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Identification the human characteristics and traits that should be presented by team members in critical situations that require a robust response in terms of punctuality and timekeeping

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Abstract

Background: It is important to explore the role of non-technical skills (NTS) when conducting airway management in anaesthetic situations, particularly in cases of intubation difficulties, and, therefore, it is first essential to comprehend the situations that can be described as straightforward intubation.

Aim: This study aims to identify the human characteristics and traits that should be presented by team members in critical situations that require a robust response in terms of punctuality and timekeeping.

Methods: A systematic literature review (SLR) was used to conduct this study. In addition, the study was allocated the following inclusion and exclusion criteria, whereby the inclusion criteria were that all the articles were published from 2005 to 2019 and must all have been written in the English language. The full published articles should be accessible, they should all be primary studies about humans, whether quantitative or qualitative, and, finally, they should be related to unprepared difficult intubation incidents. The various electronic databases, PubMed, MEDLINE, the Cochrane Library and the Cumulative Index to Nursing and Allied Health Literature (CINAHL), were used to search for the articles based on the allocated criteria.

Results: The predominant risk factors related to difficult airway management (DAM) obtained from this SLR were in the human factors' aspect in terms of language barriers, fatigue and stress, lack of skills (insufficient training), location (no expert guidance, non-hospital locations), patient factors, equipment (technical problems) and time pressure (rapid desaturation and how long was available to recover the patient) and obesity. Other findings elicited from this SLR were related to NTS: communication and leadership, the emotional work environment and patient outcomes, communication errors in the handoff process and teamwork skills.

Conclusion: Healthcare workers should be trained in the teamwork aspect. Similarly, NTS training should be introduced so that individuals can develop professionally. In addition, staff should also attend team building courses that have the aim of providing practical teamwork experiences. Future research is required so that it can enhance NTS in healthcare workers in the operating theatre (OT).

The effectiveness of operating theatre staff's non-technical teamwork skills during unprepared difficult intubation events

Chapter One: Introduction

1.1 Background

Surgical patients under general anesthesia require assistance in maintaining a clear airway for oxygen and anaesthetic gas delivery (Flin and Maran, 2015). Intubation, the process of managing the airway, is essential (Henderson, 2010). The Association of Anaesthetists of Great Britain and Ireland (AAGBI) emphasizes preoperative anaesthetic assessments to identify airway management concerns (AAGBI, 2018). Acute airway obstruction or respiratory failure necessitates immediate airway management (Ollerton et al., 2006). Pre-planning airway management is crucial for efficient anaesthesia and intubation (Flin et al., 2013). However, emergency surgeries, like trauma or cardiothoracic issues, present challenges as pre-planning isn't possible (Anderson and Klock, 2014).

1.1.1 Surgical Emergencies

Emergency surgeries may involve unknown airway difficulties requiring rapid management (Arslan Hanif et al., 2010). Clinical competence is essential in managing difficult airways (Barsuk et al., 2005). Non-technical skills (NTS), including communication and situational awareness, play a vital role in difficult airway management (Chrimes, 2016).

1.1.2 Non-Technical Skills

NTS, like communication and teamwork, enhance technical skills (Henderson et al., 2004). Limited resources hinder NTS training, impacting team performance (Hodges et al., 2007). Poor NTS levels lead to conflicts and communication failures (Crosby, 2011). NTS effectiveness is crucial, especially in diverse teams (Greenberg et al., 2007).

1.1.3 Airway Management

Airway difficulties can arise from various factors such as swelling or trauma (Ponnusamy, 2018). Effective DAM involves assessing the airway, time constraints, and potential complications (Gleeson et al., 2015). 'Cannot intubate-cannot ventilate' scenarios are rare but life-threatening (AMBOSS, 2019).

1.1.4 The Role of NTS in Tackling Difficult Airway Management Events in OT

NTS are crucial for patient safety in the OT (Flin et al., 2010). Effective communication and teamwork are vital for multidisciplinary collaboration (Brown et al., 2015). Lack of NTS contributes to errors in the OT (Barsuk et al., 2005). Human factors impact behaviour in the workplace, including anaesthesia (Flin and Maran, 2015).

1.2 The Project's Aim

This study aims to explore the role of NTS in airway management during anaesthetic procedures, focusing on unprepared difficult intubation events (Wilson and Hebbar, 2013). It seeks to identify human factors affecting team performance in critical situations, such as leadership and decision-making.

1.3 Research Question

What is the effectiveness of OT staff's non-technical teamwork skills during unprepared difficult intubation events? The study will investigate factors contributing to difficult airway management and human factors influencing efficient NTS in surgical emergency teams.

1.4 Research Implications

Identifying NTS competencies enhances successful airway management (Higgs et al., 2018). Policies should consider NTS alongside clinical expertise for better patient outcomes (Apfelbaum et al., 2013). Continuous professional development should emphasize NTS training (Rosenthal et al., 2006). In diverse healthcare settings, policies should promote cooperation among team members with diverse backgrounds (Jones et al., 2018).

