

End-Of-Life Decision Making

A Novel Entrustable Professional Activity?



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Dr. Maria Mahmood

Masters of Surgery (MCh)

School of Medicine, Trinity College Dublin

SUPERVISOR

Prof. Paul Ridgway

**Associate Professor
Trinity College Dublin
Consultant Upper GI & HPB Surgeon
Tallaght University Hospital**

July 2022

Table of Contents

| | |
|--|----|
| DECLARATION..... | 4 |
| SUMMARY – Methods & Major Findings | 5 |
| ACKNOWLEDGEMENTS | 8 |
| LIST OF ABBREVIATIONS..... | 9 |
| LIST OF FIGURES | 10 |
| LIST OF TABLES | 11 |
| CHAPTER 1 INTRODUCTION | 12 |
| CHAPTER 2 SURGICAL PROFESSIONALISM – ASSESSMENT OF TECHNICAL/NON-TECHNICAL SKILLS & EPAs: A SYSTEMATIC REVIEW | |
| 2.1 Background..... | 17 |
| 2.2 Introduction..... | 18 |
| 2.3 Methodology | 27 |
| 2.4 Discussion & Results..... | 29 |
| 2.5 Conclusion | 41 |
| CHAPTER 3 THE COMPLEX NATURE OF END-OF-LIFE DECISION MAKING IN SURGERY: A SYSTEMATIC REVIEW | |
| 3.1 Introduction and Background..... | 42 |
| 3.2 Methodology | 44 |
| 3.3 Results | 48 |
| 3.4 Discussion | 50 |
| 3.4.1 Delayed referral to palliative care / aggressive treatment near EOL | 50 |
| 3.4.2 Surgery in last year of life may be contradictory to patient’s goals of care | 51 |
| 3.4.3 Surgeon’s and Patients’ perspectives..... | 51 |
| 3.4.4 Introducing decision-making measures and Assessments | 52 |
| 3.5 Conclusion | 57 |
| CHAPTER 4 STUDYING PROFESSIONAL ATTITUDES OF SURGEONS TOWARDS END-OF-LIFE DECISION MAKING, & THEIR RESPONSES TO END-OF-LIFE CLINICAL SCENARIOS | |
| 4.1 Introduction and Background..... | 58 |
| 4.2 Methodology | 60 |
| 4.3 Results | 64 |
| 4.4 Limitations | 73 |
| 4.5 Discussion..... | 73 |

| | |
|--|-----|
| 4.6 Conclusion | 75 |
| CHAPTER 5 EVALUATING CONSTRUCT VALIDITY OF A SUMMATIVE ASSESSMENT TOOL FOR END-OF-LIFE DECISION MAKING, AND ITS UTILITY IN A HIGH-STAKES EXAMINATION | |
| 5.1 Introduction and Background | 76 |
| 5.2 Methodology | 78 |
| 5.3 Results | 83 |
| 5.4 Limitations | 96 |
| 5.5 Discussion | 96 |
| 5.6 Conclusion | 97 |
| CHAPTER 6 DISCUSSION..... | 98 |
| CHAPTER 7 CONCLUSION..... | 102 |
| APPENDIX | |
| 8.1 Appendix 1 – Participant Information Leaflet..... | 103 |
| 8.2 Appendix 2 – Consent Form..... | 110 |
| 8.3 Appendix 3 – Clinical Scenario | 113 |
| 8.4 Appendix 4 – Survey Questionnaire | 116 |
| BIBLIOGRAPHY | 123 |

DECLARATION

I declare that this thesis has not been submitted as an exercise for a degree at this or any other university and it is entirely my own work.

I agree to deposit this thesis in the University's open access institutional repository or allow the library to do so on my behalf, subject to Irish Copyright Legislation and Trinity College Library conditions of use and acknowledgement.

I consent to the examiner retaining a copy of the thesis beyond the examining period, should they so wish (EU GDPR May 2018).

SUMMARY – Methods & Major Findings

End-Of-Life (EOL) decision making involves high-end clinical decision making (CDM). Currently little is known about EOL decision making in surgery. Non-technical skills in surgery are widely accepted as essential aspects of good professional practice but incorporation into training and assessments for certain skills is not yet comprehensive, in both formative and summative design. We sought to find out;

1. What is known about End-Of-Life decision making?
2. How is it related to surgical practice? How is it taught/assessed in surgical practice?
3. Is it identified as a critical skill in surgical training? Can we develop a tool for assessment End-Of-Life decision making?

Our study aimed at creating and validating an assessment tool for EOL decision making in surgery. Systematic reviews focused on surgical professionalism, Clinical Decision Making and End-Of-Life care were conducted to lay the foundation for this project.

Informed by the systematic reviews, a detailed reflective survey questionnaire including clinical vignettes based on frequently encountered scenarios in surgical practice was conducted for understanding the perceptions and practices of surgeons around EOL decision making and palliative care.

A bespoke clinical scenario based on the findings of the survey was carefully constructed; it comprised of an acute surgical emergency in an EOL situation. This station was piloted among surgeons in a University teaching hospital for construct validity, scored by two independent examiners. Following development of construct validity this scenario was then conducted as part of the formal assessment in a high stakes fellowship examination at nodal point of transition to autonomous practice.

Major Findings

Systematic Reviews

Both reviews highlighted the lack of data around non-technical elements in surgical practice. It is widely accepted that non-technical or non-operative skills are important domains of surgical professionalism and good professional practice. However, most of the training, assessment and feedback in a surgical practice is focused on clinical skills. Little is known about EOL decision making in surgery. The reviews showed that there is no data regarding formal formative or summative assessment of EOL decision making in surgical practice.

Qualitative Survey

We found that the level of comfort in surgeons when talking to patients and families about palliative care and EOL decisions, rises with the increased number of years of experience. Their opinion regarding training in this aspect remains mostly consistent and is deemed as inadequate or neither adequate nor inadequate. Junior surgeons reported to be more influenced by family wishes when making EOL decisions. We found significant differences in the response to the clinical vignettes with the development of a construct between senior and junior surgeons.

Simulated Assessment

The simulated assessment station piloted at a university teaching hospital achieved construct validity with senior clinicians scoring significantly higher in various aspects than junior surgeons, implying that this assessment tool can be used for training and assessment purposes. The same assessment tool when conducted in a high stakes fellowship examination found that surgeons at nodal point of transition to autonomous practice scored lower than senior consultants with years of practical experience in the field in aspects of EOL decision making and communication regarding palliative decisions.

With bespoke clinical scenarios orchestrated in a simulated environment, it is possible to assess CDM and analyse high end decision making at nodal points of transition to autonomous practice. Simulated assessment in a similar manner can be employed for formative and summative assessments of EOL decision making.

