

Araştırma Makalesi/ Research Article

Evaluation of the Effect of Compassion Fatigue on Medical Error Tendency in Intensive Care Nurses

Yoğun Bakım Hemşirelerinde Merhamet Yorgunluğunun Tıbbi Hataya Eğilimi Üzerindeki Etkisinin Değerlendirilmesi

Meltem Altay¹  Yasemin Uslu² 

¹Acibadem Mehmet Ali Aydınlar University, Institute of Health Sciences, Istanbul, TÜRKİYE

²Istanbul University, Nursing Faculty, Surgical Nursing Department, Istanbul, TÜRKİYE

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ABSTRACT

Objective: This study was conducted to evaluate the relationship between compassion fatigue and tendency to medical errors in critical care nurses.

Methods: This descriptive study was conducted in the intensive care units of 16 hospitals (n=420) belonging to a private health group in Turkey between December 2021 and March 2022. Data were collected using the Compassion Fatigue-Short Scale and the Tendency to Medical Error in Nursing Scale ($r=-0.252$).

Results: The nurses' mean score on the Compassion Fatigue-Short Scale was 56.20 ± 26.77 and their mean score on the Tendency to Medical Error in Nursing Scale was 4.82 ± 0.28 . There was a statistically significant negative correlation between total scale scores.

Conclusions: The results suggest that the nurses in this study had moderate compassion fatigue and a low tendency to medical errors. A weak relationship was observed between higher compassion fatigue and a greater tendency to medical errors. Determining the factors that cause nurses to make medical errors is crucial to enable the necessary precautions to be taken. We recommend conducting multidimensional studies to evaluate the effects of compassion fatigue on patient safety and nursing outcomes.

Keywords: Critical care nursing, compassion fatigue, patient safety, tendency to medical error

ÖZ

Amaç: Bu araştırma yoğun bakım hemşirelerinde merhamet yorgunluğu ile tıbbi hata yapma eğilimi arasındaki ilişkiyi değerlendirmek amacıyla yapıldı.

Yöntem: Tanımlayıcı türdeki bu araştırma Türkiye'de özel bir sağlık grubuna ait 16 hastanenin (n=420) yoğun bakım ünitelerinde Aralık 2021 ile Mart 2022 tarihleri arasında yürütüldü. Veriler Merhamet Yorgunluğu-Kısa Ölçeği ve Hemşirelikte Tıbbi Hata Eğilimi Ölçeği kullanılarak toplandı.

Bulgular: Merhamet Yorgunluğu-Kısa Ölçeği puan ortalaması 56.20 ± 26.77 , Hemşirelikte Tıbbi Hataya Eğilim Ölçeği puan ortalaması 4.82 ± 0.28 'dir. Ölçek toplam puanları arasında istatistiksel olarak anlamlı negatif korelasyon vardı ($r=-0.252$).

Sonuç: Araştırma kapsamında hemşirelerin merhamet yorgunluğunun orta düzey ve tıbbi hata yapma eğilimlerinin düşük düzeyde saptandı. Merhamet yorgunluğunun artması ile tıbbi hata yapma eğiliminin arttığı belirlendi. Hemşirelerin tıbbi hata yapmalarına neden olan faktörlerin belirlenmesi, gerekli önlemlerin alınması açısından oldukça önemlidir. Merhamet yorgunluğunun hasta güvenliği ve hemşirelik sonuçları üzerindeki etkilerini değerlendirmek için çok boyutlu çalışmalar yapılması önerilmektedir.

Anahtar Kelimeler: Yoğun bakım hemşireliği, merhamet yorgunluğu, hasta güvenliği, tıbbi hata eğilimi

ORCID IDs of the authors: MA: 0000-0003-4866-1775; YU: 0000-0001-5727-3753

Sorumlu yazar/Corresponding author: Yasemin Uslu

Istanbul University, Nursing Faculty, Surgical Nursing Department, Istanbul, TÜRKİYE

This research is based on Meltem Altay's master's thesis.

e-posta/e-mail: yaseminuslu86@gmail.com

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Introduction

Compassion fatigue was first identified by Joinson (1992) while examining burnout in nurses and was found to be associated with reduced caregiving competence. Compassion fatigue has been described as a unique form of burnout affecting caregivers (Joinson, 1992) and was defined by Figley (1995) as a secondary traumatic stress response resulting from helping or wanting to help suffering individuals (Figley, 1995; Najjar et al., 2009).

