower quality of care and higher health care expenditure[6].

Since work-related stress manifestations are linked with the quality of the delivered nursing care[7], this may be an important issue for nurse managers. However, the manifestations of psychological distress among CCNs have not been adequately investigated. Thus, the prevalence of symptoms of mental health disorders in CCNs is investigated in the present study.

Objectives

The aim of the present study was to critically review the literature on manifestations of psychological disturbances among nurses working in ICUs. The focus was upon the prevalence of mental health disorders and the factors associated with them.

METHOD

The present systematic review consisted of three distinct phases: a) a systematic literature search, b) critical appraisal of the selected articles, and c) a synthesis of the data in a critical way. The systematic literature search was performed between September and October 2014 in the CINAHL, PubMED and Scopus databases, using the following search terms (as stand-alone ones or in combination): "critical care nurses", "ICU nurses", "mental status", "mental health", "depression", "depressive symptoms", "anxiety", "psychological status", "PTSD", "burnout" "compassion fatigue", "psychological distress". References of identified studies were also checked for relevancy. Inclusion criteria were: publication in a peer-reviewed journal dating from 1999 to present, in the English or Greek language; quantitative design, aiming to explore the level of mental health among CCNs with special focus on anxiety and depressive symptoms; hospital nurses (CCNs included) or CCNs alone employed in various types of ICUs as the target population. The studies that were excluded: a) only aimed to investigate the level of burnout or compassion fatigue or substance abuse or secondary PTSD/ vicarious trauma without exploring the level of anxiety or depressive symptoms; b) applied a qualitative design; c) were case studies, or review articles; d) explored particular types of anxiety, such as anxiety towards death. The combined search strategies returned 449 papers. The titles, the abstracts and the full texts were studied, and 434 papers were excluded. The remaining 15 papers, as well as 7 papers added after citation searching, were further studied in detail. After taking into consideration the inclusion and exclusion criteria, along with quality appraisal standards, thirteen papers were eventually included in the analysis (Figure 1).

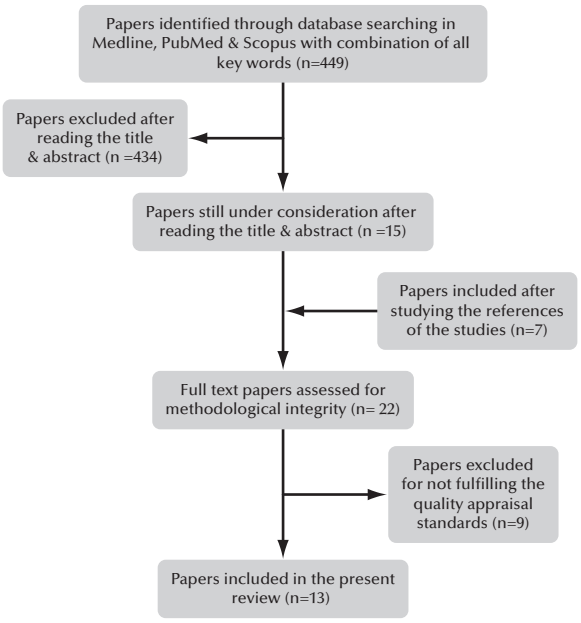

Figure 1 – Flow chart: Process of sampling – Limassol, Cyprus, 2015.

All papers considered for inclusion in this review were assessed with regard to their methodological adequacy with a modified form of the standardized tool "Critical Appraisal Skills Programme" (CASP)[8], in combination with Roe's model for critical appraisal of quantitative studies[9]. The studies included in this review were, in their majority, classified in category A of the CASP tool. This means that in all studies: 1) the aim was clearly stated; 2) the methodology/ design that was used was the appropriate one according to the research questions/ hypothesis; 3) the method of data collection was the appropriate one according to the aim of the study; 5) data were collected in a way that assured adequate coverage of the topic under study; 6) the relationship between the researchers and the participants had been adequately considered; 7) ethical issues had been taken into consideration; 8) data analysis was sufficiently rigorous; 9) there was clear reporting of findings; and 10) the implications of the findings generated by the study, as well as the limitations, were adequately discussed. However, due to the scarcity of relevant studies, the quality criterion of the aim was not too strict. Moreover, no sample size or outcome measures limitations were set. Therefore, this review focused on practically any paper that studied psychological responses of nurses working in ICUs. There was no disagreement between the researchers regarding the studies that were fulfilling the inclusion criteria or the criteria of the CASP tool.

RESULTS

Characteristics of the studies included

The majority of included papers were written in English (12) and only one in Greek. The current review integrated the findings of approximately 3.000 participants, the majority of them being women. The included studies were conducted in the following countries: four in the USA, one in Germany, three in Greece, one in Japan, one in Nigeria, one in France, one in Eastern Taiwan, and one in Turkey. The most frequently used tools were: a) the Hospital Anxiety Scale (HADS), b) the Hamilton Anxiety Scale (HAS), c) the Beck Anxiety Inventory (BAI), and d) the Beck Depression Inventory (BDI). All studies were published from 2003 onwards. The main features of the included studies are presented in Chart 1.

