ABSTRACT

Background:
Emotions influence patient care decisions and professional relationships. Emotional intelligence has been proven to predict nursing students' success in clinical practice and academic performance. Scarce amount of studies have assessed the emotional intelligence in the nursing student selection context.

Objectives:
To assess the emotional intelligence of applicants to undergraduate (bachelor level) nursing education and the factors related to it.

Design:
Cross-sectional quantitative study.

Settings:
The data collection took place in four Universities of Applied Sciences in October 2016.

Participants:
Participants were nursing applicants (N = 529) who took part in the entrance exams of the four Universities. Overall, 430 applicants (response rate 81%, 75 males) gave permission to access their results for the study's purposes.

Methods:
The Rankein Scale measure of emotional intelligence was used. All of the nursing applicants undertook the same electronic entrance exam in supervised computer classrooms. Statistical analysis included the use of two independent samples tests to compare differences in emotional intelligence scores and ANCOVA models to investigate whether background variables explained the observed differences.

Results:
In this study, nursing applicants' level of emotional intelligence was found to be average (on a scale of below average, average, above average). However, total scores ranged between 102–160 (of 160). Approximately 4% of the applicants scored below the minimum score (< 130) and therefore failed the emotional intelligence test. A statistically significant difference was found between the pass and fail groups in terms of the total score. Significant differences were also found in the three subscores and in the total score of admitted and not admitted applicants.

Conclusions:

Nursing applicants enter their studies with differing EI skills. This finding may have a major impact on how nursing students experience emotions during their studies. More research is needed to establish the use of EI in student selection context.

INTRODUCTION

Emotions are vital to the nursing profession as nurses work in emotionally charged environments. Importantly, emotions influence patient care decisions and professional relationships (Bulmer Smith et al., 2009). Emotional intelligence (EI) is defined as the intelligent and intentional use of emotions to help guide behaviour and thinking (CINAHL Subject Headings, 2019). More specifically, the emotions experienced by students within learning environments are related to their academic success and well-being (Saklofske et al., 2012). International nurse turnover rates (Flinkman and Salanterä, 2014; Rankin, 2013), increases in student attrition rates (Rankin, 2013), reports of student burnout (Watson et al., 2008) and a lack of compassion in workplace practice (Francis, 2013) indicate the need for reflection on the selection processes in nursing education.

Nursing student selection has a major societal and institutional impact because of the large number of applications processed on an annual basis. In the years 2014–2015, for example, there were almost 11,000 admissions to the Bachelor of Science nursing programs in Canada (CASN, 2016), while in 2014 in the USA, there were approximately 120,000 admissions (AACN, 2015). Internationally, nursing student selection processes most often include the assessment of academic and cognitive skills such as literacy, mathematics and problem solving (Talman et al., 2018). However, literature has emerged to support the evaluation of non-traditionally assessed skills as part of the student selection process (Haavisto et al., 2019; Pitt et al., 2014; Waugh et al., 2014). In a recent study by Haavisto et al. (2019), social skills were identified as one of the three major domains to be assessed in nursing student selection. However, in their literature review, searches in several databases regarding the assessment of nursing applicants' social skills did not produce any results. Notwithstanding, several studies addressing EI were identified (Haavisto et al. 2019). Testing the EI of applicants may prove useful from several perspectives: to predict success in clinical practice, academic performance and retention. That said, few studies have assessed EI in the context of nursing student selection.

