

EMOTIONAL INTELLIGENCE AND DEGREE OF EDUCATION OF HEALTHCARE PROFESSIONALS IN EMERGENCY MEDICINE

Marina Katinić, Livia Puljak & Marta Čivljak

Affiliation: Center for Evidence-based Medicine and Health Care, Catholic University of Croatia, Zagreb, Croatia

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ABSTRACT

Background: Emotional intelligence (EI) includes two major skills: managing oneself and successful cooperation with others. Healthcare workers are exposed to numerous work stressors, such as limited resources, organizational challenges, complex diseases, etc. EI can help healthcare workers to better cope with the demands of their work. This study aimed to analyze whether there is an association between emotional intelligence and the degree of education of healthcare professionals working in emergency medicine.

Subjects and methods: The study was conducted among healthcare personnel employed in in-hospital and out-of-hospital emergency departments in Croatia. EI was measured using the Emotional Skills & Competence Questionnaire (ESCQ-45).

Results: Of the 137 eligible participants, 97 (71%) accepted to participate. Emotional intelligence was not significantly associated with the respondents' education. Healthcare personnel employed in the in-hospital emergency department and women had higher emotional competence than workers from out-of-hospital emergency departments and men. There was no significant association between EI and the age of respondents.

Conclusion: EI of employed adults is an individual characteristic that does not depend on the educational level or degree. It would be worthwhile to explore further whether there are significant differences between the EI of healthcare workers in various settings within the health system and invest resources in increasing EI in settings with a lower EI.

Key words: emotional intelligence; degree of education; health workers; emergency medicine

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INTRODUCTION

The concept of emotional intelligence (EI) was first defined by Salovey and Mayer. They proposed that EI was a separate cognitive ability but associated with general intelligence, indicating that intelligence is not based only on processing emotion-laden information (Salovey & Mayer, 1990). Subsequently, the same authors revised their definition after noticing that they did not account for considerations about emotions. In 1997, they observed that EI includes quick observation, assessment and expression of emotions, the ability to notice, generating feelings that enable thinking, the ability to understand emotions, and knowledge about emotions (Mayer & Salovey, 1997). EI includes two major skills: managing oneself and skills of successful cooperation with others. Those two skills are essential for business success and fulfilling individual life goals. From the business aspect, the most important characteristics are self-consciousness, self-confidence, self-control, dedication, honesty, ability to communicate, accepting changes, etc. According to the Salovey et al., EI is more important than the degree of

education (Salovey et al., 2001). EI develops with age and experience. Multiple studies have shown that older adults had higher EI scores than young adults (Chapman & Hayslip, 2006; Chen et al., 2016). One explanation for the positive association between age and EI is lifelong learning and accumulated knowledge (Chen et al., 2016). As they have had more opportunities to practice EI than young individuals, older people benefit from a better understanding of emotions and their regulation strategies (Chen et al., 2016). However, the association between EI and age may disappear when the educational level is considered. Navarro-Bravo et al. have shown that young individuals, women, and individuals with a higher educational level achieved higher scores on the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), a test that assesses performance-based EI. However, their further analysis of the independent effects of variables age, gender, educational level, and depressive symptomatology and their interactions on MSCEIT total indicated that only educational level and depressive symptomatology were associated with EI ability. The direct association between age and gender

with MSCEIT score disappeared (Navarro-Bravo et al., 2019). Compassion and empathy are critical elements of health care professions. Healthcare workers are exposed to numerous work stressors, such as limited resources, organizational challenges, complex diseases, etc. EI can help healthcare workers to better cope with their work demands (Basogul & Ozgur, 2016; Hollis et al., 2017; Kousha et al., 2018; Lin et al., 2016). For example, it has been shown that EI of nurses affects conflict management strategies (Basogul & Ozgur, 2016), higher EI was predictor of lower stress, anxiety, and depression in resident physician (Kousha et al., 2018), EI was associated with residents' job satisfaction (Hollis et al., 2017), and EI was a strong predictor of resident well-being (Lin et al., 2016). These are just a few of the available studies that show the major importance of EI for healthcare workers. Considering the importance of EI for healthcare workers, it is of significant interest to monitor and enhance their EI. Prior research indicated differences in EI profiles in emergency medicine residents in different training years (Papanagnou et al., 2017), indicating that different circumstances and experiences may be a factor in the level of EI. Since the emergency medicine sector is large, covering both "out-of-hospital" and "in-hospital" settings, with very different resources and expectations from emergency medical workers in those settings, it is possible that levels of EI can be different between different emergency medicine settings. This study aimed to analyze whether there is an association between emotional intelligence and the degree of education of healthcare professionals working in emergency medicine. Specific research aims were to explore whether there is a correlation between emotional intelligence with the age and sex of respondents and the existence of differences in emotional intelligence between out-of-hospital and in-hospital emergency department medical workers.