Chapter Two: Background Literature Review

Literature reviews are vital for understanding and replicating research methods and acknowledging the quality of existing literature (Smith et al., 2011). Webster and Watson (2002) describe literature reviews as a method for analyzing substantial data to reach informed conclusions and develop theoretical frameworks. This study aims to conduct a systematic review of literature on the non-technical skills (NTS) required during difficult intubation events.

A systematic review involves extracting relevant articles and books from databases and other sources (Ovassapian et al., 2005). Comprehensive information will be gathered from diverse literature sources, including conferences, trials, and health organization guidelines (Ho-Tai et al., 1998). The review will focus not only on intubation but also on different types of difficult airway management cases (Cooper et al., 2006).

This literature review aims to gain insight into the importance of effective NTS during critical incidents of intubation (Keller et al., 2004). It will consist of two subsections: "Intubation in Airway Management" and "Human Factors of Non-Technical Skills in Difficult Airway Management."

1.1 Intubation in Airway Management

Intubation involves inserting a tube into the trachea to provide oxygen during general anesthesia (Martin et al., 2011). Medical situations requiring intubation include ventilation or oxygenation failure, airway obstruction, and severe asthma or bronchitis exacerbation (AMBOSS, 2019). Tube placement is visualized using a laryngoscope, and successful placement is confirmed by measuring exhaled carbon dioxide levels and assessing bilateral breath sounds (Walls et al., 2011). Complications of intubation include teeth damage, misplacement, infections, and late complications such as vocal cord granuloma (Cook et al., 2011).

1.2 Human Factors of Non-Technical Skills in Difficult Airway Management

1.2.1 Leadership

Leadership is essential in formulating airway management plans, allocating roles, and handling various situations (White, 2012; Flin et al., 2013).

1.2.2 Teamwork

Effective teamwork is crucial in airway management, with team members having specific roles and responsibilities (Nolan and Kelly, 2011; Reason, 2016).

1.2.3 Situation Awareness

Situation awareness is critical for effective decision-making and involves anticipating environmental elements and circumstances (Fioratou et al., 2010).

1.2.4 Decision Making

Clinicians must assess risks and benefits in airway management and continuously re-evaluate the clinical situation (Marshall and Pandit, 2016).

1.2.5 Followership
Good followership involves actively supporting team leaders and anticipating situations (Higgs et al., 2018).

1.2.6 Communication
Effective communication is essential in achieving successful operations, with elements such as role allocation and maintaining a "sterile cockpit" environment being crucial (Brown et al., 2015).

By examining these factors, this literature review aims to identify optimal practices in the operating theater to improve patient outcomes during difficult airway management incidents.

Methodology and results

Part One: Methodological Approach

1. Introduction
This chapter comprises two main components: the methodological strategy and the findings. The methodological strategy includes the rationale for conducting a systematic literature review (SLR), selection of keywords, justification for database usage, and establishment of inclusion and exclusion criteria. The findings section involves evaluating selected articles using the Critical Appraisal Skills Programme (CASP) and presenting a summary of information and results in a master table.

2. Rationale of the Systematic Literature Review
A systematic literature review (SLR) was chosen as the primary research method due to its replicability, objectivity, transparency, and systematic nature (Lucisano and Talbot, 2012). SLRs stand within the hierarchy of evidence and have the potential to deliver practical outcomes (Burns et al., 2011). The approach allows for comprehensive data collection, research appraisal, and conclusion generation (Brinjikji et al., 2015).

Initial Scope
While Google Scholar can be utilized for initial scoping, it is not sufficient alone for systematic review searches (Haddaway et al., 2015). Therefore, a combination of conventional search methods was employed to ensure comprehensive coverage.

Inclusion and Exclusion Criteria
Clear inclusion and exclusion criteria were established to narrow the research scope (Booth et al., 2015). These criteria ensure the selection of relevant primary studies and enhance the rigor of the systematic review process (Smith et al., 2011).

Keywords
Keywords were selected based on the Patient-Intervention-Comparison/Control-Outcome (PICO) model to focus the research scope (Parahoo, 2014). Variations and synonyms were included to capture diverse literature related to the topic (Cooper et al., 2001). Boolean operators were utilized to refine search results (Spink and Jansen, 2004).

Rationale for Using Databases
Databases such as PubMed, CINAHL, MEDLINE, and the Cochrane Library were chosen for their comprehensive coverage of biomedical literature (Saedon et al., 2007). Each database offers unique features and advantages for systematic literature searches (Bahaadinbeigy et al., 2010; Younger and Boddy, 2009).

Analysis and Synthesis of Database-Sourced Research Papers

Selected papers underwent a rigorous filtering process to ensure relevance and suitability (Zeng et al., 2015). The Critical Appraisal Skills Programme (CASP) was employed for paper assessment, allowing for systematic critique and selection of appropriate studies (Smith et al., 2004).

This methodological approach ensures the systematic collection, appraisal, and synthesis of relevant research materials to address the research questions effectively.

Part Two: Results

Systematic Literature Review (SLR) methodology utilized PRISMA for data gathering and analysis (Thome et al., 2016). The PRISMA flowchart facilitated the organization of gathered Randomized Controlled Trials (RCTs), clinical trials, and observational studies from various databases, including the Cochrane Library, PubMed, Medline via Ovid, and Scopus. This flowchart assisted in identifying relevant articles and excluding those that did not meet the inclusion criteria (see Figure 2.1 - PRISMA Flowchart).

