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Emotional intelligence in medical students studying general medicine and pediatrics: A multi-institutional, cross-sectional study

Emotional intelligence (EI) is very important for medical students and health care professionals. Developed EI is associated with a lower risk of burnout, higher job satisfaction, increased patient compliance, and better prognosis. The purpose of the study was to assess and compare the total level of EI, as well as its parameters, in medical students studying general medicine and pediatrics in higher medical schools. This cross-sectional study included 132 senior students, 107 (81.1%) women, aged 21 to 25 (mean age 23 ± 1.1 y.o.). 89 (67.4%) participants studied General Medicine 43 (32.6%) – Pediatrics. Both groups were comparable in terms of age, sex, and social status ($p > 0.05$). Participants self-reported demographic data and completed the self-administered Hall emotional intelligence test to assess their EI level and its parameters. General Medicine Faculty students demonstrated a higher total EI level compared to Pediatrics Faculty students (32 [7; 51] vs. 26 [–2; 35], $p = 0.031$). A low EI level was found in 52.8% vs. 81.4% students from GMF and PF, respectively. Emotional awareness was significantly improved in students from GMF (11 [4.5; 15] vs. 8 [0; 12], $p = 0.023$) as well

as self-motivation (7 [–1; 10] vs. 3 [–2; 7], p = 0.035) and the management of emotions of others (9 [–0.5; 12] vs. 5 [–1; 8], p = 0.011). Empathy and the management of one's own emotions were almost on the same level in students of both faculties, although these EI parameters tended to be more developed in participants from GMF, reaching 9 points [3.5; 14] vs. 9 points [–3; 12]) and 1 point [–7; 6.5] vs. –1 point [–5; 3], respectively. All participants in both GMF and PF had a low level of EI though it was higher in students in GMF. The weakest parameter of EI in all respondents was the management of their own emotions. We recommend including psychological trainings aimed at improving EI in the curriculum for both GMF and PF students.

Key words: emotional intelligence, medical students, Pediatrics Faculty, General Medicine Faculty, Hall emotional intelligence test, cross-sectional quantitative study, empathy, soft skills

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Эмоциональный интеллект у студентов-медиков, изучающих лечебное дело и педиатрию: мультицентровое перекрестное исследование

Эмоциональный интеллект очень важен для студентов-медиков и медицинских работников. Развитый эмоциональный интеллект связан с более низким риском выгорания, более высокой удовлетворенностью работой. Цель исследования – оценить и сравнить общий уровень эмоционального интеллекта, а также его параметры у студентов-медиков, изучающих лечебное дело и педиатрию в высших медицинских учебных заведениях. В перекрестное исследование были включены 132 студента старших курсов, из них 107 (81,1%) женщин, в возрасте от 21 до 25 лет (средний возраст 23 ± 1,1 года). 89 (67,4%) участников изучали лечебное дело, 43 (32,6%) – педиатрию. Обе группы были сопоставимы по возрасту, полу и социальному статусу (p > 0,05). Участники самостоятельно сообщали демографические данные и самостоятельно проходили тест эмоционального интеллекта Холла, чтобы оценить свой уровень эмоционального интеллекта и его параметры. Студенты лечебного факультета продемонстрировали более высокий суммарный уровень эмоционального интеллекта по сравнению со студентами педиатрического факультета (32 [7; 51] против 26 [–2; 35], p = 0,031). Низкий уровень эмоционального интеллекта выявлен у 52,8% против 81,4% студентов лечебного и педиатрического факультетов соответственно. Эмоциональная осведомленность значительно лучше

у студентов лечебного факультета (11 [4,5; 15] vs. 8 [0; 12], p = 0,023), а также самомотивация (7 [–1; 10] vs. 3 [–2; 7]), p = 0,035) и управление эмоциями других (9 [–0,5; 12] vs. 5 [–1; 8], p = 0,011). Эмпатия и управление собственными эмоциями были практически на одном уровне у студентов обоих факультетов, хотя эти параметры эмоционального интеллекта были более развиты у студентов лечебного факультета (9 баллов [3,5; 14] vs. 9 баллов [–3; 12]) и 1 балл [–7; 6,5] vs. –1 балл [–5; 3] соответственно). Все студенты – участники исследования, как лечебного, так и педиатрического факультетов, имели низкий уровень эмоционального интеллекта, хотя у студентов лечебного факультета он был выше. Самым слабым показателем эмоционального интеллекта у всех респондентов было управление собственными эмоциями. Мы рекомендуем включать психологические тренинги, направленные на повышение эмоционального интеллекта, в учебный план как для студентов-лечебников, так и для студентов-педиатров.

