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Authors:

Dr Gary Sharp (GS) a MBBS (Hons)

orcid.org/0000-0001-7736-517X

Dr Lorna Bourke (LB) b PhD

orcid.org/0000-0002-3545-9730

Associate Professor Matthew JFX Rickard (MR) c,d MB BS (Hons) FRACS

orcid.org/0000-0002-3724-1698

Institutions:

aGeneral Surgery trainee, Royal Prince Alfred Hospital, Institute of Academic Surgery, Sydney, New South Wales, Australia.

bDepartment of Psychology, Liverpool Hope University, Liverpool, UK.

cDepartment of Colorectal Surgery, Concord Hospital, Sydney, New South Wales, Australia.

dDiscipline of Surgery, Sydney Medical School, University of Sydney, Sydney, New South Wales, Australia.

Corresponding author:

Dr Gary Sharp

Royal Prince Alfred Hospital, Sydney, Australia

garybeau1@yahoo.co.uk

0413 048 078

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**Structured abstract**

Introduction

The aim of this review is to explain the components of Emotional Intelligence (EI) and explore the benefits within today’s health care system with an emphasis on surgery. EI is a person’s ability to understand their own emotions and those of the individuals they interact with. Higher individual EI has multiple proposed benefits, such as reducing stress, burnout and increasing work satisfaction. The business world recognises EI as beneficial in terms of performance and outcomes. Could surgeons benefit from being more cognisant of EI and methods of assessing and improving EI to reap the aforementioned benefits?

Methods

A search of Embase, Cochrane and Medline databases using the following search terms; emotional intelligen\*, surg\*, medic\* yielded 95 articles. After review of all the literature 39 remaining articles and 5 text books were included.

Results

To perform optimally surgeons must be aware of their own emotions and others. EI differs from IQ and can be taught, learnt and improved upon. EI is measured via validated self-reporting questionnaires and “multi-rater” assessments. High EI is positively associated with leadership skills in surgeons, non-technical skills, reduction in surgeon stress, burnout and increased job satisfaction, all of which translate to better patient relationships and care. Future implications of EI have been postulated as a measure of performance, a selection tool for training positions and a marker of burnout. EI should be an explicit part of contemporary surgical education and training.

**INTRODUCTION**

Defined as both a trait (1) and an ability distinct from general cognitive ability (IQ), emotional intelligence (EI) is the awareness, control, and expression of one’s emotions and the ability to handle interpersonal relationships judiciously and empathetically (2). Although a number of definitions have been proposed since EI was first described by Salovey and Mayer (2), the premises on which it was founded remain central to the way the concept is understood and measured today. In the business world EI has been recognized for many years as a potential hidden driver of better performance (3). Professionals with higher EI are capable of generating greater sales and managing difficult situations whilst working calmly under pressure. They can lead others effectively and remain valued co-workers far beyond their lower EI counterparts (4). Recently the medical world has begun to recognise the possible benefits of EI for both patients and staff (5).

EI is a person’s ability to understand their own emotions and those of the individuals they interact with and then act upon these appropriately (2). EI involves an individual’s perception of emotions and the ability to understand and regulate such emotions throughout daily interactions (6, 7, 8). The surgeon must control their emotions rather than let their emotions control them. The ability to do this is hypothesised to be beneficial in many aspects of communication and performance (7).

In 1995 Goleman (9) proposed five important EI associated traits; self-awareness, self-regulation, motivation, empathy, and social skill, all of which are relevant in day to day surgical practice and leadership. In order to perform at an optimum level within a team today’s surgeon is required to develop critical self-awareness skills to understand their own strengths, weaknesses, needs and desires. An important part of this process is recognising the effect that their behaviour has on others within the team. One of the main skills associated with high self-regulation is the ability to wait and allow emotions to settle so the surgeon thinks before they act (10). The qualities associated with intrinsic motivation go beyond monetary gain and include a passion for what they are trying to achieve, and perseverance. These become crucial factors in ensuring that surgeons can sustain a long and demanding career.