SUBJECTS AND METHODS

Setting

The study was conducted during July and August of 2017 in the out-of-hospital emergency departments of the Institute for Emergency Medicine of the Brod-Posavina county, located in the cities of Vrpolje, Slavonski Brod, Lužani, Nova Gradiška, and Okučani, as well as in the in-hospital emergency department of the General Hospital "Dr. Josip Benčević". In the "out-of-hospital" emergency medicine, also known as "prehospital care", medical measures and procedures are delivered outside of the hospital, i.e. at the scene, during transport, or in out-of-hospital medical offices. In-hospital emergency medicine is carried out in the hospital and involves triage, examination, consultations with different specialists, diagnostic procedures, stabilization, and advanced patient treatment.

Participants

Eligible participants were all healthcare employees in the included emergency facilities: nurses (with three different educational levels: high school degree, three-year university baccalaureate, or graduate degree), residents, and physicians employed in the analyzed institutions, and there were no exclusion criteria. There were 97 eligible participants employed in the Institute and 40 eligible participants employed in the Hospital. Participation in the study was voluntary. If the invited individuals refused to participate, we did not collect their reason for refusal.

Ethics

The study protocol was submitted to the ethics committees of the Institute for Emergency Medicine of the Brod-Posavina county and General Hospital "Dr. Josip Benčević". Both institutions approved the study protocol; the reference numbers of approvals were 1718-1/17 and 43000000/17-1496, respectively. The study was conducted according to the Declaration of Helsinki provisions (as revised in Edinburgh 2000). Eligible participants received written and oral information about the study and were invited to participate. All participants gave written and oral consent to participate in the study. Participants were guaranteed anonymity. The study was administered by providing participants with paper questionnaires. The first author distributed the questionnaires to the participants and collected completed questionnaires. Participant anonymity was preserved; each questionnaire was coded, and only the first author had information about the identity of coded participants in the study. The study was conducted during participants' working hours in a separate room where participants were alone and had privacy and anonymity.

Measuring emotional intelligence

EI was measured using the Emotional Skills & Competence Questionnaire (ESCQ-45; Croatian acronym: UEK-45) in the Croatian language. The ESCQ-45 is the shorter version of the tool ESCQ-136, which was created based on Mayer and Salovey's model (Taksic, 2002). The ESCQ-45 (Faria et al., 2006) consists of 45 items that are measured in a 5-point Likert-type scale that ranges from (1) "never" to (5) "always," and it is organized in three sub-scales. The ESCQ-45 sub-scales include: Perceive and Understand Emotion Scale (15 items); Express and Label Emotion Scale (14 items), and Manage and Regulate Emotion Scale (16 items). A higher score indicates a higher level of emotional competence, i.e., better ability to notice and understand emotions and a higher ability for expressing and naming emotions and managing emotions. The total score is a sum of the points on three sub-scales. The ESCQ-45 is intended for assessing EI and the process of recognizing one's own emotional states and emotional states of others for more efficient

problem solving and better behavior regulation. Application time of the ESCQ-45 is not limited (Perkovic Kovacevic et al., 2018). It is important to emphasize that the ESCQ-45 tests a construct called in the literature emotional intelligence as a personality trait. We used a shorter version of the scale for practical reasons due to specific working conditions at the emergency department where medical workers can be time-constrained.