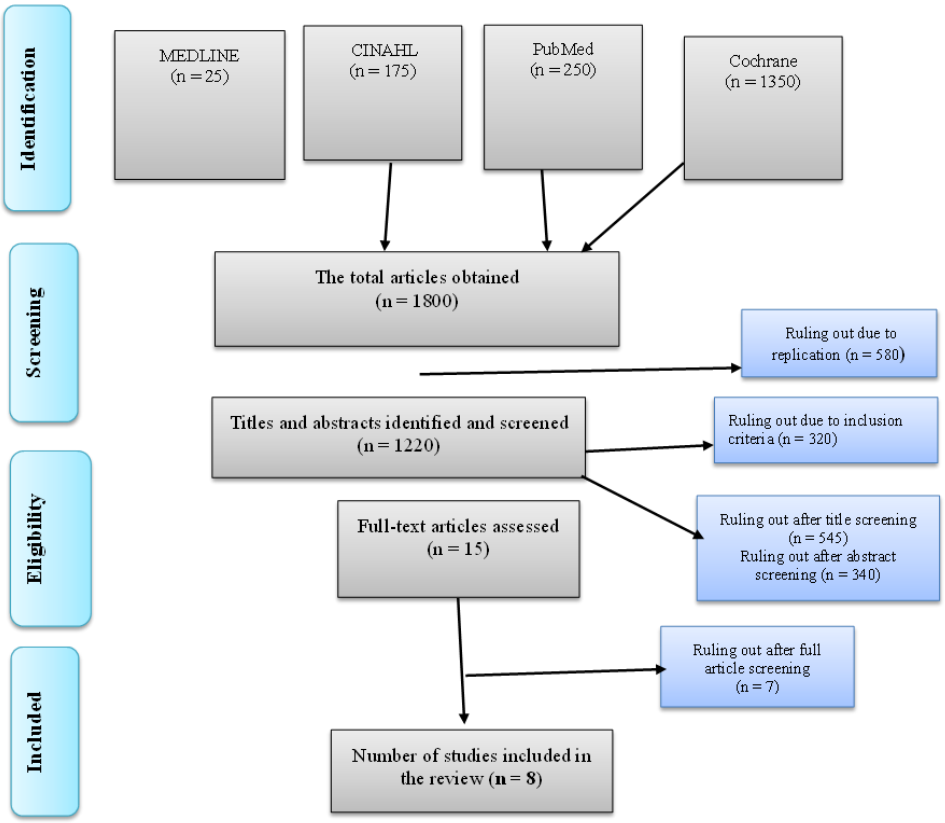

Figure 2.1 PRISMA Flowchart justifying the ten selected articles.

1 Review technique

A total of 1840 articles were identified from the four databases: CINAHL (n = 175), Cochrane (n = 1350), PubMed (n = 250), and MEDLINE (n = 25). Following the initial search, exclusion methods were applied, resulting in 8 studies being included in the review. Each of these selected articles was assessed using the CASP Quantitative Checklist, and a summary of their findings is presented in Table 2.2. Table 2.3 provides a brief description of the studies categorized by various themes.

Table 2.1: search results

Databases	Ruling out due to replication (n = 580)	Ruling out due to inclusion criteria (n = 320)	Ruling out due to screening titles and abstracts (n = 885)	Ruling out after full article screening (n = 7)	Included articles (n = 25)
MEDLINE (n = 25)	**7**	**4**	**10**	**2**	**(n = 2): Chen et al. (2011) & Elks and Riley (2009)**
CINAHL (n = 175)	**45**	**30**	**80**	**18**	**(n = 2): Crossley et al. (2011) & Undre et al. (2014)**
Cochrane (n = 1350)	**493**	**241**	**640**	**2**	**(n = 2): Nurok et al. (2011) & Halverson et al. (2014)**
PubMed (n = 250)	**35**	**45**	**155**	**13**	**(n = 2): Komasawa et al. (2018) & Marshall and Mehra (2014)**

Settings

The studies were conducted in diverse settings, including university hospitals, teaching hospitals, and specialized surgical units across different countries.

Research designs

Table 2.3 illustrates the research designs that were used in each of the selected articles. Six out of the eight studies used quantitative approaches, including an (RCT) (Marshall and Mehra 2014), three survey studies (Chen et al. 2011; Komasawa et al. 2018; Elks and Riley 2009) and two prospective observational case-control studies (Crossley et al. 2011; Nurok et al. 2011). Finally, two out of the eight studies employed a qualitative approach, in the form of semi-structured interviews (Undre et al. 2006; Halverson et al. 2011).