ACKNOWLEDGEMENTS

First and foremost, I thank, Almighty Allah, the most merciful, the most gracious who gave me the power, health, strength and means to complete my research.

I would like to express my sincerest gratitude to my supervisor Prof. Paul F. Ridgway for his continuous support of my Masters' study and research, for his patience, motivation, enthusiasm, and immense knowledge. His guidance helped me continue my work in the best possible way during this difficult time of Covid-19 related restrictions and regulations. I could not have imagined having a better advisor and mentor for my Masters study.

Besides my supervisor, I would also like to thank Ms. Amy Gillis and Ms. Maria Whelan for their voluntary participation as examiners in our pilot project of simulated assessment-station for EOL decision making. I thank Mr. Dale Whelehan for his guidance through ethical approval process and technical aspects of designing and creating a survey. My sincere thanks to Dr. Marie Morris for her collaboration in conducting the non-technical skills assessment station at the European Board Fellowship examination.

I would like to thank my family for their undivided support and encouragement throughout my research journey. Last but not least, I would like to express my sincere gratitude to Mr. Muhammad Umair for his collaboration in conducting systematic reviews, pilot assessment project, performing statistical analysis in addition to his continuous support, encouragement and guidance. I could not have done this without him.

Dr. Maria Mahmood

LIST OF ABBREVIATIONS

| ACRONYM | DEFINITION |
|----------------|---|
| TUH | Tallaght University Hospital |
| EOL | End-Of-Life |
| CDM | Clinical Decision Making |
| NTS | Non-Technical Skills |
| EPAS | Entrustable Professional Activities |
| OSCE | Objective Structured Clinical Examination |
| CBME | Competency Based Medical Education |
| WBA | Workplace Based Assessment |
| BC/WC | Best case/Worst case |
| UEMS | Union Européenne Des Médecins Spécialistes |
| FEBS | Fellow of European Board of Surgeons |
| ACE | Alternative Clinical Exam |
| IST | Improving Surgical Training |
| OPRS | Operative Performance Rating System |
| E-ASSESS | EPA Assessment for Structured Simulated Emergency Scenarios |

LIST OF FIGURES

| FIGURE NO. | DESCRIPTION |
|-------------------|---|
| FIGURE 1. | Pathway of Study Design. |
| FIGURE 2. | The CanMEDS Roles Framework |
| FIGURE 3. | Modified PRISMA Flow Diagram |
| FIGURE 4. | Modified Prisma Flow diagram – Complexity of EOL decision making in surgery |
| FIGURE 5. | Summary of Clinical Vignettes. |
| FIGURE 6. | No of times EOL decision making discussed with patients |
| FIGURE 7. | No of times EOL decision making discussed with patients’ family |
| FIGURE 8. | Adequacy of Training regarding EOL decision making |
| FIGURE 9. | Level of Comfort to discuss EOL decision making with patient and family |
| FIGURE 10. | Scoring among different job descriptions and linearity among groups |
| FIGURE 11. | Scoring among different job descriptions and linearity among groups for UEMS candidates in comparison to Registrars and Consultants at Tallaght University Hospital |
| FIGURE 12. | Pairwise comparison of Initial management among groups for UEMS candidates in comparison to Consultants at Tallaght University Hospital |
| FIGURE 13. | Pairwise comparison of Initial decision making among groups for UEMS candidates in comparison to Consultants at Tallaght University Hospital |
| FIGURE 14. | Pairwise comparisons for factors Considered in Decision Making at Tallaght University Hospital |
| FIGURE 15. | Pairwise comparison of factors considered among UEMS candidates in comparison to Tallaght University Hospital |
| FIGURE 16. | Pairwise comparison for Global rater of communications among surgeons at Tallaght University Hospital |
| FIGURE 17. | Pairwise comparison of Palliative Communication among surgeons at Tallaght University Hospital |
| FIGURE 18. | Comparison of communication skills with patients among UEMS candidates and consultants at Tallaght University Hospital |
| FIGURE 19. | Comparison of final decision making and palliative communication among UEMS candidates and consultants at Tallaght University Hospital |
| FIGURE 20. | Comparison of global rater of communication skills among UEMS candidates and consultants at Tallaght University Hospital |

LIST OF TABLES

| TABLE NO. | DESCRIPTION |
|-----------|--|
| TABLE 1. | General Perceptions of Professionalism; The Past, Present and Future |
| TABLE 2. | Previously Identified EPAs |
| TABLE 3. | Pooled Analysis Of The Full Text Articles Included In The Review |
| TABLE 4. | Important aspects of the complexity of EOL decision making |
| TABLE 5. | Themes emerging from a detailed qualitative analysis of the full text articles |
| TABLE 6. | Demographic profile of the study participants |
| TABLE 7. | Cumulative scoring of the entire sample size (N=21) |
| TABLE 8. | Cumulative scoring for the entire sample size (N=21) |
| TABLE 9. | Scoring among different job descriptions and linearity among groups |
| TABLE 10. | Scoring among different job descriptions and linearity among groups for UEMS candidates in comparison to Consultants at Tallaght University Hospital |

CHAPTER 1

INTRODUCTION

“Good surgeons know how to operate, better ones when to operate, and the best when not to operate”. This is a famous saying every resident and trainee hears at least once during their time in surgical training (1).

End-of-Life Care and End-of-Life decision making is a complex subject, wherein the perspective varies from department to department, situation to situation, elective versus emergency settings and each individual case is different (2 - 4). There is a lot that we don't know about this specific surgical skill as there is lack of data regarding the same.

Among other aspects of professionalism, End-of-Life decision making and palliative care in acute surgical settings is a non-technical domain that is widely untested and least understood. Non-technical skills (NTS) encompass personal skills such as communication, situational awareness, decision making, teamwork and leadership. Clinical Competence encompasses a wide variety of clinical skills including the ability to effectively obtain information from the patient history and physical examination, the application of medical knowledge to clinical problems, the effective use of communication skills with patients and peers, and the ability to integrate all of these facets to solve problems around a clinical encounter (5, 6). Poor performance of these skills has been shown to contribute to medical error (7)

Decision making becomes more complex in acute settings, where faced with a life-limiting condition, time constraints and emotional dilemmas. Benjamin Djulbegovic et al in a study where they evaluated models of decision making, concluded that medical decision-making employs dual-processing theory (8). Rather than employing the neural pathways utilised in rational decision analysis, medical decision-

making also draws from type 1 or intuitive decision-making. Hence, we understand it is a complex process. F.M.Boyle et al in their article “learning from regret” stated a similar inference that surgical decision-making becomes more uncertain, complex and subject to situational pressures in cases associated with deaths (9).

Assessing the ability of a surgeon to recognise an acute surgical emergency situation where palliation is the best option for the patient as opposed to surgical intervention is not easy. Aiming to avoid futile treatment that increases suffering at the end of life is an important goal in emergency surgery (10).