Ключевые слова: эмоциональный интеллект, студенты-медики, педиатрический факультет, лечебный факультет, тест эмоционального интеллекта Холла, поперечное одномоментное исследование, сочувствие, гибкие навыки

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1. Introduction

Emotional intelligence (EI) is the ability of individuals to recognize their own emotions and those of others, discern between different feelings and label them appropriately, use emotional information to guide thinking and behavior, and adjust emotions to adapt to environments [7].

Several components of emotional intelligence have been identified so far: the ability to understand own emotions and emotion of others; the ability to control and use emotions and the ability to accurately perceive, evaluate and express emotions as well [20].

EI is an indispensable part of the professional competencies of a medical student and a doctor. It is generally accepted that a high level of EI in a physician correlates with better clinical outcomes, patient satisfaction, good teamwork skills and a lower rate of professional burnout [23]. Data on EI of medical students of different specialties are limited. Historically, general medicine and pediatrics are offered as two independent curricula in many Medical Schools. EI components of general medicine and pediatric students have never been analyzed and compared before. Meanwhile, it seems to be an important issue considering the significant differences in patient populations. Pediatricians work with children and interact closely with their parents when explaining information about diagnosis and treatment, whereas general medicine specialists work only with adult patients. Therefore, our working hypothesis is that EI in pediatricians or at least its particular components, such as recognition of others' emotions, must be superior to that of general medicine specialists. The purpose of the study was to evaluate and compare EI in senior students studying at General Medicine and Pediatrics programs at medical universities to optimize future physician training.

2. Materials and methods

2.1. Study type

A cross-sectional quantitative study was conducted.

2.2. Participants

We interviewed 132 senior (six-year) students (61% – Sechenov University; 39% – Kazan State Medical University), 107 (80%) women, mean age 23.2 ± 1.1 years. Two thirds of the students enrolled in the survey were from the Faculty of General Medicine (GM students, GMS), and one third from the Pediatric Faculty (Pediatrics students, PS). The selected proportions of students were based on a total class size in pediatric and general medicine programs in two medical schools considering the gender distribution of the students. Both the GMS group and the PS group were shown to be compatible in terms of sex, age, and social conditions ($p > 0.05$).

To evaluate the level of possible biases, in addition to the main test, we selected 12 random pairs of students who know each other well (students studied in the same group for at least 3 years) and asked each student in the pair to take the test not only for themselves, but also for their groupmate. Furthermore, we analyzed the discrepancy in self-assessment and external (peer-to-peer) evaluation.

2.3. Instruments

For evaluation of EI we applied Hall's emotional intelligence test, which is an international instrument validated for the given purpose. The test questionnaire consists of 30 items, the answers to which are assessed using the 6-point Likert scale (Disagree strongly: –3 points; disagree: –2 points; disagree slightly: –1 point; agree slightly: +1 point; agree: +2 points; agree strongly: +3 points). The elements refer to five scales so that each scale contains six elements without overlapping: "emotional awareness"; "managing your emotions"; "self-motivation"; "empathy"; "managing the emotions of others' emotions". The questions on each of the scales are distributed in random order in the questionnaire to reduce biased responses. "Emotional awareness" demonstrates whether the respondent understands what particular emotions they are feeling at the moment and why. 'Managing your emotions' shows whether an individual has the ability to control his own emotions and use them to achieve certain goals. 'Self-motivation' assesses the ability to motivate yourself using one's own emotions. "Empathy" in this test reflects not only the ability to empathize and sympathize, but also to understand what feelings and emotions other people are experiencing and why. "Managing the emotions of others" shows whether the student is able to influence other people's feelings and to use them to achieve his own goals. Each EI component is classified as high, medium, or low, depending on the sum of the points (≥14 points – high; 8–13 points – medium; ≤7 points – low). In addition to assessing the separate components of EI, the Hall emotional intelligence test allows us to evaluate the integral level of EI: "cumulative emotional quotient" (≥70 points – high; 40–69 points – medium; ≤39 points – low).

