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The associates of Emotional Intelligence in medical students: A systematic review

Deepthi Edussuriya[1], Sriyani Perera[2], Kosala Marambe[3], Yomal Wijesiriwardena[1] & Kasun Ekanayake[1]

[1]Department of Forensic Medicine, Faculty of Medicine, University of Peradeniya, Sri Lanka; [2]Medical Library, University of Peradeniya, Sri Lanka; [3]Department of Medical Education, Faculty of Medicine, University of Peradeniya, Sri Lanka

Abstract

Introduction: Emotional Intelligence (EI) is especially important for medical undergraduates due to the long undergraduate period and relatively high demands of the medical course. Determining associates of EI would not only enable identification of those who are most suited for the discipline of medicine but would also help in designing training strategies to target specific groups. However, there is diversity of opinion regarding the associates of EI in medical students. Aim of the study was to determine associates of EI in medical students.

Methods: The databases MEDLINE, CENTRAL, Scopus, EbscoHost, LILAC, IMSEAR and three others were searched. It was followed by hand-searching, cited/citing references and searching through PQDT. All studies on the phenomenon of EI and/or its associates with medical students as participants were retrieved. Studies from all continents of the world, published in English were selected. They were assessed for quality using Q-SSP checklist followed by narrative synthesis on selected studies.

Results: Seven hundred and ninety-two articles were identified of which 29 met inclusion criteria. One article was excluded as its full text was not available. Seven articles found an association between 'EI and academic performance', 11 identified an association between 'EI and mental health', 11 found an association between 'EI and Gender', 6 identified an association between 'EI and Empathy' while two have found an association with the learning environment.

Conclusion: Higher EI is associated with better academic performance, better mental health, happiness, learning environment, good sleep quality and less fatigue, female gender and greater empathy.

Keywords: *Emotional Intelligence, Associates of Emotional Intelligence, Medical Students, Mental Wellbeing, Empathy*

Practice Highlights

- Higher emotional intelligence is associated with better academic performance.
- Higher emotional intelligence is associated with better mental health.
- Higher emotional intelligence is associated with female gender.
- Higher emotional intelligence is associated with greater empathy.

I. INTRODUCTION

Emotional intelligence (EI) is defined as "the ability to perceive emotions accurately, appraise, and express emotion; the ability to assess and/or generate feelings when they facilitate thought; ability to understand emotions and emotional knowledge, and to regulate emotions to promote emotional and intellectual growth" (Mayer & Salovey, 1997). Studies have found that there is a positive effect between EI and academic as well as professional success (Suleman et al., 2019). It has been reported that people and college students with good EI show better social functioning and interpersonal relationship and peers have identified them as less antagonistic and conflictual (Petrovici & Dobrescu, 2014).

Several tests and instruments that have been used to assess the Emotional intelligence of medical students were identified through the literature. These include standard EI tests, modified versions of standard EI tests,

and authors' assessment methods of their own. Schutte self-report EI test, TEIQue questionnaire and Bar-on's emotional intelligence questionnaire ((EQ-i) 2.0) have been used frequently. Each of these instruments has different advantages and disadvantages of their own.

The Emotional Quotient Inventory (EQ-i) 2.0 is a revision of the EQ-I (Bar-On, 2004). The Emotional Quotient Inventory (EQ-I) 2.0 measures the interaction between an individual and their environment. Since the EQ-i 2.0 is a revision of the original Emotional Quotient Inventory (EQ-I) the standard platform of the EQ-i validation remains intact.

The Schutte Self-Report Emotional Intelligence Test (SSEIT) is a method of measuring general Emotional Intelligence (EI), using four sub-scales: emotion perception, utilising emotions, managing self- relevant emotions, and managing others' emotions (Schutte et al., 1998). The SSEIT model is closely associated with the EQ-I model of Emotional Intelligence. It has a reliability rating of 0.90. The EI score, overall, is fairly reliable for adults and adolescents. However, the utilising emotions sub-scale has shown poor reliability (Ciarrochi et al., 2001). Also, they report a mediocre correlation of the SSREI with self-estimated EI, the Big Five EI scale, and life satisfaction (Petrides & Furnham, 2000). However, SSREI correlated poorly with well-being and EI criteria.