Other data collected

We collected the following information about participants: sex, age, place of employment, a shift in which they work (six categories: morning shift from 7 AM to 3 PM; a day-long shift from 7 AM to 7 PM; a night-long shift from 7 PM to 7 AM; all those three shifts; the fifth category was: block shifts, also called a '12-24-12-48 h system', in which employees work day-long shift for 12 h followed by 24 h rest, then night-long shift for 12 h, followed by 48 h rest, and then all over again with this schedule repeated in 12-24-12-48 h cycles; the sixth category was any other working schedule not covered with the first five categories), educational level (high school, baccalaureate, graduate degree), educational degree (high school nurse, baccalaureate, master of nursing, physician, physician resident, physician specialist, other). We collected data on work shifts to better characterize the sample, as those shifts can have major variations between different emergency medicine settings.

Data analysis

We expressed categorical data using absolute and relative frequencies. Data with normal distribution were shown as mean (M) and standard deviation (SD); data that were not normally distributed were expressed as the median and interquartile range (IQR). Differences between categorical variables were tested using the chi-square test and Fisher exact test if needed. The normality of data distribution was tested using the Shapiro-Wilk test. Differences between numerical variables between two independent variables (sex, place of employment) were analyzed using the Mann-Whitney U test and according to the age and level of education by using the Kruskal-Wallis test. Association between age and sub-scales of emotional competence was tested using Spearman's correlation coefficient. The level of significance was set at $\alpha = 0.05$. For statistical analysis, we used MedCalc Statistical Software version 14.12.0. (Mariakerke, Belgium).

RESULTS

Response rate

Of the 137 eligible participants, 97 (71%) accepted to participate. Among those employed at the out-of-

hospital emergency department, 60 of 97 (62%) employees participated, while the response rate of in-hospital emergency workers was 37 of 40 (93%).

Participants' characteristics

Detailed characteristics of participants are shown in Table 1. The average age of all participants was 39.7 ± 11.8 years; their median employment time was 15 years; there were slightly more men in the sample than the women (54 % vs. 46%). The majority worked all three shifts. Out-of-hospital emergency department workers worked more commonly in three shifts, while block shifts were significantly more common among in-hospital employees. Most of the participants had nursing high school degrees. The majority of participants were nurses. Participants working in the in-hospital emergency department had higher education compared to those from out-of-hospital (Table 1).

Emotional competence

The Cronbach alpha coefficient of the entire ESCQ-45 scale was 0.938. Table 2 shows participants' results on the Perceive and Understand Emotion Scale. With 15 items, this scale can have a total score from 15 to 75, where a higher score indicates a higher ability to perceive and understand emotions. Cronbach's alpha coefficient for this scale was 0.908. The median score of all participants was 57 (IQR 52 to 62), with the range of 33 to 74. In-hospital employees had a significantly higher score on this scale compared to out-of-hospital emergency department employees. There were no significant differences in the score on this scale in terms of participants' sex, age, and educational level (Table 3). Table 2 indicates participants' scores on the Express and Label Emotion Scale. With 14 items, this scale can have a total score from 14 to 70; a higher score indicates a higher ability to express and label emotions. Cronbach's alpha coefficient for this scale was 0.880. The median score of all participants on the Express and Label Emotion Scale was 55 (IQR 50 to 60.5), with the range 37 to 69. There was no significant difference in the score in the self-assessment of expressing and labeling emotions in terms of participants' sex, age, place of employment, and educational level (Table 4).

Table 2 shows participants' scores on the Manage and Regulate Emotion Scale. With 16 items, this scale can have a total score from 16 to 80. Cronbach's alpha coefficient for this scale was 0.802. More than 70% of the participants mostly or entirely learn from negative experiences how not to behave next time, and when they are with the person who appreciates them, they pay attention to how they behave and try to maintain a good mood. Few participants responded that they do not work more enthusiastic if they receive praise or reward and that they will not do anything for a person they like to like them back (Table 2). The median score of all participants on the Manage and Regulate Emotion Scale was 63 (IQR 59 to 68), with the range 45 to 79.