Interaction with others, allows the surgeon to place themselves in the shoes of others. An important related skill to this is empathy. It is characterized by compassion and the ability to attune effectively to the subjective feelings of others, and their causes, arrived at during an emotional experience. While at the same time remaining an observer (11). This promotes a greater trust between the surgeon, patient and colleagues so that the treatment goals of the team become shared. Underpinning empathetic skills is effective social communication, including the ability to demonstrate respect and value for others (11). Bringing people together to support the common goal for an operating theatre (OT) of staff through effective communication ensures the team works towards the best patient outcome and a harmonious work environment. Thus, lessening patient care errors, increasing patient satisfaction and lowering preventable adverse effects. Furthermore, EI sensitivity and situational awareness in the OT can reduce emotions such as anger and stress which are potential antecedents to bullying behavior. The outcome of which includes, lower staff turnover rates (12).

The EI Quotient (9) was developed as a means of differentiating individual variances in the skills related to emotional intelligence with an understanding that they can be enhanced through continual active learning and feedback (13,14) throughout all ages (5). It is considered separable from measurements of IQ which assess a static ability to reason, apply logic, and memorise as well as provide indices of speed of processing in relation to normative data (5,8,14). In making this distinction clear EI is also considered by some to be a personality trait and not a form of intellect (6). An excellent surgeon would possess not only high IQ but also high EI in order to be professionally successful (9). The purpose of this narrative review is to explain the underlying components of EI and explore the possible benefits within today’s health care system.

METHODS

A single researcher carried out a search of Embase (1980 to September 2018), Cochrane (2005 to September 2018) and Medline (1946 to September 2018) databases using the following search terms; (1) emotional intelligen\*, (2) surg\*, (3) medic\*. Terms 2 AND 3 where then searched together (4) followed by a search of (1) AND (4), culminating in 95 articles. Five book titles had already been chosen for inclusion due to the integral nature of the concept of emotional intelligence. Once the articles were deduplicated and limited to humans and English, 60 remained. These 60 articles were reviewed in full by GS, conference letters and notes were excluded (n-21). The 39 remaining articles and 5 text books (n-44) were reviewed in full and the references trawled for relevant literature with a further 3 articles being included (n-47). PRISMA criteria were not followed and as such this is a narrative review.

**Figure 1. Flow diagram of Emotional intelligence and surgery search**

**RESULTS**

*Evaluation of EI and its components*

EI assessments can be performed using “self-reporting” assessment (1800 assessment) or by combining “self-reporting” with assessment by co-workers (360° assessment). Various measures exist to self-assess specific aspects of emotional functioning (15,16) or the ability to perceive and understand emotional information (17) (Table 1).

**Table 1. Examples of Validated EI Assessment Tools**

A standardised global EI competence score is calculated similar to IQ tests (8). 180°assessments require the surgeon or trainee to rate the frequency with which a statement applies to them (15,16). A 360° assessment can counteract the potential for response bias (i.e. tendency to give more socially desirable answers). In a 360° assessment designated people who work alongside surgeons generate a more complete evaluation (25). Although no multi source feedback tools have been validated specifically for EI the large majority cover the categories highlighted to be beneficial in surgery e.g. leadership, non-technical skills and relationship with other staff and patients. They also address the 5 important EI associated traits outlined by Goleman, namely self-awareness, self-regulation, motivation, empathy, and social skill (9).

Whilst measures of reliability and validity were initially found to be inconsistent, as interest in EI measurement has burgeoned, less contradictory scientific support has been found. Surprisingly, given the strong alignment of Goleman (3,9) to the concept of EI, there appears to be far less psychometric data available for his inventory despite some revision (5,26-28). The EQ-i (15) is now the most widely used instrument and is available in 29 languages (5). This inventory taps a broad range of constructs (i.e. intrapersonal, interpersonal, adaptation, stress management and general mood) indicative of the competencies necessary with coping with the demands of a stressful OT and the potential to succeed within this environment (15) and which also interact with cognitive dimensions of IQ (29). Both the long-form and short-form versions demonstrate good to very good internal consistency (29,30). Importantly there are norms available for males and females for the questionnaire (15) and is considered to be gender fair (30). Furthermore, a lack of cultural bias across different populations in Australia and South Africa was established (31).

