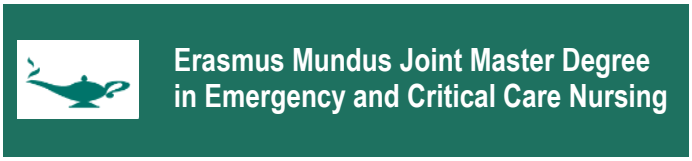

ERASMUS MUNDUS JOINT MASTER'S DEGREE IN EMERGENCY AND CRITICAL CARE NURSING (EMJMD NURSING)

Post-traumatic stress, anxiety, and depression among oncology nurses during COVID-19 pandemic

Master's Thesis

Nguyen Thi Dung

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Author	Supervisor	Co-supervisor

ERASMUS MUNDUS JOINT MASTER'S DEGREE IN EMERGENCY AND CRITICAL CARE NURSING

Mª PILAR MOSTEIRO DÍAZ, Doctor in Psychology from the University of Oviedo, Senior Lecturer, Area of Nursing, Department of Medicine, University of Oviedo and the Erasmus Mundus Joint Master's Degree in Emergency and Critical Care Nursing Lecturer and Coordinator.

And

SARA FRANCO CORREIA, Doctor from the University of Oviedo, Associated Professor in the Erasmus Mundus Joint Master Degree in Emergency and Critical Care Nursing

CERTIFY:

That the Master's Thesis submitted by Ms Nguyen Thi Dung, entitled "Post-traumatic stress, anxiety, and depression among oncology nurses during COVID-19 pandemic", carried out under my supervision in the Erasmus Mundus Joint Master Degree in Emergency and Critical Care Nursing, meets the necessary requirements to be approved as a Master's Thesis.

And for the record, and for the relevant purposes, the present certification was issued in Oviedo, on 31st January 2022.

Mª PILAR MOSTEIRO DÍAZ

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Co-Supervisor

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1. INTRODUCTION

1.1 COVID-19 and its impact

In December 2019, severe acute respiratory syndrome (SARS-CoV-2) was found in Wuhan, China, soon became a global pandemic and continued to spread with an alarming and unpredictable rate (Richards et al., 2020). Symptoms from patients with coronaviruses include mild cold, fever, muscle pain, cough, loss of taste or smell. Furthermore, 33% patients with COVID-19 have complications that are various from respiratory distress syndrome, septic shock and severe pneumonia (Al-Quteimat & Amer, 2020). According to a report from WHO, in 2020 COVID-19 viruses had infected 82 million people and killed at least 3 million people in the world (WHO, 2021). As of 6th September 2021, there have been over 220 million confirmed cases of COVID-19, including over 4.5 million deaths (WHO, 2021). The pandemic poses a threat to healthcare systems in countries. It causes persistent disruption to essential health service delivery and shortages of funding for non-COVID-19 services (WHO, 2021). Spain has been one of the most impacted countries with 4,8 million confirmed cases and approximately 85 deaths by September 2021(European Centre for Disease Prevention and Control, 2021). Research from health facilities at all levels in all provinces of mainland China reported after the SARS-CoV-2 outbreak in 2020, a notable statistically significant decrease in all indicators with all their nadir in February. As of June 2020, the healthcare industry estimated cumulative losses of 23.9% health facility visits and 21.6% inpatients (Xiao et al., 2021).

This significant reduction of health service was the result of the changes in patients and provider behaviors, suspension of health facilities and mobility restriction as well as potential reduction of non-COVID-19 diseases.

Recently, with the increasing number of cancer patients, cancer centers and hospitals are already overloaded in many regions (Kim & Kim, 2020). However, COVID-19 put more burden on the healthcare system with the disruption of all processes of cancer care from delaying diagnosis and treatment to halting clinical (Richards et al., 2020). Cancer patients with immunodeficiency problems have more opportunities to get infected diseases, extend length of stay in the hospital, worse outcome with COVID-19 and elevated mortality rate in comparison with population

(Al-Quteimat & Amer, 2020; Richards et al., 2020). Besides, diagnosis and screening programs have been suspended due to the risk of getting COVID-19 for patients, shortage of staff and non-emergency medical conditions for early and unknown cancer diseases (Xiao et al., 2021). Cancer care patterns could be modified due to the availability of medications, machines, equipment, and the potential exposure with coronavirus during cancer treatments. Supportive care and palliative care have not been available and accessible as they used to be when medical staff and facilities were deprioritized to respond to the pandemic (Richards et al., 2020). As a result, cancer patients in COVID-19 pandemic have been receiving lower quality of care even suboptimal care (Xiao et al., 2021). However, higher demand from jobs for healthcare providers as an excessive workload from the number of COVID-19 patients and the implementing strict infection control in the hospitals. These issues require a reorganizing oncology care service to adapt with COVID situation and ensure the continuous care for cancer patients who are vulnerable and cannot wait due to the aggressive cancer progression. Thus, nursing

professionals who account for the majority of hospitals workforce and play an important role in all areas of care from infection prevention, providing nursing care, containment and public health are significantly impacted in COVID-19 pandemic.

1.2 Post traumatic stress, anxiety, and depression in COVID pandemic

1.2.1 Post traumatic stress disorder

According to the American Psychiatric Association, post-traumatic stress disorder (PTSD) is a psychiatric disorder that may occur in people who experienced or witnessed a traumatic event, threatening situation, or serious injury (American Psychiatric Association, 2020). PTSD symptoms are various, but the core features of PTSD are the persistence of intense, distressing, fearfully avoided reactions triggering event reminders, mood and cognition alternation, a pervasive sense of imminent threat, sleeping disorder and hypervigilance. The lifetime prevalence of PTSD is various with different social background and nation, but it happened with more than 70% adult population in the world and 31% experience at least four events in their lifetime (Shalev, Liberzon, & Marmar, 2017).