Background

The two approaches to EI, ability- and trait-based EI, differ in their theoretical definitions (Rankin, 2013; Zysberg et al., 2011) and assessment methods (Zysberg et al., 2011). The first identifies EI as an ability (Mayer et al., 2004; Brackett and Mayer, 2003; Mayer et al., 2000,). Accordingly, EI is defined as a form of social intelligence that includes the ability to perceive and regulate emotions so as to promote one's thinking and actions (Mayer et al., 2004). The most researched model by Mayer et al. (2008) proposes a four-branch model of EI consisting of the ability to perceive emotions, to

understand emotions, to use emotions and to manage emotions. The assessment method is objective and may include recognition of facial expressions. The trait-based approach on the other hand explains EI as a personality trait that includes predispositions and ways to behave (Petrides and Furnham, 2001). The assessment method is subjective and includes a large range of non-cognitive traits that are rated by the individuals themselves (Brannick et al., 2009). Rejecting applicants based on a self-report measure would be unfair to those who have answered truthfully and would compromise the validity of the EI scores (Rankin, 2013).

There has been an increase in the number of published studies regarding EI in nursing education over the past decade. For this study, three literature reviews were identified from the published literature. Bulmer Smith et al. (2009) undertook an integrative review related to EI in nursing and nursing education. Based on a data search ranging from 1995 to 2007, the majority of the articles included in their study focused on the development of EI during nursing studies, and it was concluded that EI should be part of the nursing curriculum because students need those skills to deal effectively with their working environments and to deliver good nursing care.. Michelangelo (2015) conducted a meta-analysis to determine the overall impact of EI on nursing students and nurses. This analysis included 395 EI studies, which accounted for approximately 65 300 participants. The analysis concluded that EI at least moderately improves ($r = 0.3022$) emotional competence, critical thinking, ethical behaviour and nurses and nursing students' performance. Haavisto et al. (2019) undertook a scoping review to determine the extent of the published studies on EI in nursing/healthcare student selection. The data search was limited to 2005–2015, and the review included 20 articles. In the analysis, five domains of EI were identified: interpersonal communication skills, perceiving emotions, managing emotions, understanding emotions and utilising emotions. The most commonly used EI instruments were the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT), the Emotional Quotient Inventory, and the Schutte Emotional Intelligence Scale. Only one study reported the use of an EI instrument in the student selection phase (Rankin, 2013). According to the review by Haavisto et al. (2019), several studies demonstrated a relationship between EI and study success. However, it was concluded that research concerning EI as part of nursing student selection is not adequate.

The results of more recent research, which was not included in the aforementioned reviews, have somewhat conflicting findings. A study by Sharon and Grinberg (2018) showed that there was a relationship between the EI (Schutte Self-Report Inventory) of nursing students and their first-year average grades ($r = 0.305$, $p < 0.05$). However, in another study (Strickland and Cheshire, 2017), no relationship was found between EI (MSCEIT) and the first-semester pathophysiology or fundamentals of nursing course success. In a study by Snowden et al. (2018), EI (Trait EI Questionnaire – Short Form) was higher for the student nurse and midwife programme completers (mean 5.36, SD 0.57) than for the non-completers (mean 5.23, SD 0.68) ($p < 0.05$). However, no relationship was found between EI and programme completion when EI was measured using Schutte's Emotional Intelligence Scale.

In sum, the assessment of EI in the context of nursing student selection has only been reported in one study (Rankin, 2013). It can therefore be concluded that there is scarce research on EI and nursing student selection.

METHODS

Aims

The aim of this study was to assess the EI of applicants to nursing education. The objectives of the study were to (1) assess EI levels in nursing applicants, (2) examine factors related to EI and (3) compare EI levels in pass/fail groups and admitted/not admitted groups.

Design

This study was undertaken as a cross-sectional comparative study. The Rankein Scale measure for EI was identified as a suitable instrument to assess the EI of the nursing applicants. The instrument was chosen because it was originally developed and tested (validity/reliability) in the nursing education context, includes both trait and ability-based assessment of EI, was available with a reasonable license fee, and existed as a computer-based/online assessment tool. At the time of the instrument selection, there were reports of two other ability-based instruments that had been used in the nursing education context, namely, Audiovisual Test of Emotional Intelligence (AVEI) and Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). The AVEI consisted of pictures/short video clips. However, the instrument was not reported to exist in a computer-based/online assessment format, and it was not possible to utilize video clips in the electronic entrance exam in the autumn 2016. The use of the MSCEIT required a licensed psychologist in the research team, a fee-paying assessment course provided by the license providers and a license fee. These requirements did not meet the resources of the current research project.