Sampling Techniques

Table 2.3 categorizes the sampling techniques into two main categories. Two studies recruited patients, including 350 pediatric cardiac surgery cases (Chen et al., 2011) and 64 participants (Marshall and Mehra, 2014). On the other hand, six studies involved different healthcare professionals as participants:

- Elks and Riley (2009) recruited 110 anaesthetists from the University of Western Australia and 122 from public hospitals in Perth.
- Crossley et al. (2011) involved 56 anaesthetists, 39 scrub nurses, two surgical care practitioners, and three independent assessors.
- Undre et al. (2006) had six participants from each of the four specialist OT groups (surgeons, anaesthetists, Operating Department Practitioners (ODP), and nursing staff), totaling 24 participants.
- Nurok et al. (2011) included two anaesthesiologists, two nurses, and three safety specialists as observers.
- Halverson et al. (2014) recruited 94 team members from anesthesia, surgery, and nursing departments.
- Komasawa et al. (2018) involved anesthesia residents, with 24 male and 11 female participants.

Outcomes of the Eight Studies

The eight studies presented various outcomes related to human factors. These outcomes included language barriers, fatigue, stress, lack of skill, patient factors, equipment issues, time pressure, and obesity. Additionally, some studies highlighted non-technical skills (NTS) such as communication and leadership, emotional work environment, communication errors, and teamwork skills. Please refer to Tables 2.2 and 2.3 for a detailed summary of the findings.

1.1 Part two of section one: Discussion of the Findings

1.1.1 Overview

This chapter consists of two main sections: the discussion of the findings and the conclusion, including a discussion of the strengths and limitations, implications, recommendations, and overall conclusion of the systematic literature review (SLR).

1.1.2 Research designs

The research designs employed in the eight selected studies were primarily primary research. Two studies utilized a qualitative approach through semi-structured interviews, while seven studies utilized quantitative approaches, including randomized controlled trials (RCTs), cross-sectional studies, and prospective observational case-control studies. Only one study was an interventional study, demonstrating a variety of research designs that provided rigorous evidence on the topic.

1.1.3 NTS: communication and leadership

The findings from the selected studies highlighted various barriers to non-technical skills (NTS) at individual, team, and hospital levels. Communication and leadership were identified as crucial components influencing patient outcomes. Studies by Chen et al. (2011) and Undre et al. (2006) revealed that healthcare workers often lacked familiarity with NTS and underestimated their impact on medical procedures. Communication barriers, including poor understanding of professional roles and conflicts between medical professions, were common, as shown in Undre et al. (2006).

Elks and Riley (2009) identified communication issues between surgeons and anaesthetists, emphasizing the importance of good communication skills, particularly in emergency situations. Halverson et al. (2011) observed communication errors during emergencies, mainly attributed to equipment concerns and lack of progress reports. They suggested the implementation of communication training, checklists, and simulation exercises to enhance communication within the operating room (OT) team.

Leadership style also played a significant role in facilitating communication and teamwork. Transactional and transformational leadership styles were discussed, with transformational leadership emphasizing motivation and teamwork (Elks and Riley, 2009). Undre et al. (2006) highlighted the importance of effective NTS, including leadership and communication skills, in overcoming complications in critical care areas like the intensive care unit (ICU).

Overall, the findings underscored the importance of effective communication and leadership in healthcare settings, particularly in emergency situations, and suggested strategies such as training, checklists, and leadership development to enhance NTS and improve patient outcomes.

1.1.4 Predominant risk factors related to difficult airway management

Effective non-technical skills (NTS) play a crucial role in addressing various factors affecting airway management in the perioperative environment. These factors include language barriers,

fatigue, stress, lack of skill due to insufficient training, location constraints, patient factors such as airway obstruction, equipment issues, and time pressure. Obesity was identified as a significant factor complicating patient treatment in the operating room (OR) due to difficulties in airway clearance and surgical access (Crossley et al., 2011; Halverson et al., 2011; Chen et al., 2011).

1.1.5 Airway management (tracheal intubation management)

Guidelines emphasize the importance of enhanced airway management to improve patient care. Effective communication, planning, and problem-solving during the preoxygenation stage are crucial. However, healthcare staff need training and assessment on implementing these guidelines effectively during clinical emergencies (Crossley et al., 2011; Komasawa et al., 2018).

1.1.6 Training programmes

Studies by Crossley et al. (2011), Nurok et al. (2011), and Komasawa et al. (2018) highlighted the benefits of training programs in improving healthcare facilities. Training focused on NTS was found to significantly benefit staff performance, irrespective of the specific medical procedures involved. Therefore, implementing training programs could enhance patient outcomes by improving team performance (Crossley et al., 2011; Nurok et al., 2011; Komasawa et al., 2018).

1.1.7 Team performance and patient outcomes

Effective teamwork training programs should be designed based on an assessment of team preferences to ensure effectiveness. Team members' acceptance and comfort with the training style are crucial for successful implementation. Training programs aimed at improving NTS could lead to better patient outcomes by addressing critical areas such as communication, staffing concerns, and patient care (Undre et al., 2006; Halverson et al., 2011; Crossley et al., 2011).

1.1.8 The emotional work environment and patient outcomes

Studies by Nurok et al. (2011), Halverson et al. (2011), and Crossley et al. (2011) examined the impact of the emotional climate within the operating room on teamwork, communication, and patient outcomes. A functional emotional environment was found to be more effective in improving patient outcomes by fostering effective teamwork and stress management. Training programs focusing on NTS contributed to creating a functional emotional environment (Nurok et al., 2011; Halverson et al., 2011; Crossley et al., 2011).