Table 1. Participants' characteristics

Variables	Place of employment		Total	P
	In-hospital	Out-of-hospital		
Age, M ± SD years	40.6 ± 11.2	39.2 ± 12.3	39.7 ± 11.8	0.59*
Duration of employment, median (IQR)	15 (5.5 – 34.5)	14.5 (5.25 - 28.5)	15 (5.5 - 29.5)	0.52**
Sex, N (%)				
Men	15 (41)	37 (62)	52 (54)	0.06**
Women	22 (59)	23 (38)	45 (46)	
Working shift, N (%)				0.004†
Only morning shift	3 (8)	2 (3)	5 (5)	
Only day-long shift	1 (3)	1 (2)	2 (2)	
Only night-long shift	5 (14)	2 (3)	7 (7)	
All three shifts	22 (59)	53 (88)	75 (77)	
Block shifts (12-24-12-48)	6 (16)	1 (2)	7 (7)	
Other	0	1 (2)	1 (1)	
Educational level, N (%)				0.03**
High school	15 (41)	38 (63)	53 (55)	
Baccalaureate	14 (38)	9 (15)	23 (24)	
Graduate degree	8 (21)	13 (22)	21 (22)	
Educational degree, N (%)				<0.001†
High school nurse	13 (35)	38 (63)	51 (53)	
Baccalaureate	15 (41)	8 (13)	23 (24)	
Master of nursing	1 (3)	2 (3)	3 (3)	
Physician	2 (5)	10 (17)	12 (12)	
Physician resident	5 (14)	0	5 (5)	
Physician specialist	0 (0)	1 (2)	1 (1)	
Other	1 (3)	1 (2)	2 (2)	

*Student t-test; ** χ^2 test; †Fisher's exact test

Acronyms: IQR=interquartile range, M=mean, SD=standard deviation

There was no significant difference in managing and regulating emotions based on age, place of employment, and educational level. Women had significantly higher scores regarding managing and regulating emotions compared to men (Table 5).

The overall score of the entire ESCQ-45 questionnaire can range from 45 to 225, with a higher score indicating higher emotional competence. In our sample, the median score of the total questionnaire was 173 (IQR 160.5 to 190.5), ranging from 131 to 214. There was no significant difference in emotional competence based on age and educational level in the total sample. Women had significantly higher emotional competence compared to men. Participants working at the in-hospital emergency department had higher emotional competence than those working at out-of-hospital emergency departments (Table 6).

Spearman's correlation coefficient was used to explore the potential association of age with the ESCQ-45 questionnaire and its scales, as well as an association of scores between the scales. Participants' age was not significantly associated with the score on the total questionnaire, neither with the individual scales. Participants with higher ability of perceiving and understanding emotions had higher ability of expressing

and labeling emotions ($p = 0.669$, $P < 0.001$), as well as higher ability for managing and regulating emotions ($p = 0.661$, $P < 0.001$), and vice versa. Likewise, participants with a higher ability to express and label emotions had a higher ability to manage and regulate emotions ($p = 0.646$, $P < 0.001$), and vice versa (Table 7).

DISCUSSION

This study found that employees of the in-hospital emergency department and women had higher emotional competence than those who worked at out-of-hospital emergency departments and men. We did not find an association between EI and educational level and educational degree of healthcare workers employed at emergency departments. Studies published thus far in the literature have reported discrepant results regarding the association between EI and academic success. Lanciano and Curci explored whether EI can predict academic achievement in undergraduate students while controlling for cognitive abilities and personality traits. Academic achievement was studied via the number of exams, grade point average, as well as study time taken to prepare for each exam.