Sample and participants

A purposive sample of nursing applicants was recruited. All of the nursing applicants who participated in the entrance exam of the four Finnish Universities of Applied Sciences (UAS) in October 2016 (N = 529) and consented to the study were included. All in all, 430 applicants (response rate 81%, 75 males) gave permission to access their results for the study's purposes. The mean age of the applicants was 25 years (SD 7.1, 18–56). The exam was undertaken under supervision in computer classrooms of the four UAS.

Data collection

The Rankein Scale includes four main subscales and the EI total score (Table 1). The Rankein Scale was translated into the Finnish language. A bilingual expert translated the instrument from the source language (English) into the target language (Finnish), and another bilingual expert blindly (without access to the original language version) undertook the back-translation to the source language (Brislin, 1986). The research team (n = 3) compared the back-translated version to the original until no errors in meaning remained. The Finnish version of the Rankein Scale measure for EI was developed as an online assessment tool and included all the same subscales as the original Rankein Scale instrument (Table 1).

-Table 1 about here-

In this study, the background variables of age, gender, previous education (high school/vocational school), knowledge acquired of the profession prior to application (yes/no), previous application to nursing studies (yes/no), study programme choice (nursing as 1. or > 1.), work experience in the field prior to application (yes/no) and realistic image of the profession were included. Realistic image of the profession was assessed using a four-point Likert scale with one statement: "I have a realistic image of the nursing profession". The answer to the statement was converted to a dichotomous variable for analysis.

Data collection was undertaken after institutional approvals. An information letter was presented to the applicants prior to accessing the electronic exam. Voluntary applicants gave their informed consent by ticking 'I agree to participate' or 'I do not agree to participate' on the electronic platform. The electronic entrance exam included three parts (maximum score 70 points): (1)

learning skills (maximum score 30), (2) certainty of career choice (maximum of 20) and (3) EI (maximum of 20 points). The results of the EI part of the exam are reported in this paper. The EI scores accounted for approximately 29% (20 out of 70 points) of the total score of the entrance exam.

Ethical considerations

Ethical principles established for research were followed throughout the study (National Advisory Board on Research Ethics, 2012). Approval to undertake the study was granted by the participating higher education institutions, and ethical approval was obtained from the ethical committee (11.9.2017). An information letter about the study was distributed to nursing applicants via entrance exam invitations emailed by the four UAS approximately two weeks prior the exam. The UAS did not receive the information of the applicants who gave/did not give their informed consent to participate in the study.

Data analysis

Two independent samples tests of means were used to compare the difference in EI scores between two categories. Tests were conducted in the presence of either homogenic or heterogenic variances of scores in two categories. Test selection was made based on the homogeneity of variances test (Christensen, 1996). ANCOVA models with interactions were used to check whether background variables explained the difference between the pass and fail groups. SAS version 9.4 was used to analyse the data.