1.2.2 Anxiety and depression

Depression and anxiety are the most common symptoms of stress, affecting 20% of the working population in the UK (Bartram & Turley, 2009). It lowers work performance, increases turnover rate, absence, and causes health problems such as heart disease, sleeping disorders, hypersensitivity and dizziness for individuals (Bartram & Turley, 2009; Michie, 2002).

1.2.3 Mental health problems among nurses in COVID-19 pandemic

Nursing is one of the most highly stressful jobs (Zhang et al., 2018) as they work with patients who are already stressful and vulnerable. Nursing jobs require multiple skills to handle patient physical and psychological problems. Besides, to be able to work productively in a multidisciplinary team that includes patients, patient families and many other healthcare providers, they need to be flexible and communicate effectively in many situations. Evidence shows in the SARS 2003 outbreak, 30% of death cases are professionals in all healthcare facilities in China, 3000 medical staff were infected with 40% in hospital and 60% in community (Mo et al., 2020). Nowadays, COVID-19 pandemic is one of the most affected events worldwide. The pandemic not only puts more burden on workload with physical problems but also psychological problems for many healthcare professionals. At present, the COVID-19 pandemic is still a threat to the world with new variants. It is very important for healthcare providers to stay healthy both in physical and mental health as there is no ending sign of the COVID-19 pandemic yet. Many studies in COVID-19 situation focus on the origin of viruses, epidemiological investigation, prevention and control, diagnosis and treatment, vaccination. However, very few studies on the impact of COVID pandemic on healthcare providers or mental health of medical staff in COVID situations. There were studies in Wuhan, China to investigate workplace stress among nurses in the front line (Mo et al., 2020). Another study in Spain showed 36% of emergency nurses had psychological distress, 30.9% potentially had PTSD and 60.9% experienced insomnia (Martínez-Caballero et al., 2021). In recent years, numerous research has been done about occupational stress, burn out, compassion fatigue and job satisfaction among nurses especially in emergency and intensive care units (Basu et al., 2017). However, there are not many studies reporting about mental health in oncology nurses and still a big gap in literature

showed significant differences in prevalence and level of PTSD, anxiety, and depression among oncology nurses. Findings from a study in Korea reported the average post-traumatic stress was 20.68. ± 19.50 and 36.7% of the nurses in the high risk of PTSD. The prevalence of PTSD was higher for nurses aged ≥30 in comparison with younger nurses with 46.2% and 30.4% respectively (Moon et al., 2021). However, another study from Turkey showed a much lower rate of PTSD in nurses with 15.1% (Bahadirli & Sagaltici, 2021). Results from a study in 5 oncology institutions in Bosnia and Herzegovina showed stress, anxiety and depression levels were normal among most of healthcare and administrative staff with more than 70% respondent reported with normal level (Marijanović et al., 2021). Whereas a study in Madrid revealed among medical professionals 56.6% have symptoms of posttraumatic stress disorder, 58.6% developed anxiety disorder and about 40% present depressive disorder (Luceño-Moreno et al., 2020). The difference results among studies could be explained by the difference in context, time, research methodology and sample characteristics. Thus, this study aims to figure out the level of PTSD, anxiety and depression among oncology nurses and correlation between sociodemographic and their mental health in COVID-19 pandemic.

2. JUSTIFICATION

The COVID-19 pandemic is still a threat to the world after 2 years without ending signs but the increasing of new cases and mortality rate. It poses a burden on the healthcare system in every country around the world and nurses who are directly impacted by the pandemic as they work in all processes of healthcare services from screening, testing, treatment and follow up. COVID-19 pandemic may delay the diagnostic and treatment for many kinds of diseases but cancer as a chronic disease is very difficult to delay. Hence, healthcare providers who work in cancer must put more effort to deal with COVID-19 situations in taking care of cancer patients. There are some studies in Spain focusing on the impact of COVID-19 on mental health in emergency and intensive care nurses but not yet study in cancer care staff in pandemic. It is important to evaluate the mental health in oncology staff for organization and policy makers to have necessary actions protecting staff, the most valuable asset of the healthcare system now especially in a pandemic when most countries are facing a lack of healthcare staff.

3. RESEARCH QUESTIONS, HYPOTHESIS AND OBJECTIVES

3.1 Research questions

- What is the prevalence and level of post-traumatic stress, anxiety and depression among oncology nurses and nursing assistants during the COVID-19 pandemic?
- Is there a difference between the prevalence and levels of post-traumatic stress, anxiety and depression between nurses and nursing assistants?
- Is there any association between prevalence and levels of post-traumatic stress, anxiety, depression and socio demographic and professional characteristics like gender, age, marital status, having children, type of contract, working shifts, length of professional experience, considering the job stressing and having hobbies?

3.2. Hypothesis

Null Hypothesis (H0):

No post-traumatic stress, anxiety or depression between Oncology nurses and nursing assistants related to COVID-19 pandemic is detected.

Alternative Hypothesis (H1):

- There is a prevalence of post-traumatic stress disorder, anxiety and depression between Oncology nurses and nursing assistants due to COVID-19 pandemic.
- There is an association between post-traumatic stress disorder, anxiety and depression levels and socio-demographic and occupational profiles.

3.3. Objectives

3.3.1. General objective

The objective of the study is to know the prevalence and level of post-traumatic stress, anxiety and depression among oncology nurses and nursing assistants during the COVID-19 pandemic.

3.3.2. Specific objectives

- To characterize the socio-demographic and occupational profiles of oncology nursing staff.
- To describe the relationship between post-traumatic stress, anxiety and depression levels among oncology nurses, nursing assistants and socio demographic and occupational characteristics.

4. MATERIAL AND METHODS

4.1. Research design

A cross-sectional descriptive survey was performed.