It is a highly experienced and well-rounded surgeon’s ability to recognise a situation where subjecting a patient to aggressive surgery may be associated with high morbidity and mortality, and will adversely affect the quality of life. Secondly, robbing the patient of the last few precious hours to get their affairs in order and have a chance at saying goodbyes to family. This ability takes into account not the surgeon’s technical skill and surgical expertise, but their CDM in difficult and time pressing situations; which comprises cognitive and psychosocial skills.

Assessment And Training

When is a surgeon ready for autonomous consultant practice? Ability to ensure that a candidate is capable of handling all aspects of job-related problems is an important facet of certification (5, 11) Making sure that surgeons at the end of their training at a nodal point of transition are ready for autonomous practice should ideally include assessment of not only their clinical skills and scholarliness, but also their competence in non-operative skills and non-technical domains of professionalism including the above-mentioned skill of EOL decision making.

Previous work by McRae and Reznick also highlights the importance of evaluation methods in residency training and certification decisions that ensure the successful candidate has demonstrated the requisite level of performance in all objectives deemed essential for clinical competence, including

cognitive, psychomotor, and affective objectives (5). A new assessment tool PAME (Patient Assessment and management examination) comprising of standardised patient-based examination was developed and they concluded this type of evaluation may be useful for feedback, remediation, or certification decisions.

Entrustable Professional Activities (EPAs) define observable key tasks that a doctor should be able to do independently after having completed a certain level of education. Although the use of EPAs has been widely accepted and incorporated into surgical training schemes, the training and assessment processes are not truly representative of all domains of Good professional practice equally.

Aims

1. To explore what is known and understood about EOL decision making in surgery
2. Development and validation of an assessment tool around EOL decision making in surgeons for both training and assessment purposes.

Thesis Design

A 2-years long project was conducted, with focused systematic search of literature, a detailed qualitative survey and a pilot simulated assessment station, tested on a cohort of surgeons at a university teaching hospital. All this to help validate the assessment tool and finally employ the assessment tool in a high-stake international examination.

What do we know about surgical professionalism, it's technical and non-technical domains? What non-technical surgical skills have been adopted as EPAs with formal training and assessment?

The first chapter, a systematic review, will explore various perceptions in previous literature and definitions of Professionalism and good medical practice. How training bodies define different aspects

of professional medical practice and what measures are taken for rigorous assessment of these domains, both technical and non-technical.

What do we know about EOL decision making in surgery? Is it identified as a critical skill in surgical training?

The following systematic review will then focus on CDM in EOL situations to gain some insight into the dynamics, situational pressures and factors; human factors, disease factors and technical factors that are all at play when a surgeon is faced with the challenge of making a difficult decision. For this purpose, a systematic review will be performed exploring existing literature around EOL decision making in surgery and what is known about the training and assessment of this skill.

Understanding the basic perceptions of surgeons around EOL decision making and palliative care

A detailed cross-sectional survey will be created, informed by the systematic reviews of “Surgical professionalism and its technical/non-technical domains” and “End-of-Life decision making in surgery”. This survey will then be distributed electronically among a cohort of surgeons. This section of the thesis focuses on the rationale, methodology and results of this survey performed.

In the survey, surgeons will be asked to reflect upon their professional views regarding treatment options and decision making in EOL scenarios, by responding to single-best answer questions. By exploring professional views of surgeons, we aim to gain an insight into current practices and opinions. Also, to explore the adequacy of training in this domain.

Designing and testing a summative assessment tool for EOL decision making

This is a construct validity study. The survey results are followed by a pilot initiative for assessment of surgical decision making in EOL situations. A simulated scenario for assessment will be structured,

informed by the survey data and tested on the same cohort of surgeons. Through this simulated assessment-station we aim to achieve construct validity among junior and senior surgeons.

Through this extensive project (see figure 1) we aim to highlight the importance of EOL decision making as a critical non-technical skill in surgery. This will be a step towards identifying EOL decision making as an EPA for assessment at nodal points of transition to autonomous practice, bringing about potential improvement in prospective examinations.



Figure 1. Pathway of Study Design. Systematic reviews, explored various perceptions in previous literature and definitions of Professionalism and good medical practice in context with technical and non-technical domains. A cross-sectional survey, informed by the reviews, looking into surgical professionalism and End-of-Life decision making in surgery” in turn will be the basis of a construct valid study (pilot project at university teaching hospital and bespoke simulated station at European Board of General Surgery Examinations)

CHAPTER 2

SURGICAL PROFESSIONALISM – ASSESSMENT OF TECHNICAL/NON-TECHNICAL SKILLS & EPAs: A SYSTEMATIC REVIEW

2.1 Background

In the modern world of medicine, the importance of clearly defining professionalism and standardising the expectations attributed to registered medical practitioners is greatly increased. To quote Andrew Abbott, American sociologist and social theorist working at the University of Chicago, professionalism has the “quality of institutionalising expertise in people” (12)

Lapses in professionalism are easier to point out, but they too are often vaguely defined (13). This is supported by the fact that the Irish Medical Council *reported* 411 complaints against registered medical practitioners in the 2016 annual report (14). The complaints received were categorised on numerous grounds, including cases of “Professional Misconduct” and “Poor Professional Performance”. These are vague terms, as professionalism encompasses a broad spectrum of attributes, both technical and non-technical domains. Based on the Irish Medical Council reports it is a known fact that a number of complaints are received related to the non-technical skills. These statistics indicate a potential for improvement in both the training of practitioners and their assessment at nodal points of transition to pre-autonomous and autonomous practice, particularly in the non-technical skills.

Hence training bodies in the past decade have put efforts into clearly defining these domains, and established assessment tools for evaluating individual performance on different aspects of professionalism. However, literature shows that there is an unequal representation of professional

domains in training and assessment practices, with more emphasis being put on technical/clinical skills. (13, 15, 16)

In this study we explored what is known about professionalism in surgery, how surgeons perceive good professional practice and what advancements are being made for introduction and development of assessment tools to ensure the highest standards of professional conduct in practitioners.

2.2 Introduction

Professionalism as an ideology only started in the early 19th century in North America and Western Europe (17) . Professionalism, professionalisation and professional practice are all interlinked and complex terms that encompass a variety of attributes, and, together, these attributes identify and define a professional. Certain qualities and a certain level of knowledge, expertise and skill are required and expected of individuals in different professions. Professions are considered as knowledge-based occupations that demand authority because of their expertise. However, with that authority comes a high level of expectation. (12, 18, 19)

What are these expected attributes? Specialized knowledge, first and foremost, professionals are known for their specialized knowledge. They've made a deep personal commitment to develop and improve their skills, and, where appropriate, they have the degrees and certifications that serve as the foundation of this knowledge. We come across a number of definitions of professionalism in literature;

1. The Merriam-Webster dictionary defines professionalism as "the conduct, aims, or qualities that characterize or mark a profession or a professional person"; and it defines a profession as "a calling requiring specialized knowledge and often long and intensive academic preparation" (20)
2. A Royal College of Physicians working party defined **professionalism** as 'a set of values, behaviours and relationships that underpins the trust the public has in doctor (19)

There is a lack of clear definition, however, of professionalism, leading to challenges in teaching and reinforcing professionalism in practice (13).