Degree of anxiety and depressive symptoms among CCNs and association with work-related stressors

The prevalence of anxiety symptoms in Greece indicates that approximately 20% of participants were experiencing anxiety symptoms of moderate intensity, whereas 4% of them were suffering from symptoms of severe intensity[1,10]. Symptoms with the greater intensity were: a) sleep disturbances, b) anxiety mood, c) cognitive disorders and d) tension. The most important factors that appeared to be related with anxiety symptoms were: a) female sex, b) employment in a public hospital, and c) years of work experience as a critical care nurse. In addition, the number of ICU beds was found to be correlated with anxious mood. Overall, anxiety symptoms among Greek ICU nurses appeared to be related to prevailing staffing conditions[10]. Moreover, it was shown that satisfaction from nurse-to-physician interaction is associated with CCNs' anxiety state, tension, and depressive symptoms, whilst satisfaction from interaction among nursing personnel was correlated with the levels of anxiety, tension, and sleep disturbances[1]. Overall, although anxiety symptoms might be associated with the degree of satisfaction from professional interaction, the latter was not reported as a strong predictor of anxiety symptoms and might not be a significant indicator of ICU nurses' well-being[1]. Nevertheless, it is worth mentioning that both studies focused on the intensity of anxiety symptoms, without taking into consideration the difference between state and trait dimensions of anxiety.

Other researchers in Greece[11] attempted to determine whether a rotating shift system, including night shifts, is associated with changes in the secretion of hormones in nurses, and subsequently with their mental status. They performed a cross-sectional survey in 32 CCNs during 2006. Measurements were made at the beginning and the end of each shift. Results showed a statistically greater reduction of cortisol levels between the two measurements among nurses working in rotation compared to nurses in the morning shift group ($p=0.032$). Moreover, levels of the thyroid-stimulating hormone (TSH) were statistically significantly increased in the rotating group but not in the morning shift group ($p=0.049$). More importantly, positive correlations were noted between TSH changes and scores in the General Health Questionnaire (GHQ) in the night shift group. This questionnaire mainly assesses the degree of anxiety and depressive symptoms. Therefore, it was proposed that psychosomatic disturbances as well as anxiety and depressive symptoms might be more common among critical nurses doing night shifts. In conclusion, this study linked the circular working hours of ICU nurses with the dys-regulation of both the circadian rhythm of hormone secretion and other parameters related to mental and physical health. The psychosomatic effects from those variations were: a) sleep disturbances, b) tension, c) depressive mood, d) cognitive disorders, and e) tension in personal and social life.

The association among type of shift, sleep quality, chronic fatigue, anxiety and depressive symptoms was studied elsewhere, too[12]. A study in the USA revealed that almost 1 out of 4 ICU nurses (23%) reported clinical depressive symptoms of mild, moderate or severe degree and 1 out of 3 nurses (32%) reported clinical anxiety symptoms of mild or moderate degree. Furthermore, results indicated that nurses who were working during the night shift were at a higher risk of developing depressive symptoms compared to their colleagues who were working on morning shifts. Moreover, depressive symptoms, along with self-assessed quality of sleep, were found to be important contributors to chronic fatigue in CCNs.

Another work-related stressor, the imbalance between effort and reward was further investigated in CCNs, and a possible association with mental health status was assessed[13]. This study showed that approximately 10.2% of ICU nurses reported clinical anxiety and depressive symptoms (cut-off point 11 in the HADS scale). Moreover, the level of depressive symptoms in the study sample was higher compared to a healthy control group ($t=4.21$, $df=117$, $p<0.0001$). Furthermore, Post Traumatic Stress Disorder (PTSD) symptoms were also identified in 7.7% of CCNs. Work-related factors that were found to be associated with psychiatric symptoms, i.e anxiety and depressive symptoms, and PTSD, were the degree of reward ($r= 0.38$-0.49, $p<0.01$), effort ($r= 0.41$-0.50, $p<0.01$), and over-commitment ($r= 0.39 – 0.54$, $p<0.01$), whilst the imbalance between effort and reward was only associated with reported PTSD symptoms (0.19, $p<0.05$). Perceived social support was negatively associated with the manifestation of psychiatric symptoms ($r=-0.37$ for PTSD, $r=-0.40$ for anxiety symptoms, and $r=-0.63$ for depressive symptoms, $p<0.01$). Overall, according to the researchers' interpretation of their findings, the occurrence of anxiety and depressive symptoms in CCNs may be associated with the overwhelming effort–reward imbalance, in combination with the responsibility of caring for high-risk patients, as well as the load of administrative tasks that ICU nurses are faced with.

Many researchers revealed that the work environment of critical care seems to be more stressful compared to others.