The Trait Emotional Intelligence Questionnaire (TEIQue), is an openly accessible instrument developed to measure global trait emotional intelligence. Based on the Trait Emotional Intelligence Theory, a significant number of research has been conducted regarding emotional intelligence (EI) (Mikolajczak et al., 2007). The TEIQue is available in long form and short forms. Internal consistency and test-retest both indicated scale reliabilities of 0.71 and 0.76. High correlations between the TEIQue with Shrink's Emotional Intelligence Scale showed validity in measuring emotional intelligence and the "Big Five" Personality Traits.

Apart from those assessment methods, Genos Emotional Intelligence Assessment, Mayer-Salovey-Caruso Emotional Intelligence Test, TMMS-24 data and DASS-21 scale, Bradbury-Graves's Emotional Intelligence and Siberia Schering's Emotional Intelligence Questionnaire have also been used by the authors to assess the EI.

A comprehensive survey in medicine states that EI had a positive contribution in doctor-patient relationship, increased empathy, teamwork, communication skills, stress management, organisational commitment and leadership (Arora et al., 2010). EI is invariably important to medical professionals as it is associated with self-monitoring which would not only ensure adapting to clinical situations appropriately and having desirable interpersonal relations but also result in a favorable outcome for the patient and the wellbeing of the practitioner.

Few studies suggest that EI training can help medical students to build their leadership and empathy skills, as they enter the clinical years (Austin et al., 2005; Dolev et al., 2019). Literature surveys on emotional intelligence and medicine, and physician leadership qualities concludes that EI correlates with many of the competencies that modern medical curricula seek to deliver including leadership (Mintz & Stoller, 2014; Reshetnikov et al., 2020). Other studies indicate that age and gender are associated with emotional intelligence. However, some studies showed that EI at medical school admission could not reliably predict academic success in later years (Reshetnikov et al., 2020). These studies have all looked at the associates in an isolated sense. However, it would also be interesting to reflect on the concept of EI in a broader sense as it is inevitable that there would be an interaction of factors.

The medical course extends over a period of five years as opposed to most undergraduate degrees which are shorter. Medical training involves close interactions with different categories of people including patients, doctors of different grades and the paramedical staff. Training includes long hours of work in stressful environments where some situations could be emotionally challenging. This long undergraduate period and relatively high demands of the medical course would require medical students to possess a high degree of EI. As findings of different studies on EI are sometimes diverse in opinion, it would be useful to conduct a systematic review to identify the associates of EI in order to design training strategies which target specific groups.

Even though EI is considered a trainable trait, the extent of trainability depends on many personal and institutional factors (Mattingly & Kraiger, 2019). Völker (2020) expresses that trainability in emotional intelligence is subjected to acquired knowledge which is situational and may depend on accumulating relevant experience.

In the Sri Lankan context, the sole criteria for selection of students to a medical course is the academic excellence at the Advanced level examination, which alone may not reflect their suitability to follow a profession like medicine (University Grants Commission, 2022).

However, since EI is an essential trait especially for medical practice many universities worldwide use different tools to assess EI in their applicants. Furthermore, different universities adopt varying techniques to develop EI of their students throughout the course. It is envisaged that this review would not only help determine what additional factors could be considered in the selection of applicants for a medical course but would also help teachers design training strategies to target specific groups of students and also ensure a more enjoyable and productive learning experience for the students as a whole. There is no doubt that these selection and intervention programs would produce doctors with more favourable qualities which would not only produce greater benefits to the patient but would prevent burn out among doctors.

A. Objective

The objective of this study is to find out, the associates of Emotional Intelligence in Medical students based on available literature in English from 2015 to 2020.

