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Original Research

Assessment of emotional intelligence in pediatric and med-peds residents

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ABSTRACT

Objective: The purpose of this study was to determine the baseline emotional intelligence (EI) scores of pediatric and Med-Peds residents and to identify the components of EI that were high or low. **Methods:** The residents from pediatric and Med-Peds residency programs at a university-based training program volunteered to complete an online self-report EI survey (EQ-i 2.0) in May 2015. A summary EI score report was generated for each resident by a consulting firm. De-identified score reports were compared between programs and by year of training. **Results:** All pediatric and Med-Peds residents completed the survey (N=47). The median score for the group as a whole for overall EI was higher than the national average and considered to be in the high range (110). The highest median subcomponent scores were in impulse control (114) and empathy (113), and the lowest subcomponent scores were in Independence (101) and assertiveness (102). No difference was seen between pediatric and Med-Peds residents in their total EI scores or the various components. The residents in their early years of training (post graduate year [PGY] 1-2) compared to later years of training (PGY 3-4) showed significant differences in the component of assertiveness (100 vs. 109, and $P = 0.002$) and Empathy (115.5 vs. 110, and $P = 0.03$).**Conclusions:** As a group, pediatric and Med-Peds residents scored lowest in areas of independence and assertiveness. While assertiveness scores improved with added years of training, empathy scores decreased. To improve the overall level of EI of pediatric and Med-Peds residents, educational interventions should focus on the areas of independence, assertiveness, and empathy.

KEY WORDS: Emotional intelligence, pediatric, residents

INTRODUCTION

Emotional intelligence (EI) has been described as the ability to recognize and understand emotions in yourself and others, and the ability to use this awareness to manage your behavior and relationships [1]. This skill is particularly important for physicians as they interact with patients, colleagues, and other members of the health-care team. Weng demonstrated a physician's level of EI positively correlated with patients' trust, which in turn correlated with better patient follow-up, better doctor-patient relationships and increased patient satisfaction [2]. In fact, EI is a critical health-care leadership skill and a key competency in all settings - from administrative roles to the ward and bedside [2]. Unfortunately, the training of health-care providers to develop their EI skills is lacking, and the medical community is just now becoming aware of the value of these skills [3].

This key competency of EI is not traditionally assessed and taught to physicians-in-training. More recent studies have assessed EI skills in resident physicians. In these studies, residents completed various validated self-report questionnaires/inventories that measure their level of EI. One study observed that orthopedic residents scored low on EI and concluded that they may benefit from further training to improve the competencies such as communication, teamwork, and professionalism [4]. Another study demonstrated that surgery, pediatric, and pathology residents had a global EI level similar to that of the general population. However, despite the global EI score of the resident physicians being average, there were distinct areas of the high and low development relative to the general population sample [5]. Jensen *et al*. determined that the EI scores of surgical residents were higher than that of the normal population. However, since the individual score reports varied greatly, the authors concluded that assessment of EI could provide a powerful educational needs assessment for surgical residents on an individual basis [6].

Unfortunately, the majority of studies analyzing EI skills have not included pediatric residents in their study population. The purpose of this study was to establish the baseline EI scores of pediatric and Med-Peds residents and to identify the components of EI that were high or low, allowing a better understanding of areas for further EI development in our residents.

METHODS

In May 2015, residents from the pediatric and Med-Peds residency programs voluntarily participated in an online EI survey assessing their EI skills. The survey tool used was the Bar-On emotional quotient inventory 2.0, EQ-i 2.0® [7],

administered by the consulting firm of Xcellero leadership. The survey is an online 133-item self-assessment instrument that uses a 5-point Likert scale to measure EI on 5 composite scales and 15 content subscales. All scores are normalized to a national mean of 100 with a standard deviation 15. Before completing the EI survey, respondents were asked to provide demographic information including age, gender, postgraduate year (PGY) of training, and specialty. Each participant accessed the online survey using a unique password. A summary EI score report was created for each resident and de-identified score reports generated by the consulting firm were then forwarded to the investigators and used to analyze the results. The study received exempt status by the Loyola University Health Sciences Institutional Review Board.

Statistical Methods

Fisher's exact test was used to compare respondents' gender by residency type (i.e., pediatric vs. Med-Peds) and residents' PGY by residency type. For each construct, normality of the EI composite scores were evaluated visually using QQ plots stratified by residency type and PGY. Due to observing some non-normally distributed scores, nonparametric models were necessary.