Table 2. Participants' scores on all the subscales of the ESCQ-45 questionnaire

	N (%) participants					Total
	Never	Seldom	Occasionally	Usually	Always	
Perceive and Understand Emotion Scale						
When I meet an acquaintance, I immediately notice his/her mood	2 (2.1)	6 (6.3)	24 (25.3)	48 (50.5)	15 (15.8)	95 (100)
When I see how someone feels, I usually know what has happened to him	0	20 (20.8)	39 (40.6)	32 (33.3)	5 (5.2)	96 (100)
I am able to tell the difference if my friend is sad or disappointed	0	2 (2.1)	16 (16.7)	47 (49)	31 (32.3)	96 (100)
I am able to detect my friend's mood changes	2 (2.1)	1 (1)	12 (12.4)	48 (49.5)	34 (35.1)	97 (100)
I can easily think of a way to make my friend happy on his/her birthday	0	3 (3.1)	22 (22.7)	39 (40.2)	33 (34)	97 (100)
If I observe a person in the presence of others, I can determine precisely her or his/her emotions	2 (2.1)	4 (4.1)	34 (35.1)	46 (47.4)	11 (11.3)	97 (100)
I do not have difficulty to notice when somebody feels helpless	0	4 (4.2)	27 (28.1)	45 (46.9)	20 (20.8)	96 (100)
I am able to tell somebody's feelings by the expression on his/her face	0	2 (2.1)	31 (32)	48 (49.5)	16 (16.5)	97 (100)
I can detect my friends' concealed jealousy	1 (1)	5 (5.2)	30 (30.9)	44 (45.4)	17 (17.5)	97 (100)
I notice when somebody tries to hide his/her bad mood	1 (1)	5 (5.2)	32 (33.3)	44 (45.8)	14 (14.6)	96 (100)
I notice when somebody feels guilty	1 (1)	1 (1)	41 (42.3)	46 (47.4)	8 (8.2)	97 (100)
I notice when somebody tries to hide his/her real feelings	0	2 (2.1)	32 (33)	55 (56.7)	8 (8.2)	97 (100)
I notice when somebody feels down	1 (1)	3 (3.1)	22 (22.7)	49 (50.5)	22 (22.7)	97 (100)
I notice when somebody's behavior varies considerably from his/her mood	0	1 (1)	31 (32)	54 (55.7)	11 (11.3)	97 (100)
I know how to pleasantly surprise each of my friends	0	2 (2.1)	21 (21.6)	40 (41.2)	34 (35.1)	97 (100)
Express and Label Emotion Scale						
Putting my feelings and emotions into words comes easily to me	2 (2.1)	3 (3.1)	29 (29.9)	37 (38.1)	26 (26.8)	97 (100)
When something doesn't suit me, I show this immediately	0	8 (8.2)	37 (38.1)	31 (32)	21 (21.6)	97 (100)
I can easily think of a way to approach a person I like	1 (1.1)	5 (5.3)	32 (34)	44 (46.8)	12 (12.8)	94 (100)
I am capable to list the emotions that I am currently experiencing	2 (2.1)	3 (3.1)	22 (22.9)	42 (43.8)	27 (28.1)	96 (100)
I am able to express my emotions well	0	5 (5.2)	21 (21.6)	41 (42.3)	30 (30.9)	97 (100)
I can recognize most of my feelings	1 (1)	2 (2.1)	12 (12.4)	50 (51.5)	32 (33)	97 (100)
I am capable to describe my present emotional state	0	2 (2.1)	6 (6.2)	46 (47.4)	43 (44.3)	97 (100)
I can say that I know a lot about my emotional state	0	3 (3.1)	19 (19.6)	43 (44.3)	32 (33)	97 (100)