Validity and reliability

In the present study, it was not possible to assess the validity/reliability of the Rankein Scale because the results from the online assessment were available on the subscore and total score levels, not on the item level. However, the Rankein Scale has previously been tested for validity and reliability by the scale's developer. The Rankein Scale was developed by Robert Rankin following his doctoral research into the correlation between EI and programme outcomes for student nurses. The EI test he applied was Schutte et al.'s Assessing Emotions Scale (AES) (2007). A significant correlation was found between EI and the following outcomes: student retention, academic performance and clinical performance (Rankin, 2013). Following on from this research, an online assessment of EI was developed. The assessment includes a self-report, adapted from Schutte et al.'s AES (self perception), and three ability tests: self management, social awareness and emotional awareness. For the self-report, 16 items were extracted from the AES (initially 33 items) based on reliability scores in the original research and were modified for the Rankein Scale. The modified items were then subjected to principal component analysis (Varimax rotation method with Kaiser normalisation converged in 9 iterations). The modified items achieved a reliability coefficient of 0.84 when validated with the pilot group (n = 64). The ability sections of the Rankein Scale include self management, social awareness and emotional awareness. These were developed and tested using focus groups selected from senior nursing staff. The groups were initially asked to rank elements of EI that they believed were most relevant to the care sector. These elements were collated by the focus groups into three sections, and questions were developed to test the three sections. The focus groups were then asked to reach a consensus on both the relevance and accuracy of the questions and on the 'correct' answers. A paper version of the Rankein Scale was piloted with a large recruitment agency to obtain average scores, and this allowed the researchers to apply the categories (Table 1).

RESULTS

The level of emotional intelligence of nursing applicants and factors related to it

According to the total scores of the EI test, nursing applicants' level of EI was average (on the scale of below the average, average and above average, mean 143.6) (Tables 1 and 2). More specifically, nursing applicants demonstrated an average level in self perception, but an above average level in self management, social awareness and emotional awareness.

-Table 2 about here-

There were several factors related to the EI of nursing applicants (Table 3). Age, gender and previous education were most often statistically significantly related to EI, suggesting that female, more mature applicants with high school backgrounds mainly scored better.

-Table 3 about here-

Difference in EI scores between the pass and fail groups

The difference in EI scores between the pass and fail groups was examined using two independent samples tests of means (Table 4). According to the results, 16 out of 430 applicants (3.7%) scored (raw scores) below the minimum score (< 130) set by the Rankein Scale developers (Table 1). The only statistically significant difference between the pass and fail groups was observed in the EI total score.

-Table 4 about here-

In the further analysis, ANCOVA models were used to describe interactions between independents. An interaction describes a combined effect of two independents on the dependent. There was a statistically significant interaction between previous application and pass/fail in the EI total score ($p < 0.01$), suggesting that previous application to nursing may explain the difference in the EI total score to some extent between the pass and fail groups. In the fail group, applicants with previous applications to nursing received a lower EI total score (mean difference -6.8, mean CI -13.0– -0.7, $p < 0.05$) than applicants without previous applications. In the pass group, there was no significant difference in the EI total score regarding previous applications to nursing.

Difference in EI scores of admitted and not admitted applicants

In the two independent samples tests of means analysis, a statistically significant difference was found in the EI total scores of admitted and not admitted applicants, as well as in the three subscales (self perception, social awareness and emotional awareness) and in one of the sub-subscales (utilising emotions) (Table 5). According to the results, applicants who were admitted to the nursing programme scored higher than applicants who were not admitted. The biggest statistically significant differences were observed in emotional awareness and total score (Table 5).

-Table 5 about here-

In the further analysis, ANCOVA models were used to describe interactions between independents. There was a significant interaction between realistic image and admission groups (admitted, not

admitted) in self perception ($p < 0.02$) and utilising emotions ($p = 0.02$), but interaction was not significant in the EI total score, suggesting that a realistic image may explain the differences to some extent between the admission groups. For self perception, in the admitted group, there was no significant difference regarding realistic image. In the not admitted group, applicants with a realistic image received higher scores in self perception (mean difference 4.5, mean CI 2.2–6.8, $p < .001$) than applicants with a less realistic image. For utilising emotions, in the admitted group, there was no significant difference regarding realistic image. In the not admitted group, applicants with a realistic image received higher scores in utilising emotions (mean difference 1.0, mean CI 0.1-1.9, $p < 0.05$) than those with a less realistic image.

A significant interaction was found between previous education and admission groups on utilising emotions ($p < 0.01$), suggesting that previous education may explain the differences between the admission groups. In the admitted group, there was no significant difference regarding previous education. In the not admitted group, applicants with a high school diploma received slightly better scores (mean difference 0.8, mean CI 0.1-1.5, $p < 0.02$) than those with a vocational school diploma.