1.1.9 Communication errors in the handoff process

Identifying and minimizing communication errors, especially during the handoff process, is crucial for patient safety. Strategies such as improving information flow and equipment understanding can help reduce errors related to equipment and resource management (Elks and Riley, 2009; Halverson et al., 2011; Nurok et al., 2011).

1.1.10 Problem-based learning in OT management

Problem-based learning (PBL) plays a significant role in developing self-confidence and enhancing NTS among healthcare practitioners, particularly in emergency situations. Simulation-based training using PBL approaches allows staff to practice real-life scenarios, improving their confidence in managing emergencies without compromising patient care (Komasawa et al., 2018; Nurok et al., 2011; Crossley et al., 2011).

1.1.11 Teamwork skills

Marshall and Mehra's (2014) study investigated the use of cognitive aids in supporting communication and teamwork during emergency situations. While the use of cognitive aids improved practitioners' NTS, it did not enhance their technical skills. However, cognitive aids facilitated better communication and role clarity within the team. Fixation errors, such as attempting inappropriate procedures during emergencies, were highlighted as potential causes of poor patient outcomes (Marshall and Mehra, 2014).

1.2 Section Two: Conclusion

1.2.1 Overview

This chapter begins with the SLR's strengths and limitations, followed by its implications. Afterwards, the recommendations are presented, followed by the conclusion of the whole SLR.

1.2.2 Strengths and limitations

1.2.2.1 Strengths

An extended literature review process was undertaken, resembling systematic review stages, allowing for a comprehensive overview of the topic (McCulloch et al., 2011).

1.2.2.2 Limitations

The SLR faced methodological limitations that hindered meta-analysis due to the diverse research approaches in the reviewed articles (Rutherford et al., 2012). Challenges in identifying applicable articles were noted due to the absence of standardized terminology, and pragmatic constraints limited the scope of the search (Yule et al., 2006). The use of digital sources only and exclusion of non-English research might have led to incomplete outcomes, along with potential researcher bias in article selection (Yule et al., 2006).

1.2.3 Practical implications

The SLR underscores the importance of non-technical teamwork skills in perioperative settings for patient outcomes. Awareness and training in NTS are vital for effective emergency response and overall patient care (Yule et al., 2006). The implications extend to training and clinical application, facilitating the identification of opportunities for safety interventions and improved teamwork (Rutherford et al., 2012).

1.2.4 Recommendations and future research

1.2.4.1 Recommendations

Surgeons and healthcare workers should receive leadership, team management, and NTS training to foster effective teamwork (Elks and Riley, 2009; McCulloch et al., 2011). Team building courses and leadership training for surgeons are suggested to enhance collaboration and leadership skills within surgical teams (Flowerdew et al., 2012).

1.2.4.2 Future research

Future research should focus on enhancing NTS dynamics in perioperative healthcare workers, particularly in relation to the environment and patient safety. Primary research, both quantitative and qualitative, is recommended to explore airway management errors during cardiopulmonary resuscitation and minimize healthcare provider conflicts in the operating room (Yule et al., 2006).

1.2.5 Conclusion

This SLR highlights the importance of training courses focusing on non-technical skills (NTS) to enhance healthcare workers' efficiency (Crossley et al., 2011). Key areas identified for improvement include communication, leadership, teamwork, and handoff processes (Elks and Riley, 2009; Chen et al., 2011; Nurok et al., 2011). The findings underscore the critical role of effective teamwork and NTS in ensuring both healthcare workers' and patients' safety, particularly in high-risk environments like the operating theater (Halverson et al., 2014; Undre et al., 2006).

Moreover, the results suggest that enhancing medical staff's teamwork skills can positively impact technical performance (Satyapal et al., 2018). The analysis also identifies current challenges caused by various factors, indicating the need for targeted interventions to optimize patient outcomes and improve healthcare quality.

Language barriers are highlighted as a significant concern, emphasizing the importance of high-quality interpretation services for effective communication between healthcare professionals, patients, and their relatives (Chen et al., 2011).

1.3 References

AMBOSS. 2019. *Airway management and ventilation*, Available at: https://www.amboss.com/us/knowledge/Airway_management_and_ventilation [Accessed: 26 January 2019].

Arslan Hanif, M. et al. 2010. Advanced airway management does not improve outcome of out-of-hospital cardiac arrest. *Academic Emergency Medicine* 17(9), pp. 926-931.

Avenell, A. et al. 2001. Lessons for search strategies from a systematic review, in the Cochrane Library, of nutritional supplementation trials in patients after hip fracture. *The American Journal of Clinical Nutrition* 73(3), pp. 505-510.

Aveyard, H. 2014. *Doing a literature review in health and social care: A practical guide.* McGraw-Hill Education (UK).

Bahaadinbeigy, K. et al. 2010. MEDLINE versus EMBASE and CINAHL for telemedicine searches. *Telemedicine and e-Health* 16(8), pp. 916-919.

Barsuk, D. et al. 2005. Using advanced simulation for recognition and correction of gaps in airway and breathing management skills in prehospital trauma care. *Anesthesia & Analgesia* 100(3), pp. 803-809.

Barton, S. 2000. Which clinical studies provide the best evidence?: The best RCT still trumps the best observational study. *British Medical Journal* 321(7256), pp. 255–256.