My behavior is a reflection of my inner feelings	1 (1)	7 (7.2)	33 (34)	39 (40.2)	17 (17.5)	97 (100)
People can tell what mood I am in	2 (2.1)	4 (4.2)	28 (29.2)	43 (44.8)	19 (19.8)	96 (100)
I usually understand why I feel bad	0	2 (2.1)	24 (25)	35 (36.5)	35 (36.5)	96 (100)
I have found it easy to display fondness for a person I like	1 (1)	8 (8.3)	20 (20.8)	42 (43.8)	25 (26)	96 (100)
I can easily name most of my feelings	0	2 (2.1)	22 (22.7)	46 (47.4)	27 (27.8)	97 (100)
I am able to express how I feel	0	4 (4.1)	11 (11.3)	48 (49.5)	34 (35.1)	97 (100)
Manage and Regulate Emotion Scale						
I am able to maintain a good mood even if something bad happens	1 (1)	7 (7.2)	37 (38.1)	42 (43.3)	10 (10.3)	97 (100)
I can maintain a good mood, even when the people around me are in a bad mood	1 (1)	3 (3.1)	26 (26.8)	50 (51.5)	17 (17.5)	97 (100)
Unpleasant experiences teach me how not to act in the future	0	3 (3.2)	8 (8.4)	42 (44.2)	42 (44.2)	95 (100)
When somebody praises me, I work with more enthusiasm	3 (3.1)	8 (8.2)	13 (13.4)	37 (38.1)	36 (37.1)	97 (100)
When I like a person, I will do anything to make him/her to like me	3 (3.1)	8 (8.3)	36 (37.5)	32 (33.3)	17 (17.7)	96 (100)
When I am in a good mood, it is difficult to bring my mood down	2 (2.1)	1 (1)	24 (25)	48 (50)	21 (21.9)	96 (100)
When I am in a good mood, every problem seems easy to solve	0	2 (2.1)	22 (22.9)	40 (41.7)	32 (33.3)	96 (100)
When I am with a person who thinks highly of me, I am careful about how I behave	0	4 (4.1)	17 (17.5)	43 (44.3)	33 (34)	97 (100)
I study and learn best, when I am in a good mood and happy	0	1 (1)	19 (19.6)	38 (39.2)	39 (40.2)	97 (100)
If I really want to, I will solve a problem that may seem impossible to solve	0	1 (1)	13 (13.5)	47 (49)	35 (36.5)	96 (100)
I do not have difficulty to persuade a friend that there is no reason to worry	0	3 (3.1)	26 (26.8)	51 (52.6)	17 (17.5)	97 (100)
I try to control unpleasant emotions, and strengthen positive ones	1 (1)	5 (5.2)	19 (19.8)	52 (54.2)	19 (19.8)	96 (100)
There is nothing wrong with how I usually feel	0	2 (2.1)	19 (19.6)	47 (48.5)	29 (29.9)	97 (100)
I do my duties and assignments as soon as possible, rather than think about them	0	5 (5.2)	25 (25.8)	36 (37.1)	31 (32)	97 (100)
I try to keep up a good mood	1 (1)	2 (2.1)	8 (8.2)	55 (56.7)	31 (32)	97 (100)
As far as I am concerned, it is normal to feel the way I am feeling now	0	1 (1)	22 (22.9)	42 (43.8)	31 (32.3)	96 (100)

Table 3. Participants' scores on the Perceive and Understand Emotion Scale based on their characteristics

Participants' characteristics	Median (interquartile range)	Range	P*
Place of employment	60 (53.5 - 64)	41 - 74	0.02
In-hospital	55 (50 - 60.75)	33 - 71	
Out-of-hospital			
Sex			
Men	54.5 (50.25 - 60.75)	33 - 74	0.06
Women	59 (54 - 63)	47 - 69	
Age			
≤ 30 years	55 (51 - 60.75)	33 - 69	
31 - 40 years	58 (53 - 62)	48 - 74	0.68†
41 - 50 years	59 (48 - 64.5)	41 - 69	
≥51 years	56 (51.25 - 62.75)	33 - 67	
Educational level			
High school	57 (52.5 - 63)	33 - 71	
Baccalaureate	58 (51 - 61)	47 - 69	0.94†
Graduate degree	58 (50.5 - 62)	33 - 74	
All participants	57 (52 - 62)	33 - 74	

*Mann Whitney U test;†Kruskal Wallis test

Table 4. Participants' score on the Express and Label Emotion Scale based on their characteristics

Participants' characteristics	Median (interquartile range)	Range	P*
Place of employment			
In-hospital	55 (49.5 - 63.5)	40 - 68	0.34
Out-of-hospital	54 (50 - 59.75)	37 - 69	
Sex			
Men	53.5 (50 - 60)	37 - 69	0.34
Women	56 (51 - 61.5)	39 - 69	
Age			
≤ 30 years	54 (51.5 - 57.75)	37 - 69	
31 - 40 years	54.5 (50 - 60.75)	44 - 69	0.95†
41 - 50 years	59 (42 - 64)	65 - 42	
≥51 years	56.5 (50 - 61.5)	39 - 68	
Educational level			
High school	55 (49.5 - 61.5)	39 - 69	
Baccalaureate	56 (50-60)	42 - 69	0.83†
Graduate degree	54 (51.5 - 58.5)	37 - 64	
All participants	55 (50 - 60.5)	37 - 69	