The median values for each construct were tabled along with their interquartile range by residency type and separately by PGY. Non-parametric Wilcoxon rank sum tests were used to detect differences in these composite EI scores between peds and Med-Peds residents as well as between PGY 1 and 2 versus PGY 3 and 4. In this way, each construct was treated as a different outcome, and no adjustment was used to control Type I error. Finally, some sensitivity analyses were conducted. We used Wilcoxon rank sum tests to detect differences in EI scores by gender, and we standardized as z-scores all residents' scores using norms for the general population [7].

RESULTS

All pediatric (n = 31) and Med-Peds (n = 16) residents completed the EQ-i 2.0® survey [Table 1]. The majority of respondents were female (77%), and gender was comparable between residency types (P = 0.15). Further, residents equally represented PGY 1 through 3 (n = 14 per year), with few reporting they were in their 4th year (n = 5 or 11%); there was no difference in PGY by residency type (P = 0.19).

Regarding overall EI, the median composite score for all respondents was 110 (IQR = 103 - 116), which was higher than the national average and considered to be in the high range [Figure 1]. Among all respondents, the highest scores were observed in impulse control (Mdn = 114, and IQR = 105 - 123), empathy (Mdn = 113, and IQR = 110 - 121)), and social responsibility (Mdn = 112, and IQR = 101 - 117) the lowest scores were in assertiveness (Mdn = 102, and IQR = 98 - 112), flexibility (Mdn = 102, and IQR = 96 - 111), and independence (Mdn = 101, and IQR = 93 - 107).

Table 1: Demographic information of residents

Demographic variable	Med-Peds residents n=16 (%)	Pediatric residents n=31 (%)	Total residents n=47 (%)	P
Sex				0.15
Female	10 (63)	26 (84)	36 (77)	
Male	6 (38)	5 (16)	11 (23)	
Year of training				0.19
PGY 1	4 (25)	10 (32)	14 (30)	
PGY 2	4 (25)	10 (32)	14 (30)	
PGY 3	4 (25)	10 (32)	14 (30)	
PGY 4	4 (25)	1 (3.2)	5 (11)	

PGY: Post-graduate year

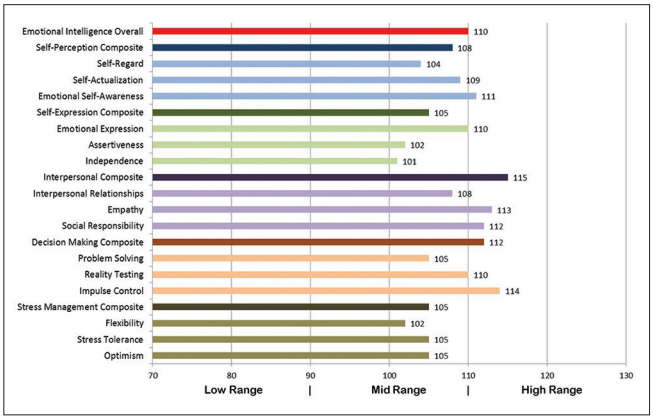

Figure 1: Median composite and subcomponent scores for all residents

A summary of resident scores is stratified by the number of residents scoring in the low, mid, or high range in Table 2. 25 residents (53%) had a total EI score in the high range. The EI component of empathy had the most number of residents in the high range (77%), while the independence construct comprised a large number of residents in the low range (21%).

Importantly, there were no differences between pediatric and Med-Peds residents on their total EI scores or any other EI composite score [all P > 0.05; Table 3]. The EI composite scores were further analyzed by dichotomous PGY (i.e., early years of training versus later years of training), and generally, EI was comparable between the two groups [Table 4]. However, residents in their early years of training (PGY 1-2) had the lower assertiveness (Mdn = 100, and IQR = 91 - 108) when compared to those in later years of training (Mdn = 109, and IQR = 102 - 116; P = 0.002) yet the higher Empathy composite scores (Mdn = 116, and IQR = 111 - 123) when compared to those in later years of training (Mdn = 110, and IQR = 102 - 115; P = 0.03) [Table 4].

Regarding the sensitivity analyses, we did not detect any differences in EI composite scores between males and females (not tabled), and overall EI was not a function of residents' age (R^2 = 0.0001 and P = 0.94). Further, we found that our sample of residents' scores was comparable to the general population used to validate the EQ-i 2.0 survey (not tabled).