This was, too, the conclusion of a study aiming to explore the relationship between work-related stress factors and mental/physical symptoms among different nursing specialties in Japan[4]. In this study, the mental status was assessed with the Brief Job Stress Questionnaire[14], which includes subscales for vigor, irritability, fatigue, anxiety and depressive mood. As far as ICU nurses were concerned, the researcher found they were experiencing anxiety and depressive symptoms and fatigue at a higher level than other nursing specialties ($p<0.05$), independently of demographic variables. Work-related factors that were associated with these symptoms were the nature of the work and subsequent overload (i.e. the pressure of caring for critically ill patients), quality of workplace environment, perception of being suitable for this job and challenged by the tasks required by it.

According to a study from Nigeria[15], reported anxiety symptoms of nurses in a University College Hospital were associated with burnout indices. The sample in this study was drawn from the ICU, the Accident and Emergency Department, Oncology, Dentistry and General Outpatients Departments. According to the results, nurses reported higher levels of burnout and anxiety symptoms (STAI, $p <0.01$ and $p<0.05$ respectively) [16], and worse overall mental health status (GHQ-12, $p< 0.05$). Moreover, statistically significant associations were found between the level of education and: 1) anxiety symptoms (STAI, $r=0.2$, $p<0.05$); and 2) mental health status (GHQ-30, $r=0.19$, $p<0.05$)[16-18].

Two studies[4,15] recruited nurses from different nursing specialties, including ICU nurses. Another study explored the manifestation of depressive symptoms and possible associations with burnout symptoms in ICU nurses in France [19]. In particular, this study aimed to identify factors linked to the onset of professional burnout among CCNs. According to the results, the frequency of depressive symptoms was significantly higher among nurses suffering from severe burnout. Moreover, clinical symptoms of depression were described by approximately 12% of participants, whilst 78% of them revealed severe symptoms of the burnout syndrome ($p<0,0001$).

Although all aforementioned studies so far provide evidence for the association between levels of work related stress and the degree of self-reported psychiatric symptoms, a prospective study in Turkey revealed the opposite. In particular, the aim of this study was to compare the level of oxidative stress in 60 CCNs against 60 general care nurses, at the beginning and the end of their shift (morning vs. evening/night shift)[20]. Moreover, the level of anxiety symptoms was assessed. With regard to the results, oxidative stress indices were increased among all nurses at the end of day and of night shifts ($p < 0.05$); however, they were not significantly different at the beginning and the end of the shifts among CCNs compared to nurses of general care ($p > 0.05$). The same trend was noted in relation to anxiety symptoms ($p > 0.05$). The reported level of anxiety symptoms was not clinically relevant (STAI, mean=39, scale range=20-80). Thus, this study suggested that the level of stress and anxiety symptoms was not associated with the type of working shift, i.e. day or night. Moreover, this study implied that the increase of oxidative stress is due to elevated physical activity, thus irrelevant to the specific work environment (ICU or general care) or personality traits.

The association between personality features and mental health status was the focus of other researchers. Within this framework, a possible link between resilience and symptoms of psychological morbidity was assessed[21]. Findings indicated that approximately one out of five critical nurses displayed clinical symptoms of anxiety, whereas one out of ten had depressive and PTSD symptoms. The presence of resilience was associated with a significantly lower prevalence of PTSD (8% vs. 25%, $p<0.01$). Similarly, the frequency of anxiety and depressive symptoms was lower in nurses who were characterized by resilience (2% vs. 14%, $p=0.001$, and 8% vs. 21%, $p=0.03$, respectively).

Another important issue is the exploration of the factors related to CCNs' intention to leave their job. This was the aim of a study in eastern Taiwan[22]. Approximately half of participants reported that they intended to leave their work. The majority of factors associated with that intention were connected, more or less, to the level of self – reported mental health status. In particular, participants identified as such factors the level of their physical health, the number of diseases, the degree of happiness, the presence of depressive symptoms, job satisfaction, quality of sleep, and educational level ($p=0.05$-0.001). The most significant predictors of the nurses' intention to leave their profession were depressive symptoms and poor sleep quality. Additionally, the type of ICU was associated with the intention to quit (surgical vs. medical, $p<0.0001$), which may indicate that it was indirectly associated with the manifestation of depressive symptoms.

Symptoms of Post Traumatic Stress Disorder among CCNs.

A study in the USA[23] explored whether there was an increased prevalence of Post Traumatic Stress Disorder (PTSD) symptoms in ICU nurses compared to nurses from other specialties. Twenty-two percent of CCNs reported clinical symptoms of anxiety, whilst 31% of them clinical symptoms of depression. Moreover, ICU nurses had an increased prevalence of PTSD (24%, 95% CI, 18-29) compared to nurses from other specialties (14%, 95% CI, 8-20, $p=0.003$). The above results were further confirmed in a sample of 140 CCNs from the Atlanta area[23]. In particular, 29% of them (95% CI, 22–37) reported clinical symptoms of PTSD, 20% of them anxiety symptoms and 26% depressive symptoms. Overall, it was found that being employed in an ICU was a risk factor for developing PTSD (OR = 1.45, $p =0.02$, 95% CI, 1.24-1.72). However, being an ICU nurse conferred no risk for developing general anxiety or depressive symptoms, as measured with the HADS scale ($p=0.36$). Furthermore, CCNs who were working during the evening/ night shifts had a greater risk to develop symptoms of PTSD (OR = 1.47, 95% CI= 1.23-