Critical care nurses (CCNs) are exposed to human suffering and complex care needs are encountered more frequently than other nurses. These factors compound the pressure and competing demands experienced by nurses and make them more susceptible to compassion fatigue (Alharbi et al., 2019). A meta-analysis of nurses' compassion fatigue levels showed that CCNs had the highest levels of compassion fatigue (Xie et al., 2021). In another systematic review evaluating compassion fatigue among healthcare professionals in intensive care units (ICUs), the frequency of compassion fatigue was reported to vary between 7.3% and 40% (Van Mol et al., 2015). Thus, there is ample evidence that nurses are at greater risk for compassion fatigue than other healthcare professionals.

Compassion fatigue adversely impacts both the physical and mental psychological of nurses. In addition, compassion fatigue leads to negative patient experiences, poor concentration, decreased efficiency, reduced quality of care, disruptions in patient care, and increased work errors, and therefore is negatively associated with patient safety (Bilgiç & Cebeci, 2022; Cho & Steege, 2021; Cross, 2019; Gurdap & Cengiz, 2023). Psychological parameters are known to affect the tendency to medical errors. Studies to determine the effect of compassion fatigue, which is a common psychological problem in CCNs, are quite limited. Large-scale, multicenter studies to determine the factors associated with medical errors and patient safety, which is increasingly important, are essential for maintaining patient safety and creating a safety culture. As compassion fatigue is believed to be a potential factor in medical errors, this multicenter study sought to evaluate compassion fatigue using objective measurement tools and determine the relationship between these parameters in CCNs.

Method

Study Design

This study was multisite descriptive and correlational.

Sample

The sample of the study consisted of 466 nurses working in adult ICUs in a total of 16 hospitals in Turkey. Nurses who had been working in the adult ICUs for at least 6 months were included in the study. Nurses who were still in the orientation period, working in pediatric and neonatal ICUs, or working in the ICU as daily support staff were not included in the study. Data were collected from a total of 420 nurses (90% response rate) working on the study dates. The study was conducted between December 2021 and March 2022.

Ethics committee permission was obtained for the research (2021–12/23) and written permission was also obtained from the participating hospitals. In the data collection form, the purpose of the study was explained to the nurses and voluntary participation was obtained from the participants by clicking on the 'agree' or 'disagree' buttons. The study was carried out in accordance with the Declaration of Helsinki.

Data Collection Tools

Compassion Fatigue-Short Scale (CF-SS) and the Tendency to Medical Error in Nursing Scale (TMENS) were used in the study. The participants completed the tools online via Google Forms. An invitation letter stating the purpose and link of the study was sent to the nurses through the e-mail system of the hospitals. In order to increase participation in the study, reminder messages were sent to the nurses intermittently after the invitation letter. It took an average of 10-15 minutes to answer the data collection form. The data collection forms completed online were backed up daily by the researchers.

Compassion Fatigue-Short Scale: The scale was developed by Adams et al. (2006) (Adams et al., 2006) and conducted Turkish validity and reliability by Dinç and Ekinçi in 2019 (Dinç & Ekinçi, 2019). The scale consists of 13 items in 2 subscales: secondary trauma and occupational burnout. The items are rated on a 10-point Likert-type scale ranging from rarely/never (1 point) to very often (10 points). The scale score ranges from 13 to 130. The higher the scale score value, the higher the level of compassion fatigue.

Tendency to Medical Error in Nursing Scale: The TMENS was developed by Özata and Altuncan in 2010 and consists of 49 items in 5 subscales:

medication and transfusion administration (18 items), falls (5 items), hospital infections (12 items), communication (5 items), and patient monitoring and equipment safety (9 items) (Özata & Altuncan, 2010). The items are rated on a 5-point Likert-type scale: never (1 points) to always (5 points). Mean scores are used in the evaluation of scale results. A higher mean score reflects a lower tendency and a lower mean score reflects a higher tendency for nurses to make medical errors.