2.4. Ethics

Before the beginning of the study, students received a research information sheet. Participation in the study was voluntary and anonymous. All students provided their informed consent to participate in the research. The study is approved by the local ethics committee of Sechenov University (protocol number 10–21 of June 17, 2021).

2.5. Statistical analysis

Statistical analysis was performed using the IBM Statistical Package for the Social Sciences (SPSS) Statistics v. 22 program. Discrete data are presented as absolute values and percentages. Continuous data are presented as an arithmetic mean ± mean square deviation in the case of normal distribution or as quartiles 50 [25; 75] if the distribution was different from

normal. The normality of the distribution was tested using the Kolmogorov–Smirnov criterion. The Mann–Whitney criterion (U-test) was used to estimate the differences between two independent groups. The Wilcoxon test was performed to assess differences in related samples (self-assessment and peer assessment in pairs). Statistically significant differences were considered to be those at $p \leq 0.05$.

3. Results

3.1. General Hall emotional intelligence test results in GMS and PS

Statistically significant differences between GMS and PS were obtained in 6 of the 30 questions (table 1). GMS were significantly more likely to respond positively that they could influence others in a calming way (question 12: 2 [–1; 3] vs. 1 [–1; 2], $p = 0.002$) and improve others' mood (question 26: 2 [0; 3] vs. 1 [–1; 2], $p = 0.004$). Furthermore, GMS were more likely to agree that people who are aware of their feelings are more successful in managing their lives (question 25: 3 [1; 3] vs. 2 [–1; 3], $p = 0.018$). GMS demonstrated a greater tendency to analyze their own negative emotions (question 17: 1 [–1; 3] vs. 1 [–2; 2], $p = 0.015$) and to understand the needs of others (question 23: 2 [1; 2] vs. 1 [–1; 2], $p = 0.016$). Finally, GMS were more inclined to agree with the statement that they could force themselves to face obstacles again and again if necessary (question 13: 2 [–1; 2] vs. 1 [–1; 2], $p = 0.027$).

Table 1

Statistical analysis of the Hall emotional intelligence (EI) test results in students from the general medicine and pediatric faculties

Question	General Medicine	Pediatrics	*p*-value
1. Both negative and positive emotions serve me as a source of knowledge about how to act in life	2 [2; 3]	3 [2; 3]	>0.05
2. Negative emotions help me understand what I need to change in my life	2 [1; 3]	2 [1; 3]	>0.05
3. I am calm when I feel pressure from the outside	–1 [–2; 1]	–1 [–2; 1]	>0.05
4. I can observe the change in my feelings	2 [1; 3]	2 [1; 2]	>0.05

Continuation of table 1

Question	General Medicine	Pediatrics	*p*-value
5. When necessary, I can be calm and focused to act according to the demands of life	2 [1; 2]	1 [–1; 2]	>0.05
6. When necessary, I can evoke a wide range of positive emotions, such as fun, joy, inner surge, and humor	1 [–1; 2]	1 [–2; 2]	>0.05
7. I closely monitor my health	2 [1; 3]	1 [–1; 2]	>0.05
8. After something has upset me, I can easily control my feelings	1 [–1; 2]	–1 [–1; 1]	>0.05
9. I can listen to the problems of other people	3 [1; 3]	2 [1; 3]	>0.05
10. I do not dwell on negative emotions	–1 [–1; 2]	–1 [–2; 1]	>0.05
11. I am sensitive to the emotional needs of others	2 [1; 2]	2 [1; 2]	>0.05
12. I can have a soothing effect on other people	**2 [–1; 3]**	**1 [–1; 2]**	0.002*
13. I can force myself to face obstacles over and over again	**2 [–1; 2]**	**1 [–1; 2]**	0.027
14. I try to approach life's problems creatively	1 [–1; 2]	1 [–1; 1]	>0.05
15. I adequately respond to the moods, motivations, and desires of other people	2 [1; 2]	2 [–1; 2]	>0.05
16. I can easily enter a state of calmness, alertness, and focus	1 [–1; 2]	1 [-1; 1]	>0.05
17. When time permits, I deal with my negative feelings and figure out what the problem is	**1 [-1; 3]**	**1 [-2; 2]**	0.015
18. I can quickly calm down after an unexpected upset	–1 [–2; 2]	–1 [–1; 1]	>0.05
19. Knowing my true feelings is important to stay in good shape	2 [1; 3]	2 [–1; 2]	>0.05
20. I understand well the emotions of other people, even if the latter are not openly expressed	1 [–1; 3]	1 [–1; 2]	>0.05