1.71, p = 0.026). Other characteristics that were found to be associated with the manifestation of PTSD symptoms were marital status (p=0.04), age (p=0.06), and number of working days per week (p=0.05). With regard to the main symptoms of PTSD that were reported, 21% of nurses recalled having nightmares and 17% reported having severe anxiety or panic attacks related to the work experience in the ICU. Overall, the most pronounced PTSD symptoms revealed were: a) sleep disturbances, b) irritability, c) restlessness, d) feelings of anger or irritation, and e) muscle tension. Work-related factors that were described as traumatic by ICU nurses were: inpatient death; verbal abuse from other nurses, physicians and relatives of inpatients; extensive open wounds; massive bleeding or heavy injuries; care of people with poor life expectancy; cardiopulmonary rescuscitation (CPR); feelings of incompetence; and the high ratio of inpatients to nurses. These events were relived in dreams and caused avoidance behavior and hyper-vigilance, which would last over a month.

Other researchers[24] investigated the relationship among PTSD, anxiety and depressive symptoms, and social support in nurses employed in emergency rooms, ICUs and general medical wards in a Level 1 Trauma center. The scores reported by CCNs on the instruments employed were: a) 11.1±14.0 [scale range (SR) 0-66)] for PTSD, which indicates absence of symptoms, b) 24.68± 5.2 [Beck Anxiety Inventory (BAI), SR=0-63], which indicates moderate levels of anxiety symptoms, and c) 4.96 ± 6.18 [Beck Depression Inventory (BDI), SR=0-63], which denotes absence of depressive symptoms. Moreover, particular work-related factors were associated with nurses' mental health disturbances. These factors were: a) death or altered body image of the patient, b) poor patient outcomes due to delayed treatment, c) performing painful and/or life-threatening procedures, d) negative public image of nurses, e) absence of contact with the patient, f) dissatisfaction coming from patients' family members, and h) medication errors. Results indicated that CCNs reported a significant level of anxiety symptoms, although no clinically significant symptoms of PTSD and depression were noted.

Overall, the factors related to CCNs' psychological morbidity according to the studies included are presented in Chart 3, whilst the frequencies and mean scores of anxiety, depressive and PTSD symptoms in Chart 2.

Chart 1. Methodological features of the studies included – Limassol, Cyprus, 2015.

	Study/ Origin	Aim	Design/ sample/ instruments	Main limitations
1	(13) Germany	To investigate the association among effort reward imbalance, mental health status and resources in diverse professional groups in ICUs.	• Descriptive cross-sectional design, single-centre study • Self-reported questionnaires • Purposeful sampling (142 nurses and physicians) • Instruments: ERI, BSI, HADS-D, IES, F SozU-K-22, LSQ • Cronbach's alpha α =0.90	• Decreased external validity: Low response rate Purposeful sample • The cross-sectional design does not allow conclusions regarding causality to be made
2	(1) Greece	To investigate potential associations between the severity of anxiety symptoms and i) demographic, vocational, educational factors and ii) satisfaction from interactions.	• Descriptive correlational design, multi-centre study • Self-reported questionnaires • 229 members of nursing personnel • Convenience sample • Instruments: HAS, Interactions IWS subscale • Reliability: Cronbach's alpha α = 0.896 • Construct validity: Factor analysis with Varimax rotation	• No consideration of the difference between state and trait dimensions of anxiety. • Decreased external validity (convenience sample) • The cross-sectional design does not allow conclusions on causality to be made
3	(21) USA	To investigate possible associations between resilience and symptoms of psychological morbidity in CCNs	• Cross-sectional, nation-wide study • Self-reported questionnaires • 744 CCNs • Random sample • Instruments: HADS, PDS, MBI, CD-RISC • Reliability: Cronbach's alpha α > 0.77 for all scales & subscales used	• Low response rate
4	(20) Turkey	To evaluate the oxidative stress parameters and anxiety symptoms, and associations with type of i) shift and ii) ward.	• Prospective, single-centre study • Self-reported questionnaires & blood tests • 120 nurses in ordinary service and ICU • Convenience sample • Instruments: TAS, TOS, OSI, STAI • Measurements: Biochemical analysis, total oxidant status, total antioxidant status	• Small sample size • Convenience sample • Biological factors were not taken into consideration • The metric properties of the STAI-S subscale were not tested
5	(10) Greece	To investigate the degree of anxiety symptoms and the relationship with demographic, educational and professional factors.	• Descriptive correlational, multi-centre study • Self-reported questionnaires • 229 ICU nurses • Convenience sample • Instruments: HAS • Reliability: Cronbach's alpha α = 0.896 • Construct validity: Factor analysis with Varimax rotation	• No consideration of the difference between state and trait dimensions of anxiety • Convenience sample • The cross-sectional design does not allow conclusions on causality to be made • Staffing per shift was not estimated

