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Research Article

The Effect of Compassion Fatigue on Medical Error Tendency in Nurses Working in Intensive Care Units

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Abstract

***Purpose**: This study was planned as a descriptive study to determine the effect of compassion fatigue on medical error tendency in nurses working in intensive care units.*
***Methods**: The study was conducted between October 2022 and January 2023 in the intensive care units of Bingol State Hospital and Bingol Maternity and Children's Hospital. The study was conducted with 78 nurses. Data were collected through the Personal Information Form, the Compassion Fatigue Short Scale, and the Medical Error Tendency Scale. Data analysis was performed using one-way analysis of variance (ANOVA), Mann Whitney U, Kruskal Wallis, Pearson correlation, and linear regression tests.*
***Results**: The average age of participating nurses was 32.43 (±5.61) years, 56.4% (44) were female, 61.5% (48) had a bachelor's degree, and 55.1% (43) had worked in intensive care units for 0-5 years. The participants were found to have a moderate level of compassion fatigue (55.96±14.27; min:13-max:130) and a low level of medical error tendency (4.37±.339). Compassion fatigue was found to be significantly higher in nurses who were married and had children. The medical error tendency score was significantly higher in female nurses (p<.05). Although compassion fatigue was found to explain the medical error tendency by 12%, the result was not significant (p=.294).*
***Conclusion**: The results of the study showed that compassion fatigue did not affect medical error tendency. It is recommended to increase evidence-based scientific studies to reduce compassion fatigue and medical errors and to develop and implement training programs that empower nurses and enhance their resilience.*

***Key words**: Compassion fatigue, Intensive care, Medical error, Nursing,*

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Introduction

Nursing is a complex profession that includes science and art and requires some special knowledge and skills. Therefore, nursing should be performed in an approach that prioritizes the sense of compassion as well as current knowledge (1). Strauss et al. (2016) defined compassion as "*The feeling that arises in witnessing another's suffering and that motivates a subsequent desire to help*" (2). Providing a sense of compassion in patient care could increase patients' satisfaction, reinforce a sense of trust in nurses among patients and their relatives, and help patients recover (1, 3). The feeling of compassion could have positive consequences such as happiness and the development of social relations, yet it may also create negative emotions such as anxiety, anger, and fear (4).

Nurses work in a complex environment and are exposed to a variety of work-related problems. On the other hand, providing care to patients can be physically, emotionally, and spiritually exhausting for them while they witness patients' pain and trauma in their work every day (5). For a person experiencing compassion, this condition may turn into chronic fatigue over time (3).

The literature has documented higher levels of compassion fatigue among nurses working in intensive care units compared to nurses working in different clinics (6, 7).

A meta-analysis on nurses' compassion fatigue levels showed that nurses working in intensive care units had the highest level of compassion fatigue (6). Another systematic review on compassion fatigue among healthcare professionals in intensive care units reported the prevalence of compassion fatigue ranging from 7.3% to 40% (7). Hence, there is ample evidence indicating that nurses are more at risk.

Compassion fatigue affects nurses both physiologically and psychologically. Compassion fatigue may lead to decreased empathy, decision-making ability, care skills, and care quality; disruption of patient care; and increased work errors, which affects patient safety negatively (3, 8, 9). Psychological parameters are known to affect medical error tendency. The primary goal in providing healthcare services is commonly reported not to harm the patient but rather to provide benefit. However, the high mortality rates caused by unsafe health services indicate the importance of patient safety (10).

It should not be forgotten that compassion fatigue and patient safety are elements that will affect each other. Nurses experiencing compassion fatigue affect patient safety and increase their tendency to make medical errors (11, 12). The literature includes almost no studies that evaluated the effect

of compassion fatigue on medical error tendency in intensive care units. Only two studies in Turkey were found to have investigated the effect of compassion fatigue on medical error tendency in intensive care units (13, 14). Sabancioglları et al. (2021) also stated that medical errors occur with a decrease in the level of compassion. Therefore, this study aimed to examine the effect of compassion fatigue on medical error tendency in nurses working in intensive care units.

What is the level of compassion of nurses and their tendency to make medical errors?

Does the level of compassion of nurses affect the tendency to make medical errors?

Methods

Study design

This study used a descriptive and cross-sectional design.

Setting and time of the study

The study was conducted in the intensive care units of two state hospitals in Bingol province, which is located in eastern Turkey. Data were collected between October 2022 and January 2023. The study was conducted in a total of six intensive care units, which included five adult and one neonatal intensive care as primary, secondary, and tertiary intensive care units.