A more objective alternative to self-report tools with or without 360o assessments is to consider the performance of individuals on tasks requiring emotion-based skills. (e.g., The Mayer-Salovey-Caruso Emotional Intelligence Test [MSCEIT]) (32). The MSCEIT assesses four areas (perceiving emotions, facilitating thought, understanding emotions and managing emotions). It includes, rating facial photographs based on emotion factors, comparing emotional states presented with different stimuli, and completing sentences for understanding of vocabulary surrounding emotions. A global score represents the links between the degree of emotionally intelligent responses according to expert opinion across all four factors.

In contrast to the conceptualisation of EI as an ability or skill, embedded within the notion of IQ performance measures, is the view that it is an emotional disposition. A review (33) of the validity of emotional sensitivity as a separable personality construct included a meta-analysis of the data from the Trait Emotional Questionnaire (TEIQue) (33) across 18 different studies (6). The TEIQue assesses aspects of personality traits that are specifically related to affect (e.g., empathy, stress management emotion regulation, emotion perception, relationships) and it was found that the global EI score was able to account for a significant proportion of the variance beyond the contribution made by the five factor personality constructs (34). To conclude, although tests, such as, the MSCEIT (32) and TEIQue (6) include common dimensions of assessment, are accessible, have similar administration time and can be completed online; significantly less psychometric evaluation has been undertaken on them in contrast to the Bar-On measures.

*EI in Surgery and suggested benefits*

In surgery, EI is important in the following categories;

Leadership

In 1956 Dr John Lister commented in the New England Journal of Medicine that “strong medical leadership is essential today” (35). Leadership today remains a central function for contemporary surgeons (5) and *successful leadership* is vital in effective health care environments (36-38). This sentiment is reinforced by several global government bodies that have placed leadership development at the forefront of their health manifestos (36). Modern surgeon-leaders are only valuable and operational if they communicate successfully, encourage trust and motivation within the workforce (5). Such leaders are not only inspirational but are also capable of adopting new ideas for future advancements (37,39) and effectively assisting the OT team (40).

There is a significant correlation between high EI and leadership skills in surgeons (5,7,14,40). It is through these leadership qualities that the surgeon can ensure greatest patient care. Patel et al. (40) outlined the qualities and attributes essential in surgical leaders and emotional competence is one such quality. It is important to note that “Leadership” does not only apply to traditional positions of leadership such as department head. Every surgeon is ultimately responsible for the milieu of their individual OT on a day to day basis working towards the best interests of the *patient*.

Non-technical skills and relationship with other staff

In surgery technical skills are obviously paramount, however non-technical skills underpin safer operative surgery. A high level of EI can improve performance in the operating theatre in relation to situation awareness, communication, decision making and leadership/teamwork. Medical treatments and surgical procedures are evolving and the application of these new technological advances are placing more demands on health care workers andpatients, requiring advanced understanding and emotional awareness by health care practitioners (36,41,42).

Focussing on patient centred care requires impeccable communication (43). Non-technical skills in surgery have gained increasing relevance of late and it is now common knowledge that human factors are critical to the care of surgical patients (7) and managing emotions is paramount in this care (4). Failure in non-technical skills such as communication is a recognised cause of surgical errors (38). A large majority of complaints regarding health care practitioners arise due to poor communication (14). Simply being compassionate is no longer enough (14) and health care workers are aware of the need to improve upon non-technical skills (44). Elevated levels of EI can eliminate communication barriers. An understanding of both the surgeon’s and the patient’s emotional states can facilitate subjective and objective examinations (14,44). The ability to understand the patients emotional state will help the surgeon create a tailored approach to their ongoing treatment and the style of medical advice offered (14) culminating in satisfied patients (7,41,45). The opposite has also been recognised, and a low EI may pose patient care issues (46).