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	Study/ Origin	Aim	Design/ sample/ instruments	Main limitations
6	(11) Greece	To investigate whether a rotating shift system is associated with changes to the secretion of hormones and mental status in CCNs	• Cross-sectional survey, single-centre study • Self-reported questionnaires & blood samples • 32 CCNs • Convenience sample • Instruments: SSI (SQ, PHQ, CQ, CTI, GJS, CF, GHQ, CSAQ, CMQ, EPI, SDS) • Reliability: Cronbach's alpha ranged from 0.7 to 0.92	• Small sample size • Convenience sample • The type of shift during the day prior to blood sampling, or other events that might have occurred during the shift and might have affected hormone levels were not assessed
7	(4) Central Japan	To investigate the association between job-related stressors and mental and physical self-reported health status	• Cross-sectional, multi-centre study • Self-reported questionnaires • Purposeful sample • 1.551 female hospital nurses • Instrument: BJSQ	• The metric properties of the instruments used were not measured • Decreased external validity due to the special cultural context of Japan • Inclusion of auxiliary nurses in the sample • The cross-sectional design does not allow conclusions on causality to be made
8	(22) Eastern Taiwan	To explore the factors related to CCNs' intention to leave their profession	• Cross sectional exploratory, single-centre study • Self-reported questionnaires • 130 nurses employed in two ICUs of one medical centre • Purposeful sample • Instruments: A researcher – designed questionnaire based on Cooper's model, VAS	• Structured tools for the measurement of variables were not used • The cross-sectional design does not allow conclusions on causality to be made • Decreased external validity due to the special cultural characteristics of Taiwan
9	(23) USA	To compare the prevalence of PTSD, anxiety and depressive symptoms between ICU and general care nurses	• Cross-sectional, multi-centre study • Self-reported questionnaires • 351 nurses (230 ICU nurses & 121 general medical or surgical nurses) and 140 ICU nurses • Purposeful sample • Instruments: PTSS-10, HADS	• The cross-sectional design does not allow conclusions on causality to be made • Decreased external validity (purposeful sample)
10	(19) France	To investigate factors associated with the onset of professional burnout in CCNs, including depressive symptoms	• Cross-sectional study • Self-reported questionnaires • 2.392 CCNs • Random sample • Instruments: MBI, CES-D • Nation-wide study	• Inclusion of nursing personnel of different educational backgrounds/ task orientations • The metric properties of the tools used were not tested
11	(24) USA	To investigate the relationship between PTSD and psychological experiences of ER, ICU and general medicine nurses in a Level 1 Trauma Center	• Cross-sectional single-centre study • Self-reported questionnaires • 125 Nurses • Purposeful sample • Instruments: MPSS, MSPSS, PDEQ, BAI, BDI-II	• Sample of nurses employed in only one hospital • Low response rate
12	(15) Nigeria	To investigate burnout dimensions and related factors amongst hospital health professionals.	• Cross-sectional, single-centre study • Self-reported questionnaires • 260 health professionals, including ICU nurses • Purposeful sample • Instruments: MBI, GHQ-12, STAI • Cronbach's alpha ranged from 0.70 to 0.86	• Sample of nurses employed in only one hospital • The correlational nature of the study design does not allow causality assumptions to be made
13	(12) USA	To investigate the association among chronic fatigue, type of shift, sleep quality, anxiety and depressive symptoms	• Descriptive correlational design, multi-centre, nation-wide study • Self-reported questionnaires • 142 female CCNs • Random sample • Instruments: SSICFS, PSQI, BDI-II, BAI II, SSIGBIS • Reliability: Cronbach's alpha 0.81 <α< 0.90 for all scales used	• The correlational nature of the study design does not allow causality assumptions to be made