Target population and sample of the study

The target population of the study consisted of 97 nurses who worked in the intensive care units of two state hospitals. The purpose was to reach the entire population, but the study was completed with 78 nurses because 13 nurses did not want to participate in the study and 6 nurses were relocated. The study reached 80.4% of the population. Post hoc power analysis was performed after the study was conducted. Considering the correlation coefficient between the Compassion Fatigue Scale score and the Medical Error Tendency Scale score, the power was found to be 88.6% when alpha=0.05, and the sample size was calculated as 78. Inclusion criteria of the study were working in intensive care units, agreeing to participate in the study, and being aged 18 years or older. Exclusion criteria were not agreeing to participate in the study and working in different clinics other than intensive care units.

Data collection

Data were collected through the “Personal Information Form”, the ‘Compassion Fatigue Short Scale’, and the 'Medical Error Tendency Scale’ forms. The data collection forms were administered to the nurses. The completed forms were collected by the researcher at different times. The data

collection forms were administered to four nurses for piloting to evaluate the comprehensibility of the questions; no changes were made in the questions. 4 nurses who participated in the pilot test were included in the sample group. Filling in the data collection forms took about 15 minutes.

Personal information form

The Personal Information Form, which was developed in line with the literature, included a total of 19 questions, which were composed of 12 questions about the participating nurses' socio-demographic and professional characteristics (age, gender, years of experience in the profession, type of working, education level, marital status); three questions about compassion fatigue (whether they experienced compassion fatigue, problems that may cause compassion fatigue and whether it is related to medical errors); and four questions about medical errors (frequency of medical errors, types of medical errors, things encountered after medical errors occur and problems that may cause medical errors) (16, 17).

Compassion fatigue scale

The Compassion Fatigue Short Scale (CFS) was developed by Adams et al. (2006). Turkish validity and reliability of the scale were conducted by Dinç and Ekici (2019) to measure compassion fatigue (18). The items are responded on a 10-point Likert scale and include two sub-scales (trauma and work burnout). The scale is a self-report assessment tool that asks participants to indicate the extent to which each item reflects their experiences. No scoring algorithm and cut-off point were specified for the scale. The scale consists of 13 questions and the scores to be obtained range between 13 and 130. The items are responded between very often (10) and rarely/never (1), with a maximum score of 130 and a minimum score of 13. While lower mean scores indicate a lower level of compassion fatigue, higher scores indicate a higher level of compassion fatigue experienced by individuals. Cronbach's α coefficient of the CFS was found 0.876. In this study, Cronbach's α coefficient was calculated as 0.75.

Medical error tendency scale

The validity and reliability of the Medical Error Tendency Scale were performed by Ozata and Altunkan (2010) to determine nurses' medical error tendency. The scale consists of five sub-scales and 49 items, which include 18 items related to medication and transfusion practices, 12 items related to nosocomial infections, nine items related to patient monitoring and material safety, five items related to falls, and 5 items related to communication. The

scale is responded on a 5-point Likert scale using options as (1. Never; 2. Very rarely; 3. Sometimes; 4. Usually and 5. Always). The scale has no cut-off point. While higher mean scores indicate lower medical error tendency lower mean scores indicate higher medical error tendency. Cronbach's α reliability coefficient was found 0.95 (19). In this study, Cronbach's α coefficient was found 0.94.

Statistical analysis

This study used numbers, percentages, means, standard deviations, and minimum-maximum values for descriptive statistics. The normality distribution of the data was analyzed using the Shapiro-Wilk test. As for differences, the Independent Sample T-test and Mann-Whitney U Test were used to see the differences between categorical variables consisting of two groups and continuous variables. Differences between categorical variables with more than two categories and continuous variables were determined using the one-way ANOVA Test and Kruskal Wallis Test. Statistically significant differences were detected using Post Hoc tests to see the source of the differences. Pearson correlation tests and linear regression tests were performed to analyze the relationship between the scales. SPSS Windows version 23.0 package program was used for statistical analysis, and $p<0.05$ was considered statistically significant.

Limitations and generalizability of the study

Since this study was conducted only with nurses working in the intensive care units of hospitals in Bingol province, the results can only be generalized to nurses working in intensive care units in Bingol.

Ethical considerations

The study followed the principles of the Declaration of Helsinki. Ethics committee approval was obtained from Bingol University Ethics Committee on 07.09.2022 (no: 2022/16 - decision 9). Institutional permission was obtained from Bingol Provincial Directorate of Health on 20.09.2022. Necessary permissions for the scales used in the study and written consent from all participating nurses were obtained.