*Mann Whitney U test;†Kruskal Wallis test

The authors also took gender differences into account in these relationships. They used the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), the Raven's Advanced Progressive Matrices, the reduced version of the Eysenck Personality Questionnaire, and academic achievement measures. Their results indicated that EI was positively associated with academic achievement indices and that EI ability adds a portion of incremental variance concerning cognitive ability and personality variables in explaining academic success. They also found that the association between EI and academic achievement was generally higher for men than women. Consequently,

they suggested that EI training would benefit academic institutions (Lanciano & Curci, 2014). Cheshire et al. have analyzed whether there is a causal relationship between the EI scores and the traditional academic admission criteria, such as grade point average and evaluation methods of a baccalaureate nursing program. They included 85 nursing students in their study and measured EI with the MSCEIT. They did not find significant relationships or correlations with the current evaluation methods for admitting students to nursing school or the evaluation methods used once students are already in the nursing program. The authors concluded that perhaps assessing nursing students' EI measures

a type of intelligence that is different from that represented by academic achievement (Cheshire et al., 2015). Suliman analyzed whether there is an association between academic success and learning styles and emotional social intelligence of 98 Saudi nursing students in conventional and accelerated programs. Data were collected using the Kolb learning style inventory and the Bar-On emotional quotient inventory (EQ-i). The study did not show a significant association between learning abilities or styles and emotional social intelligence, and academic success. The author concluded that either no actual relationship exists between academic success and emotional social intelligence or that emotional social intelligence could be confounded with other factors, such as professional and cultural values (Suliman, 2010). Parker et al. analyzed the association between EI and academic achievement among the 372 first-year Canadian students using the Emotional Quotient Inventory (EQ-i:Short). The authors reported that the prediction of academic success from EI variables provided divergent results, depending on how the EI variable was operationalized (Parker et al., 2004). Our study did not involve students, but instead, we focused on employees in emergency departments, both in-hospital and out-of-hospital. The academic achievement of students is ultimately associated with their final educational degree. Although previous research has indicated an association between EI ability and educational level (Navarro-Bravo et al., 2019), we did not find a significant association between the different educational levels or educational degrees and EI. We were unable to find any prior studies about EI and educational level in emergency department healthcare workers. In our study, we did not find a significant association between EI and age. Other studies mostly reported that EI increases with age. Chapman et al. reported that older adults have significantly higher EI scores compared to young adults (Chapman & Hayslip, 2006). Cabello et al. analyzed EI ability among 12198 Spanish adults; they found that EI ability varied with age according to the inverted-U curve, indicating that younger and older adults scored lower on EI ability than middle-aged adults, except for the branch of understanding emotions (Cabello et al., 2016). It was suggested that the positive association between age and EI could be explained by lifelong learning and accumulated knowledge (Kaufman et al., 2008). These differences, compared to our study, could be explained by our limited sample. We did not include a wide range of individuals of different age ranges; the average age of participants in this study was around 40 years, reflecting the average age of the working population. Multiple EI studies have shown that women often score significantly higher on EI tests than men, but discrepancies in these studies were also observed. Meta-analyses on differences between women and men in emotion recognition have shown a small to moderate

advantage for women. However, inconsistent results from recent studies have also led to questions about the implications of the different methodology used in various studies and different stimuli and samples used (Fischer et al., 2018). Therefore, it has been debated whether women's scores on self-report tests also reflect the actual differences in emotional recognition on actual performance tests, such as requiring participants to recognize emotions from the face (Fischer et al., 2018). Fischer et al. have explored this emotional sensitivity hypothesis, i.e., expectation that women are more sensitive to perceive subtle emotional cues, on a community sample of more than 5000 participants and found no support for such hypothesis (Fischer et al., 2018). Our finding that in-hospital emergency department healthcare workers had higher emotional competence than those working in the out-of-hospital emergency departments deserves further attention. Vandewaa et al. have explored the value of EI in healthcare workers, using the sample of clinical nurses, and found that the EI dimension related to perceiving emotion was associated with conscientiousness while facilitating thinking was associated with civic virtue (Vandewaa et al., 2016). Managing emotion was associated with conscientiousness, civic virtue, altruism, and courtesy. These results indicate that higher EI may increase conscientiousness in performing work duties and in the levels of involvement and participation in institutional affairs. Higher levels of EI may also increase altruistic activities and discretionary coordinating efforts. However, the authors also warn that a poor work environment has to be taken into account and that increasing only EI may not provide global results (Vandewaa et al., 2016). Our study's limitations are the limited convenience sample size and cross-sectional nature of the study, which does not allow for making conclusions regarding causal relations. Our study's strengths are the population included, consisting of healthcare workers employed at both in-hospital and out-of-hospital emergency departments.