Abbreviations: ***BAI:*** *Beck Anxiety Inventory;* ***BDI-II:*** *Beck Depression Inventory II;* ***BJSQ:*** *Brief Job Stress Questionnaire;* ***BSI:*** *Brief Symptom Inventory;* ***CD-RISC:*** *Connor-Davidson Resilience Scale;* ***CES-D:*** *Center for Epidemiological Studies Depression Scale;* ***CF****: Chronic Fatigue;* ***CMQ:*** *Composite Morningness Questionnaire;* ***CQ:*** *Coping Questionnaire;* ***CSAQ:*** *Cognitive Somatic Anxiety Questionnaire;* ***CTI:*** *Circadian Type Inventory;* ***EPI:*** *Eysenck Personality Inventory;* ***F SozU-K-22:*** *Social Support Questionnaire "F-SozU";* ***GHQ:*** *General Health Questionnaire;* ***GHQ-12:*** *General Health Questionnaire-12;* ***GJS:*** *General Job Satisfaction;* ***HADS:*** *Hospital Anxiety and Depression Scale;* ***HADS-D:*** *Hospital Anxiety and Depression Scale;* ***HAS:*** *Hamilton Anxiety Scale;* ***IES:*** *Impact of Event Scale;* ***IWS:*** *Index of Work Satisfaction;* ***LSQ:*** *Life Satisfaction Questionnaire;* ***MBI:*** *Maslach Burnout Inventory;* ***MPSS:*** *Modified Posttraumatic Symptom Scale;* ***MSPSS:*** *The Multidimensional Scale of Perceived Social Support;* ***OSI:*** *Oxidative Stress Index;* ***PDEQ:*** *The Peritraumatic Dissociative Experience Questionnaire;* ***PDS:*** *Posttraumatic Diagnostic Scale;* ***PHQ:*** *Physical Health Questionnaire;* ***PSQI:*** *Pittsburgh Sleep Quality Index;* ***PTSS-10:*** *Post Traumatic Stress Syndrome 10 Questions Inventory;* ***SQ:*** *Sleep Questionnaire;* ***SSI:*** *Standard Shiftwork Index;* ***SSICFS:*** *Shiftwork Index Chronic Fatigue Scale;* ***SSIGBIS:*** *Standard Shiftwork Index General Biographic Information Section;* ***STAI:*** *State Trait Anxiety Inventory;* ***TAS:*** *Total Antioxidant Status;* ***TOS:*** *Total Oxidant Status;* ***VAS:*** *Visual Analogue Scale;* ***ER:****Emergency Room;* ***CCNs:*** *Critical Care Nurses;* ***ICU:*** *Intensive Care Unit.*

Chart 2. Frequencies and mean scores of anxiety, depressive and PTSD symptoms according to the results of the studies included – Limassol, Cyprus, 2015.

Studies Included by Reference Number	Clinical Symptoms					
	Anxiety Symptoms		PTSD Symptoms		Depressive Symptoms	
	Frequencies (Scale used)	Mean±SD (Scale range)	Frequencies (Scale used)	Mean±SD (Scale range)	Frequencies (Scale used)	Mean±SD (Scale range)
(13)	10.2% (HADS)	5.6±3.9 (HADS, 0-21)	7.7% (IES-R)	2.8± 1.6 (IES-R, 0-5)	10.2% (HADS)	4.8±4.2 (HADS, 0-21)
(1)	20.8% moderate 3.1% severe (HAS)	0.71 ±0.66 (HAS, 0-3)	NE	NE	NM	0.65±0.97 (HAS, 0-3)
(21)	18% (HADS)	12.5±3.0 (HADS, 0-21)	21% (PDS)	NM	11% (HADS)	10.6±1.8 (HADS,0-21)
(20)	NM	39.66±5.67, 38.93±6.07 33±5.1, 37.46±4.63 (STAI-S, 20-80)	NE	NE	NE	NE
(10)	19.9% moderate 3.9% severe 1.8% very severe (HAS)	0,72±0,69 (HAS, 0-3)	NE	NE	NM	65 ±0,97 (HAS, 0-3)
(11)	NM	27.2±1.2 (rotating shift) 25.1±2.9(morning shift) (STAI, 14-70)	NE	NE	NM	NE
(4)	NM	7.4 (BJQS, 3-12)	NE	NE	NM	12.1 (BJSQ, 6-24)
(22)	NM	NE	NM	NE	NM	5.18±2.19 (SDQ, 0-10)
(23)	20 – 22% (HADS)	NM	24 – 29 % (PTSS-10)	NM	26-31% (HADS)	NM
(19)	NE	NE	NE	NE	12% (CES-D)	NM
(24)	NM	24.68± 5.2 (BAI, 0-63)	NM	11.1±14.0 (MPSS-SR, 0-66)	NM	4.96 ± 6.18 (BDI, 0-63)
(15)	NM	NM	NE	NE	NM	NM
(12)	32 % (BAI)	5.22±4.59 (Day shift) 5.93±5.41 (Night shift) (BAI, 0-63)	NE	NE	23 % (BDI)	7.18±4.59 (Day shift) 10.35±7.89(Night shift) (CES-D, 0-63)

Abbreviations: ***BAI:*** *Beck Anxiety Inventory;* ***BDI****: Beck Depression Inventory;* ***BJSQ****: Brief Job Stress Questionnaire;* ***CES-D****: Center for Epidemiological Studies Depression Scale;* ***HADS****: Hospital Anxiety and Depression Scale;* ***HAS:*** *Hamilton Anxiety Scale;* ***IES-R:*** *Impact of Event Scale Revised;* ***MPSS-SR****: Modified Posttraumatic Symptom Scale-Self Report;* ***NE****: Not explored;* ***NM****: Not mentioned;* ***PDS****: Posttraumatic Diagnostic Scale;* ***PTSS-10****: Post Traumatic Stress Syndrome 10 Questions Inventory;* ***SDQ****: Self Developed questionnaire;* ***STAI****: State Trait Anxiety Inventor.*

Chart 3. Factors related to ICUNs' psychological morbidity according to the studies included – Limassol, Cyprus, 2015.

