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3 **Occupational safety in nurses working in a tertiary care hospital**
4 **in Turkey**

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11
12 **Abstract**

13 **Objective:** To determine the occupational safety of nurses working in a tertiary
14 care hospital.

15 **Methods:** The cross-sectional and descriptive study was conducted at a tertiary
16 care hospital at Kocaeli University, Turkey, from January to March 2016, and
17 comprised nurses working at the hospital. A questionnaire and the occupational
18 safety scale were used to collect data. The Occupational Safety Scale has seven
19 subscales. Frequencies, percentages, mean values and standard deviations were
20 calculated during data analysis.

21 **Results:** Of the 200 nurses, 180(90%) were female and 88(44%) had 6-11 years
22 of professional experience. The overall mean score of the scale was
23 2.593 ± 0.770 . Nurses working in daytime had better score on the healthcare
24 screening and registry systems subscale compared to nurses working in shifts
25 ($p=0.020$). There were no differences between the other subscales and work
26 patterns ($p>0.05$).

27 **Conclusion:** The nurses were found to have poor occupational safety.

28 **Key Words:** Nurse, Occupational safety, Occupational health, Occupational
29 disease.

30

31 **Introduction**

32 The World Health Organisation (WHO) describes a healthy workplace as an
33 environment where the staff and managers collaborate constantly to improve
34 and maintain employees' safety, health and wellbeing, and healthy and safe
35 physical conditions, psychosocial work setting and work culture are
36 incorporated, individual health resources are available, the health of the
37 employees and their families are improved, and their contribution to the whole
38 is ensured. Since the 1950s, WHO and the International Labour Organization
39 (ILO) have been undertaking the necessary work and arrangements for healthy
40 workplaces.¹ Occupational accidents, injuries, diseases and major industrial
41 disasters currently represent a national and international concern for human,
42 social and economic costs. Several measures and strategies have been developed
43 and implemented over the years to prevent, control, reduce or eliminate
44 occupational accidents and adapt to technological and economic advances.
45 Occupational accidents and diseases, however, are still very frequent.
46 According to a recent ILO report, 2 million occupational deaths occur
47 worldwide every year. Most of these deaths are due to occupational cancers,
48 circulatory and cerebrovascular diseases and some infectious diseases. Fatal and
49 non-fatal occupational accidents are estimated to have an annual incidence of
50 270 million. Based on the most recent data from ILO and WHO, the overall rate
51 of occupational accidents and diseases shows a gradual decrease in most
52 industrialised countries, while the rate remains unchanged or is increasing in
53 developing and industrialising countries.² Of the 35 million employees
54 worldwide, 2 million were exposed to hepatitis B virus (HBV), 0.9 million to
55 hepatitis C virus (HCV) and 170,000 to human immunodeficiency virus (HIV).
56 Of these injuries, 15,000 resulted in HCV, 70,000 in HBV and 500 in HIV

57 infections. More than 90% of these infections occur in developed countries.
58 Taking universal measures against these infections is essential.³
59 Most nurses inevitably have extended working hours and work overload.
60 Healthcare workers are charged with sudden, constant and unexpected tasks to
61 increase the institution's quality. Additionally, new procedures, devices and
62 novel medicines may negatively affect healthcare workers. Many advances
63 introduced in hospitals aim at improving patients' condition, whereas they may
64 pose a threat for healthcare workers' occupational health and safety. Healthcare
65 workers face occupational accidents, occupational diseases and many healthcare
66 problems. Occupational accidents and diseases are frequent in healthcare
67 workers despite the measures taken for occupational health and safety⁴.
68 Occupational safety in nurses is not an area extensively studied. The current
69 study was planned to fill the gap by determining the occupational safety of
70 nurses working in a tertiary care setting.

71

72 **Subjects and Methods**

73 The cross-sectional, descriptive study was conducted at a tertiary care hospital
74 at Kocaeli University, Turkey from January to March 2016. After approval from
75 the institutional ethics review board, the sample was raised from among the
76 nurses working at the hospital at the time of the study. All eligible nurses were
77 approached, and those who did not volunteer to participate were excluded.

78 Demographic and professional data was collected using a 16-item questionnaire
79 exploring age, gender, education, work pattern, occupational experience,
80 satisfaction from occupational safety practices, previous experience of
81 occupational accident and disease, rate of occupational accidents and diseases in
82 the institutions etc. The Occupational Safety Scale⁵ (OSS) was also used to
83 collect relevant data. The OSS has 45 items scored on a 6-point Likert scale
84 ranging from "I completely agree" to "I completely disagree". The total score
85 from the scale ranges from 45 to 270. Dividing the score with the number of

86 items in the scale gives a score range of 1 to 6. High scores indicate good
87 occupational safety. The OSS has six subscales: occupational diseases and
88 complaints (ODC), healthcare screening and registry systems (HSRS), accidents
89 and poisonings (AP), administrative support and approaches (ASA), materials
90 and tools control (MTC), preventive measures and rules (PMR), and suitability
91 of the physical environment (SPE).