Statistical Analysis

Data were statistically analyzed using the Number Cruncher Statistical System (NCSS 2007) (Kaysville, Utah, USA). Normal distribution data were tested by using the Shapiro-Wilk test and graphical analysis. Non-normally distributed data were tested by using the Mann-Whitney U test. Multiple comparisons of non-normally distributed data analyzed Kruskal-Wallis and Dunn-Bonferroni tests. Spearman correlation analysis was used to evaluate the correlation between quantitative variables. P value <0.05 was accepted as statistically significant.

Ethical Considerations

Ethics committee approval to conduct the study was obtained by Acıbadem Mehmet Ali Aydınlar University Medical Research Evaluation Board (2021–12/23) and written permission was also obtained from the participating hospitals. Written informed consent was obtained from nurses. The study was carried out in accordance with the Declaration of Helsinki.

Results

The demographic characteristics of the 420 CCNs included in the study are shown in Table 1. Of the nurses, 74.8% (n=314) were female and the mean age was 26.15±5.47 years. It was determined that 30% (n=126) of the nurses had 3-5 years of nursing experience, 28% (n=118) of the nurses had worked in the ICU for 1-3 years, 73.3% (n=308) worked in general ICUs (Table 1).

The nurses' mean CF-SS scores were 56.20±26.77 for the total score, 19.72±10.87 for the secondary trauma subscale, and 36.49±17.50 for the occupational burnout subscale (Table 2).

The mean total TMENS score of the nurses was 4.82±0.28. Their mean subscale scores were 4.82±0.29 for the medication and transfusion administration subscale, 4.86±0.30 for the falls subscale, 4.88±0.29 for the hospital infections subscale, 4.73±0.41 for the patient monitoring and

equipment safety subscale, and 4.83±0.37 for the communication subscale (Table 2).

Table 1. Descriptive characteristics of the nurses (n=420)

Descriptive Characteristics	Mean±SD	Median (Min-Max)
Age	26.15±5.47	24 (20-50)
Sex	n	%
Female	314	74.8
Male	106	25.2
Education level		
Health Vocational High School	170	40.5
Associate degree	78	18.6
Undergraduate Degree	146	34.8
Postgraduate degree	26	6.2
Nursing experience		
0-1 year	60	14.3
1-3 years	91	21.7
3-5 years	126	30
5-10 years	90	21.4
>10 years	53	12.6
Time working in ICU		
0-1 year	72	17.1
1-3 years	114	27.1
3-5 years	118	28.1
5-10 years	77	18.3
>10 years	39	9.3
Has critical care nursing certification		
No	339	80.7
Yes	81	19.3
Type of ICU	n	%
General ICU	308	73.3
Coronary ICU	42	10
Cardiovascular surgery ICU	70	16.7

ICU: Intensive care unit

There was a statistically significant difference in the nurses' CF-SS total scores based on years of professional experience (p=0.001) and years working in the ICU (p=0.002). Nurses with 0-1 years of professional experience had significantly lower CF-SS total scores than those with 1-3 years, 5-10 years, and 10 years or more (p=0.010, p=0.001; p=0.011, respectively), and nurses working in the ICU for 0-1 years had significantly lower scores than those in the ICU for 5-10 years (p=0.001) (Table 3). In addition, nurses certified in CCN had significantly lower CF-SS total scores than those who were not (p=0.001) (Table 3).

Table 2. The nurses’ mean scores on the compassion fatigue-short scale and tendency to medical error in nursing scale (n=420)

Compassion Fatigue-Short Scale	Number of Items	Mean±SD	Median (Min-Max)
Secondary Trauma	5	19.72±10.87	18 (5-50)
Occupational Burnout	8	36.49±17.50	37 (8-80)
Total	13	56.20±26.77	55 (13-130)
Tendency to Medical Error in Nursing Scale			
Medication and Transfusion Administration	18	4.82±0.29	4.9 (3-5)
Falls	5	4.86±0.30	5 (3-5)
Hospital Infections	12	4.88±0.29	5 (3-5)
Patient Monitoring and Equipment Safety	9	4.73±0.41	5 (2.9-5)
Communication	5	4.83±0.37	5 (2.4-5)
Total	49	4.82±0.28	4.9 (3-5)

There were statistically significant differences in TMENS total scores according to education level (p=0.023) and years of professional experience (p=0.024). Scores were significantly higher among health vocational high school graduates than those with postgraduate education (p=0.034) and among

nurses with 3-5 years of professional experience than those with 5-10 years of experience (p=0.048) (Table 4). Nurses with CCN certification also had significantly higher TMENS total scores than those without (p=0.005) (Table 3).