Bone and Spine. 2015. *What is hierarchy of evidence*? Available at: http://boneandspine.com/what-is-hierarchy-of-evidence/ (Accessed: 11 December 2015).

Booth A. et al. 2015. What is the evidence for the effectiveness, appropriateness and feasibility of group clinics for patients with chronic conditions? A systematic review. Southampton (UK): NIHR Journals Library; 2015 Dec. *Health Services and Delivery Research* Vol. 3: No. 46 doi:10.3310/hsdr 03460) Chapter 2, Review methods. Available from: https://www.ncbi.nlm.nih. gov/books/NBK333460/.

Brinjikji, W. et al. 2015. Systematic literature review of imaging features of spinal degeneration in asymptomatic populations. *American Journal of Neuroradiology* 36(4), pp. 811-816.

Brown III, C.A. et al. 2015. Techniques, success, and adverse events of emergency department adult intubations. *Annals of Emergency Medicine* 65(4), pp. 363-370.

Burns, P.B. et al. 2011. The levels of evidence and their role in evidence-based medicine. *Plastic and Reconstructive Surgery*, 128(1), p.305.

Buyck, M. et al. 2019. Effects of blindfold on leadership in pediatric resuscitation simulation: a randomized trial. *Frontiers in Pediatrics* 7, p.10.

Campbell, R. 2012. Managing upper respiratory tract complications of primary ciliary dyskinesia in children. *Current Opinion in Allergy and Clinical Immunology* 12(1), pp. 32-38.

Cant, R.P. et al. Improving the non-technical skills of hospital medical emergency teams: The Team Emergency Assessment Measure (TEAM™). *Emergency Medicine Australasia* 28(6), pp. 641-646.

Catchpole, K. et al. 2008. Teamwork and error in the operating room: analysis of skills and roles. *Annals of Surgery* 247(4), pp. 699-706.

Cemalovic, N. et al. 2016. Human factors in the emergency department: is physician perception of time to intubation and desaturation rate accurate? *Emergency Medicine Australasia* 28(3), pp. 295-299.

Chen, J.G. et al. 2011. Adaptation of a postoperative handoff communication process for children with heart disease: a quantitative study. *American Journal of Medical Quality* 26(5), pp. 380-386.

Chrimes, N. 2016. The Vortex: a universal 'high-acuity implementation tool' for emergency airway management. *British Journal of Anaesthesia* 117(suppl_1), pp.i20-i27.

Concato, J. et al. 2000. Randomized, controlled trials, observational studies, and the hierarchy of research designs. *New England Journal of Medicine*, 342(25), pp. 1887-1892.

Cook, T.M. et al. 2011a. Major complications of airway management in the UK: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 1: anaesthesia. *British Journal of Anaesthesia* 106(5), pp. 617-631.

Cook, T.M. et al. 2011b. Major complications of airway management in the UK: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 2: intensive care and emergency departments. *British Journal of Anaesthesia 106*(5), pp. 632-642.

Cook, T.M. and MacDougall-Davis, S.R. 2012. Complications and failure of airway management. *British Journal of Anaesthesia* 109(suppl_1), pp. 68-85.

Coolen, E. et al. Measuring situation awareness and team effectiveness in pediatric acute care by using the situation global assessment technique. *European Journal of Pediatrics* pp. 1-14.

Cooper, H. et al. 2001. Developing an evidence base for interdisciplinary learning: a systematic review. *Journal of Advanced Nursing* 35(2), pp. 228-237.

Cooper, D.R. et al. 2006. *Business research methods* (Vol. 9). New York: McGraw-Hill Irwin.

Crosby, E.T. 2011. An evidence-based approach to airway management: is there a role for clinical practice guidelines? *Anaesthesia* 66, pp. 112-118.

Crossley, J. et al. 2011. Prospective observational study to evaluate NOTSS (Non-Technical Skills for Surgeons) for assessing trainees' non-technical performance in the operating theatre. *British Journal of Surgery* 98(7), pp. 1010-1020.

Darby, J.M. et al. 2018. Emergency surgical airways following activation of a difficult airway management team in hospitalized critically ill patients: a case series. *Journal of Intensive Care Medicine* 33(9), pp. 517-526.

Elks, K.N. and Riley, R.H. 2009. A survey of anaesthetists' perspectives of communication in the operating suite. *Anaesthesia and Intensive Care* 37(1), pp. 108-111.

El-Orbany, M. and Woehlck, H.J. 2009. Difficult mask ventilation. *Anesthesia & Analgesia* 109(6), pp. 1870-1880.

Fioratou, E. et al. 2010. Beyond monitoring: distributed situation awareness in anaesthesia. *British Journal of Anaesthesia* 105(1), pp. 83-90.

Flin, R. et al. 2013. Human factors in the development of complications of airway management: preliminary evaluation of an interview tool. *Anaesthesia* 68(8), pp. 817-825.

Flin, R. and Maran, N. 2015. Basic concepts for crew resource management and non-technical skills. *Best Practice & Research Clinical Anaesthesiology* 29(1), pp. 27-39.