4.2. Time and setting:

-Time: Data was collected from 23rd September to 30th October 2021

- Setting: Cancer care units in Central University Hospital of Asturias, Spain

4.3. Population and sample

- Population: All nurses and nursing-assistants who work in oncology department, hematology department and hematopoietic stem cell transplant unit from both in-patient and out-patient care units in the Central University Hospital of Asturias, Spain with target population is 102.

Participants were selected according to inclusion and exclusion criteria:

- Inclusion criteria:

- Nurses and nursing assistants who work in the selected units during period of study.
- Nurses and nursing assistants who agree to participate and gave informed consent.

- Exclusion criteria:

- Nurses and nursing assistants who did not accept to participate.
- Participants with less than 80% of questionnaire completion.

4.5. Variables

- **Sociodemographic and occupational variables**

  - Age: in years.
  - Gender: Male, female.
  - Total working experience as healthcare workers: in years.
  - Total working experience in oncology/hematology: in years.
  - Children: yes, no.
  - Marital status: single, marriage/cohabitation, divorced/separate/widow.
  - Working schedule: fix in the morning, morning/afternoon shift, morning/afternoon/night shift rotating.
  - Specialty: Oncology, hematology
  - Unit: daycare, inpatient care unit or others.
  - Type of labor contract: Permanent, temporary, or other types of contracts.
  - People to take care at home: yes, no.
  - Smoking habit: yes, no.
  - Professional category: nurse, nursing assistant.
  - Living place: urban, rural.

- **Variable related to COVID-19 pandemic:**

  Independent variables assessed by yes/no questions

  - Do you have to take care COVID patients?
  - Do you have a family member who was positive with COVID?

- Do you have a friend who was positive with COVID?
- Have you been positive with COVID?
- Are you afraid of coronavirus?
- Do you feel stressed?
- Are you vaccinated?

4.6. Instruments

The following instruments in Spanish language were used in the study:

- **An ad hoc questionnaire** (Appendix-A): on social demographic and occupational variables, and variables related to COVID-19 pandemic.
-
- **Post-traumatic stress disorder** (Appendix-B)**:** The Impact of Event Scale-Revised in Spanish version was used to assess the stress of nurses and nursing assistants in COVID-19 pandemic as a traumatic life event (Baguena Puigcerver et al., 2001). The instrument has excellent internal consistency (Cronbach's alpha = 0.95), as well as sensibility and specificity of 74.5% and 63% respectively. The scale is made up of 22 items in three subscales. Intrusion with 7 items (intrusive thought, nightmare, intrusive feelings, and imagery, dissociative like re-experiencing), avoidance with 8 items (numbing of responsiveness, avoidance of feelings, situations, and ideas) and hyperarousal with 7 items (anger, irritability, hypervigilance, difficulty concentration, heightened startle). The items are rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). The IES-R yields a total score (ranging from 0 to

88) to assess level of PTSD and the lower of score, the better for patients. The IES-R score from 24 to 32 indicates PTSD is a clinical concern with partial PTSD or at least some of the symptoms. The IES-R score from 33 to 36 presents the best cut off for a probable diagnosis of PTSD and people with score 37 and above may suffer immune system suppression (Hyer & Brown, 2008).

- **Anxiety and depression** (Appendix-C)**:** The Spanish version of the Hospital Anxiety and Depression Scale (HADS) instrument was used (Herrero et al., 2003). HADS is a Likert 0-3 response scale and comprises 7 items for anxiety subscale and 7 items for depression subscale. Although the anxiety and depression are interspersed within the questionnaire and usually coexist, they are scored separately in the scale to assess level of anxiety and depression. The higher the score, the greater prevalence of anxiety and depression symptoms. The anxiety and depression scores range from 0 to 21 and the cut off scores are from 8 to 10 for both subscales. Cut-off scores are between 8 and 10 possible or presence of a mood disorder. HADS is a popular tool for its simplicity, speed and ease in clinical practice and research. In Spanish adaptation, it has shown adequate psychometric properties, confirmed validity and an internal consistency of 0.77 in anxiety and 0.71 in the depression subscale.

4.7. Data analysis

IBM SPSS 27 was used to perform statistical analyses. The study population characteristic, working condition and COVID-19 related characteristics were presented as frequencies, and

percentages. Descriptive analysis statistics (mean, standard deviation, minimum and maximum) were used to show the scores of PTSD, anxiety and depression. The chi-square test was performed to assess the prevalence of psychological problems based on socio demographic and COVID-19 related factors. Mean of Pearson's r test and ANOVA and student's t test were performed to look for relationships between variables. The statistical significance level used was $p \leq .05$.