DISCUSSION

Emotions are essential in the nursing profession. Nursing students experience a range of emotions within different learning environments early on in their studies. According to previous studies, students' emotions are related to their academic success and well-being (Saklofske et al., 2012). This indicates the need to assess nursing applicants' maturity in order to recognise and regulate their emotions. EI is considered a well-defined and measurable concept (Mayer et al., 2004) that may provide a reliable and effective measure for nursing student selection. However, there is scarce research regarding the assessment of the EI of nursing applicants. The purpose of this paper was therefore to assess the EI of nursing education applicants.

The results of this study indicated that the Finnish nursing applicants' ($n = 430$) EI levels were average on a scale of below average, average and above average. The mean EI score of the applicants was 143.6 (out of 160), and any score below 130 points was considered below average. There are no previous studies reporting the use of the Rankin Scale, and the result can therefore not be directly compared to another study. Nevertheless, a study by Rankin (2013) assessed nursing applicants' EI levels. The Assessing Emotions Scale (AES) was used to assess the EI of nursing applicants, and their mean score was 127.5 (out of 165; Schutte et al., 2009). The nursing applicants in the Rankin (2013) study therefore received lower EI scores than in the present study. There could be several reasons for this. First, the nursing applicants in the two studies undertook the EI tests under very different circumstances. In the current study, EI was established as part of the entrance exam, whereas in the Rankin study, the EI scores did not contribute to the final entrance score. It is possible that, in Rankin's study, the nursing applicants did not give their full attention to the AES. Second, the scales differ in terms of their assessment methods. The Rankin Scale is considered an ability-based instrument, whereas the AES is a trait-based, self-report instrument. The instruments also differ with regard to their scoring. Based on the mean total scores of this study, the Finnish nursing applicants' EI levels were fairly good overall. However, concerns have been raised over high EI scores. Some evidence has suggested that too much emotional awareness may lead to psychological distress (Snowden et al., 2018). In other words, very high values may not always be optimal. In the future, it would be beneficial to determine whether there is an applicable range of scores that could identify programme completers from non-completers, as also suggested by Snowden et al. (2018).

In this study, there was a considerable variation in the EI total scores (Table 2), which ranged between 102 and 160. This result is in line with that of a previous study on nursing students: Strickland and Chesire (2017) found a considerable variation in the EI scores (MSCEIT) of the nursing students in their study. These ranged from 54 to 140. This result may indicate that some nursing applicants and students are more emotionally skilled than others. More research is needed to determine whether more emotionally developed applicants in the application phase sustain better emotional pressures during nursing education.

In the present study, approximately 4% of the applicants (n = 16) scored below the minimum score set by the test developers, presenting some evidence of the sensitivity of the instrument in this population. Because emotions have been found to influence patient care decisions (Strickland and Chesire, 2017; Bulmer Smith et al., 2009), low EI skills may have a direct effect on patient care. Furthermore, nursing students with low EI skills may experience clinical environments as being too emotionally demanding and ultimately discontinue their studies. The small number of applicants who failed the EI component of the exam may imply that the balance of the applicants were already fairly emotionally skilled. An optimal cut score should be investigated in the future.

A statistically significant difference in the EI total scores was found between the pass and fail groups. Similar results have not previously been reported. The fact that a statistically significant difference was found in the EI total scores may support the notion of a comprehensive assessment of EI because the Rankin Scale consists of four subscales. This is in the line with the extensive research by Mayer, Salovey and Caruso who suggested a four-branch model (e.g. Mayer et al., 2000, 2004, 2008). In the present study, 16 applicants received an EI score that was below the pass mark. Future studies should investigate the differences between pass and fail groups using larger sample sizes to observe whether there are further differences in the subscales, such as self-management, social awareness and emotional awareness, that were very close and to demonstrate any statistically significant differences between the groups. It would also be interesting to follow the development of EI instruments in future studies.