Table 2: Scores by range

EI component	Score range		
	Low (70-89) (%)	Mid-range (90-109) (%)	High-range (110-130) (%)
Total EI	0	22 (47)	25 (53)
Self-perception composite	0	25 (53)	22 (47)
Self-regard	5 (11)	30 (64)	12 (26)
Self-actualization	0	25 (53)	22 (47)
Emotional self-awareness	3 (6)	17 (36)	27 (57)
Self-Expression composite	3 (6)	28 (60)	16 (34)
Emotional expression	5 (11)	18 (38)	24 (51)
Assertiveness	4 (9)	29 (62)	14 (30)
Independence	10 (21)	26 (55)	11 (23)
Interpersonal composite	0	15 (32)	32 (68)
Interpersonal relationships	1 (2)	24 (51)	22 (47)
Empathy	0	11 (23)	36 (77)
Social responsibility	0	20 (43)	27 (57)
Decision making composite	1 (2)	20 (43)	26 (55)
Problem solving	6 (13)	25 (53)	16 (34)
Reality testing	1 (2)	22 (47)	24 (51)
Impulse control	1 (2)	16 (34)	30 (64)
Stress management composite	4 (9)	27 (57)	16 (34)
Flexibility	7 (15)	26 (55)	14 (30)
Stress tolerance	5 (11)	26 (55)	16 (34)
Optimism	5 (11)	26 (55)	16 (34)

Valid counts are tabled. Percentages are within row. EI: Emotional intelligence

Table 3: Med-Peds versus pediatric resident scores

EI component	Med-Peds residents (n=16)	Pediatric residents (n=31)	Total residents (n=47)	*P*
Total EI	113.0 (102.5. 117.5)	110.0 (104.0, 115.0)	110.0 (103.0, 116.0)	0.97
Self-perception composite	110.0 (99.0, 113.5)	107.0 (102.0, 119.0)	108.0 (102.0, 116.0)	0.55
Self-regard	103.0 (93.5, 109.0)	104.0 (99.0, 113.0)	104.0 (95.0, 111.0)	0.64
Self-actualization	110.5 (107.0, 115.5)	109.0 (104.0, 117.0)	109.0 (104.0, 117.0)	0.46
Emotional self-awareness	106.0 (97.0, 118.0)	111.0 (104.0, 122.0)	111.0 (101.0, 122.0)	0.09
Self-expression composite	111.0 (100.5, 115.5)	104.0 (94.0, 111.0)	105.0 (96.0, 114.0)	0.18
Emotional expression	105.0 (101.5, 116.0)	110.0 (95.0, 121.0)	110.0 (100.0, 118.0)	0.51
Assertiveness	109.0 (102.0, 116.0)	102.0 (95.0, 112.0)	102.0 (98.0, 112.0)	0.06
Independence	106.0 (94.0, 110.0)	101.0 (81.0, 104.0)	101.0 (93.0, 107.0)	0.09
Interpersonal composite	112.5 (107.5, 117.0)	115.0 (108.0, 120.0)	115.0 (108.0, 120.0)	0.49
Interpersonal relationships	106.5 (100.0, 113.0)	111.0 (105.0, 122.0)	108.0 (103.0, 119.0)	0.24
Empathy	110.0 (110.0, 113.0)	115.0 (107.0, 123.0)	113.0 (110.0, 121.0)	0.13
Social responsibility	113.5 (108.0, 124.0)	112.0 (105.0, 119.0)	112.0 (105.0, 119.0)	0.34
Decision-making composite	112.0 (99.5, 117.0)	113.0 (103.0, 117.0)	112.0 (101.0, 117.0)	0.31
Problem solving	102.0 (94.5, 113.0)	105.0 (99.0, 110.0)	105.0 (96.0, 113.0)	0.96
Reality testing	106.5 (93.0, 114.0)	110.0 (103.0, 117.0)	110.0 (103.0, 117.0)	0.18
Impulse control	112.5 (105.0, 123.0)	114.0 (105.0, 123.0)	114.0 (105.0, 123.0)	0.80
Stress management composite	105.5 (100.5, 116.5)	105.0 (95.0, 111.0)	105.0 (98.0, 112.0)	0.29
Flexibility	100.5 (96.0, 109.5)	105.0 (93.0, 113.0)	102.0 (96.0, 111.0)	0.92
Stress tolerance	108.5 (102.0, 115.0)	104.0 (94.0, 110.0)	104.0 (99.0, 110.0)	0.08
Optimism	108.0 (103.0, 114.5)	103.0 (98.0, 113.0)	105.0 (100.0, 113.0)	0.12