4.8. Ethical aspects

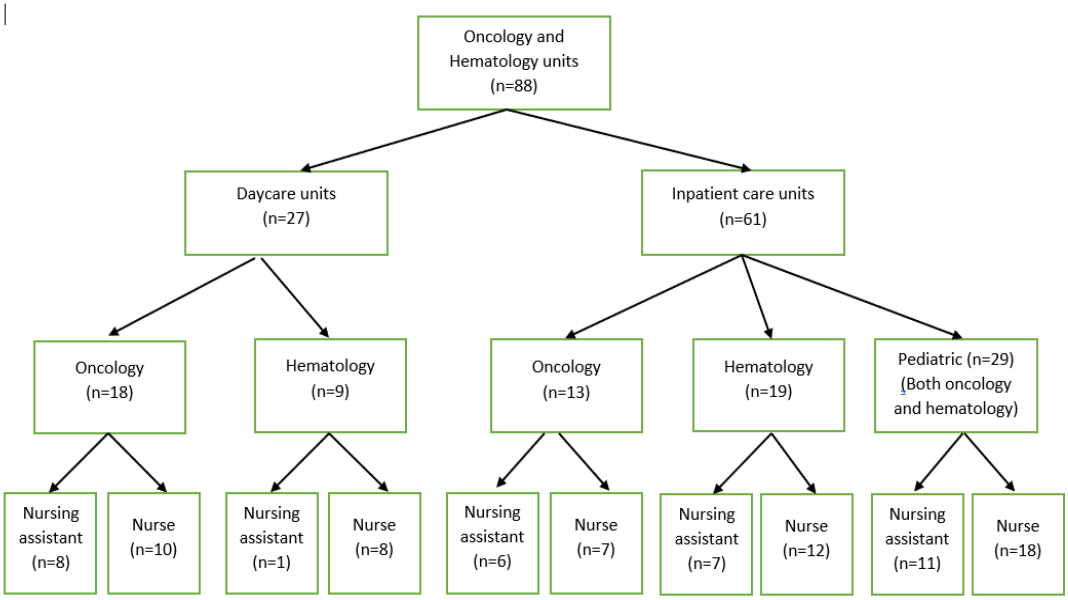
The permission to conduct the study was given by an approval from the Ethics Research Committee of the Principality of Asturias (Appendix - D). Before collecting data, all participants were informed about the study directly and the consents were gained by the answers of questionnaires from participants. Confidentiality was assured throughout the study and the participants had the right to withdraw their participants at any phase of the research process. The study was designed according to the ethical and legal aspect (The European Parliament & Council of the European Union, 2016).

5. RESULTS

5.1. Descriptive analysis

5.1.1. Sociodemographic, clinical characteristics and concerns of COVID diseases.

Figure 1. Flowchart of sample data collection



There were 91 nurses and nursing assistants participating in the study out of population of 102. Three out of 91 were excluded as the response rates were lower than 80%. The final sample consisted of 88 participants (86.27%) with mean age of 42.52 (SD = 13.19) years (range, 22-63years). The mean working experience time was 8.86 (SD = 9.59) years (range, 1-44 years) whereas the mean of working experience in cancer care was 5.39 (SD = 5.33) years (range, 1-33 years).

The majority of participants was female with 79 women (89.8%). 54 out of 91 (61.4%) professionals were in marriage or cohabitation and 52 (59.1%) of responders had no children. Nurses accounted for 62.5% and nursing assistants contributed 37.5% for the number of the responders. Participants were evenly distributed in oncology, hematology and both specialties with 35.2%, 31.8% and 33% respectively. Majority of nurses and nursing assistants in the study worked in in-patient care units with 69.3% and the rest worked in out-patient care units.

Regarding to COVID-19 diseases, all the participants were vaccinated and 20.5% of them had COVID-19 positive. 13.6%of nurses and nursing assistants had direct contact with COVID-19 patients at work, 46,6% had family members with COVID-19 positive and 73.9% had friends with COVID-19 disease. Among 88 responders, 56.8% reported the presence of stress and 12 out of 91(13.6%) were afraid of COVID. The details of socio demographic, clinical characteristics and concerns of COVID-19 were shown on the below table (see Table 1).

Table 1. Characteristics of participants

Variables	**Total number N=88**	**N**	**%**
Gender	Male	9	10.2
	Female	79	89.8
Children	Yes	36	40.9
	No	52	59.1
Marital status	Single	27	30.7
	Marriage/cohabitation	54	61.4
	Separate/divorced/widow	7	8.0
Work shift	Fix-schedule	26	29.5
	Morning and afternoon	15	17.0
	Rotated schedule with all shifts	47	53.4
Unit	Daycare	27	30.7
	Hospitalization	61	69.3

Specialty	Oncology	31	35.2
	Hematology	28	31.8
	Both oncology and hematology	29	33.0
Type of contract	Permanent	20	22.7
	Temporary	68	77.3
Take care of COVID-19 patients?	No	76	86.4
	Yes	12	13.6
Take care other people at home	No	60	68.2
	Yes	28	31.8
COVID-19 positive?	No	70	79.5
	Yes	18	20.5
Family member with COVID-19?	No	47	53.4
	Yes	41	46.6
Friend with COVID-19?	No	23	26.1
	Yes	65	73.9
Smoking	Non-smoker	74	84.1
	Smoker	14	15.9
Professional category	Nurse	55	62.5
	Nursing assistant	33	37.5
Afraid of COVID-19	No	76	86.4
	Yes	12	13.6
Stress	Have no stress	38	43.2
	Have stress	50	56.8
Place to live	Rural	8	9.1
	Urban	80	90.9

5.1.2. Posttraumatic stress disorder (PTSD)

The PTSD in nurses and nursing assistants was measured by IES-R scale. The statistical analysis showed the mean and Std. Deviation of intrusion, avoidance and hyperarousal were 1.03 (SD = 0.89), 1.08 (SD = 0.90) and 1.08 (SD = 0.97) while mean of total score for IESR was 23.46 (SD = 19.1), range (0-68) (see Table 2).

Table 2. Subscales of IES-R

	N	Minimum	Maximum	Mean	Std. Deviation
Intrusion	88	.00	3.43	1.0341	.88858
Avoidance	88	.00	3.00	1.0795	.90023
Hyperarousal	88	.00	3.57	1.0844	.97365

Regarding the level of PTSD, the majority of people in the study were at normal level with 58% of responders and 26.1% of participants were at severe level. Regarding to professions, the percentage of nursing assistant presented high level of distress was 33.33% that is higher in cancer nurses with 21.8% (see Table 3).

Table 3. IES-R levels.