Table 3. Comparison of compassion fatigue and tendency to medical error in nursing scores according to descriptive characteristics

Age	Compassion Fatigue-Short Scale		Tendency to Medical Error in Nursing Scale	
	r	p	r	p
	0.042	0.391	-0.016	0.743
	Mean±SD	Median (Min-Max)	Mean±SD	Median (Min-Max)
Sex				
Female	57.18±27.31	57 (13-128)	4.83±0.27	4.9 (3-5)
Male	53.32±25.01	49.5 (13-130)	4.78±0.32	4.9 (3.1-5)
	<i>p</i>	^a 0.158		^a 0.094
Education level				
Health Vocational High School	56.98±24.31	55.5 (13-130)	4.85±0.28	5 (3-5)
Associate degree	59.91±27.66	58 (13-122)	4.81±0.25	4.9 (4-5)
Undergraduate degree	52.62±30.04	52.5 (13-128)	4.81±0.30	4.9 (3.1-5)
Postgraduate degree	60.12±16.90	54.5 (29-88)	4.72±0.33	4.8 (3.8-5)
	<i>p</i>	^b 0.169		^b 0.023*
Nursing experience				
0-1 year	43.63±27.53	39.5 (13-124)	4.84±0.26	5 (4-5)
1-3 years	57.65±27.11	61 (13-128)	4.79±0.31	4.9 (3.1-5)
3-5 years	54.67±25.80	54 (13-124)	4.85±0.26	5 (3.4-5)
5-10 years	62.76±24.60	65 (15-116)	4.79±0.30	4.9 (3-5)
>10 years	60.47±26.87	58 (15-130)	4.82±0.30	5 (3.8-5)
	<i>p</i>	^b 0.001**		^b 0.024*
Time working in ICU				
0-1 year	47.49±28.85	40.5 (13-124)	4.85±0.25	5 (4-5)
1-3 years	56.63±26.42	57 (13-128)	4.80±0.30	4.9 (3.1-5)
3-5 years	53.87±24.57	53 (13-122)	4.83±0.29	4.9 (3.4-5)
5-10 years	64.04±23.98	68 (15-116)	4.80±0.30	4.9 (3-5)
>10 years	62.62±30.57	59 (15-130)	4.85±0.27	5 (3.8-5)
	<i>p</i>	^b 0.002**		^b 0.292
Has critical care nursing certification				
No	58.32±25.77	57 (13-128)	4.81±0.28	4.9 (3.1-5)
Yes	47.35±29.15	46 (13-130)	4.86±0.28	5 (3-5)
	<i>p</i>	^a 0.001**		^a 0.005**
Type of ICU				
General ICU	55.09±27.46	54 (13-128)	4.81±0.31	4.9 (3-5)
Coronary ICU	53.67±22.95	51 (15-96)	4.88±0.20	5 (4.1-5)
Cardiovascular surgery ICU	62.60±25.17	63 (15-130)	4.85±0.22	4.9 (4-5)
	<i>p</i>	^b 0.055		^b 0.645

^aMann-Whitney U test ^bKruskal-Wallis test & Dunn-Bonferroni test

*p<0.05 **p<0.01 r: Spearman Correlation Test, ICU: Intensive care unit

There were statistically significant but weak correlations between the nurses' CF-SS total scores and TMENS total score ($r=-0.252$) and TMENS medication and transfusion administration subscale score ($r=-0.286$). There were also very weak negative correlations between CF-SS total scores and TMENS scores in the falls subscale ($r=-0.107$), hospital infections subscale ($r=-0.155$), patient monitoring and equipment safety subscale ($r=-0.178$), and communication subscale ($r=-0.155$) (Table 4).