Flowerdew, L. et al. 2012. Identifying nontechnical skills associated with safety in the emergency department: a scoping review of the literature. *Annals of Emergency Medicine* 59(5), pp. 386-394.

Freytag, J. et al. 2019. Rating the quality of teamwork - a comparison of novice and expert ratings using the Team Emergency Assessment Measure (TEAM) in simulated emergencies. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 27(1), p.12.

Gilligan, P. et al. 2005. To lead or not to lead? Prospective controlled study of emergency nurses' provision of advanced life support team leadership. *Emergency Medicine Journal* 22(9), pp. 628-632.

Gleeson, S. et al. 2015. Human factors in complex airway management. *BJA Education* 16(6), pp .191-197.

Haddaway, N.R. et al. 2015. The role of Google Scholar in evidence reviews and its applicability to grey literature searching. *PloS One* 10(9), p.e0138237.

Halm, E.A. et al. 2002. Is volume related to outcome in health care? A systematic review and methodologic critique of the literature. *Annals of Internal Medicine* 137(6), pp. 511-520.

Halverson, A.L. et al. 2011. Communication failure in the operating room. *Surgery* 149(3), pp. 305-310.

Henderson, J.J. et al. 2004. Difficult Airway Society guidelines for management of the unanticipated difficult intubation. *Anaesthesia* 59(7), pp. 675-694.

Henderson, J. 2010. Airway management in the adult. In: *Miller's Anaesthesia. 7th ed. Philadelphia: Churchill Livingstone*, pp. 1573-1610.

Higgins, J.P. et al. 2011. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *British Medical Journal* 343, p.d5928.

Higgs, A. et al. 2018. Guidelines for the management of tracheal intubation in critically ill adults. *British Journal of Anaesthesia* 120(2), pp. 323-352.

Ho-Tai, L.M. et al. 1998. Gas leak and gastric insufflation during controlled ventilation: face mask versus laryngeal mask airway. *Canadian Journal of Anaesthesia* 45(3), pp. 206-211.

Jirojwong, S. and Pepper, K. 2013. Quantitative Research Design. In S. Jirojwong, M. Johnson & A. Welch (Eds.), *Research methods in nursing and midwifery*. Sydney: Oxford University Press.

Kitchenham, B. et al. 2009. Systematic literature reviews in software engineering – a systematic literature review. *Information and Software Technology* 51(1), pp. 7-15.

Komasawa, N. et al. 2018. Problem-based learning for anesthesia resident operating room crisis management training. *PloS One* 13(11), p.e0207594.

Kristensen, M.S. 2010. Airway management and morbid obesity. *European Journal of Anaesthesiology (EJA) 27*(11), pp. 923-927.

Kurmann, A. et al. 2014. Impact of team familiarity in the operating room on surgical complications. *World Journal of Surgery* 38(12), pp. 3047-3052.

Lancaster, T. et al. 2000. Effectiveness of interventions to help people stop smoking: findings from the Cochrane Library. *British Medical Journal* 321(7257), pp. 355-358.

Lucisano, K.E. and Talbot, L.A. 2012. Simulation training for advanced airway management for anesthesia and other healthcare providers: a systematic review. *AANA Journal* 80(1), pp. 25-31.

Maignan, M. et al. 2016. Team Emergency Assessment Measure (TEAM) for the assessment of non-technical skills during resuscitation: validation of the French version. *Resuscitation* 101, pp. 115-120.

Marshall, S.D. 2015. [PDF]. *Radical evolution: the 2015 Difficult Airway Society guidelines for managing unanticipated difficult or failed tracheal intubation*. Available at: https://onlinelibrary.wiley.com/doi/full/10.1111/anae.13354. [Accessed: 30 January 2019]

Marshall, S.D. and Chrimes, N. 2016. Time for a breath of fresh air: rethinking training in airway management. *Anaesthesia* 71(11), pp. 1259-1264.

Marshall, S.D. and Mehra, R. 2014. The effects of a displayed cognitive aid on non-technical skills in a simulated 'can't intubate, can't oxygenate' crisis. *Anaesthesia* 69(7), pp. 669-677.

Marshall, S.D. and Pandit, J.J. 2016. Radical evolution: the 2015 Difficult Airway Society guidelines for managing unanticipated difficult or failed tracheal intubation. *Anaesthesia* 71(2), pp. 131-137.

Martin, L.D. et al. 2011. 3,423 emergency tracheal intubations at a university hospital: airway outcomes and complications. *The Journal of the American Society of Anesthesiologists* 114(1), pp. 42-48.

McCulloch, P. et al. 2011. Interventions to improve teamwork and communications among healthcare staff. *British Journal of Surgery* 98(4), pp. 469-479.

McGill University Health Centre 2016. *MEDLINE via OVID or via PUBMED?* Available at: http://www.muhclibraries.ca/files/2016/08/medline-ovid-or-pubmed-EN-FINAL-2016August.pdf [Accessed: 21 February 2019]

Moneypenny, M.J. 2017. When are 'human factors' not 'human factors' in can't intubate can't oxygenate scenarios? When they are 'human' factors. *BJA: British Journal of Anaesthesia* 118(3), pp. 469-469.