	N	%
Normal	51	58.0
Mild	9	10.2
Moderate	5	5.7
Severe	23	26.1
Total	88	100.0

5.1.3. Anxiety and depression

The Hospital Anxiety and Depression Scale (HADS) was used to assess the level of anxiety and depression among cancer staff in the hospital of Central University Hospital of Asturias. The mean score of anxiety was 6.64 with SD = 3.98 and range (0-18) while in depression, it was

4.33 of mean score with SD = 3.48 and range (0-14). The normal level of anxiety and depression accounted for the majority of participants with 67% and 80.7% respectively. Regarding to professions, the prevalence of high level of anxiety and depression were 14.54% and 3.64% in nurses and 24.24%, 12,12% in nursing assistants (see Table 4).

Table 4. Anxiety and depression levels.

	Anxiety	**Depression**
	N (%)	**N (%)**
Normal	59 (67%)	71 (80.7%)
Borderline abnormal	13 (14.8%)	11 (12.5%)
Abnormal	16 (18.2%)	6 (6.8%)
Total	88 (100%)	88 (100%)

5.2 Correlation analysis

5.2.1. The relationship between socio demographic, professional characteristics and PTSD.

As shown in Table 5, the results of statistical analysis indicated that there are significant associations between IES-R levels and marital status (p=0.019%), professional category (p=0.005%). The presence of PTSD in single participants, people in marriage/cohabitation and separate/divorced/widow people were 37%, 41% and 71% respectively. Regarding to job position, nursing assistants showed higher percentage of PTSD presence (31% of nurses and 61.6% of nursing assistants) as well as severe level of PTSD (21.9% in nurses and 33.3% in nursing assistants). In addition, participants concern of COVID-19 such as the fear of COVID-19 or having stress showed lower risk of PTSD (P<0.001).

Table 5. Association between IESR levels and category variable

		IES-R levels					
		Normal	Mild	Moderate	Severe	Total	p
Marital status	Single	17 (63%)	3 (11%)	3 (11%)	4 (15%)	27(100%)	.019
	Marriage/ cohabitation	32 (59%)	6(11%)	0(0%)	16 (30%)	54(100%)	
	Separate/divorced/widow	2(29%)	0(0%)	2(29%)	3 (42%)	7(100%)	
Having friend with COVID-19	No	9 (39%)	1(4%)	3 (13%)	10 (44%)	23(100%)	.023
	Yes	42 (65%)	8 (12%)	2 (3%)	13 (20%)	65 (100%)	
Professional category	Nurse	38 (69%)	5 (9.1%)	0 (0%)	12 21.9%)	55 (100%)	.005
	Nursing assistant	13 39.4%)	4 (12.1%)	5 (15.2%)	11 33.3%)	33 (100%)	
Fear of COVID-19	Yes	50(65.8%)	5(6.6%)	5 (6.6%)	16 (21%)	76 (100%)	<.001
	No	1 (8.3%)	4 (33.3%)	0 (0%)	7 (58.3%)	12 (100%)	
Stress	Yes	32 84.1%)	2 (5.3%)	2 (5.3%)	2 (5.3%)	38 (100%)	<.001
	No	19 (38%)	7 (14%)	3 (6%)	21 (42%)	50 (100%)	

Among numeric categorical variables, age and cancer care experience showed the positive correlation with IES-R level (p=0.04 and p=0.045 respectively). At normal IESR-level, mean

age of 38.96 years (SD=12.682) and mean of cancer care experience was 4.33 (SD=4.097) while at severe IESR level, mean of age was 42.52 years (SD=14.188) and mean of cancer care experience was 7.83 years (SD=7.596) (see Table 6).

Table 6. Association between IESR levels and numeric variables

IESR level		AGE	CANCER CARE EXPERIENCE
Normal	Mean	38.96	4.33
	N	51	51
	Std. Deviation	12.682	4.097
Mild	Mean	43.00	4.11
	N	9	9
	Std. Deviation	12.227	2.977
Moderate	Mean	57.60	7.20
	N	5	5
	Std. Deviation	6.309	4.207
Severe	Mean	46.96	7.83
	N	23	23
	Std. Deviation	12.608	7.596

Total	Mean	42.52	5.39
	N	88	88
	Std. Deviation	13.188	5.334
p		.04	.045

5.2.2. Relationship between socio demographic, professional characteristics with anxiety and depression

In the exam of relationship between anxiety, depression levels and socio demographic, occupational variables as well as variables related to COVID-19 pandemic. The results showed positive correlation between anxiety levels and stress or people to take care at home ($p<.05$). There was 28% of people who reported themselves with stress at abnormal level of anxiety and 32.2% of participants who must take care of other people at home presented abnormal level of anxiety (see Table 7).

Table 7. Association between socio demographic, professional characteristic and anxiety, depression

		Level of anxiety				
		Normal	Borderline abnormal	Abnormal	Total	
People to take care at home	No	42 (70%)	11 (18.3%)	7 (11.7%)	60 (100%)	.044
	Yes	17 (60.7%)	2 (7.1%)	9 (32.2%)	28 (100%)	

Do you have stress?	No	34 (89.4%)	2 (5.3%)	2 (5.3%)	38 (100%)	< .01
	Yes	25 (50%)	11 (22%)	14 (28%)	50 (100%)	

5.2.3. The correlation between posttraumatic stress disorder, anxiety, and depression

To examine the correlation among posttraumatic stress disorder level, depression level and anxiety level, the Pearson correlation was used to analyze. This analysis revealed significant correlations among levels of depression, anxiety, and distress ($p<0.01$). Healthcare professionals who have anxiety, tend to have depression and stress and vice versa. In order to assess the relationship between stress, anxiety and depression levels and socio demographic, profession characteristics. The results showed correlation between post-traumatic stress level and age with Pearson correlation: 0.308, sig. (2-tailed: 0.04). See table 8.