Table 4. Relationship between tendency to medical error scale in nursing and compassion fatigue-short scale scores

Tendency to Medical Error in Nursing Scale		Compassion Fatigue-Short Scale		
		Secondary Trauma	Occupational Burnout	Total
Medication and Transfusion Administration	r	-0.251	-0.299	-0.286
	p	0.001**	0.001**	0.001**
Falls	r	-0.077	-0.127	-0.107
	p	0.117	0.009**	0.029*
Hospital Infections	r	-0.109	-0.182	-0.155
	p	0.025*	0.001**	0.001**
Patient Monitoring and Equipment Safety	r	-0.144	-0.198	-0.178
	p	0.003**	0.001**	0.001**
Communication	r	-0.120	-0.177	-0.155
	p	0.014*	0.001**	0.001**
Total	r	-0.207	-0.277	-0.252
	p	0.001**	0.001**	0.001**

r: Spearman's correlation test

* $p < 0.01$ * $p < 0.05$

Discussion

Compassion fatigue and patient safety are two important and interconnected concepts. This study was conducted to investigate levels of compassion fatigue and tendency to medical errors among CCNs and to evaluate the factors influencing them.

The results showed that compassion fatigue among the nurses in our study was at a moderate level and was associated with years of professional experience, years working in the ICU, and having CCN certification. Shahar et al. (2019) found that middle-aged nurses (aged 49-65 years) had greater compassion fatigue than young nurses (aged 22-48 years) (Shahar et al., 2019). As age increases, there is also an increase in years of professional experience. More work experience translates to a longer duration of caring for people who are suffering, which may lead to compassion fatigue. A large proportion (72.3%) of the nurses in our study had been working in the ICU for less than 5 years. In previous studies, this ratio was reported to be between 30% and 70% (Jakimowicz et al., 2018; Ryu & Shim, 2021; Salimi et al., 2020). Therefore,

our sample differs from those of other studies in terms of experience in critical care. Reasons for this may include the large young population in Turkey, the increase in new graduates due to the recent rise in the number of schools providing nursing education, the increase in the number of intensive care beds, and high staff turnover rates among nurses in the participating centers. Age was not found to be a significant factor in our study, as the nurses had a low mean age and were from the young population. We believe this variable should be reevaluated in studies including nurses in different age groups.

In the literature, compassion fatigue scores were found to be higher in women than men (Avcı et al., 2022; Özen et al., 2019). In this study, we observed no gender-based difference in compassion fatigue level. It may be due to the high number of female gender in the study. This situation may need to be re-evaluated in studies with larger samples where the number of genders is similar. We detected no relationship between education level and compassion fatigue in the present study. A 2020 meta-analysis including 71 studies showed that demographic characteristics such as years of work experience and which department nurses worked in were not associated with the development of compassion fatigue (Cavanagh et al., 2020). In this study, CCNs mostly graduated from health high school and undergraduate degrees. Increasing education level may affect compassion fatigue by changing professional and compassion satisfaction. Such a result may have emerged because the distribution of the educational status of the nurses was not similar.

Medical errors lead to longer hospital stays, higher morbidity and mortality rates, and higher cost of medical care due to prolonged treatment (Miller, 2011). The results of our study suggested that the nurses had a low tendency to medical errors. When the national literature is evaluated, nurses have been reported to have a low to moderate tendency to medical errors (Avşar et al., 2016; Cebeci et al., 2012; Demir Dikmen et al., 2014; Işık Andsoy et al., 2014; Işık et al., 2012; Özata & Altuncan, 2010; Özen et al., 2019; Yüksel et al., 2019). The nurses in our study may have seemed to have a low tendency to medical errors because they responded favorably to questions related to correct medical practices. Therefore, findings of a low tendency to medical errors does not mean that there will be no medical errors. One study reported that 48.9% of nurses had made at least one error in medication administration

during their career and 72.2% had witnessed at least one medication administration error by their colleagues (Manav & Başer, 2018).