Median composite scores for each construct are tabled with their interquartile range. EI: Emotional intelligence

DISCUSSION

We demonstrated that our pediatric and Med-Peds residents as a group have EI levels in the high range measured by the EQ-i 2.0® self-assessment tool. In fact, 53% of the residents in our study had an EI score considered to be in the high range, a very different finding from Chan's study of orthopedic residents, which found only 10% to be in the competent range [4]. Our study cohort had an overall EI score that was above the general population (110 vs. 100) although this was not statistically significant. This may be due to our small sample size and lack of power in our study. When we compared pediatric to Med-Peds residents, we found no difference in their overall EI score or its various components.

The results of our study show pediatric and Med-Peds residents rated themselves higher in some constructs of EI and lower in other areas. In our study, the areas of impulse control, empathy, and social responsibility were all observed in the high range. The components with the lowest scores were assertiveness, flexibility, and independence, with scores in the mid-range for all of these areas.

Table 4: PGY and scores

EI component	PGY 1 and 2 (n=28)	PGY 3 and 4 (n=19)	P
Total EI	110.0 (102.5, 116.5)	112.0 (103.0, 115.0)	0.91
Self-perception composite	106.0 (102.0, 118.0)	110.0 (103.0, 116.0)	0.50
Self-regard	104.0 (93.5, 107.5)	104.0 (99.0, 113.0)	0.43
Self-actualization	108.0 (104.0, 117.0)	112.0 (104.0, 114.0)	0.93
Emotional self-awareness	111.0 (101.0, 122.0)	111.0 (104.0, 122.0)	0.97
Self-expression composite	103.5 (94.0, 112.0)	106.0 (101.0, 115.0)	0.24
Emotional expression	106.5 (103.0, 117.0)	110.0 (98.0, 121.0)	0.80
Assertiveness	100.0 (91.0, 107.0)	109.0 (102.0, 116.0)	0.002*
Independence	101.0 (90.0, 110.0)	101.0 (93.0, 107.0)	0.97
Interpersonal composite	114.5 (110.0, 119.5)	115.0 (106.0, 120.0)	0.40
Interpersonal relationships	108.0 (105.0, 119.0)	111.0 (100.0, 119.0)	0.95
Empathy	115.5 (111.5, 122.0)	110.0 (102.0, 115.0)	0.03*
Social responsibility	112.0 (106.5, 119.0)	112.0 (105.0, 122.0)	0.91
Decision making composite	112.5 (102.0, 120.0)	112.0 (101.0, 115.0)	0.42
Problem solving	106.0 (90.0, 111.5)	102.0 (99.0, 113.0)	0.99
Reality testing	110.0 (101.5, 117.0)	107.0 (103.0, 114.0)	0.59
Impulse control	115.5 (108.0, 123.0)	108.0 (102.0, 117.0)	0.12
Stress management composite	106.0 (98.0, 115.0)	105.0 (100.0, 111.0)	0.60
Flexibility	106.5 (96.0, 114.5)	99.0 (87.0, 108.0)	0.09
Stress tolerance	104.0 (99.0, 110.0)	104.0 (99.0, 110.0)	0.85
Optimism	103.0 (93.5, 116.0)	105.0 (103.0, 113.0)	0.45

Median composite scores for each construct are tabled with their interquartile range. PGY: Post graduate year, EI: Emotional intelligence. *P<0.01