Table 8. Correlation between posttraumatic stress disorder and psychological problems

		IESR level	Level of depression	Level of anxiety
IESR level	Pearson Correlation	1	.412**	.559**
	Sig. (2-tailed)		.000	.000
	N	88	88	88
Level of depression	Pearson Correlation	.412**	1	.613**
	Sig. (2-tailed)	.000		.000
	N	88	88	88
Level of anxiety	Pearson Correlation	.559**	.613**	1
	Sig. (2-tailed)	.000	.000	
	N	88	88	88

**. Correlation is significant at the 0.01 level (2-tailed).

6. DISCUSSION

The research aimed to assess the prevalence and level of posttraumatic stress disorder, anxiety and depression among cancer nursing staff in Central University Hospital of Asturias, Spain during COVID-19 pandemic. It also proposes to evaluate the relationship between the mental health problems and socio demographic, working environment and COVID-19 related factors.

Prevalence and Levels of PTSD, anxiety and depression

In this research, based on 88 responses from nurses and nursing assistants in oncology-hematology units. The majority of nursing staff in HUCA were at normal level (58%) and over quarter of participants were at severe level of posttraumatic stress disorder (26.1%) those suffering from the immune system. The IESR mean score was 23.46 (SD=19.1) and prevalence of PTSD was 42% range from mild to severe level with score ≥24. The results are similar to a study of 300 nurses in Korea with an IESR mean score of 20.68 (SD = 19.5) and 36.7% nurses at high risk of PTSD (Moon et al., 2021). The prevalence of healthcare workers in Madrid (n= 1422) was higher with 56.6% of healthcare workers presenting symptoms of PTSD and it was much lower with 15.4% of front-line staff in Taiwan (Lu et al., 2021; Luceño-Moreno et al., 2020). Regarding three subscales in IES-R scale, study shows mean scores of three subscales in HUCA were lower in a COVID-19 hospital in Italia (Marcomini et al., 2021). Mean of Intrusion, Avoidance and Hyperarousal were 1.03, 1.08 and 1.08 respectively in HUCA and they were 1.55, 1.49 and 1.32 in Italia. However, a study from 783 medical staff that include 377 emergency nurses in Turkey showed a much lower rate of PTSD among emergency nurses with 15.1% in comparison with PTSD prevalence in this study (Bahadirli & Sagaltici, 2021). Another

research from 5 oncology centers in Bosnia and Herzegovina revealed the prevalence of PTSD among oncology staff was 25.1% with different levels (Marijanović et al., 2021). The difference between studies could be understandable because of the characteristic of population, the different times studies were conducted during COVID-19 pandemic and different scales were applied. This study was conducted one of the lowest coronavirus cases-period and also the project to support healthcare professionals with psychological problems was applied at Central University Hospital of Asturias.

In this study, prevalence of anxiety and depression among nurses and nursing assistants in cancer units were 33% and 19.3% (cut off score was 8). They were quite low in comparison with some previous studies in Spain as well as other parts of the world. The study in Madrid in 2020 indicated 58.6% of healthcare workers had anxiety and it was 46% with depression (Luceño-Moreno et al., 2020). A study in China also revealed the higher rate with 44.6% of healthcare staff presenting symptoms of anxiety and it was 44.6% for depression (Lai et al., 2020). Similar results were found from the studies in Brazil (Dal'Bosco et al., 2020). Research in Taiwan showed a prevalence rate of 25.6% for depression and 30.6% for anxiety among frontline healthcare providers that was closer to the result in this study (Lu et al., 2021).Compared with oncology professionals in Saudi Arabia, the result in this study was significantly lower as the anxiety prevalence in Saudi Arabia was 55.3% (Alghanmi et al., 2021).The similar result was found in the study from 3014 oncology nurses in China with 19.97% of depression (Shen et al., 2020).

Correlation of socio demographic and COVID-19-related variables with posttraumatic stress disorder, anxiety and depression

Results from this study show positive and significant correlation between posttraumatic stress level and marital status, types of job and who was afraid of COVID-19, felt stress and had friends with COVID-19 positive. Among people who are divorce/widow/separate, 61% of them have depression and 42% with severe levels while depression prevalence was 41% in marriage/cohabitation and 37% in single people. The similar results were found in study in Korea with 44.3% in married and 33.9% in single people (Moon et al., 2021). Besides, participants, who have friends with COVID-19 positive, have lower risk of PTSD. 44% of healthcare staff who have no friends with COVID-19 were at a severe level of PTSD while it was 20% in a group of people who have friends with COVID-19 positive. This relationship has not been found yet in previous studies. The study also shows that nursing staff with the fear of COVID-19 or who find themselves are not stressful with COVID-19 situation, have a greater prevalence rate of PTSD in different levels. In more details, 58.3% of people reported themselves not afraid of COVID-19 a severe level of PTSD while it is only 21% of people with a negative response. This finding is opposite with the result from a study in Taiwan (Lu et al., 2021). Regarding the role of workers, nursing assistants suffered from PTSD more than nurses in this research. There are 31% nurses in PTSD with different levels and 21.9% have severe levels of PTSD while they are 59.6% and 33.3% in nursing assistants. It supports the findings from some previous studies in Madrid as well as China that found lower-level workers with more symptoms of PTSD among healthcare staff (Lai et al., 2020; Luceño-Moreno et al., 2020). In China, prevalence of PTSD was 71.5% with 8.7% at severe level while they were 75.4% and 11.6% in nurses. However, it reverses with the findings in Turkey and Korea where physicians

showed higher rate of PTSD than nurses and charge/senior nurses also reported higher PTSD rate than staff nurses (Bahadirli & Sagaltici, 2021; Moon et al., 2021). This present study also demonstrates the significant correlation between age, cancer care experience and PTSD level. The higher age or longer experience in cancer care they are, the higher level of PTSD they may have. At a severe PTSD level, the mean age was 46.96 and the mean of cancer care experience was 7.83. The finding from a study in Korea also revealed the higher prevalence of PTSD in older people that was 30.4 in group of people from 20-29 years old but 46.2% in group of people from 30 and above but the study in Turkey showed the opposite result with higher risk of PTSD for people with lower working experience (Bahadirli & Sagaltici, 2021; Moon et al., 2021).