End of table 1

Question	General Medicine	Pediatrics	*p*-value
21. I can recognize emotions well from facial expressions	2 [–1; 2.5]	2 [–1; 2]	>0.05
22. I can easily put aside negative feelings when it is necessary to take action	1 [–1; 2]	1 [–1; 2]	>0.05
23. I am good at picking up signs in communication that indicate what others need	**2 [1; 2]**	**1 [–1; 2]**	0.016
24. People consider me to be a good judge of other people's experiences	1 [–1; 2]	1 [–1; 2]	>0.05
25. People who are aware of their true feelings are more successful in managing their lives	**3 [1; 3]**	**2 [–1; 3]**	0.018
26. I can improve the moods of other people	**2 [0; 3]**	**1 [–1; 2]**	0.004
27. You can consult with me on issues people have in their relationships	2 [1; 3]	1 [–1; 2]	>0.05
28. I am good at listening to other people's emotions	2 [–1; 2]	1 [–1; 2]	>0.05
29. I help others to use their motivations to achieve their personal goals	1 [–1; 2]	1 [–1; 2]	>0.05
30. I can easily disconnect from worrying about problems	–1 [–2; 1]	–1 [–2; 1]	>0.05

* Statistically significant differences are highlighted in bold.

3.2. Separate components of emotional intelligence in GMS and PS

Separate EI components: ≥14 or more – high; 8–13 – medium; ≤7 – low.

The "Emotional awareness" score differed significantly between GMS and PS. This indicator was higher for GMS (11 [4.5; 15] vs. 8 [0; 12], $p = 0.023$). A high level of emotional awareness prevailed among GMS (37% of respondents), while most PS (48.8%) showed a low level of this EI component. Only 11.6% of PS had a high level of emotional awareness (fig. 1*a*).

The score of "Managing your emotions" was low in the vast majority of GMS (78.7%) and PS (93%) and represented 1 [–7; 6.5] vs. –1 [–5; 3], $p > 0.05$). Only 3.4% of the students who responded from the Faculty of General Medicine demonstrated a high level of control over their own emotions. Among PS, not a single person scored a sufficient number of points for a high level, in 7% this EI component was medium (fig. 1*b*).

"Self-motivation" is another component of EI that differed statistically between GMS and PS. This parameter was generally higher for GMS: 7 [–1; 10] vs. 3 [–2; 7], $p = 0.035$. However, a low level of self-motivation prevailed in both groups: 55.1% of respondents among GMS and 79.1% among PS (fig. 1*c*).

No statistically significant differences were found in the "empathy" scores in GMS and PS (9 [3.5; 14] versus 9 [–3; 12], $p > 0.05$), but only one-third of GMS and one-fifth of PS demonstrated a high level of empathy. Approximately 40% of the respondents in both groups had a low level of empathy (fig. 1*d*).

The "Managing the emotions of others" was found to be better developed in GMS compared to PS: 9 [–0.5; 12] vs. 5 [–1; 8], $p = 0.011$. Among GMS, 40% and 20% of the respondents demonstrated medium and high levels of this component, respectively, while among PS, this index was low in two-thirds and medium in only a quarter of the respondents (fig. 1*e*).

3.3. Cumulative emotional quotient in GMS and PS

The "Cumulative emotional quotient" score was significantly higher for GMS than for PS (32 [7; 51] vs. 26 [–2; 35], $p = 0.031$. A high level of EI was observed only in 4.5% of GMS and 2.3% of pediatricians (fig. 2). Cumulative emotional quotient: ≥70 or more – high; 40–69 – medium; ≤39 – low.