Significant differences were also found between the admitted and not-admitted applicants in the three EI subscores and the total scores. The most substantial differences were observed in emotional awareness and the total score, again indicating the importance of the total score. Further research is needed to establish the importance of the individual subscores. However, the results of this study should be interpreted with caution because the EI scores contributed almost one third of the weighting of the composite score on which the accept/reject decision was based. In other words, the EI scores accounted for approximately 29% of the overall score on the entrance exam. Nevertheless, the statistically significant differences provide some indication of the sensitivity of the instrument in this context.

Age, gender and previous education, as well as some other background factors, were related to the EI scores of the nursing applicants in the current study. However, in the further multivariate analysis, these factors did not explain any of the observed differences between the groups. This finding is in line with that of the study by Snowden et al. (2018) in which females scored higher in terms of EI, but in the further analysis, gender did not explain the differences in EI scores. Nonetheless, it would be of value for future studies to investigate whether a gender bias exists in the assessment of EI, especially in the student selection context. According to our results, a realistic image of the profession explained the differences between the admission groups (admitted/not admitted) for self-perception and utilising emotions. This result may indicate that applicants who have a realistic image of the profession are also able to better recognise whether their personal qualities match the demands of the profession. In other words, these applicants may already have self-assessed their suitability for the profession. Notwithstanding, this result should be interpreted

with caution because the assessment of realistic image was based on one self-report statement. However, there is growing evidence in the literature indicating the importance of selecting applicants with a realistic image of the profession (Glerean et al., 2017, 2018). It is suggested that a more robust assessment of realistic image be undertaken in the future. Furthermore, according to the results of the current study, previous application(s) to nursing may explain some of the differences in the EI total scores between the pass and fail groups. Since there is no previous research to support this result, the meaning of previous application(s) will need to be investigated further in the future.

Strengths and Limitations

The data collection in this study included several higher education institutions that were geographically spread out. The Rankin Scale developers confirmed that the reliability and validity of the scale had previously been verified by the scale developers. Unfortunately, the scale developers have not published any results of the validity testing. It is therefore very important that further testing be conducted in the future to determine the reliability and validity of the scale. The translation of the instrument included expert translation, blinded expert back-translation and final verification by the researchers. The entrance examination results were available in an electronic format, decreasing the risk of errors in the raw data. All the statistical tests were performed by a statistician to enhance the reliability of the analysis. There were however some limitations in this study. All the study participants were nursing students. The inclusion of other healthcare disciplines may have provided a more in-depth view of the level of EI. The small proportion of applicants who failed the EI test (n = 16) may have weakened the results. Future, larger samples may present more significant differences between the pass and fail groups, as demonstrated in this study by the p-values being close to statistical significance for self-management, social awareness and emotional awareness. The fact that the EI scores accounted for approximately 29% of the overall score on the entrance exam may weaken the reliability of the statistically significant results regarding the differences between the accepted and not-accepted applicants.

CONCLUSIONS

According to previous studies, nursing students' emotions are related to academic success and well-being, yet the results of this study suggest that nursing applicants enter their studies with differing EI skills. This finding may have a major impact on how nursing students experience their emotions in different learning environments, specifically early on in their studies. However, based on the results of this study, it cannot be concluded that the assessment of the EI of nursing applicants is predictive of study success. More research is needed to establish the predictive value of EI in the context of nursing student selection. Further development of the Rankin Scale online assessment is suggested to obtain item-level results in the future. It would thus be possible to further assess the reliability and validity of the scale.

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Conflict of interest
One of the authors is a partner in Rankein Scale Ltd., which currently provides the Rankein Scale measure of EI as an online tool with a license fee. Other declarations of interest: none.

Ethical approval
Approval to undertake the study was granted by the participating higher education institutions, and ethical approval was obtained from the ethical committee (11.9.2017).

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