Similar with PTSD, abnormal levels of anxiety occurred with 14% of people who reported themselves stressful while it is only 5.3% in people without stress. Besides, people, who must take care of other people at home, have a higher rate of anxiety with 39.3% and it is 30% for those without someone in charge at home. This difference can be explained that healthcare workers with more responsibilities will have to suffer more and that causes a higher risk of anxiety. Some previous studies also indicated that people who live with family have greater psychological problems because they were afraid to infect or transmit COVID-19 virus to their relatives at home (Luceño-Moreno et al., 2020).

In many studies, they found many socio demographic variables such as being women, working for 12-24 hours shift or having comorbidity diseases as predictors of PTSD, anxiety, and depression (Bahadirli & Sagaltici, 2021; Lai et al., 2020; Luceño-Moreno et al., 2020; Marijanović et al., 2021; Riello et al., 2020). However, in this study there is no statistical significance relation between those factors with mental health problems. It could be explained by the small number and percentage of men (9 men with 10.2%) and nurses, nursing assistants

in this study work rotate shift but just for 7-10 hours so they may not have that great impact on three study psychological dimensions.

7. LIMITATIONS

As other studies, the present study has its strengths and limitations. To the best of our knowledge, this is the first study in Spain to investigate the prevalence of PTSD, anxiety and depression in cancer nurses and nursing assistants. This study has been done in hospital with the voluntary healthcare professionals that costs no money and doesn't require much time to perform. The instruments of IES-R scale and HADS have been used worldwide, applicable and validated in Spain already. Thus, the findings from this study can be useful for organizations and policy makers to know and protect their staff from the negative impact of COVID-19 pandemic. It also can be used as a reference for other studies and a longitudinal study to follow up the impact of continuous changes on the psychological status of healthcare workers could be considered. However, this study was conducted in the only cancer nurses and nursing assistant in Central University Hospital of Asturias with most of the participants are females, so it is difficult to generalize for all cancer nurses or healthcare workers across the entire country especially in Spain there are different healthcare systems in different autonomous communities. The data were collected using self-reported questionnaires so some data could be over-reported or under-reported, which may not match with clinical diagnosis by mental health professionals. Also, the data were collected from September to October 2021, when the new case of COVID-19 in Spain, particularly in Asturias was very low so it could be less distress for healthcare staff and the impact of COVID-19 pandemic on mental health could be underestimated in this period.

8. IMPLICATIONS FOR CLINICAL PRACTICE

The COVID-19 pandemic has been impacting almost all areas worldwide from economic, education and healthcare services. Nursing staff, who are the first and last contact with patients in medical settings, are most impacted in the pandemic. After 2 years from the first cases in Wuhan, the pandemic is continuing with new variants without ending signs. Thus, it is very important to keep medical staff healthy both in physical and mental aspects. Keep following and promoting projects, policies to protect healthcare workers should be considered as priority actions to end the pandemic.

9. CONCLUSIONS

- The study figures out the prevalence of PTSD, anxiety and depression in cancer nurses and nursing assistants are 42%, 33% and 19.3% respectively.
- The PTSD rate in nursing assistants is higher than PTSD in nurses.
- People in divorced/separated/widow were found to have the highest rate of PTSD, followed by people in marriage/cohabitation and single people have the lowest risk of PTSD.
- Having no friends with COVID-19 positive or positive feelings about COVID-19 situations are correlated with presence of PTSD.
- Younger people with less cancer care experience have lower levels of PTSD than seniors.
- People who report themselves with stress or who must take care of other people at home suffer more from anxiety with different levels.

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APPENDIX-A

Socio demographic and working-related data

Por favor, complete los siguientes cuestionarios con datos relacionados con su situación actual.

Edad (en años)		**Sexo**	☐ Masculino ☐ Femenino
¿Total de años de experiencia laboral? Total solo Oncología		**Tienes hijos**	☐ Si ☐ No
Estado civil	☐ Soltero/a ☐ Viviendo en pareja / Casado/a ☐ Divorciado/a / separado/a /Viudo/a	**Turno de trabajo**	☐ Fijo de mananas ☐ Mananas/tardes ☐ RotatorioM/T/N
Especialidad	☐Hematología ☐Oncología	**Unidad**	☐ Hospital de día ☐ U hospitalización ☐ Otra/otro:
Situación laboral	☐ Fijo ☐ Eventual/Interino ☐ Otros	**¿Tiene que cuidar a pacientes covid o a paciente con sospechosa de covid?**	☐ Si ☐ No
¿Tiene personas a su cargo?	☐ Si ☐ No	**¿Ha sido positivo en COVID-19?**	☐ Si ☐ No
¿Algún familiar suyo ha sufrido COVID- 19?	☐ Si ☐ No	**¿Algún amigo suyo ha sufrido COVID-19?**	☐ Si ☐ No
Hábito tabáquico durante la pandemia	☐ No fumador ☐ Fumador.	**Profesión:**	☐ Enfermera/o ☐Auxilliar de enfermeria
¿Tienes miedo?	☐ Si ☐ No	**¿Sientes estrés?**	☐ Si ☐ No
¿Se encuentra usted vacunado?	☐ Si ☐ No	**Lugar de residencia**	☐ Población Rural ☐ Población Urbana

APPENDIX-B

Impact of Event Scale Revised (Spanish version)

1. Impact of Event Scale – Revised (Baguena et al., 2001)

A continuación, se encuentra un cuestionario con dificultades que pueden presentar los individuos tras un evento estresante. Por favor, Lea cada elemento e indique cuán angustiosa ha sido para usted cada dificultad **durante los pasados 7 días** con respecto que ocurrió desde febrero.