CONCLUSIONS

We found that employees of the in-hospital emergency department and women had higher emotional competence than workers who worked at out-of-hospital emergency departments and men. We did not find an association between EI and educational level and educational degree of healthcare workers employed at emergency departments. We can conclude that the EI of employed adults is an individual characteristic that does not depend on the educational level or degree. It would be worthwhile to explore further whether there are major differences between the EI of healthcare workers in various settings within the health system and invest resources in increasing EI in

Table 5. Participants' score on the Manage and Regulate Emotion Scale based on their characteristics

Participants' characteristics	Median (interquartile range)	Range	P*
Place of employment			
In-hospital	65 (59.5 - 69)	46 – 75	0.15
Out-of-hospital	63 (57.25 - 68)	45 - 79	
Sex			
Men	63 (56 - 67.75)	45 – 73	0.03
Women	65 (60.5 - 68.5)	55 - 79	
Age			
≤ 30 years	63 (60 - 65.75)	55 – 79	0.98†
31 - 40 years	64.5 (58.25 - 68.75)	53 – 73	
41 - 50 years	64 (55 - 69)	45 – 75	
≥51 years	64 (57 - 68)	45 - 75	
Educational level			
High school	64 (57 - 69)	45 – 78	0.81†
Baccalaureate	63 (62 - 66)	53 – 79	
Graduate degree	61 (60 - 66.5)	55 - 73	
All participants	63 (59 - 68)	45 - 79	

*Mann Whitney U test;†Kruskal Wallis test

Table 6. Emotional competence in the total sample according to the participants' characteristics

Participants' characteristics	Median (interquartile range)	Range	P*
Place of employment			0.04
In-hospital	177 (167 - 193.5)	135 – 208	0.03
Out-of-hospital	170.5 (158.25 - 186.5)	131 - 214	
Sex			
Men	169.5 (158 - 186.5)	131 – 213	0.95†
Women	176 (169 - 192)	150 - 214	
Age			
≤ 30 years	171.5 (165.75 - 179.25)	131 – 214	0.93†
31 - 40 years	173 (163.5 - 188.25)	152 – 213	
41 - 50 years	187 (145.0 - 196.0)	135 – 208	
≥51 years	177.5 (157 - 191.5)	140 - 205	
Educational level			
High school	175 (158.5 - 192)	135 – 213	0.93†
Baccalaureate	173 (164 - 189)	151 – 214	
Graduate degree	172 (162.5 - 189.5)	131 - 207	
All participants	173 (160.5 - 190.5)	131 - 214	

*Mann Whitney U test;†Kruskal Wallis test

Table 7. Association between age and individual scales of ESCQ-45 questionnaire for the assessment of emotional competence

	Participants' age	Perceive and Understand Emotion Scale	Express and Label Emotion Scale	Manage and Regulate Emotion Scale
Perceive and Understand Emotion Scale	-0.002 (0.98)	-		
Express and Label Emotion Scale	0.090 (0.38)	0.669 (<0.001)	-	
Manage and Regulate Emotion Scale	-0.039 (0.70)	0.661 (<0.001)	0.646 (<0.001)	-
Emotional competence	-0.009 (0.93)	0.888 (<0.001)	0.871 (<0.001)	0.857 (<0.001)

settings with a lower EI.

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Study design: MC; Data collection and analysis: MK; Data collation and writing the first draft of the manuscript: LP; Final approval of the manuscript: MK, LP, MC.

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Correspondence:

Livia Puljak
Center for Evidence-based Medicine and Health Care
Catholic University of Croatia
Ilica 242, 10000 Zagreb, Croatia
Email address:
livia.puljak@unicath.hr, livia.puljak@gmail.com