With current standards and advancements in the medical world, it has become more challenging than ever to define and standardise all aspects of professionalism and competence that a practitioner must exhibit in order to qualify for autonomous practice. It has also become clear in the literature of the past decade that non-technical skills are now widely accepted as an integral component of professional competence. The question is; are training bodies providing sufficient training opportunities related to the non-technical skill aspects? How can we best assess residents at a nodal point of transition to autonomous practice ensuring that the assessment tools are exhaustive of all domains of professionalism?

What is Professionalism in surgical practice? Past and Present

Physicians are a profession that have increasingly become autonomous or self-regulating over the years. A publication in the 1840 *British Medical Journal* revealed an increase in professional consciousness from medical practitioners in England. Physicians in the 19th century came to have the features of modern professions. A major one was autonomy. This was further emphasized with the establishment of a controlling body of the profession. Competition and overcrowding (two or three decades after 1930) also put pressure on governments to establish a system of registration and requirements for those who wished to practice. This led to the Medical Act of 1840. In fact, this council consisted mostly of doctors. Therefore, they were in control of regulating their own profession. The act required their members to oversee medical education, keep track of the numbers of qualified practitioners, and regulate it for the government. The Medical Act (1858) also raised the standards for qualifications. A modern code of medical ethics was also implemented in the 19th century (21)

To paraphrase and summarise the work of Irving Taylor (19); surgeons have a responsibility to maintain the highest level of public trust and confidence in the profession. In a stressful working environment, interpersonal relationships and communication between colleagues, as well as between patients and surgeons, can become increasingly fraught. However, this cannot be used as an excuse to condone or mitigate unprofessional behaviour. This can be demonstrated by ensuring that each of the domains of professionalism is clearly identified, trained and assessed with validated tools.

How training bodies define Good Professional Practice?

Professionalism and professional practice encompass a wide spectrum of technical and non-technical skills. For a physician/surgeon to be deemed as professionally competent he/she needs to exhibit all these qualities. For a training body to guarantee maximum levels of professionalism and competence of all their trainees, they need to lay down a clear and concise set of qualities expected of them, which deem them capable and trustworthy of autonomous practice.

Eight Domains of Good Professional Practice as devised by Irish Medical Council (22).

Patient Safety and Quality of Patient Care: Patient safety and quality of patient care should be at the core of the health service delivery that a doctor provides. A doctor needs to be accountable to their professional body, to the organisation in which they work, to the Medical Council and to their patients thereby ensuring the patients whom they serve receive the best possible care.

Relating to Patients: Good medical practice is based on a relationship of trust between doctors and society and involves a partnership between patient and doctor that is based on mutual respect, confidentiality, honesty, responsibility and accountability.

Communication and Interpersonal Skills: Medical practitioners must demonstrate effective interpersonal communication skills. This enables the exchange of information, and allows for effective

collaboration with patients, their families and also with clinical and non-clinical colleagues and the broader public.

Collaboration and Teamwork: Medical practitioners must co-operate with colleagues and work effectively with healthcare professionals from other disciplines and teams. He/she should ensure that there are clear lines of communication and systems of accountability in place among team members to protect patients.

Management (including Self-Management): A medical practitioner must understand how working in the health care system, delivering patient care and how other professional and personal activities affect other healthcare professionals, the healthcare system and wider society as a whole.

Scholarship: Medical practitioners must systematically acquire, understand and demonstrate the substantial body of knowledge that is at the forefront of the field of learning in their specialty, as part of a continuum of lifelong learning. They must also search for the best information and evidence to guide their professional practice.

Professionalism: Medical practitioners must demonstrate a commitment to fulfilling professional responsibilities by adhering to the standards specified in the Medical Council’s “Guide to Professional Conduct and Ethics for Registered Medical Practitioners”.

Clinical Skills: The maintenance of Professional Competence in the clinical skills domain is clearly specialty specific and standards should be set by the relevant Post-Graduate Training Body.

A similar model has been devised by many health care institutions and medical councils. Figure 2 illustrates the role framework as outlined by Royal College of Physicians and Surgeons of Canada. CanMEDS is a framework that identifies and describes the abilities physicians require to effectively meet the health care needs of the people they serve. These abilities are grouped thematically under seven roles. A competent physician seamlessly integrates the competencies of all seven CanMEDS Roles (23).



Figure 2. The CanMEDS Roles Framework

Professionalism, in relation to surgical practice, incorporates competence, consistency, honesty and integrity. Good medical practice requires the highest levels of integrity, conduct and behaviour from surgeons.

How do we assess professional practice in surgical trainees? What are we assessing and what should we be assessing?

At present, competency-based, outcome-focused training has greatly replaced the conventional, more traditional master-apprentice teaching in postgraduate training. This change requires a different

approach to the assessment of clinical competence, especially given the decisions that must be made about the level of independence allowed to trainees. Although a variety of assessment efforts (ABSITE, OSCE, milestones, and staff evaluations) have been utilised for decades to assess and monitor surgical trainees along the duration of their curriculum, the advent of entrustable professional activities (EPAs), pioneered by Professor Olle Ten Cate, may offer a better method to assess, monitor, and offer remediation to surgical trainees. Ensuring that trainees are ready for independent practice upon graduation relies on the assessment of technical operative as well as non-technical skills. Various means and high-quality in-depth studies exist around a rigorous, reliable and meaningful evaluation of technical skills to ensure that graduates have the skills necessary for safe, independent practice, but information around assessment of non-technical skills and professionalism remains limited.

The assessment pattern of the Royal College of Surgeons at the end of a surgical residency scheme currently comprises of MCQs, SEQ style questions, OSCE with un-observed and observed stations and case related viva examination. Although the skill of a surgeon is best apparent in actual clinical settings, for exam purposes the next best thing can be simulated scenarios. Simulation-based education is frequently used to augment clinical learning experiences and allow for direct observation and assessment. Numerous tools exist for skill assessment in simulation. These tend to be focused on technical or non-technical skills with checklists to identify whether the learner performed certain steps, rather than informed decisions about a learner's readiness for independent practice. It has been suggested that simulation can be used to inform entrustment decisions around specific EPAs, but this is largely untested in the areas of clinical decision making under stressful conditions.