II. MATERIALS AND METHODS

The research question was defined based on the PICOS (Population, Intervention, Comparison, Outcomes and Setting) format. The review protocol was developed according to PRISMA-P 2015 (Preferred reporting items for systematic review and meta-analysis protocols) statement (Moher et al. 2015) by all three authors DE, KM and SP and was registered in the PROSPERO Registry (CRD42021227877). The methodology for the systematic review (SR) followed the guidelines and standards of IOM (Institute of Medicine) (Eden et al., 2011) and PRISMA-2015 for reporting.

A. Search Strategy

A Systematic and comprehensive search was conducted by SP in April 2020 and references were managed using the software Mendeley. The search explicitly aimed to identify all published and unpublished relevant studies in order to limit bias in the searching process. The key search terms were identified with the aid of a search-term-harvesting table by KM and DE. A combination of relevant medical subject headings and search terms tagged with other appropriate search fields were used in the literature search. The following databases were searched:

CDSR (Cochrane Database of Systematic Reviews), DARE (The Database of Abstracts of Reviews of Effects), MEDLINE (1950- 2020) via Pubmed (See supplemental Appendix 1 for search strategy), CENTRAL (The Cochrane Central Register of Controlled Trials, 1948 - 2020), Scopus, EbscoHost, LILAC, IMSEAR (Index Medicus for South East Asian region) and WHO International Clinical Trials Registry Platform (ICTRP). In addition to electronic searches, two key journals (2015-2020) were hand-searched, and cited & citing references of all included studies were screened for further relevant articles. Searches were limited to studies published between the years 2015-2020. Searching other resources included grey literature such as PQDT (ProQuest Dissertations and Thesis database) and Global health (via WHO).

B. Selection Criteria

After removal of duplicates from the retrieved articles, the remaining articles with abstracts were uploaded to the Web application, Rayyan (Quzzani et al., 2016) for the purpose of screening. The criteria for selection of articles were based on the PICOS elements. The studies were from all continents of the world and limited to those published in English. All studies focusing on the phenomenon of EI and/or its associates with medical students as participants were considered for inclusion in the review.

The authors DE, KM, SP and KE independently screened the uploaded articles in Rayyan, using the above eligibility criteria. In the first phase, title and abstract of each article were reviewed by any of the two authors independently for its candidacy. Following this initial evaluation, the full text of all those selected articles were retrieved and further examined by KM and DE independently (second phase), for the final verification before inclusion in the review. Any disagreements regarding eligibility of studies were resolved by consulting a third author (SP). Reviews, systematic reviews, editorials, letters and comments were removed. Articles which met the eligibility criteria were selected for inclusion in the review. Excluded studies were marked with the 'reason' in Rayyan.

C. Data Extraction and Quality Assessment

Data from all included studies were extracted by the review authors YW and KM using a data extraction table developed for the purpose of this review (Appendix 2). Data extracted were cross-checked by SP for any errors. Information recorded included: study details (author, year, country of origin), participants (number of participants, gender, level of undergrad program, etc.), methods (study aim, design, total study duration, tools used), study type (phenomenon /context studied) and outcomes (all relevant findings related to primary and secondary outcomes).

SP and YW independently assessed the quality of those selected studies using Quality Assessment Checklist for Survey Studies in Psychology (Q-SSP) (Protogerou &

Hagger, 2020) Results of the quality assessments were compared (Appendix 3); any disagreements were resolved by consensus. Articles which met the required quality criteria were selected for inclusion in the review.

D. Strategy for Data Synthesis

Due to the heterogeneity between the included studies, a quantitative synthesis was not considered. A narrative synthesis of the findings from individual included studies was carried out by DE, based on the characteristics of the targeted populations and the type of outcome such as association/correlation of EI with academic performance, professional success, social functioning, interpersonal relationship, empathy, teamwork spirit, communication skills, stress management, organizational commitment, leadership quality, self-monitoring, mental health and emotional well-being.