Factors related to ICUNs' psychological morbidity	Studies Included by Reference Number												
	(13)	(1)	(21)	(20)	(10)	(11)	(4)	(22)	(23)	(19)	(24)	(15)	(12)
Demographics/personal characteristics													
Age/ Long work experience		×			×					×		×	
Female Gender		×			×								
Patients' condition													
Extensive open wounds/Massive bleeding/Heavy injuries									×				
Painful and life-threatening procedures											×		
Death									×	×	×		
Therapy related factors													
Poor outcomes due to delayed treatment											×		
Medication errors											×		
No contact with patients											×		
Personality characteristics													
Resilience			×										
Perception of role incompetence									×			×	
Job fitness/ Job satisfaction							×	×					

continua …

… continuação

Factors related to ICUNs' psychological morbidity	Studies Included by Reference Number												
	(13)	(1)	(21)	(20)	(10)	(11)	(4)	(22)	(23)	(19)	(24)	(15)	(12)
Psycho – somatic well being													
Decreased quality of sleep								×	×				×
Fatigue													×
Burnout syndrome			×							×		×	
Administration/ Organizational policies													
Dysfunctional administration												×	
Public hospital ICU		×			×								
Round-the-clock schedule						×						×	
Night /Evening shift									×				×
Type of ICU (surgical/ medical)	×							×					
Quality of Tasks/ Overload													
Increased administrative tasks/ Nurse in charge	×								×			×	
Task requirements/ Routine							×					×	
High responsibility/ Care for people at high risk/ Job control	×						×		×				
Effort-reward imbalance	×												
Increased task load				×			×						
Staffing conditions/ Pa-N ratio/ Number of beds		×			×				×				
Quality of Interactions													
Quality of professional interactions/environment		×					×			×		×	
Dissatisfaction coming from patients' families											×		
Quality of relationship with patients										×	×	×	
Verbal abuse (N-N, P-N, Pa-N)									×				

Abbreviations: ***N-N:*** *Nurse to nurse;* ***Pa-N:*** *Patient to nurse;* ***P-N:*** *Physician to nurse.*

DISCUSSION

This was the first systematic review which aimed to investigate the prevalence of anxiety and depressive symptoms among CCNs, including symptoms of PTSD, as well as related factors associated with the manifestation of these disturbances. The main finding was that almost 1 out of 5 critically care nurses suffered from psychological distress. More specifically, the prevalence of anxiety ranged in included studies from 10.2% to 32%, whilst the frequency of depressive symptoms from 11% to 31%. This variability could be attributed to the variety of the tools used, to diverse sampling techniques, as well as to the different cultural contexts within which studies were performed. Additionally, specific factors were associated with ICU nurses' psychological morbidity, namely: demographics, personality traits, quality of professional interactions (between nurses of different ranking, as well as between nurses and physicians), therapeutic procedures, need for higher responsibility, patients' grave condition or death, nurses' physical well-being, administration policies, task requirements, and work overload.

With regard to the methodological features of the reviewed studies, the vast majority of them adopted a cross-sectional design. As a result, assumptions on causality linking work-related factors to psychiatric symptoms could not be safely drawn. Another important limitation of the reviewed studies lies in the fact that most people who suffer from severe symptoms of psychological disturbances are reluctant to participate. Thus, the true percentage of people with clinical anxiety and depressive symptoms may have been underestimated. On the other hand, most reviewed studies used valid tools with adequate psychometric properties, which enhance the internal validity of the reported results. Moreover, almost half of the studies were nationwide, multi-centered and applied random sampling, characteristics that render their results generalizable within the particular cultural context.

According to the results of the reviewed studies, an increased prevalence of anxiety and depressive symptoms among critically care nurses compared to other nursing specialties was shown[4,24]. This prevalence should also be compared to the one of the general population[25]. Considering that almost all studies included only female nurses, a comparison to the female general population would have been more appropriate. According to the WHO [25], the prevalence of depressive symptoms among women of reproductive age is approximately 20% in developed countries. However, this frequency represents the lifelong prevalence[25,26], whereas in the studies included in the current review cross-sectional prevalence is reported; and such prevalence for the general female population is significantly lower than 20%[25,26]. Another reason for the increased frequency of depressive symptoms in the reviewed studies could stem from the fact that depression is not only more prevalent in women than in men, but may also be more persistent in them[26].

Another study finding was that depressed mood and severe sleep disturbance are the main causes of CCNs leaving the profession,[22] which underlines the need for targeted interventions towards this vulnerable group of employees. Screening procedures need to be implemented, since it is well known that those who suffer from such symptoms appear reluctant to seek professional help[26]. In particular, only 2 out of 5 people who experience symptoms of mood or anxiety disorders seek assistance form health care professionals during the first year of the onset of the disorder[26]; this delay may not only jeopardize the quality and safety of delivered care, but may also influence the clinical outcome of such symptoms negatively[27].