EPAs are now widely accepted and incorporated into training modules, and are also recognised as valid assessment tools. Further improvement can be made in training and prospective examinations by developing EPAs exhaustive of all domains of professionalism to ensure that all registered practitioners meet the standards and quality of patient care expected of them.

The concept of Entrustable Professional Activities (EPAs)

Entrustable Professional Activities (EPAs) define observable key tasks that a doctor should be able to do independently after having completed a certain level of education.

Progression is facilitated by frequent assessments of the defined activities, with increased degree of independence, EPA is currently used in several countries both in undergraduate and post graduate education. All specialties are struggling to some extent with developing assessment mechanisms for EPAs.

Measuring and assessing professionalism as a single entity poses a practical challenge as the term encompasses a wide spectrum of qualities including both technical and non-technical skills. Hence the concept of “Entrustable Professional Activities” seems appealing as it presents a pragmatic and reasonable solution to this predicament. They are units which may be used to facilitate progression in training at a person-centred pace. The EPAs can be described as an evolution of a competency-based medical educational concept, applying the concept of the competencies of a person to specific workplace contexts. In this way the expected level of skills and supervision at a certain stage of training have a more practical meaning and the danger of fragmentation of individual competencies in the competence-based model is avoided. EPAs and milestones provide training bodies and trainees with clear expectations of the skills and abilities they need at each stage of training. Based on observations of a resident’s ability to perform the EPA a training body can assess if they can be entrusted to perform this EPA in the future.

An EPA, as defined by the Canadian Royal College of Physicians and Surgeons, is a key task of a discipline that an individual can be trusted to perform in a given health care context, once sufficient competence has been demonstrated. EPAs are a common approach to Competency Based Medical Education (CBME) around the world.

The future consideration here is to modify these assessment tools and validate them in a simulated environment for prospective examinations. Assessment following an EPA framework in the simulation context may be useful to provide data points to inform entrustment decisions as a part of a trainee's assessment (24, 25)

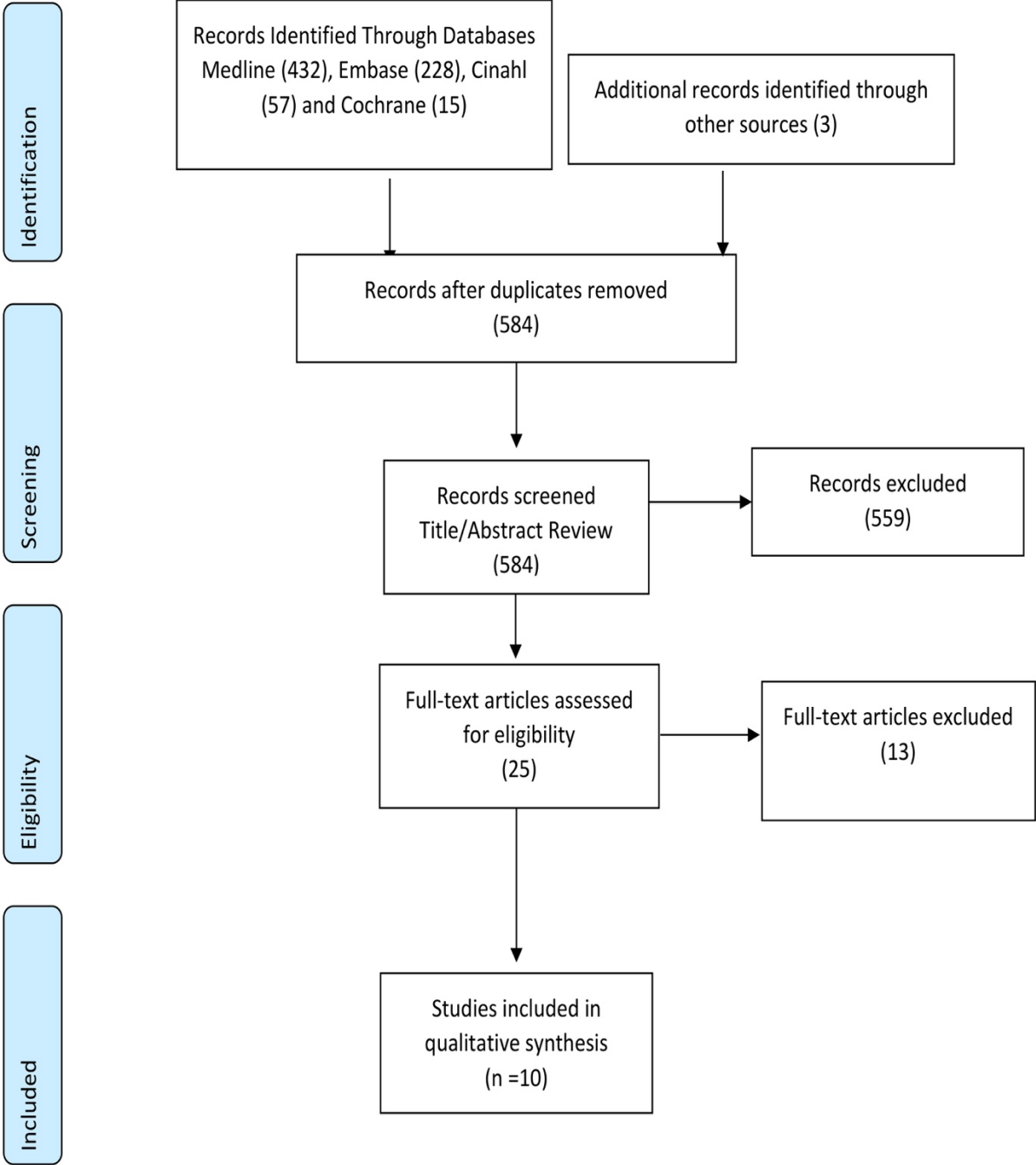
2.3 Methodology

A systematic review was performed according to the guidelines and recommendations from the Preferred Reporting Items for Systematic reviews and Meta-analyses (PRISMA, see Figure 3).

Search Strategy

The review was conducted through the electronic databases Pubmed, Embase, Cochrane and Cinahil. The search terms used were, “professionalism” or “surgical professionalism” or “professional medical practice” and “entrustable professional activities” and “surgical assessment” or “autonomous practice”; yielding a total of 732 articles. Medline (432 articles), EMBASE (228 articles), Cochrane (15 articles) and Cinahil (57 articles). Two reviewers independently reviewed the literature according to the predefined strategy and criteria. Each reviewer extracted the data. All data was recorded independently by both literature reviewers in separate databases and were compared at the end of the reviewing process to limit selection bias. Duplicates were removed and any disparities were clarified. References and bibliography lists and journal contents pages were hand searched, including JAMA, Journal of Surgical Education, BMJ, but no further relevant articles were identified. Where the information was not available publicly, contact was made directly with the author to request availability. The review process is highlighted in the modified PRISMA flow diagram (see Figure 3).