92 OSS reliability was established with $r=0.47-0.74$ and Cronbach alpha 0.96.
93 After after taking informed consent from the subjects, they were given the data
94 collection tools which were collected back three hours later. Incomplete
95 questionnaires were excluded.

96 Frequencies, percentages, mean values and standard deviations (SDs) were
97 calculated using student's t-test. Level of significance was set at $p<0.05$.

98

99 **Results**

100 Of the 200 nurses, 180(90%) were female, 131(65.5%) were married, 98(49%)
101 were aged 20-29 years, 135 (67.5%) had bachelor's degree, 88(44%) had 6-10
102 of professional experience, 90(45%) had 6-10 years of experience in the current
103 institution, and 118(59%) worked in shifts (Table 1).

104 Overall, 100(50%) nurses reported sleep disturbances, 78(39.2%) psychosocial
105 diseases, 73(36.7%) skin diseases, 68(34.2%) musculoskeletal diseases and
106 58(29.2%) had gastrointestinal diseases.

107 Also, 120(60%) nurses said they had been exposed to verbal violence,
108 118(59.2%) had chronic fatigue, 105(52.5%) had soft-tissue trauma, 88(44.2%)
109 had emotional problems, 80(40%) had been exposed to psychological violence
110 and 63(31.7%) had muscle and joint injuries (Table 2).

111 Nurses had a mean total OSS score of 2.593 ± 0.770 which, along with subscale
112 scores, was low (Table 3).

113 Nurses working daytime had better significantly better score on the HSRS
114 subscale than nurses working in shifts ($p=0.020$). No significant differences
115 were found between the other subscales and work patterns ($p>0.05$).

116

117 **Discussion**

118 The mean total OSS score found in the current study was lower than that
119 reported from an earlier study, while the subscale scores fluctuated between the
120 two studies⁶.

121 In a study performed to determine security climate perceptions, healthcare staff
122 had a low perception of overall security climate. Employees working in medical
123 units had lower perceptions regarding “communication”, “work setting”,
124 “occupational health and safety education and feedback”, “management
125 dependence” subscales of security climate compared with those working in
126 administrative and support units.⁷

127 Compared to literature⁸⁻¹⁰, the current study demonstrated poor scores for OSS,
128 especially for ODC and ASA subscales. The differences may be explained by
129 administrative patterns adopted in various hospitals or different policies adopted
130 for occupational health and safety.

131 In our study, the most common occupational accident the nurses experienced
132 was soft-tissue trauma (52.5%). In a study in Germany, 31.4% healthcare
133 workers reported experiencing needle-stick injury at least once during the
134 preceding month. It was found that 34% of the needle-stick injuries were due to
135 not using safety equipment.¹¹ In another study, needle-stick injury was the most
136 common accident among healthcare workers (52.9%), followed by blood splash
137 from patients (21.7%).¹² In another study, the prevalence of needle-stick injuries
138 over the preceding one year was 28.1%. Of them, 46.5% had two or more
139 needle-stick injuries. More than half of the injuries had occurred during
140 intravenous (IV) injections. A huge majority (96%) of nurses were not using
141 gloves when the needle-stick injury occurred. Of them, 46.5% washed their

142 hands with soap and water immediately after the needle-stick injury.¹³ In
143 another study with 655 nurses, about 40% had experienced at least one injury or
144 disease in the preceding year.¹⁴ In one study, needle-stick injury was noted in
145 14% physicians and nurses. More than 80% of them had not received the three
146 doses of hepatitis B vaccine.¹⁵ Needle-stick injuries are known to be under-
147 reported despite their frequent occurrence.^{14,16}

148 In a study in India with 120 healthcare employees, 2% nurses and 57%
149 laboratory technicians practised universal measures for protection against
150 infections. Only 7% nurses and 6% technicians were familiar with correct
151 handling of patient waste material. Good hand-washing was performed by 17%
152 nurses, while none of the technicians washed their hands properly.¹⁷ In a
153 hospital providing tertiary care, only 31% of the nurses took appropriate
154 measures against needle-stick injury.¹⁸

155 The current is limited owing to the fact that it was done at a single hospital, and,
156 as such, the findings cannot be generalised.