With regard to PTSD symptoms, three studies demonstrated data in relation to their frequency. One study in Germany[13] showed that almost 1 out of 10 CCNs reported such symptoms, whilst 2 studies in the USA revealed a much higher prevalence (21 and 29%) [21,23]. This difference might be attributed to differences in study designs, organizational cultures or organizational health care systems between the two countries. In any case, nurses described specific work-related traumatic events, (such as inpatient death, verbal abuse, etc), which were relived in dreams and would further lead to avoidance behavior and hyper-vigilance[23,28]. Worth mentioning is also the fact that, in relation to the burnout syndrome, only one study has explored a possible association with symptoms of PTSD[23]. Since, according to this study,[23] the majority of nurses who met the criteria of PTSD reported at the same time symptoms of emotional exhaustion and depersonalization, further research in this direction is needed, in order to clarify any causal relationship. Additionally, of particular concern is the fact that symptoms of PTSD are associated with substance abuse and depression[29]. In any case, such symptoms may have an effect on the quality and safety of delivered care. As mentioned earlier, it appears that anxiety and depressive symptoms coexist most of the times with burnout symptoms[19,30]. Furthermore, it has been shown that CCNs who suffer from professional burnout may develop feelings of despair and hopelessness. These conditions are of particular importance, since they are considered to represent risk factors for suicidal behavior[30]. All the above should be taken into consideration in future research, as well as for targeted interventions aiming to alleviate CCNs from such symptoms.

Limitations

Cross-sectional study design, with its inherent restrictions, and tendency of affected individuals to abstain from such studies have been mentioned above. A further limitation was that the studies included were solely in the English and Greek languages. As a result, data published in other languages, including any possible contradictory findings, were not included. Additionally, the fact that only data published in peer reviewed journals were included in the present study may have resulted in selection bias[31]; studies reporting against the association between psychiatric symptoms and critical care nursing may have not been published, thus could not possibly have been included in the present study.

CONCLUSION

The results of this review suggest considerable psychological morbidity in CCNs. Special attention needs to be given to symptoms of PTSD, which were reported as being rather frequent. Psychological burden in this population was associated with a variety of factors, from demographics and quality of professional interactions, to task requirements and work overload. In conclusion, studies in relation to psychological responses of nurses employed in the ICU are limited, internationally. They do, however, generate the necessary basis for future prospective studies, that will be designed to test interventions aimed at supporting the role of ICU nurses and, ultimately, at ameliorating their herein demonstrated psychological morbidity.

RESUMO

Objetivo: Rever sistematicamente evidências de respostas psicológicas disfuncionais em Enfermeiros de Unidades de Cuidados Intensivos (EUCI), com foco na ansiedade, sintomas depressivos e fatores relacionados. **Método:** Foi realizada uma pesquisa bibliográfica, com avaliação crítica e síntese de dados dos estudos, nas bases de dados da CINAHL, PubMed e Scopus, para o período de 1999 até ao presente. Foram utilizados os seguintes termos de pesquisa, individualmente ou em combinação: "estado mental" "sintomas depressivos" "ansiedade" "enfermeiros de UCI" "PTSD" "burnout" "fadiga da compaixão" "stress psicológico". **Resultado:** Foram incluídos treze estudos quantitativos em Inglês e Grego. Os resultados sugerem um aumento da carga psicológica nos EUCI comparativamente com outras especialidades de enfermagem, assim como com a população em geral. **Conclusões:** Estudos internacionais de investigação sobre a resposta psicológica de EUCI são limitados. Estudos futuros, longitudinais e de intervenção, irão contribuir para uma melhor compreensão do fenômeno.

DESCRITORES

Equipe de Enfermagem; Terapia Intensiva; Ansiedade; Depressão; Esgotamento Profissional; Revisão.

RESUMEN

Objetivo: Buscar evidencias de respuestas psicológicas disfuncionales en Enfermeros de Unidades de Terapia Intensiva, con enfoque en la ansiedad, síntomas depresivos y factores relacionados. **Método:** Revisión sistemática, con evaluación crítica y síntesis de datos de los estudios, llevada a cabo en las bases de datos CINAHL, PubMed y Scopus, en el período de 1999 hasta el presente, utilizándose los siguientes términos de investigación, individualmente o en combinación: "estado mental", "síntomas depresivos", "ansiedad", "enfermeros de UCI", "estrés post traumático", "burnout", "fatiga por compasión" y "estrés psicológico". **Resultado:** Fueron incluidos trece estudios cuantitativos en Inglés y Griego. Los resultados sugieren un incremento de la carga psicológica en los Enfermeros de UCI comparativamente con otras especialidades de enfermería, así como con la población en general. **Conclusión:** Estudios internacionales

de investigación acerca de la respuesta psicológica son limitados. Estudios futuros, longitudinales y de intervención, contribuirán a una mejor comprensión del fenómeno.

DESCRIPTORES
Grupo de Enfermería; Cuidados Intensivos; Ansiedad; Depresión; Agotamiento Profesional; Revisión.

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