¿Cuánto te angustiaron o molestaron estas dificultades?

Los anclajes de respuesta al ítem son:

0=en absoluto; 1=un poco; 2 = moderadamente; 3=bastante; 4= Extremadamente

1.	Cualquier recuerdo me hacía volver a sentir lo que sentí antes.
2.	Tenía problemas para permanecer dormido.
3.	Otras cosas me hacían pensar en el suceso.
4.	Me sentía irritable y enojado.
5.	Procuraba no alterarme cuando pensaba o recordaba lo sucedido.
6.	Pensaba en ello aún cuando no quería.
7.	Sentía como si no hubiese sucedido o no fuese real.
8.	Me mantenía lejos de cualquier cosa que me recordara lo sucedido.
9.	Imágenes del suceso asaltaban mi mente.
10.	Me sobresaltaba y asustaba fácilmente.
11.	Intentaba no pensar en el suceso.
12.	Me daba cuenta de que quedaban muchos sentimientos sin resolver.
13.	Mis sentimientos sobre el suceso estaban como adormecidos.
14.	Me encontraba como si estuviese funcionando o sintiendo como durante.
15.	Tenía problemas para conciliar el sueño.
16.	Me invadían oleadas de fuertes sentimientos sobre lo sucedido.
17.	Intentaba apartarlo de mi memoria.
18.	Tenía problemas de concentración.
19.	Cosas que me recordaban lo sucedido me causaban reacciones.
20.	Soñaba con lo sucedido.
21.	Me sentía vigilante y en guardia.
22.	Intentaba no hablar de ello.

APPENDIX-C

Hospital Anxiety and Depression Scale (Spanish version)

2. Hospital Anxiety and Depression Scale(Versión original de Zigmond y Snaith, 1983)

Este cuestionario ha sido diseñado para ayudarnos a saber cómo se siente usted. Lea cada frase y marque la respuesta que más se ajusta a cómo se sintió **durante la semana pasada**. No piense mucho las respuestas. Lo más seguro es que si responde deprisa sus respuestas se ajustarán mucho más a cómo realmente se sintió.

D	A	Me siento tenso o nervioso	D	A	Me siento como si cada día estuviera más lento
	3	Todos los días	3		Por lo general, en todo momento
	2	Muchas veces	2		Muy a menudo
	1	A veces	1		A veces
	0	Nunca	0		Nunca
		Todavía disfruto con lo que antes me gustaba			**Tengo una sensación extraña, como si tuviera mariposas en el estómago**
0		Como siempre		0	El Nunca
1		No lo bastante		1	En ciertas ocasiones
2		Sólo un poco		2	Con bastante frecuencia
3		Nada		3	Muy a menudo
		Tengo una sensación de miedo, como si algo horrible me fuera a suceder			**He perdido interés en mi aspecto personal**
	3	Definitivamente y es muy fuerte	3		Totalmente
	2	Sí, pero no es muy fuerte	2		No me preocupeo tanto como debiera
	1	Un poco, pero no me preocupa	1		Podría tener un poco más de cuidado
	0	Nada	0		Me preocupo al igual que siempre
		Puedo reírme y ver el lado divertido de las cosas			**Me siento inquieto, como si no pudiera parar de moverme**
0		Al igual que siempre lo hice		0	Mucho
1		No tanto ahora		1	Bastante
2		Casi nunca		2	No mucho
3		Nunca		3	Nada
		Tengo mi mente llena de preocupaciones			**Me siento optimista respecto al futuro**
	3	La mayoría de las veces	3		Igual que siempre
	2	Con bastante frecuencia	2		Menos de lo que acostumbraba
	1	A veces, aunque no muy a menudo	1		Mucho menos de lo que acostumbraba
	0	Sólo en ocasiones	0		Nada
		Me siento alegre			**Me asaltan sentimientos repentinos de pánico**
0		Nunca		0	Muy frecuentemente
1		No muy a menudo		1	Bastante a menudo
2		A veces		2	No muy a menudo
3		Casi siempre		3	Rara vez
		Puedo estar sentado confortablemente y sentirme relajado			**Me divierto con un buen libro, la radio, o un programa de televisión.**
	3	Siempre	3		A menudo
	2	Por lo general	2		A veces
	1	No muy a menudo	1		No muy a menudo
	0	Nunca	0		Rara vez

APPENDIX-D

Approval from the Ethics Research Committee of the Principality of Asturias

GOBIERNO DEL PRINCIPADO DE ASTURIAS

CONSEJERÍA DE SALUD

Dirección General de Calidad, Transformación y Gestión del Conocimiento

Comité de Ética de la Investigación del Principado de Asturias
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Oviedo, 26 de enero de 2022

El Comité de Ética de la Investigación del Principado de Asturias, ha revisado el Proyecto de Investigación (Trabajo Fin de Master) T.F.M. –cód CEImPA 2021.483, titulado "Stress and psychological impact of COVID-19 in healthcare professionals at oncology units". Investigador Principal THI DUNG NGUYEN, Universidad de Oviedo.

El Comité ha tomado el acuerdo de considerar que el citado proyecto reúne las condiciones éticas necesarias para poder realizarse y en consecuencia emite su autorización.

Los Consentimientos informados deberán firmarse por duplicado (para dejar constancia de ello) y una copia deberá ser archivada con la documentación del estudio.

Le recuerdo que deberá guardarse la máxima confidencialidad de los datos utilizados en este proyecto.

CONSEJERÍA DE SANIDAD
COMITÉ DE ÉTICA DE LA INVESTIGACIÓN CON MEDICAMENTOS DEL PRINCIPADO DE ASTURIAS

Fdo: PABLO ISIDRO MARRON
Secretario del Comité de Ética de la Investigación del Principado de Asturias