Results

The average age of the participants was 32.43±5.61 years; 56.4% were female; 53.8% (42) were married, 50% had at least one child; 67.9% had income equal to expenses; 61.5% had a bachelor's degree; 43.6% had been performing their profession for 6 to 10 years; 55.1% had been working in intensive care for 0-5 years, and 59% worked in night shift.

While the Compassion Fatigue Scale total mean score (55.96±14.27) and work burnout (36.07±9.17) sub-scale mean scores were found to be at a moderate level, secondary trauma (19.88±6.81) sub-scale mean score was found to be below the average (Table 1).

Table 1. Scales mean scores.

Scales and Sub-scales	X̄±SD	Min	Max	Scale min -max scores
Compassion fatigue scale total score	55.96±14.27	24	94	13-130
Secondary trauma	19.88±6.81	8	38	5-50
Work burnout	36.07±9.17	16	57	8-80
Medical error tendency scale total score	4.37±0.33	3.57	4.98	1-5
Medication and transfusion practices	4.47±0.33	3.17	5	1-5
Nosocomial infections	4.43±0.39	3.50	5	1-5
Patient monitoring and material safety	4.03±0.49	2.89	5	1-5
Falls	4.44±0.36	3.80	5	1-5
Communication	4.36±0.55	3	5	1-5

X:Mean; SD:Standard deviation, min:minumum, max: maximum

The Total Medical Error Tendency Scale (4.37±.339) mean scores as well as medication and transfusion practices (4.47±0.33), nosocomial infections (4.43±0.39), patient monitoring and material safety (4.03±0.49), falls (4.44±0.36) and communication (4.36±0.55) sub-scale scores were found to be high. This result indicates that the participants had low medical error tendency (Table 1).

Levels of compassion fatigue were higher in married nurses (X̄=60.59±14.28) compared to single nurses (X̄=50.55±12.38) and in nurses who had children (X̄=37.38±10.09) compared to those who did not have children (X̄=34.76±8.06), and the difference between the scores was statistically significant (p=0.002, d=0.751; p=0.015, d=0.286). The level of compassion fatigue indicated no significant differences with gender, education level, years of experience, type of working, working hours, choosing the profession willingly and preference of working place (p>0.05, Table 2).

Table 2. Comparison of descriptive characteristics of nurses with scale scores.

Variables		n(%)	Compassion fatigue scale total score			Medical error tendency scale total score		
			X̄±SD	Cohen d/eta^2	Test(p)	X̄±SD	Test(p)	Cohen d/eta^2
Gender	Male	34 (43.6)	57.14± 12.64	d=0.148	0.642 (0.523)	4.24± 0.28	3.14 **(0.002)**	d=0.738
	Female	44 (56.4)	55.04± 15.49			4.47± 0.34		
Marital status	Married	42 (53.8)	60.59± 14.28	d=0.751	3.28 **(0.002)**	4.40± 0.32	0.518 (0.382)	d=0.208
	Single	36 (46.2)	50.55± 12.38			4.33± 0.35		
Having children	Yes	39 (50.0)	37.38± 10.09	d=0.286	2.50 **(0.015)**	4.40± 0.31	0.760 (0.450)	d=0.178
	No	39 (50.0)	34.76± 8.06			4.34± 0.36		
Education level	High school (a)	10 (12.8)	51.90± 9.73	η^2=0.056	4.87 (0.181)	4.11± 0.30	8.98 **(0.030) b>a,c,d**	η^2=0.142
	Associate degree (b)	16 (20.5)	56.62± 15.32			4.48± 0.34		
	Undergraduate degree (c)	48 (61.5)	55.47± 14.74			4.40± 0.31		
	Postgraduate degree (d)	4 (5.1)	69.25± 8.38			4.03± 0.33		
Years of experience	0-5 years	14 (17.9)	48.14± 9.24	η^2=0.090	3.25 (0.071)	4.37± 0.34	0.039 (0.843)	η^2=0.009
	6-10 years	34 (43.6)	55.38± 14.93			4.33± 0.38		
	11 years and above	30 (38.5)	60.26± 14.13			4.40± 0.28		
Years of experience in the intensive care unit	0-5 years	43 (55.1)	55.62± 14.34	η^2=0.186	0.797 (0.671)	4.34± 0.36	0.393 (0.822)	η^2=0.117
	6-10 years	25 (32.1)	56.04± 14.50			4.40± 0.32		
	11 years and above	10 (12.8)	57.20± 17.83			4.39± 0.27		
Type of working	Day shift	10 (12.8)	61.80± 18.68	η^2=0.025	1.55 (0.460)	4.48± 0.36	4.62 (0.099)	η^2=0.061
	Night shift	46 (59)	55.21± 11.05			4.30± 0.35		
	Night and day shift	22 (29.2)	54.86± 17.80			4.46± 0.27		
Working hours	40-47 hours	28 (35.9)	55.32± 15.90	η^2=0.087	2.64 (0.266)	4.41± 0.36	0.657 (0.720)	η^2=0.089
	48-55 hours	41 (52.6)	57.60± 12.07			4.32± 0.33		
	56 hours and over	9 (11.5)	50.44± 18.15			4.42± 0.29		