The finding that certain dimensions of EI are high (impulse control, empathy, and social responsibility) while other dimensions are low (assertiveness, flexibility, and independence) in our resident population could represent a self-selection process into these specialties. The residents that choose to take care of children as a career may have personality traits that allow them to work better with pediatric patients. Greenberg *et al*. found most pediatric residents had high or moderate preferences to show affection or warmth toward others (i.e., to be empathetic) [8]. Borges *et al*. examined EI scores in medical students choosing primary care (including pediatrics) versus non-primary care specialties. They found students matching in primary care specialties had a higher level of empathic concern than those matching in non-primary care specialties [9]. Another study demonstrated students choosing surgery specialties had higher scores on the impulsive sensation seeking and aggression-hostility scales compared to students selecting non-surgery specialties as a career [10]. Warschkow *et al*. found surgeons to be more aggressive than internists. Their study revealed internists actually had an aggressiveness score that was below the general population [11]. The pediatric and Med-Peds residents in our study who have chosen these particular specialties may already have higher levels of impulse control and empathy, and the lower level of assertiveness as characteristics needed to be able to care for children and parents. McKinley *et al*. actually showed similar results in their pediatric group which scored low in assertiveness and high in empathy [5]. The low score in flexibility could reflect a resident's work schedule and rigorous strains of the training environment. Independence scores may be low as an inherent feature of being a trainee who by design does not make many independent clinical decisions. Our study results would suggest that residents caring for pediatric patients may benefit from additional training related to improving assertiveness, flexibility, and independence.

As part of our analysis, we also compared EI scores by level of training and generally observed no difference by PGY. However, when early years of training (PGY 1-2) were compared to later years of training (PGY 3-4), there was a significant difference in the components of assertiveness and empathy. The residents in their later years of training scored higher in assertiveness compared to those in their earlier years. This could be secondary to a resident's comfort level and increased self-confidence in managing their patients over added years of training. The finding that empathy was significantly lower in PGY 3-4 years of training compared to PGY 1-2 years is disconcerting. This phenomenon has, however, been reported in the literature previously. Neumann *et al*. conducted a systematic review of studies looking at empathy of medical students and residents [12]. They concluded that self-perceived empathy declines significantly during the course of medical school and residency; and in particular, as a result of increased contact with patients in the clinical phase of training. Most of the studies in this review evaluated residents in nonpediatric related residency programs. However, Greenberg *et al*. examined only pediatric residents and found no decline in empathy from PGY1 to PGY3 year, which is in contrast to the findings of our study [13]. One reason for this difference may be that we did not follow the same group of residents over the time. We simply compared two separate cohorts of residents at the two separate levels of their training. It is possible the PGY 3-4 year residents in our study always had a lower level of empathy, even while they were PGY 1-2's.

Assertiveness is defined as communicating feelings, beliefs and thoughts openly, and defending personal rights and values in a socially acceptable, non-offensive, and non-destructive manner [7]. Assertiveness as a distinct quality among resident physicians has not been previously studied. Studies have been published regarding the role of speaking up for patient safety issues and clinical decision making. If we consider speaking up as a surrogate of assertiveness, one study of surgery residents demonstrated a decreased willingness of residents to voice concerns related to patient care decisions that they were uncomfortable with [14]. The authors cited some possible reasons for this reluctance which included a hierarchical culture, working with supervisors who were considered less approachable, and trainee personality traits such as being quieter by nature. A recent literature review by Okuyama *et al*. concluded hesitancy to speak up is one factor that may contribute to communication errors and that many junior physicians hesitate to voice their concerns over patient safety [15]. Hesitancy to speak up could indicate a low level of assertiveness since the person was not able to communicate feelings, beliefs, and thoughts openly.

The more senior residents (PGY3-4) in our study did have higher assertiveness scores than the PGY1-2 residents, however, as a group our cohort rated assertiveness as one of the lowest components of their EI.

Our finding that assertiveness scores were higher in our senior residents, while their empathy was lower than our early year residents is also concerning. One would hypothesize does a resident's level of assertiveness increase at the cost of losing empathy? Based on our literature review, this issue as not been previously addressed in the medical education literature. However, a few studies have looked at the power (the ability to influence other people) and its relationship to empathy. In the business world, studies suggest that power may inhibit the ability to pay attention to and comprehend other people's emotional states and thus decrease the ability to experience empathy [16]. This is in contrast to Greenberg *et al*. study in which they specifically looked at pediatric residents and found no change in their sense of power or empathy from their first to third year of postgraduate training [13]. A previous study by Greenberg *et al*. had shown only 15% of pediatric residents had a high need to express control, a personality factor associated with power seeking [8]. They concluded personality factors specific to pediatric residents could account for why sense of power did not increase with acquisition of new knowledge and skills. Our study showed senior residents had a high level of assertiveness which could be related to acquisition of new knowledge and skills. These new skills may increase their self-reported level of assertiveness (ability to communicate feelings, beliefs, and thoughts openly) but may not necessarily lead to a sense of increased power (ability to influence other people). More studies are needed to understand the relation between assertiveness and empathy.