3.4. Paired emotional intelligence evaluation

The paired EI evaluation showed the minimum differences between the EI assessment results in 12 random pairs of students (table 2). The only EI component for which the differences were close to statistically significant was the management of the emotions. Significant differences were obtained for questions 18 and 25. In the 18th question "I can calm down quickly after an unexpected upset", the self-reported scores were lower than those of the peers: 1 [–1; 2] vs. 1 [1; 2], $p = 0.046$. In the 25th question "People who are aware of their true feelings are more successful in managing their lives", more points were received from respondents than from their peers: 2 [1; 3] vs. 1.5 [1; 2], $p = 0.026$.

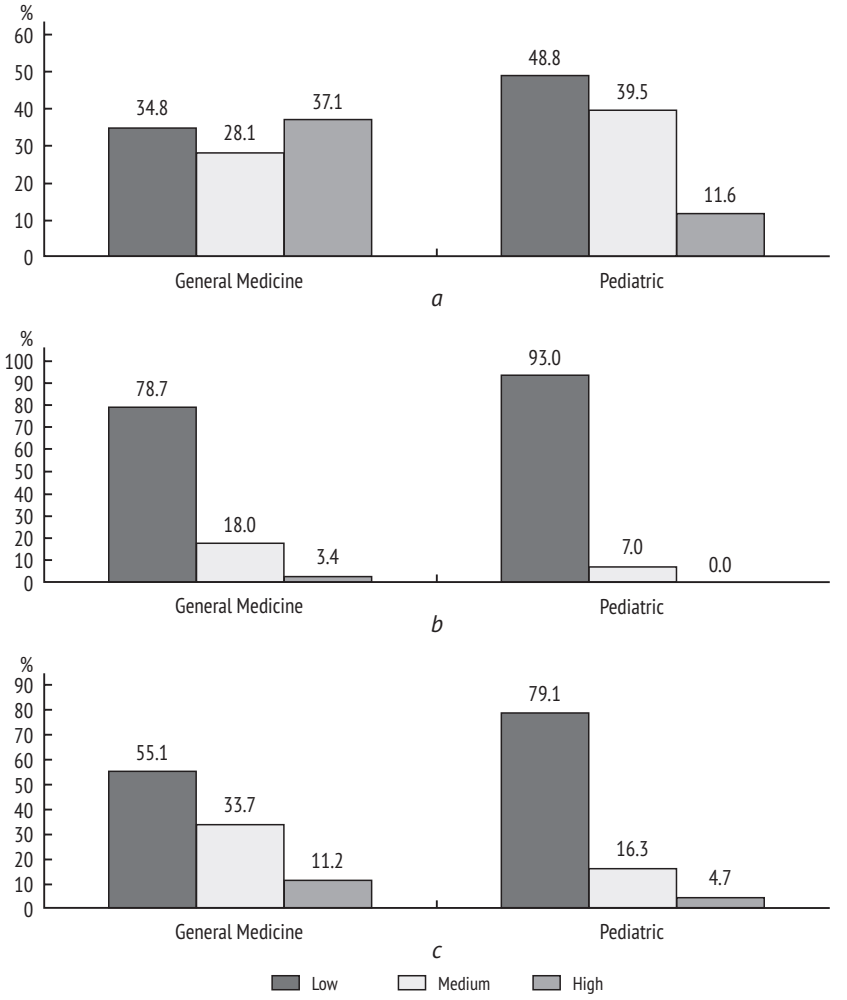

Fig. 1. Comparative analysis of the results of the emotional intelligence assessment in students of the General Medicine and Pediatric Faculties:

a – emotional awareness; *b* – managing your emotions; *c* – self-motivation; *d* – empathy; *e* – managing the emotions of others