III. RESULTS

A total of 792 articles were retrieved during the literature search. After removing the duplicates, 752 articles were considered for screening using the eligibility criteria. Initial evaluation of articles through title and abstract resulted in only 29 articles meeting the selection criteria. During the full-text evaluation, one article (Parijitham, 2018) was removed, as its full-text article could not be found even after contacting the author. The data that support the findings of this study are openly available at https://doi.org/10.6084/m9.figshare.15564210 (Edussuriya et al., 2021). Twenty-eight articles were finally selected for quality assessment. Flow diagram of the selection of studies is shown in Figure 1.

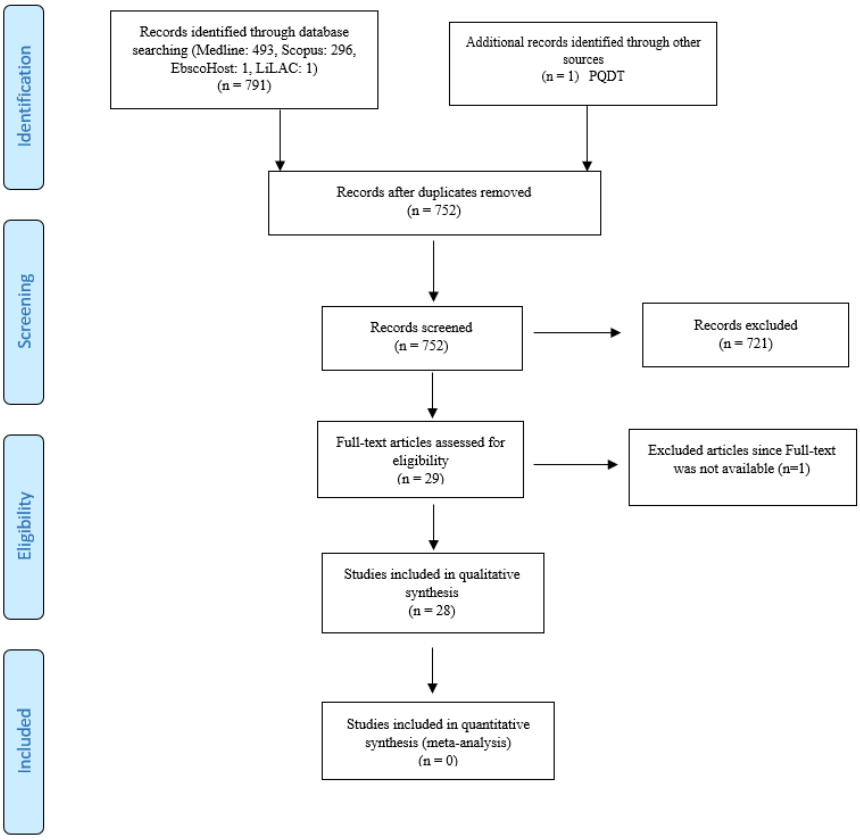

Figure 1. Flow diagram illustrating included and excluded studies in the systematic review

The study design of the selected studies comprised of 26 cross sectional (majority), one longitudinal and one quasi-experimental. However, all studies used standard validated survey questionnaires to collect data. Therefore, to assess the quality of selected studies, Quality Assessment Checklist for Survey Studies in Psychology (Q-SSP) was selected as the best, 'applicable to all' tool in this review, considering its relevance also to the trait emotional intelligence since emotions, thoughts and mental processes are aspects of psychology. The quality of the studies was determined by the extent to which the items on above checklist were met by each of the articles. There were 20 checklist items in the tool out of which one item (item-19 – Debriefing participants at the end of data collection) could be justifiably waived; one reason being none of the included studies used it in the methodology. Thus 19 items were considered to be applicable in this review (Appendix 4).