Management/mitigation of stress and burnout

It is well established that surgeons experience high levels of stress, burnout and suicidal ideation (47,48). Surgeons, whether trainees or fully qualified, are subjected to a vast array of stressful situations throughout a normal working day (49). Acute stress, defined as “the physical, mental or emotional response to a perceived increase in demand for motor, cognitive, or other performance” (50) is of particular interest within the OT. Some of the acute stressors surgeons face are unique (51) and although a certain level of acceptable acute stress may be beneficial, uncontrolled amounts are detrimental (6,14). There is a causal relationship between chronic stress and burnout (52). Burnout in medicine is defined as a “state of mental exhaustion caused by the doctor’s professional life” (53). There is a central role played by emotions in the overall reaction to stress and burnout (54). Most notably, the cost required to regulate emotional manifestations in an attempt to meet the organisational (and societal) based expectations of the role of a surgeon (55). Burnout is common in surgeons and a major contributor to poor mental health (56), clinician “depersonalisation” and medical errors (53) and manifests as poor productivity, irrational decision making and potential self-harm thoughts or actions (47,48). Fifty one percent of general surgery residents showed signs of “severe burnout” with up to a quarter of those who commence surgical training failing to finish (48). Added to this, it is likely that stress, burnout, and effective EI performance is moderated by sleep deprivation (57) and, therefore, not surprising that drop-out rate is one of the highest amongst all specialties (58). Of the remaining trainees who eventually qualify, an estimated 40% will have symptoms of burnout during their consultant years (59).

An adequate, or high level of EI, may improve a surgeon’s ability to cope with stress and prevent or ameliorate burnout (44). EI allows one to understand one’s emotions and the environmental stressors surrounding them (44). Understanding these emotions then allows the individual to react appropriately whilst influencing others (44). Related to EI is the concept of mindfulness (60). Mindfulness is the ability to maintain moment to moment attention to emotional and social events (61). Two main components interact with internal networks of attentional control (62); (1) self-regulation processes and (2) orientation to one’s experience in the present moment, and characterised by curiosity, openness and acceptance (62). Evidence of a relation with EI comes from training studies in mindfulness techniques which suggest that they enable the improvement of the clarity with which we perceive of our own mental states (63) as well as, increases in positivity and adaptive emotional profiles (64). A higher level of mindfulness in those with higher EI may be a protective mechanism against acute stress (14,45,47,48,65) and lead to improved job satisfaction (51). A lower global EI has been noted as a significant factor correlating with burnout (56) through individuals not being able to recognise their own emotions, those around them and environmental stressors. It is important to realise that burnout cannot be eliminated completely by the individual becoming more emotionally intelligent (56), however, elevated levels of EI are associated with increased job satisfaction and lower levels of stress, displeasure and burnout (48,51). Lindeman et al (48) suggest that burnout rates may be reduced in resident physicians if they are granted greater autonomy, provided meaningful feedback and enjoy a supportive work environment. This is one potential way trainees could develop greater EI.

Patient centred care and patient satisfaction

Patient centred care (PCC), refers to the guiding principles placing the individual receiving care or support at the centre of associated professional practice. PCC acknowledges patients’ preferences and values; as well as promoting flexibility in the provision of health care, and seeking to move beyond the traditional paternalistic approach (66). Effective health care is measured in terms of patient satisfaction, which in turn provides surgeons with an insight into the effectiveness of the care/empathy patients have received. There is a demonstrable shift in the number of dissatisfied health care users as evidenced by an increase in poor patient trust and lawsuits against doctors (42). Most complaints relate to poor communication, not clinical competence. Insights into both the surgeon and the patient’s emotions associated with higher levels of EI, may be an explanation as to why some practitioners appear to be better at delivering PCC (67). Trust is also a fundamental part of the surgeon-patient relationship and a higher EI has been associated with greater patient trust (42). Unfortunately, the same authors found that surgical patients had a lower level of trust in their surgeon when compared to their medical counterparts. This may be due in part to surgeons placing less emphasis on patient autonomy and provision of treatment when compared to their medical counterparts (42). Surgeons need to develop, maintain and at times, rebuild patient trust (42). Increasing EI improves the ability to manage and read emotions and this might potentially enhance PCC, improve the quality of the surgeon-patient relationship, increase levels of satisfaction and concordance with management plans (66).In addition, a further threat to the relationship between patient and surgeon, can occur through a cycle of anger, where both feel they have been exposed to bad treatment and/or an injustice; or have a diminished tolerance threshold when a goal cannot be achieved. An emotional outburst of anger towards the patient is not going to achieve the desired effect for the surgeon or the patient. EI programs have been instrumental in developing strategies to manage negative emotions and intensifying positive ones. Increasing knowledge of assertive strategies for coping with problematic social situations or becoming more aware of the harmful consequences of negative emotions for themselves and for others should reduce aggressive behaviour (68).