In the literature, it has been stated that the highest tendency to medical errors among nurses is in the communication domain (Sayılan & Boğa, 2018; Yüksel et al., 2019). In this study, we determined that the highest tendency to medical error was in the area of patient monitoring and equipment safety. In the hospitals where our study was conducted, the procedures and instructions used in patient follow-up are standardized, and the process is monitored by the board/committees. We believe that this mode of operation reduces nurses' responsibility regarding equipment safety and may increase their tendency to medical errors.

In the present study, nurses' tendency to medical errors was found to be associated with the descriptive characteristics of education level, years of professional experience, time working in the ICU, and whether they are certified in CCN. It has been stated in the literature that rates of medical error decrease with longer professional experience (Dikmen et al., 2016; Özen et al., 2019). However, other studies indicated that there is no relationship between years of professional experience and the tendency to medical errors (Bariş et al., 2018; Cebeci et al., 2012; Işık Andsoy et al., 2014). In contrast to the literature, we observed that nurses with 3-5 years of experience had a lower tendency to medical errors than nurses who had been working for 5-10 years.

In terms of education level, nurses with master's level education had a higher tendency to medical errors than nurses at other education levels. Our findings contradict those of a study reporting that the patient safety practice scores were higher among nurses with a master's degree (Ryu & Shim, 2021). It has also been stated that nurses who receive undergraduate and postgraduate education have a lower tendency to medical errors (Özen et al., 2019).

According to our results, nurses with CCN certification had a lower tendency to medical errors. The content of the CCN training program consists mainly of professional subjects. This suggests that the CCNs participating in these programs are those who generally care about professional development, consciously choose and love their profession, and work in critical care environments by their own choice. The low tendency for medical errors among CCNs in this study may also be related to this certificate training program.

The results of this study suggest that a higher level of compassion fatigue may be associated with a higher tendency to medical errors. Compassion fatigue might contribute to an increase in the incidence of nurse-sensitive errors in hospitals. As a patient safety outcome, nurses are directly accountable for malpractices in the care setting (Alharbi et al., 2020). Compassion fatigue in shift nurses increases job stress and leads to burnout, thereby reducing their ability to concentrate on their work and potentially increasing the number of patient safety incidents (Ryu & Shim, 2021; Wang et al., 2022).

Conclusion and Recommendations

The results of this study indicate that nurses had moderate compassion fatigue and a low tendency to medical errors. There may be a positive relationship between compassion fatigue in nurses and their tendency to medical errors. Compassion fatigue experienced by CCNs is not only detrimental to their physical and mental health but also causes more patient safety incidents, which adversely affects patient safety. Determining the factors that cause nurses to make medical errors is crucial to enable the necessary precautions to be taken. A regular training program should be established to protect nurses from compassion fatigue, teach them coping methods, and raise awareness. In addition, nurses should be encouraged to participate in critical care certification programs. We recommend conducting multidimensional studies to evaluate the effects of compassion fatigue on patient safety and other nursing outcomes such as falls, infections, and pressure injuries.

Limitations

This study has some limitations. The research cannot be generalized to the entire nurse population because it was conducted in adult ICUs of hospitals belonging to a private health group. Furthermore, only the subjective opinions and perceptions of the nurses about their tendency to medical errors were evaluated. No observation of the nurses in the clinical setting was performed to objectively assess whether medical errors were made. Compassion fatigue was also evaluated only quantitatively and not qualitatively.

Ethics Committee Approval: Ethics committee approval to conduct the study was obtained by Acibadem Mehmet Ali Aydınlar University Medical Research Evaluation Board (2021–12/23).

Peer-review: External referee evaluation.

Author Contributions: Idea/Concept: MA, YU; Design: MA, YU; Supervision: YU; Materials: MA, YU; Data Collection: MA; Analysis: MA, YU; Literature Review: MA, YU; Writing: MA, YU; Critical Review: MA, YU.

Conflict of interest: The authors declare that they have no conflict of interest.

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What did the study add to the literature?

- Compassion fatigue and patient safety are two important and interconnected concepts. There may be a positive relationship between compassion fatigue and the tendency to medical errors.
- Compassion fatigue experienced by critical nurses is not only detrimental to their physical and mental health but also causes more patient safety incidents.
- The psychosocial well-being of nurses, especially compassion fatigue, should be taken into consideration in maintaining patient safety and improving the quality of care in intensive care units.

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