Source (Author/Year)	Country	Study Design	Sample Size and RR	Domain Measured	Tool Used	Quality Assessment Score
Moslehi et al., 2015	Iran	Cross Sectional Study	182	Emotional Intelligence and Academic Performance	Emotional Intelligence Questionnaire	12/20
Unnikrishnan et al., 2015	India	Cross Sectional Study	532	Emotional Intelligence and Academic Performance, Mental Wellbeing, Demographic Characters	Schutte self-report EI test	13/20
Holman et al., 2016	United States	Survey Pre post intervention Team cohesion	42	Emotional Intelligence and Academic Performance, Team cohesion	Schutte self-report EI test	12/20
Aithal et al., 2016	India	Cross Sectional Study	200	Emotional Intelligence and Academic Performance	Mayer-Salovey-Caruso Emotional Intelligence Test	13/20
Ibrahim et al., 2017	Saudi Arabia	Cross Sectional Study	540	Emotional Intelligence and Academic Performance, Demographic Characters	From a Questioner Assessing EI	14/20
Wijekoon et al., 2017	Sri Lanka	Cross Sectional Study	130	Emotional Intelligence and Academic Performance, Demographic Characters, Leadership	Schutte self-report EI test	15/20
Vasefi et al., 2018	Iran	Cross Sectional Study	435	Emotional Intelligence and Academic Performance, Demographic Characters	Genos Emotional Intelligence Questioner	15/20
Noughani et al., 2015	Iran	Cross Sectional Study	168	Emotional Intelligence and Academic Performance, Demographic Characters	TEIQue-SF questionnaire	10/20
Chew et al., 2015	Malaysia	Cross Sectional Study	159	Emotional Intelligence and Mental Wellbeing	Bar-On EQ-i 2.0	16/20
Mahaur et al., 2017	India	Cross Sectional Study	170	Emotional Intelligence and Mental Wellbeing	TEIQue-SF questionnaire	12/20
Gupta et al., 2017	India	Cross Sectional Study	Time 1 - 213 Time 2 - 138	Emotional Intelligence and Mental Wellbeing, Academic Performance	Schutte self-report EI test	14/20

Ranasinghe et al., 2017	Sri Lanka	Cross sectional survey Regression analysis	471	Emotional Intelligence and Mental Wellbeing, Academic Performance	Schutte self-report EI test	15/20
Heidari Gorji et al., 2018	Iran	Cross Sectional Study	450	Emotional Intelligence and Mental Wellbeing	Intelligence Questionnaire of Petridis	14/20
Carvalho et al., 2018	Spain	Longitudinal Study	303	Emotional Intelligence and Mental Wellbeing	From a Questioner Assessing EI	13/20
Raut and Gupta, 2019	India	Quasi-experimental study	Part 1 - 94 Part 2 - 20	Emotional Intelligence and Mental Wellbeing, Demographic Characters	From a Questioner Assessing EI	11/20
Abdali et al., 2019	Iran	Cross Sectional Study	400	Emotional Intelligence and Mental Wellbeing	From a Questioner Assessing EI	15/20
Skokou et al., 2019	Greece	Cross Sectional Study/Correlation Study	206	Emotional Intelligence and Demographic Characters	TEIQue-SF questionnaire	14/20
Ghahramani et al., 2019	Iran	Cross Sectional Study	292	Emotional Intelligence and Mental Wellbeing	Siberia Schering's Emotional Intelligence Questionnaire	14/20
Tyszkiewicz-Bandur et al., 2017	Poland	Cross Sectional Study	328	Emotional Intelligence and Demographic Characters	Schutte self-report EI test	14/20
Yee et al., 2018	Malaysia	Cross Sectional Study	200	Emotional Intelligence and Demographic Characters	From a Questioner Assessing EI	14/20
Dolev et al., 2019	Israel	Cross Sectional Study	111	Emotional Intelligence and Demographic Characters	Bar-On EQ-i 2.0	15/20
Bertram et al., 2015	United States	Cross-sectional study	150	Emotional Intelligence and Empathy, Demographic Characters	NEO-Five-Factor Inventory	14/20
Khan et al., 2016	Pakistan	Cross Sectional Study	300	Emotional Intelligence and Empathy, Demographic Characters	TEIQue-SF questionnaire	13/20
Sundararajan and Gopichandran, 2018	India	Cross Sectional Study	207	Emotional Intelligence and Empathy, Demographic Characters	From a Questioner Assessing EI	17/20
Abe et al., 2018	Japan	Cross Sectional Study	357	Emotional Intelligence and Empathy, Demographic Characters	TEIQue-SF questionnaire	13/20