*EI in Surgical Education and Training*

In the surgical setting, several potential uses of EI have been postulated in the literature. These include measuring EI to assess resident performance (56), recognising those at risk of burnout allowing pre-emptive intervention (48,56). The use of EI in general surgery resident assessment for potential employment has been hypothesised, and there are both proponents (6) and opponents (49) of this use. “Hard skills” in surgery, such as operative log books and publications are often used to assess junior staff for promotion to training positions. However, it is often the non-technical skills, such as EI, or lack thereof, that create problems later.

One may argue that EI has its greatest potential use in modern surgical education. The “Halsted-apprenticeship” traditional method of surgical training with its long hours, steep hierarchies, subjective feedback of performance and ambiguous definitions of competence is no longer appropriate or possible. Surgical training in 2019 should involve competency based training, multi-modal educational approaches, such as simulation with appropriate and structured feedback (14). EI is not only an undergraduate educational issue, it affects post-graduate doctors and is beneficial in continuing professional development (42). Surgical trainees self-report poor competency in communication skills and leadership and are driven to improve these skills (5), EI workshops may be beneficial. Wolf et al (69) applied a rigorous three round modified Delphi process involving over 100 experienced educators spanning medical undergraduate education to continued professional development to identify competencies that are attributed to being successful in transition from undergraduate to residency. They found ten core competencies, EI being one, that they suggest assisted successful transition (69). Consequently, there have been suggestions that EI workshops should be used to allow medical practitioners the opportunity to improve their EI, in turn reducing the negative effects of stress (42,47,48,56) whilst increasing knowledge and understanding of patient expectations and trust (42). In order for EI education to be productive it must be multidisciplinary, carried out in a sensitive and supported environment and have clear purpose and objectives (14). Due to the increasingly recognised importance of non-technical skills (43), several surgical institutions have now developed and compulsory courses that include EI (7,43). The compulsory nature of the aforementioned course is suggested to be integral in an effective EI module (4).

McKinley and Phitayakorn (4) focussed on EI and teaching through simulation. Recorded image play-back ensures participants must view their actions, emotions and body language. Simulation is a powerful tool which highlights EI flaws whilst ensuring patients come to no harm (4). There are currently a few business-based EI simulation models available to purchase but no surgical simulation model is known (4).

In light of the above literature it is our view that the components of EI be taught to and learnt by surgical trainees. The form in which this is done should be varied to accommodate the learning environment deemed beneficial for each individual group. It is also the authors view that the use of simulation teaching, high-tech versus a simple phone recording of a simulated situation for example, be utilised to draw attention to one’s body language, spoken word and interactions. Ultimately, the limited research surrounding this area should lead to experiments and suggestions from the surgical community too.

There are limitations to this narrative review. Being a narrative review and not a systematic review means strict PRISMA protocol has not been followed. The current level of research surrounding EI in surgery is minimal and low impact at best. Measurement of EI is difficult and not standardised. These limitations highlight the need for large scale qualitative research focussing on knowledge of EI in the surgical community; interpretation of EI’s benefits and potential pit falls in surgery and how the surgical community can create and endorse a more emotionally intelligent surgical workforce with the associated benefits.

**CONCLUSION**

For many years the business community has recognised the importance of EI as a potential driver of great performance. The surgical community is beginning to recognise EI as an important factor in both patient care and surgeon well-being. Higher EI levels may reduce stress and burnout, improve leadership and improve patient trust. The surgical community as a whole must be mindful that those factors deemed to affect EI most; lack of sleep, long working hours, poor job satisfaction and interpersonal relationships are those that surgeons face on a daily basis. As such, surgeons should be the first to enrol in EI continued professional development modules to reduce stress, increase positive emotions and improve patient care.

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**Figure 1. Flow diagram of Emotional intelligence and surgery search**

Studies included (a further 25 references found during full text review)
(n = 69)

Full-text articles assessed for eligibility
(n = 44)

Records identified through database searching
(n = 95)

Records after duplicates removed
(n = 75)

Records screened
(n = 65)

Records excluded
(n = 21)

Records identified through other resources (books)
(n = 5)