A study by Orsini and Jerez in dental education literature may serve as a model on how to teach health-care providers key elements of EI such as empathy and assertiveness. The authors outlined indicators specifying how a dental student should act to fulfill a specific element related to the dimension of social skill [17]. They listed eleven indicators that help show an empathic and assertive attitude during clinical care to establish a satisfactory dentist-patient relationship. These indicators include: Clinician expresses kindness while reflecting a positive attitude of willingness to help, supports and bases his/her ideas without offending or neglecting the patient; care provider finds the right time to express any criticism or complaints; practitioner acknowledges the patient's point of view without necessarily adopting the same perspective; health-care professional diverts objections and complaints through a calm and calculated tone, conveying a reflecting and controlled attitude. Many of these same indicators can be used to teach physicians-in-training how to show empathy and assertiveness as they establish a strong rapport with their patients.

The concept of EI needs to be further explored in medical education. EI may be one of several important theories that help move the culture of medical education ahead by creating a better learning, working, and caring environment [18]. EI has the potential to deepen understanding of the specific competencies related to professionalism and interpersonal and communications skills [18]. These two core competencies may be further developed in residents using specific models of EI. Goleman's model of EI includes the four components of self-awareness, self-management, social awareness, and social skill [19]. These skills allow a person to be aware of and understand how their own emotions affect themselves and how they affect others around them as they build meaningful relationships. This same skill set of EI can be used to help residents become competent in the areas of interpersonal and communication along with professionalism.

The Accreditation Council for Graduate Medical Education (ACGME) and the American Board of Pediatrics partnered to create the Pediatric Milestone Project which delineates 21 competencies that can be evaluated through milestones of achievement [20]. The competency of interpersonal and communications skills, sub-competency 2 states: Demonstrate the insight and understanding into emotion and human response to emotion that allows one to appropriately develop and manage human interactions. The milestone to be achieved by a graduating pediatric resident is as follows: Perceives, understands, uses, and manages emotions in a broad range of medical communication scenarios and learns from new or unexpected emotional experiences; effectively manages own emotions appropriately in all situations; effectively and consistently uses emotions to gain and maintain therapeutic alliances with others. This desired milestone clearly corroborates with the skills of EI.

The competency of professionalism, sub-competency 3: Professional conduct states: High standards of ethical behavior which include maintaining appropriate professional boundaries. The milestone to be achieved is: Has excellent EI about human behavior and insight into self, and uses this information to promote and engage in professional behavior as well as to prevent lapses in others and self. Taylor *et al*. suggest the concept of EI has value for teaching professionalism to physicians-in-training [21]. In fact, Lucey CR contends that the skills self-awareness and self-control, both components of Goleman's EI model, must be taught to residents as part of professionalism curricula [22].

Limitations

Our study had several limitations. First, this was a descriptive, cross-sectional study involving a single group of pediatric and Med-Peds residents at one institution. As a cross-sectional study, we did not follow EI levels over time to determine if scores changed for an individual resident or group of residents. Second, our program is a smaller residency in an academic institution; therefore, this limitation makes it unclear if we can extend our findings to pediatric and Med-Peds residents at larger academic-based training programs or residents at community hospitals. Although all residents in the two programs completed the EI assessment, our small cohort makes it difficult to generalize our results to all pediatric and Med-Peds residents. The small

sample size could also preclude us from identifying other significant differences between various EI components related to gender, level of training, and type of residency program. Another limitation stems from the fact we focused only on trainees that work with children, so we cannot extrapolate these results to other specialties. In addition, we used a validated self-assessment tool to measure EI; and therefore, this could introduce potential problems with self-reporting bias. Finally, this study did not compare a resident's EI level and performance during residency training. Further research comparing, the relationship between pediatric residents' EI levels and their summative evaluations for ACGME competencies such as professionalism and interpersonal/communications skills would be beneficial.

CONCLUSION

This study demonstrates pediatric and Med-Peds residents as a group scored in the high range for their overall EI level. The components of EI in which they rated themselves highest were impulse control, empathy, and social responsibility. The areas that were scored the lowest included assertiveness, flexibility, and independence. While assertiveness scores did improve with added years of training, empathy scores declined. Educational interventions to improve resident EI scores should focus on the areas of independence, assertiveness, and empathy. These interventions should help them become assertive but should ensure they do not lose empathy.

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