Irfan et al., 2019	Pakistan	Cross Sectional Study	2170	Emotional Intelligence and Empathy, Demographic Characters	Schutte self-report EI test	14/20
Shi and Du, 2020	China	Cross Sectional Study	1392	Emotional Intelligence and Empathy, Mental Wellbeing	TEIQue-SF questionnaire	16/20
Othman et al., 2020	Lebanon	Cross Sectional Study	296	Emotional Intelligence and Decision Making	From a Questioner Assessing EI	16/20

Table 1. Characteristics of included studies

	Association with EI	
	Present	Absent
Academic performance	Moslehi et al.,2015	Holman, M.A et al.,2016
	Unnikrishnan, B et al.,2015	Vasefi, Ali et al.,2018
	Chew, B.H et al.,2015	Gupta et al.,2017
	Aithal, A.P et al.,2016	
	Ibrahim et al.,2017	
	Wijekoon, C.N et al.,2017	
Emotional Wellbeing	Ranasinghe et al.,2017	Mahaur, R et al.,2017
	Noughani, F et al., 2015	
	Chew, B.H et al.,2015	
	Unnikrishnan, B et al.,2015	
	Gupta et al.,2017	
	Ranasinghe, P et al.,2017	
	Gorji, A.M.H et al.,2018	
	Carvalho, V.S et al.,2018	
	Abdali, N et al., 2019	
	Skokou, M et al.,2019	
	Ghahramani et al.,2019	
	Shi, M et al.,2020	
Demographic Characters	Tyszkiewicz-Bandur, M et al.,2017	Yee, K.T et al.,2018
	Unnikrishnan, B et al.,2015	Dolev et al.,2019
	Aithal, A.P et al.,2016	Vasefi, Ali et al.,2018
	Ibrahim et al.,2017	Abe et al.,2018
	Raut et al.,2019	
	Skokou, M et al.,2019	
	Bertram, K et al.,2015	
	Khan, M A et al.,2016	
	Sundararajan, S et al.,2018	
	Irfan M et al., 2019	
Empathy	Bertram, K et al.,2015	
	Khan, M A et al.,2016	
	Sundararajan, S et al.,2018	
	Abe et al.,2018	
	Irfan M et al., 2019	
	Shi, M et al.,2020	
Decision Making	El Othman, R et al.,2020	

Table 2. Categorisation of findings of the studies

A. Findings of Studies and Data Analysis

1) EI and academic performance: According to studies, a positive correlation was identified between EI and academic performance (Aithal, et al., 2016, Ibrahim et al. 2017; Moslehi et al., 2015, Wijekoon et al., 2017) while (Ranasinghe et al., 2017; Unnikrishnan et al., 2015) also found a significant association between EI and academic performance. These studies indicated that students with higher EI intend to perform better in their academic work. A cross-sectional study done by Chew et al. (2015) showed that medical students with less emotional intelligence were largely unaware of their anxiety, which was associated with lower academic performance. According to studies done by Holman et al., 2016, Gupta et al., 2017 and Vasefi et al., 2018 there was no correlation of EI with academic performance. A study by Othman et al., 2020 revealed that EI showed a significant positive effect on intuitive decision-making style and a negative effect on avoidant and dependent decision-making styles which may explain better academic performance of medical students with high EI.