Mulrow, C.D. 1994. Systematic reviews: rationale for systematic reviews. *British Medical Journal* 309(6954), pp. 597-599.

Niforopoulou, P. et al. 2010. Video-laryngoscopes in the adult airway management: a topical review of the literature. *Acta Anaesthesiologica Scandinavica* 54(9), pp. 1050-1061.

Nolan, J.P. and Kelly, F.E. 2011. Airway challenges in critical care. *Anaesthesia* 66, pp. 81-92.

Nurok, M. et al. 2011. The relationship of the emotional climate of work and threat to patient outcome in a high-volume thoracic surgery operating room team. *BMJ Quality & Safety* 20(3), pp. 237-242.

Ollerton, J.E. et al. 2006. Potential cervical spine injury and difficult airway management for emergency intubation of trauma adults in the emergency department - a systematic review. *Emergency Medicine Journa*, 23(1), pp. 3-11.

Pattni, N. et al. 2017. Gender, power and leadership: the effect of a superior's gender on respiratory therapists' ability to challenge leadership during a life-threatening emergency. *BJA: British Journal of Anaesthesia* 119(4), pp. 697-702.

Payne, R. and Firth-Cozens, J. (1987). *Stress in health professionals*. John Wiley & Sons.

Pearson, E. and McLafferty, I. 2011. The use of simulation as a learning approach to non-technical skills awareness in final year student nurses. *Nurse Education in Practice* 11(6), pp. 399-405.

Ponnusamy, K. 2018. *Difficult Airway Society*. Available at: https://das.uk.com/content/patient_info/what_is_airway_management [Accessed: 29 January 2019]

Reason, J. 2016. *Managing the risks of organizational accidents*. Routledge.

Reason, J. and Hobbs, A. 2017. *Managing maintenance error: a practical guide*. CRC Press.

Rosenman, E.D. et al. 2018. A simulation-based approach to measuring team situational awareness in emergency medicine: a multicenter, observational study. *Academic Emergency Medicine* 25(2), pp. 196-204.

Rosenthal, M.E. et al. 2006. Achieving housestaff competence in emergency airway management using scenario based simulation training: comparison of attending vs housestaff trainers. *Chest* 129(6), pp. 1453-1458.

Rutherford, J.S. et al. 2012. Non-technical skills of anaesthetic assistants in the perioperative period: a literature review. *British Journal of Anaesthesia* 109(1), pp. 27-31.

Saedon, M. et al. 2007. Is there a changing trend in surgical management of gastroesophageal reflux disease in children? *World Journal of Gastroenterology: WJG* 13(33), p.4417.

Sampson, M. et al. 2009. An evidence-based practice guideline for the peer review of electronic search strategies. *Journal of Clinical Epidemiology*, 62(9), pp. 944-952.

Smith, E. et al. 2004. The development of a prehospital search filter for the Cochrane Library. *Australasian Journal of Paramedicine* 2(1).

Smith, V. et al. 2011. Methodology in conducting a systematic review of systematic reviews of healthcare interventions. *BMC Medical Research Methodology* 11(1), p.15.

Spiegelhalter, D.J. et al. 2004. *Bayesian approaches to clinical trials and health-care evaluation (Vol. 13)*. John Wiley & Sons.

Spink, A. and Jansen, B.J. 2004. A study of web search trends. *Webology* 1(2), p.4.

Undre, S. et al. 2006. Teamwork in the operating theatre: cohesion or confusion? *Journal of Evaluation in Clinical Practice* 12(2), pp. 182-189.

Wallin, C.J. et al. 2007. Target-focused medical emergency team training using a human patient simulator: effects on behaviour and attitude. *Medical Education* 41(2), pp. 173-180.

Walls, R.M. and Murphy, M.F. eds., 2008. *Manual of emergency airway management*. Lippincott Williams & Wilkins.

Walls, R.M. et al. 2011. Emergency airway management: a multi-center report of 8937 emergency department intubations. *The Journal of Emergency Medicine* 41(4), pp. 347-354.

Webster, J. and Watson, R.T. 2002. Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly* pp.xiii-xxiii.

White, N. 2012. Understanding the role of non-technical skills in patient safety. *Nursing Standard* 26(26) pp. 43-48.

Wijdicks, E.F. et al. 2003. Emergency intubation for respiratory failure in Guillain-Barré syndrome. *Archives of Neurology* 60(7), pp. 947-948.

Wilson, K.G. et al. 2005. Evaluation of a decision aid for making choices about intubation and mechanical ventilation in chronic obstructive pulmonary disease. *Patient Education and Counseling* 57(1), pp. 88-95.

Younger, P. and Boddy, K. 2009. When is a search not a search? A comparison of searching the AMED complementary health database via EBSCOhost, OVID and DIALOG. *Health Information & Libraries Journal* 26(2), pp. 126-135.

Yule, S. et al. 2006. Non-technical skills for surgeons in the operating room: a review of the literature. *Surgery* 139(2), pp. 140-149.

Zeng, X. et al. 2015. The methodological quality assessment tools for preclinical and clinical studies, systematic review and meta-analysis, and clinical practice guideline: a systematic review. *Journal of Evidence-based Medicine* 8(1), pp. 2-10.