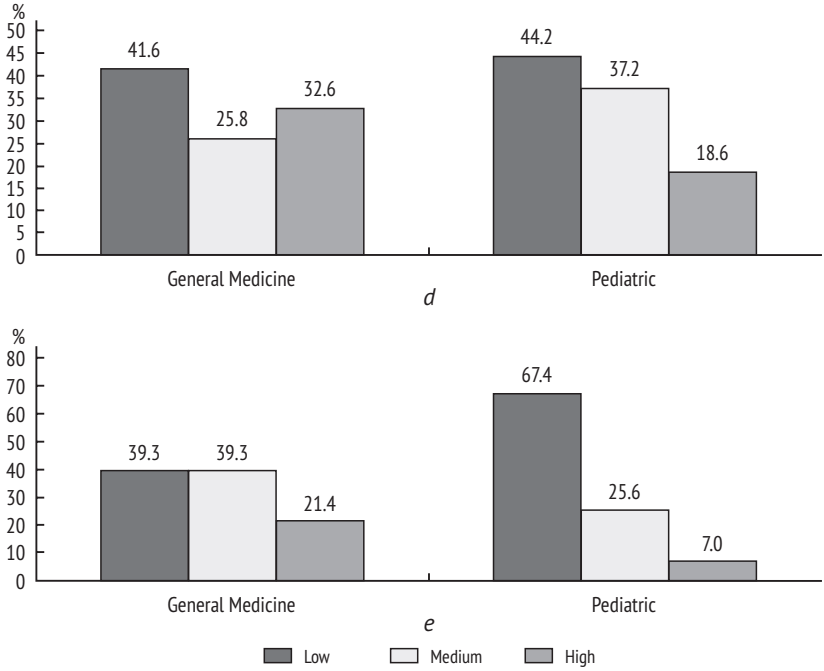

Fig. 1. End

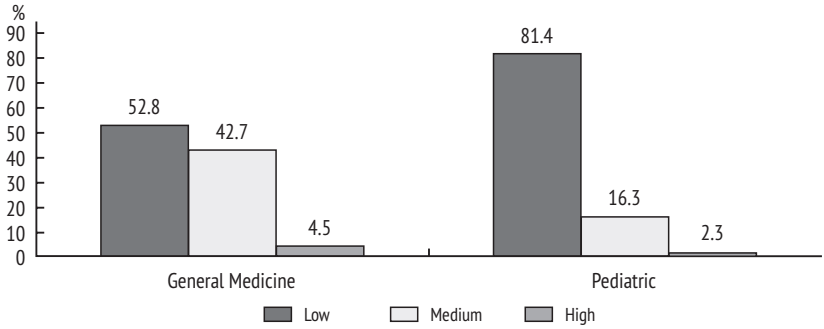

Fig. 2. Cumulative emotional quotient in GMS and PS

Table 2

Estimation of the differences between the EI assessment results in 12 random pairs of students who know each other for a long time

Parameters	Self-assessment	Peer assessment	*p*-value
Emotional awareness	8.5 [5.25; 14.75]	9 [6; 11.75]	0.65
Managing your emotions	7.5 [–4; 11]	9 [2.5; 14]	0.051
Self-motivation	9.5 [1.25; 14.5]	9.5 [1.25; 14.5]	1
Empathy	12 [7.5; 14]	11 [8.25; 14]	0.764
Managing the emotions of others	10.5 [9; 12.75]	11.5 [8.25; 14]	0.76
Cumulative emotional quotient	51 [18.25; 64.75]	54.5 [34.5; 59.75]	0.58

4. Discussion

Despite the wide coverage of the topic of EI in medical students around the world, there are limited publications devoted to comparison of its components between different profile medical specialists available [12]. The EI of internists and surgeons has been evaluated in a single study by Weng et al. in 2011 [22]. A comparative study of medical, dental and nursing program students was conducted in England, revealing no significant differences between the specialties [2].

The Hall emotional intelligence test we chose for our study allowed us to assess and analyse not only cumulative emotional quotient, but also separate components of EI.

"Emotional awareness" is important for physicians of any specialty because it allows a physician to notice signs of emotional burnout, depression, and anxiety disorders and to apply specialized help in a timely manner. It is essential for pediatricians working with adolescents since emotional changes in these patients can indicate the onset of various psychopathological conditions such as aggressive and suicidal behavior. Our result showed a low level of emotional awareness in PS, and this could be a weak point in their education.

"Managing your emotions" is an indicator of the ability to communicate with both patients and colleagues, which needs to always be cultivated and improved. The number of students with high control of their own emotions was surprisingly low in both faculties and suggests a strong need for special psychological training aimed at improving emotion management.

A low level of 'self-motivation' also prevailed in both groups, which also suggests the need to correct this parameter with appropriate training, as its low level may affect both the quality of study and future quality of medical care.

"Empathy" plays a vital role in the establishment of physician-patient contact [8]. It was expected that this indicator would be high for students from both faculties, but the distribution turned out to be different. It is necessary to actively identify students with a low level of empathy and improve it with the help of psychological correction, and to associate EI and gratitude with empathy in medical students [13].