2) EI and mental health (emotional wellbeing): A direct relationship between EI and academic satisfaction was found in studies done by Rouhani et al., 2015, Unnikrishnan et al., 2015 and Carvalho et al., 2018. Further, Carvalho et al., 2018 reported that a positive relationship was observed between EI and academic-related well-being which accounts for both academic performance and mental health. It was seen that medical students with less emotional intelligence were largely unaware of their anxiety (Chew et al., 2015) and those with higher emotional intelligence perceived lesser stress (Gupta et al., 2017 and Ranasinghe et al., 2017). Shi and Du (2020) found that EI was strongly and negatively associated with Personal Distress. Heidari Gorji et al. (2018) identified a direct relationship between emotional intelligence and mental health while a study done by Mahaur et al. (2017) did not find a significant relationship between the two. Ghahramani et al. (2019) identified a significant positive relationship of EI with happiness while Abdali et al. (2019) showed a positive correlation with sleep quality and a negative correlation with general fatigue.

3) EI and demographic characters: Higher EI in females compared to males was found (Aithal et al., 2016, Bertram et al., 2015, Ibrahim et al., 2017, Khan et al., 2016, Raut & Gupta, 2019 Sundararajan and Gopichandran, 2018, Tyszkiewicz-Bandur et al., 2017, Unnikrishnan et al., 2015 and Wijekoon et al., 2017). Irfan et al. (2019) suggests that female medical students had significantly higher empathic behavior and emotional intelligence than male students. However, Skokou et al. (2019) did not find any difference in EI in males and females. Vasefi et al. (2018) and Abe et al. (2018) too did not find a significant relationship between EI and gender. However, Abe et al. (2018) revealed that females showed significantly higher Neuroticism, Agreeableness and Empathy scores than males. According to Ibrahim et al. (2017) increasing age resulted in higher EI. However, Yee et al. (2018) did not find a significant association of EI with age. According to Yee et al. (2018) there was no significant association of EI with ethnicity.

4) EI and empathy: Significant correlation between EI and Empathy was identified (Bertram et al., 2015, Irfan et al., 2019 Khan et al., 2016; Sundararajan & Gopichandran, 2018). Shi and Du (2020) suggests that EI helps medical professionals to establish a better association with the patient.

5) Learning environment: Relationship between EI and academic background was identified by both Irfan et al. (2019) and Sundararajan and Gopichandran (2018). According to Sundararajan and Gopichandran (2018), students who attended government schools for high school education had greater emotional intelligence than students from private schools. But Irfan et al. (2019) suggests that medical students of private medical schools showed higher level of empathy as compared to public medical schools. Dolev et al. (2019) reveals that there are no differences in EI levels between first-year and sixth-year medical students.

IV. DISCUSSION

The review included studies conducted in South and Southeast Asian, European, Arabian, North American and South American countries. Majority of studies on Asian students revealed a high association between EI and academic performance. However, two studies on Asian students and one on US students failed to observe such associations. The impact of EI on academic performance may be explained by the fact that being aware of one's anxiety relieved stress and those with high EI experienced greater mental wellbeing and satisfaction with their programs; which may contribute to better academic performance. Furthermore, the fact that EI showed a positive correlation with better mental health/wellbeing, less perceived stress/distress, happiness, good sleep quality and less fatigue may account for the better academic performance of students with high EI.

Empathy is an important aspect in the delivery of high-quality healthcare. Several researchers from different regions of the world reported strong association between empathy and high EI scores. Therefore, assessment of EI may be useful in admitting students for medical degrees. However, since EI is considered as a "trainable trait", the

role that EI plays in admitting students to medical schools is debatable. Therefore, all efforts must be taken by medical schools to include activities that enhance EI, during the medical course, irrespective of the EI levels of students on admission. The fact that EI did not improve with seniority does not purely support the fact that EI is not trainable but it maybe those students were not exposed to and not sensitised to activities which enhance EI.