Figure 3. Modified PRISMA Flow Diagram



Inclusion Criteria

All English language papers published in the above-mentioned journals from 1980 to 2020, referencing surgery, professionalism and EPAs were included. Papers using evidence from other healthcare professions were included if surgical practitioners were among the study sample, and the papers were considered relevant to assessment of surgical competence and professionalism. Papers where the study sample was not surgeons but they were still included were considered relevant as they focused on the development of EPAs and assessment of non-technical aspects of professionalism in elective and emergency scenario simulations.

Exclusion Criteria

Papers that were excluded after title review focused on professionalism and competence in areas of nursing, pharmacy, pharmacology, neo-natology and pediatrics, neurology, nephrology, radiation and oncology and veterinary disciplines among others. Papers excluded after abstract review were focused on one specific aspect of competence and not related to development, observation or assessment techniques for EPAs.

2.4 Discussion & Results

In the traditional surgical training model, the time spent in training is considered the most important factor and assumed to confer proof of competence. Trainees usually undergo two examinations during the training programme— the membership and fellowship examinations as assessment of competence at nodal points of transition. These examinations, however, are mostly designed to focus on the assessment of knowledge and clinical skills. In the recent years an increasing number of studies highlighting the importance of non-technical domains and aspects of good professional practice, as well as training and assessment in said aspects.

To contextualise the adequacy of professionalism training and assessment in acute surgical settings and end of life scenarios, we explored the existing literature about professionalism and its various perspectives. An extensive search was carried out from five databases and ten full text articles were included in this study. We found that even though the notion of Professionalism in the medical field is not a new concept, studies and work regarding practical application, feedback from supervisors, training and assessment did not start until much later around the turn of the 20th century.

General perception and understanding among trainers and residents

Residency programs in different departments and institutions around the world have extensive workbooks and toolkits for the instruction of professionalism during residency. However, the constructs of “professionalism” and other core competencies even though widely recognized as part of training curriculum, are vague and ambiguous with a lack in the exploration of the residents’ understanding and perspective. (26). In an article published in the Annals of Emergency Medicine (2014) they performed semi-structured interviews of senior residents close to the completion of their training. Qualitative methodology was adopted with a free-listing style. The common themes emerged were “Respect, compassion, empathy, integrity, communication, confidence, ethics, integrity, interactions (with patients), kind, non-judgmental, punctual, quality, responsibility, appearance, awareness, balance, confidentiality, courtesy, dealing, dignity, diligence, equality, honesty, interactions (with colleagues), interpersonal, open-minded, patient-centred, pleasant, politeness, positive, separation, skills, smart, tolerant”. One conclusion they drew from this study was that residents learnt professionalism from observation and role models, not through any formal training.

WHAT IS KNOWN?

Both technical and non-technical skills are important aspects of surgical professionalism. Although EPAs are valid assessment tools for competence in both work-based environment and simulated environment, work needs to be done for improvement of assessment methods for non-technical, non-operative skills.

WHERE IS THE GAP?

There is lack of data about NTS in surgical practice, there are no studies about assessment and training of clinical decision making or EOL care in surgery.

WHAT THIS STUDY ADDS TO OUR KNOWLEDGE?

Understanding what non-technical aspects of surgical professionalism need to be studied and evaluated.

Table 1. General Perceptions of Professionalism; The Past, Present and Future

To institutionalise the assessment of trainees in a competency-based context and determine whether they can be entrusted with certain defined clinical activities, it can be practically achieved firstly by understanding what are considered by educators as vital domains of professional practice, also referred to as essential facets of competence (FOC). To summarise the work of Marjo Wijnen-Meijer et al in their study (16) published in 2013. Eight Dutch and eight German experts scored each FOC on a five-point scale for relevance. When the 16 experienced clinicians graded each FOC on a Likert scale, there was a strong agreement among the educators of Netherlands and educators of Germany about the top 10 FOCs including ‘Scientific and empirical grounded method of working’, ‘Knowing and

maintaining own personal bounds and possibilities', 'Active professional development', 'Teamwork and collegiality', 'Active listening to patients', and 'Verbal communication with colleagues and supervisors. They concluded that these FOCs may be used in training for educators who need to make entrustment decisions about trainees.

Where it is obvious from the existing literature that non-technical/non-operative skills are considered, by both training bodies and trainees, as important domains of surgical professionalism for a clinician to be competent, it is also apparent that work needs to be done for the development of training and assessment of said domains. A similarly relevant inference was drawn by Craig McIlhenny et al as they reviewed the training paradigms for surgeons in the UK, Japan, and Mexico. American Journal of Surgery (2018) Craig McIlhenny et al (15) explored and compared general surgery education across the three continents. In the UK they found that, Royal College has identified areas where improvements need to be made in surgical training and have introduced the Improving Surgical Training (IST) pilot project. Some salient features of this improvement project are; a move toward a truly competency-based program of training, with trainees' progress depends on demonstration of competence rather than simple time served, improved use of simulation, both for technical and non-technical skills, and proper integration of that simulation into the specialty curricula and assessment systems. The authors identified the importance of focusing on education over service and basing surgery residency training on solid, standardised curricula that incorporate objective forms of assessments and clear benchmarks for promotion.

EPAs as assessment tools in elective settings

Ten Cate and Scheele proposed entrustable professional activities (EPAs) as a holistic approach to workplace curriculum development and assessment in 2016 (Medical Education). In this article the authors discussed that milestones and EPAs can help in developing curricula and assessments that train doctors in the qualities needed for competent practice (27). In the modern medical world, a doctor's competence can be defined by a transparent, dynamic portfolio of EPAs, genuinely reflecting actual competence, extending competency-based medical education into competency-based medical practice.

Since then, numerous attempts have been made to develop and refine this modern competency-based system of education, work-place based assessment and the use of EPA checklists in prospective examinations. In current, existing literature EPAs have been widely studied and there appears to be a consensus regarding the validity as assessment tools for exhibiting competency of surgeons for being entrusted with an activity in un-supervised conditions.

An observational study conducted in South Australia by Nyoli Valentine et al concluded that EPAs are valid assessment tools in a workplace-based training environment. Entrustment levels for both clinical and non-clinical EPAs were assessed by supervisors and by trainee self-assessment. It showed that entrustment levels for junior trainees increased over time. They also found that the senior trainee self-assessment closely matched supervisor assessment. While the rationale for using EPAs is clear, testing of their construct validity has been limited (28)

A number of studies have been conducted and have confidently validated EPAs and OSCE style, simulated stations in exams as assessment tools in different aspects of elective clinical practice through simulations and virtual surgical patients.