"Managing the emotions of others" Self-motivation is not only a component of emotional intelligence, but also an essential soft skill that all clinicians must be competent in. However, this component is very important for pediatricians, as it often allows them to persuade a child to undergo upcoming treatment or to properly inform parents about the need for medical involvement (vaccination, surgical operations, etc.). Thus, pediatricians with low level of management of emotions of others should be identified and also referred for appropriate training.

Surprisingly, self-reported scores appeared to be lower than those of peers. In total, peers overestimated their groupmates' ability to manage their own emotions. However, isolated differences in self-assessment and peer-to-peer assessment were not statistically significant ($p > 0.05$) and did not affect the overall result. This allowed us to conclude that the respondents' self-assessment in the Hall test was highly objective.

The overall picture appeared to be rather disappointing. Half of the GMS and four-fifths of the PS had a low cumulative emotional coefficient, a logical reflection of the problems we described in our analysis of the separate components of EI. One of the factors that could have affected these results is the timing. Students were asked to complete the questionnaire during the COVID-19 pandemic, which is associated with uncertainty and stress. The latter has previously shown a negative correlation with EI in several studies [11; 14; 16]. On the other hand, a difficult worldwide situation such as a pandemic demands more qualified medical specialists to be trained who should have much higher EI than usual. Meanwhile, the findings of similar studies on senior medical students around the world are quite diverse and controversial [12].

The unexpected finding of this study was that pediatric faculty students have demonstrated lower scores in several EI components compared to general medicine faculty students. Pediatric communication also has its own specifics: finding a common language with children, adolescents and their parents, understanding young patients without words, being able to calm

and inspire confidence, helping overcome anxiety and fear, and finding the right words to comfort the patient [8]. Our assumption that self-control, the ability to regulate own and other people's emotions, the ability to feel the emotional states and experiences of a child and an adult, to empathize and respond to these feelings and emotions, while maintaining clarity of thought and a clear understanding of the required professional therapeutic actions is more important for the ones being prepared to work with children, was not confirmed. Apparently, students from both faculties equally need a certain intervention and changes in the curricula to promote the development of EI.

It might be possible to introduce modern types of activities to help the student develop emotional intelligence. For example, future pediatricians will certainly benefit from social and medical volunteer work related to education and disease prevention among adolescents and young people and helping parents and children who need support. This could be families with disabled children, pediatric patients with an autism spectrum disorder. Future physicians can be cooperating with children's health centers, etc. [8].

Understanding the relevance of EI in a future specialist allows educators to pay the most serious attention to them, to place appropriate accents, and to take a fresh look at the organization of the educational process in a medical university, including the training of future pediatricians. Changes in the curriculum should include both tools for the assessment and development of EI. Psychometric testing upon admission to both undergraduate and clinical residency programs should be considered first to select future medical professionals who fit the purpose. Evaluation of general intellectual ability, critical thinking, problem solving ability along with EI components using that tool has proven its importance and effectiveness in multiple studies in different countries [3; 21; 24]. Regarding the instruments to be introduced to medical schools to promote EI development in trainees, the following should include complex simulations with standardized real and virtual patients that exceed practical and communication skills building [18; 15], also team-based learning (TBL) in pediatric bedside teaching [9].

Reflective writing should become an essential component of learning the humanities and clinical medicine at all levels of training, including continuous professional development [5; 17]. Its undeniable advantage is in its simplicity, cost-effectiveness, and multipurposeness [1; 4; 6]. Faculty members would only need to undergo the 'train the trainer' program based on the principles of BEGAN [19]. Another essential change that must be introduced in medical universities to build EI in medical undergraduates is the formative feedback application as an evaluation tool to monitor student progress, as some authors have suggested [10]. Further study of EI is needed in students of medical universities of various specialties.

5. Conclusions

The cumulative emotional quotient was higher in the senior students of GMF compared to PF. Students from GMF demonstrated better results in such components of EI as emotional awareness, self-motivation, and managing the emotions of others. However, we should consider that an insufficient level of EI prevailed among all students regardless of the faculty, with particularly low scores shown by respondents in terms of managing their emotions. Therefore, we highly recommend modifying the existing medical curriculum in Medical Schools by introducing approaches to improve EI for both GMF and PF students.

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