Table 2. Comparison of descriptive characteristics of nurses with scale scores (continued).

Choosing the profession willingly	Yes	60 (76.9)	55.20± 13.68	d=0.219	490 (0.553)	4.35± 0.32	0.384 (0.933)	d=0.227
	No	18(23.1)	58.50± 16.25			4.43± 0.38		
Preference of working place	My own preference	66(84.6)	56.62± 13.44	d=0.265	326 (0.336)	4.36± 0.34	0.384 (0.933)	d=0.029
	Out of my own preference	12(15.4)	52.33± 18.48			4.37± 0.34		

p<0.05, t test, Kruskal Wallis test, Mann Whitney U test, X:Mean; SD:Standard deviation; n:number of patients; %:percentage, a,b,c,d: Post Hoc tests

Medical Error Tendency Scale score was statistically significantly higher in female nurses ($\bar{X}$=4.47±0.34) compared to male nurses ($\bar{X}$=4.24±0.28) and in nurses with an associate degree ($\bar{X}$=4.48±0.34) compared to nurses with undergraduate and graduate degrees ($\bar{X}$=4.40±0.31, $\bar{X}$=4.03±0.33) (p=.0002, d=0.738; p=0.030, η^2=0.142) (Table 2). Medical error tendency was found to have no statistically significant differences between marital status, having children, years of experience, type of working, working hours, choosing the profession willingly, and preference of working place (p>0.05, Table 2).

Table 3 shows that the Compassion Fatigue Scale and the Compassion Fatigue sub-scales had a negative and statistically nonsignificant relationship with the Medical Error Tendency Scale and Medical Error Tendency Scale sub-scales (r <0.3; p> 0.05 in all parameters; Table 3).

Table 3. Correlation between the compassion fatigue and the medical error tendency.

	Medical error tendency scale					
Compassion fatigue scale	**Medical Error Tendency Scale total**	**Medication and transfusion practices**	**Nosocomial infections**	**Patient monitoring and material safety**	**Falls**	**Communi-cation**
	r(p)	r(p)	r(p)	r(p)	r(p)	r(p)
Compassion Fatigue Scale total score	-.121(.294)	-.072(.533)	-.139(.229)	-.073(.527)	-.124(.281)	-.130(.255)
Secondary trauma	-.006(.961)	-.045(.693)	-.012(.916)	.079(.493)	-.066(.564)	.004(.973)
Work burnout	-.184(.109)	-.078(.499)	-.207(.071)	-.172(.133)	-.143(.211)	-.206(.071)

Spearman Test, r: correlation coefficient, p<0.05

The findings showed that compassion fatigue explained medical error tendency at a proportion of 12%, which was not statistically significant (p= 0.294; Table 4).

Table 4. Linear regression analysis.

	Medical error tendency scale		
	R	R^2	p
Compassion fatigue scale	0.12	0.015	0.294

Linear regression analysis, R: Korelasyon katsayısı, R^2 : Korelasyon açıklama oranı, $p<0.05$

Discussion

The concepts of nursing and care and compassion cannot be separated from each other (20). Compassion has an important place in the care relationship between the nurse and the patient and in the success of the treatment (21) In this study, it was investigated whether compassion fatigue of intensive care nurses has an effect on the tendency to medical errors.

In the present study, it was determined that the mean scores of compassion fatigue among nurses were at a moderate level (Table 1). A meta-analysis study showed that nurses working in intensive care units had the highest level of compassion fatigue (6). Another systematic review on compassion fatigue among healthcare workers in intensive care units reported that the prevalence of compassion fatigue ranged between 7.3% and 40% (7). In a study conducted with intensive care nurses, compassion fatigue of nurses was found to be at a moderate level as in this study (22). In a systematic review on compassion fatigue in nursing students, it was determined that students' compassion fatigue was at a moderate level (23). Intensive care units are places where nurses may experience high levels of compassion fatigue due to workload, fatigue, extreme stress and witnessing the constant pain of patients (7). Compassion fatigue can not only induce a variety of physical and mental diseases, but also lead to a decline in the level of work engagement, resulting in loss of work enthusiasm, low-level work efficiency and even medical disputes and medical negligence (24). It may be possible to obtain different results in terms of compassion fatigue between studies conducted with different sample groups under different working conditions.