157

158 **Conclusion**

159 Nurses had poor occupational safety. It may be improved through effective
160 supervision and monitoring of the trainings given regarding occupational safety.

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165

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222 **Table 1: Demographical and Occupational Details (n=200)**

Variable	n	%
Gender	Female	180 90.0
	Male	20 10.0
Marital Status	Married	131 65.8
	Single	69 34.2
Age	20-29	98 49.2
	30-39	93 46.7
	40-49	9 4.1

Education	Occupational School of Health	23	11.7
	Undergraduate (2 years)	27	13.3
	Bachelor (4 years)	135	67.5
	Master	15	7.5
Years of Occupational Experience	0-5 years	63	31.7
	6-10 years	88	44.2
	11-15 years	34	16.7
	16-20 years	15	7.4
Experience in the Current Institution	0-5 years	78	39.2
	6-10 years	90	45.0
	11-15 years	23	11.7
	16-20 years	9	4.1
Work pattern	Daytime	82	40.8
	In shifts	118	59.2
Total		200	100

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226 **Table 2: Nurses' past experience of occupational disease and occupational**
 227 **accident/injury (n=200)**

Past experience of occupational disease	Yes		No	
	n	%	n	%
Sleep disturbances	100	50	100	50
Psychosocial diseases (panic-attack, depression etc.)	78	39.2	122	60.8
Skin diseases (eczema, dermatitis, alopecia, etc.)	73	36.7	127	63.3
Musculoskeletal diseases (herniated disc, Carpal tunnel s. etc.)	68	34.2	132	65.8
Gastrointestinal system diseases (ulcer, colitis, constipation, etc.)	58	29.2	142	70.8
Cardiovascular diseases (hypertension/varicosis etc.)	53	26.7	147	73.3
Nervous system diseases (Cerebrovas. D., herniated disc, etc.)	25	12.5	175	87.5
Respiratory diseases (asthma, bronchitis, COPD, etc.)	17	8.3	183	91.7
Infectious diseases (hepatitis, AIDS, etc.)	5	2.5	195	97.5
Cancer	2	0.8	198	99.2
Past experience of occupational accident/injury				
Exposure to verbal violence (patient relative/staff, etc.)	120	60	80	40
Chronic fatigue	118	59.2	82	40.8
Soft-tissue trauma (needle-stick/cut/bruise, etc.)	105	52.5	95	47.5

Emotional problems (loneliness, burnout, etc)	88	44.2	112	55.8
Exposure to psychological violence (hospital staff)	80	40	120	60
Muscle and joint injuries (waist/back/arm/leg pain, etc.)	63	31.7	137	68.3
Slips/falls etc. traumas	42	20.8	158	79.2
Exposure to physical violence (patient/relative)	33	16.7	167	83.3
Poisonings (ethylene oxide, food, drug, X ray, etc.)	23	11.7	177	88.3
Electric shocks and burns	3	1.7	197	98.3

228 COPD: Chronic obstructive pulmonary disease; AIDS: Acquired immunodeficiency
 229 syndrome.

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233 **Table 3: Nurses' Occupational Safety Scale (OSS) mean scores and**
 234 **comparison of nurses' mean occupational safety scores and work patterns**

Subscales	Mean±SD	Minimum	Maximum
Occupational Diseases and Complaints	1.701±.700	1.00	5.23
Healthcare Screening and Registry Systems	2.729±1.114	1.00	5.67
Accidents and Poisonings	3.056±1.263	1.00	5.60
Administrative Support and Approaches	1.804±.828	1.00	5.14
Materials and Tools Control	2.760±1.263	1.00	6.00
Preventive Measures and Rules	3.215±1.236	1.00	6.00
Suitability of the Physical Environment	2.883±1.305	1.00	6.00
Scale total	2.593±.770	1.00	4.81
Comparison of nurses' mean occupational safety scores and work patterns			
Subscales	Daytime Mean±SD	In shifts	
		Mean±SD	t* p
Occupational Diseases and Complaints	1.75±.69	1.66±.70	.730 .467
Healthcare Screening and Registry Systems	3.01±1.14	2.53±1.05	2.36 .020
Accidents and Poisonings	3.03±1.32	3.07±1.22	- .887 .143
Administrative Support and Approaches	1.92±.93	1.72±.74	1.31 .191 6

Materials and Tools Control	3.00±1.22	2.59±1. 26	1.74 6	.084
Preventive Measures and Rules	3.35±1.32	3.11±1. 16	1.03 1	.305
Suitability of the Physical Environment	3.03±1.39	2.78±1. 24	1.02 7	.307
Scale total	2.73±.77	2.49±.7 5	1.64 5	.103

235 * Student's t-test; SD: Standard deviation.

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