A pilot study conducted by Jennifer Steiman et al (29) in a large academic institution in USA concluded that using a SEPA (surgical EPA) format ensures specific understanding of each graduating resident's ability and SEPA may be a valid tool for defining and capturing multiple areas of competence. The surgical residents were assessed for two common surgical diseases; breast cancer and gall bladder disease and they were scored on their performance in four domains; Content Knowledge (through multiple choice exam), History/Physical Assessment (by direct observation using CAMEO assessment form), Clinical reasoning (through Virtual Surgical Patient website) and Procedural Skill (through the Operative Performance Rating System (OPRS)).

Another pilot study conducted by Yazan N. Aljamal (30) in the USA concluded that using a 59min OSCE-type simulation assessment offered reasonable insight into surgical residents' performance in relation to four EPA topics; Inguinal hernia repair, right upper quadrant pain, right lower quadrant pain and trauma resuscitation. It focused on their performance in aspects of anatomy, OR video commentary, open procedural skills, laparoscopic skills, fundamental surgical skills, and both mock oral and imaging exam questions.

The above-mentioned pilot studies as many others in recent literature are testing the usefulness, efficacy and practical feasibility of EPAs surrounding technical operative skills. However, with the advent of holistic medicine and the concept of "treating the patient, not the disease" it is now widely accepted that non-technical skills are an integral component of any clinician's competence and professionalism. Residents would benefit from the development of EPAs focusing on non-technical skills for both training and assessment purposes. A similarly relevant inference was drawn by Craig McIlhenny et al (15) as they reviewed the training paradigms for surgeons in the UK, Japan, and Mexico to allow comparisons with the US training paradigm, noting a necessary required improvement in the use of simulation, both for technical and non-technical skills, and proper integration of that simulation into the specialty curricula and assessment systems.

It is noticeable that the EPAs developed for training, education, feedback and assessment purposes in the surgical field are focused around the technical and operative domains with little existing work on the assessment of non-technical domains or clinical decision making.

Moving towards non-technical skills and use of EPAs in acute settings

Focus on skill acquisition, which is easier to describe and to measure, may lead to displacement of important skills such as cognitive and critical thinking, as well as the interpersonal skills needed for effective patient interaction (13, 31)

With an emphasis on technical skill acquisition in the early years of surgical training, it is challenging, yet crucial, to maintain a focus on the non-technical competencies that are expected of our fully qualified surgeons.

The use of simulated scenarios for assessment of surgeon's performance in emergency scenarios is untested, as most existing studies test and validate EPAs for assessment in elective situations. Considering the fact that in actual practice, there is limited opportunity for direct observation of trainees in such settings, the use of simulation may prove useful by allowing direct observation. While there is some evidence that performance of procedural skills in the simulated setting may translate to real patient care settings (32) , this is less clear for other competency domains (33)

Some recent work has been done in other fields of medicine for improvement of assessment based on competence and entrustment decisions. We discuss two relevant studies below where they have explored the use of EPAs and simulations in the fields of emergency paediatrics and anaesthesiology.

When we look at the work of Caroline Andler et al (24) published recently (Journal of Graduate Medical Education, April 2020), they developed and collected validity evidence for a simulation-based tool grounded in the EPA framework, the E-ASSESS (EPA Assessment for Structured Simulated Emergency ScenarioS). Simulation scenarios reflected common pediatric emergencies, where performance was

rated on two EPAs: “Manage patients with acute, common diagnoses,” and “Lead an interprofessional health care team”. Three raters used E-ASSESS to assign entrustment levels based on performance in simulation and their ratings were compared to entrustment levels assigned by clinical supervisors (different from the study raters) for the same residents on a separate tool designed for clinical practice. They found reasonable interrater reliability and concluded that the E-ASSESS tool may be a model for other similar tools to inform entrustment decisions about resident readiness for independent practice.

Even though the medical field has come a long way in the development of EPAs for training, feedback and assessment, additional work needs to be done for assessment tools exhaustive of all domains of good professional practice, to include the non-technical, non-procedural skills. To ensure all graduating surgeons at the end of their training can be entrusted with un-supervised, independent practice.

To summarise the work of Orsolya Solymos in a recent study by the Royal College of Anaesthesiologists of Ireland, the potential advantage of EPAs for trainees is the opportunity for them to receive feedback on aspects of their performance from their consultants, in a planned and structured way, based on observation and/or review of their practice. They outlined the process of developing EPAs as the framework for competency-based specialist anaesthesiology training in Ireland, focusing primarily on the tagging of the competencies within an EPA to the Medical Council Eight Domains of Good Professional Practice (13). In their results they found that majority of the Feedback Reports (57%) focused on the ‘Clinical Skills’ domain, while 21.7% were tagged to the ‘patient safety and quality of patient care’ domain. Of note, only four of the 447 Feedback Reports (0.9%) focused on ‘Professionalism’—the domain least utilised as the focus of feedback, showing an overrepresentation of “clinical skills” domains

The literature and studies suggest challenges in promoting feedback across the full range of domains and suggest that defining and assessing professionalism is challenging. Table 3 below provides a pooled analysis of the full text articles included in the review.

Focus on skill acquisition, which is easier to describe and to measure, may lead to displacement of important skills such as cognitive and critical thinking, as well as the interpersonal skills needed for effective patient interaction (13, 31)

With an emphasis on technical skill acquisition in the early years of surgical training, it is challenging, yet crucial, to maintain a focus on the non-technical competencies that are expected of our fully qualified surgeons. Following table shows the technical and non-technical skills that have been previously tested and identified as tasks to be assessed or EPAs.

TECHNICAL/OPERATIVE SKILLS**NON-TECHNICAL SKILLS**

| | |
|---|--|
| INGUINAL HERNIA REPAIR | Lead an interprofessional health care team |
| RLQ PAIN (APPENDECTOMY) | Manage acute diagnosis as a Team leader |
| RUQ PAIN (CHOLECYSTECTOMY) | Effective communication |
| TRAUMA RESUSCITATION (Open surgical skills; laparoscopic surgical skills; imaging; knot tying; skin closure) | |
| BREAST CANCER | |
| GALL-BLADDER DISEASE (History taking; diagnostic test ordering; cognitive knowledge) | |
| PHYSICAL EXAMINATION | |