Evidence indicated a positive association between high EI scores and female gender. It maybe postulated that the "nurturing and caring" role assigned by society to the females influence their upbringing. Thereby improving their emotional intelligence.

In conclusion it must be stated that since a majority of studies revealed that higher EI is associated with better academic performance, better mental health and greater empathy and since EI is considered a trainable trait, curricular need to be developed with a view to improving EI.

In order to develop EI, curricular should contain programs on general leadership development, self-care/ wellness and burn-out prevention (Monroe & English, 2013). Small-group experiential learning activities and meeting with trained mentors throughout the years would be helpful. Debriefing sessions and maintaining a journal are some other techniques that need to be considered. It may be helpful to discuss change management and quality improvement with students (Audra et al., 2020). Exposure of students to skills of self-awareness and self-management through discussion, exposure to theories of conflict management, mindfulness practice, leadership training, discussions on learning styles, discussions on power and influence, identification of team dynamics, exposure to high-functioning inter-professional teams, peer coaching, health care leader interview and shadowing of experienced clinicians are some techniques that could be adopted in attempting to develop EI among students (Kozlowski & Ilgen, 2006). It would be beneficial to evaluate acquisition based on completion of an EI inventory, feedback from peers and staff, project presentations, reflective writing, measurement of achievement of professional and personal development benchmarks and milestones, performance on simulated scenarios and small-group exercises (Pan & Allison, 2010).

During the study it was observed that there is paucity of longitudinal studies on Associates of EI. Therefor it would be beneficial to conduct longitudinal studies which may help identify some aspects with regard to the trainability of EI in medical students.

V. CONCLUSION

Through this review it was revealed that higher EI is associated with

- better academic performance,
- better mental health including less perception of stress and distress, happiness, good sleep quality and less fatigue,
- female gender, and
- greater empathy.

No significant association was found between age, ethnicity, and seniority in the medical course, and emotional intelligence. No conclusions could be made about the association between the nature of the educational institute (private or state) and emotional intelligence.

A. Limitations

In this review, it was found that authors of included studies which used several different tools to assess the EI of medical students. Each of these tools have their own advantages and disadvantages which cause comparison difficult. It could not be assumed that, each and every one of these methods provide results in the same level.

B. Recommendation

Since high EI has shown a positive correlation with academic performance and better mental wellbeing of students and since it has been identified as a "trainable trait" all efforts should be made to enhance EI of medical students during their undergraduate training.

Notes on Contributors

Edussuriya D.H (DE) was the Principal Investigator of the study. Protocol drafting, study selection, analysis and interpretation of data, synthesis of findings of individual studies and the drafting of manuscript was done by the author.

Perera S. (SP) facilitated the methodology, involved in drafting the protocol and retrieved selected articles, since the author has previous experience in conducting systematic reviews. Reference management in Mendeley and Rayyan, cross-checking the extracted data, assessed quality of selected studies and final review of draft was also done by the author.

Marambe K.N (KM) was involved in drafting the protocol, involved in article selection and extracted data from the selected articles.

Wijesiriwardena W.M.S.Y (YW) extracted data from selected articles, assessed the quality of selected articles and finalised the manuscript.

Ekanayake E.M.K.B (KE) has screened the uploaded articles in Rayyan.

Ethical Approval

The review is registered in PROSPERO - The International Prospective Register of Systematic Reviews under the registration number CRD42021227877 for the systematic review.

Data Availability

Data set that support the findings of this study are openly available in Figshare repository https://doi.org/10.6084/m9.figshare.15564210

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Declaration of Interest

No conflicts of interest are associated with this paper.

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*Edussuriya D.H
Department of Forensic Medicine, Faculty of Medicine,
University of Peradeniya, Sri Lanka, 20400
+94711698916
Email: deepthi.edussuriya@med.pdn.ac.lk