Compassion fatigue is affected by many factors related to demographic characteristics and working conditions of individuals (16, 25). In the present study, no difference was determined between the total compassion fatigue scale score and factors

such as gender, socioeconomic status, educational level, years of working in the intensive care unit, working style, working hours, and voluntary choice of profession (Table 2). A meta-analysis including 21 studies determined that gender, age and working hours did not affect compassion fatigue (26), which is similar to this study. As in the study conducted by Wijdenes et al. (27) with trauma nurses, it was determined that compassion fatigue increased as the years of working increased, but the result was not significant (Table 2). A systematic review study obtained contradictory results indicating that being female increased/decreased compassion fatigue (7). Unlike this study, nurses who chose the profession willingly were determined to have lower compassion fatigue (3, 28). Practicing the profession willingly is a condition that is considered to give morale and motivation to individuals. This study found that compassion fatigue was higher in nurses who did not choose the profession willingly, but the result was not statistically significant. This finding may be related to the small sample size. Compassion fatigue total mean scores in the study were determined to be statistically significantly higher in married nurses compared to single nurses and in nurses who had children compared to those who did not have children (Table 2). Similar to this study, a study conducted with 1521 nurses by Ruiz-Fernández et al. (2020) determined that compassion fatigue was higher in married individuals (5). Unlike this study, Sacco et al. (2015) determined that compassion fatigue was higher in single nurses (29). Hinderer et al. (2014) reported no differences between compassion fatigue and marital status (30). This finding can be explained by the fact that the majority of the nurses participating in the study were married and half of them had children. Compassion fatigue is considered to increase with the presence of a person/people who are obliged to take care of the outside of work life in nurses or other professional groups. For this reason, it is recommended to investigate the effect of nurses' roles in their social life other than nursing.

Medical errors encountered in the provision of healthcare services cause patient harm, prolonged hospitalization periods, and negative issues in the healthcare system. For this reason, preventing medical errors is crucial (31). Due to the characteristics of the patient group and strenuous working conditions, especially intensive care units are places where medical errors are frequently encountered (32). This study found that women had a low level of medical error tendency (Table 2). The literature includes studies with similar results (33, 34). Some studies reported no

differences between gender and medical error tendency (35, 36). This finding could be associated with the high number of female nurses participating in the study because male and female nurses go through the same education process. Therefore, gender is considered to indicate no differences. Of the nurses participating in this study, 61.5% had undergraduate degree. It was determined that the tendency for medical errors in nurses with an associate's degree was statistically significantly higher compared to nurses with bachelor's and master's degrees (Table 2). It is similar to the results obtained by Büyük et al. (2021) (37). Dikmen et al. (2014) reported that the level of education did not affect the tendency for medical errors (38). Unlike these studies, Tuncay and Kilic (2023) found that the tendency for medical errors in nurses with an associate's degree was statistically significantly lower compared to nurses with bachelor's and master's degrees (39). As a result, undergraduate nurses seem to have higher levels of medical error tendency. The reason for this high medical error tendency among nurses who had an undergraduate degree should be investigated. In addition, in recent years many nursing schools with no educational infrastructure have been opened in our country, and these schools have a large number of graduates. Besides, many new graduates are being appointed to numerous newly opened hospitals in our country. The effect of the current situation on the medical error tendency is considered to be another issue that needs to be investigated because many things related to institutional and educational infrastructure and management processes can affect medical error tendency.

Limitation

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.

Conclusion and Recommendations

This study found a moderate level of compassion fatigue and a low level of medical error tendency; there was no relationship between compassion fatigue and medical error tendency; and there was a statistically significant difference between compassion fatigue and marital status, having children, years of experience, and between medical error tendency and gender, socio-economic status, and education level. In line with these results, it is recommended; to increase evidence-based

scientific studies, to provide nurses with alternative complementary methods such as empathy trainings, communication trainings, psychologist consultations, or yoga, to design resilience training programs as well as treatments to reduce nurses' compassion fatigue, and nurses should be supported with deep breathing exercises, emotional care, positive thinking, the development of social support systems, and artistic activities, to reduce compassion fatigue, a work environment should be established where nurses can freely express their emotions and thoughts, Rest areas should be created for nurses working in closed units, and their spiritual needs should be taken into consideration.

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