Table 2. Previously Identified EPAs

| TITLE | YEAR | AUTHOR | SKILL | ASSESSMENT | RATIONALE FOR INCLUSION |
|--|------|-------------------|---------------|------------|---|
| MAKING EPAS A 59 MINUTE OBJECTIVE MEASURE FOR SURGICAL TRAINEES E A PILOT STUDY | 2019 | Yazan N. Aljamal | Technical | Yes | EPAs are a valid tool for training and assessment |
| E-ASSESS: CREATING AN EPA ASSESSMENT TOOL FOR STRUCTURED SIMULATED EMERGENCY SCENARIOS | 2020 | Caroline Andler | Both | Yes | EPAs valid for assessment in simulated emergency scenarios. |
| RESIDENT PERSPECTIVES ON PROFESSIONALISM LACK COMMON CONSENSUS | 2013 | Christine S. Cho, | Both | No | professionalism in emergency medicine, role modeling and observation |
| GENERAL SURGERY EDUCATION ACROSS THREE CONTINENTS | 2017 | Craig McIlhenny | Both | Yes | Need for improved use of simulation, both for technical and non-technical skills, and proper integration of that simulation into the specialty curricula and assessment systems |
| MOVING BEYOND THE TECHNICAL SKILLS AND PROMOTING PROFESSIONALISM— | 2020 | Orsolya Solymos | Non-technical | Yes | advocate and make recommendations for more effective incorporation of the non-technical domains of professional practice in the processes of curriculum development, teaching, learning, feedback and assessment. |
| MEASURING COMPETENCE IN SURGICAL TRAINING THROUGH ASSESSMENT OF SURGICAL ENTRUSTABLE | 2018 | Jennifer Steiman, | Non-technical | Yes | Surgical EPAs; such tools are a viable way of evaluating the skill and competency of surgical trainees. Using an entrustable professional activity assessment tool (SEPAA), as we have |

| | | | | | |
|---|------|---------------------|-----------|-----|---|
| PROFESSIONAL ACTIVITIES | | | | | proposed, could provide a detailed understanding of the competence of graduating general surgery residents |
| COMPETENCY-BASED POSTGRADUATE MEDICAL EDUCATION: PAST, PRESENT AND FUTURE | 2017 | Olle Ten Cate | Technical | Yes | EPAs integral part of modern training |
| THE PROMISE, PERILS, PROBLEMS AND PROGRESS OF COMPETENCY-BASED MEDICAL EDUCATION | 2016 | Claire Touchie | Both | Yes | Use EPAs to achieve goals of CBME. Each EPA should be linked to all competency domains |
| ENTRUSTABLE PROFESSIONAL ACTIVITIES FOR WORKPLACE ASSESSMENT OF GENERAL PRACTICE TRAINEES | 2019 | Nyoli Valentine | Both | Yes | EPAs are valid assessment tools in a workplace-based training environment. Rationale for using EPAs is clear, but testing of construct validity is limited. Construct validation is an extensive process. They developed construct validity among senior and junior trainees. |
| ESSENTIAL FACETS OF COMPETENCE THAT ENABLE TRUST IN MEDICAL GRADUATES | 2013 | Marjo Wijnen-Meijer | Both | No | Eight Dutch and eight German experts scored each FOC on a five-point scale for relevance. A rank-order comparison showed that there was almost full agreement about the top 10 FOCs. |

Table 3. Pooled Analysis Of The Full Text Articles Included In The Review

2.5 Conclusion

Although the use of EPAs has been widely accepted and incorporated into surgical training schemes, the training and assessment processes are not truly representative of all domains of good professional practice equally. Further studies and work is required in the field for more effective incorporation of the non-technical domains of professional practice in the processes of curriculum development, teaching, learning, feedback and assessment. EOL decision making in surgery is not one of the NTS studied, tested or identified as an EPA for training and assessment.

Technical elements for surgeons are well established for training, studied extensively, and assessed in both simulated and workplace environments (WBAs). Non-Technical elements for surgeons are well established but there is no formal training, nor are they well studied.

Here the question arises what is known about End-Of-Life care and End-Of-Life decision making in surgery? Have there been attempts at introducing training or assessing methods in surgical departments for their clinical decision making abilities in palliative care situations? We explore that in the next chapter.

CHAPTER 3

THE COMPLEX NATURE OF END-OF-LIFE DECISION MAKING IN SURGERY: A SYSTEMATIC REVIEW

3.1 Introduction and Background

Our findings from the previous chapter (Surgical Professionalism- Assessment of Technical/Non-Technical Skills and EPAs; A Systematic Review) show that EOL decision making and palliative care in surgery is a NTS that has not been studied or assessed as part of surgical training schemes or as an EPA. We performed this systematic review to explore existing literature on this topic in the realm of surgery.

Clinical Decision Making is an important nontechnical skill for a surgical resident qualifying or being assessed for autonomous practice. CDM employs two distinct types of mental processes, ranging from intuitive and subconscious to analytical and conscious (34, 35, 36). Surgeons become acclimated to fast-acting, quick-thinking throughout training, this type of decision-making is critical to individual success and, in some cases, is critical to the preservation of patients' life, limbs, or vital organs (36).

CDM involves a number of considerations and factors:

Patient factors

Disease factors

Technical factors

These factors combined with a basic background knowledge, surgical expertise and scholarship about the particular condition in question all govern the decision of a treating surgeon.

CDM in elective settings differs from acute settings and emergency scenarios in a number of ways (37, 38). In addition to the above factors being under consideration, there is a pressing time constraint and more often than not a critical high-stake decision to be made; that is mostly reserved for the most senior and most experienced member of the team (37, 38, 39). The decision is influenced by stress, personal experience, training, cultural leaning and clinical setting (40, 41). The distinctive setting and environment in emergency care settings pose a challenge to the analytic approach, particularly when confronted with a critically ill patient who requires immediate action (38, 39). Little is known about the considerations of surgeons and influencing factors when faced with an EOL situation, or an acute surgical emergency where the patient has an underlying terminal illness or malignant condition.

It is imperative for an experienced surgeon to identify a clinical situation where invasive treatment or aggressive surgery is not potentially life-saving and may also adversely affect the quality of life for a patient. The opening lecture of the congress of the American Society of Clinical Oncology by the famous US surgeon Atul Gawande, addressed the issue of the role of the doctor on the care of patients with terminal illnesses (42). He argued “Prolonging life should not represent the goal of the doctor's decision-making, who must instead pay attention to preserving the patient's quality of life as much as possible”.

Aiming to avoid futile care, which by definition does not benefit the patient, is a veritable target to achieve. There is a growing body of international empirical evidence that doctors provide futile treatment to adult patients at the end of life (43, 44, 45).

Surgical Training Around End-Of-Life Care

Most surgical training programs have no curriculum to teach palliative care. The distinctive needs of surgeons cannot be reasonably met with programs designed for nonsurgical specialties. In-hospital teaching is limited by time constraints and working hour limitations. New methods are needed to efficiently teach surgical residents about these problems. Surgical residents think that understanding palliative care is a useful part of their training (46, 47).

3.2 Methodology

A systematic review was performed according to the guidelines and recommendations from the Preferred Reporting Items for Systematic reviews and Meta-analyses (PRISMA, see Figure 4).

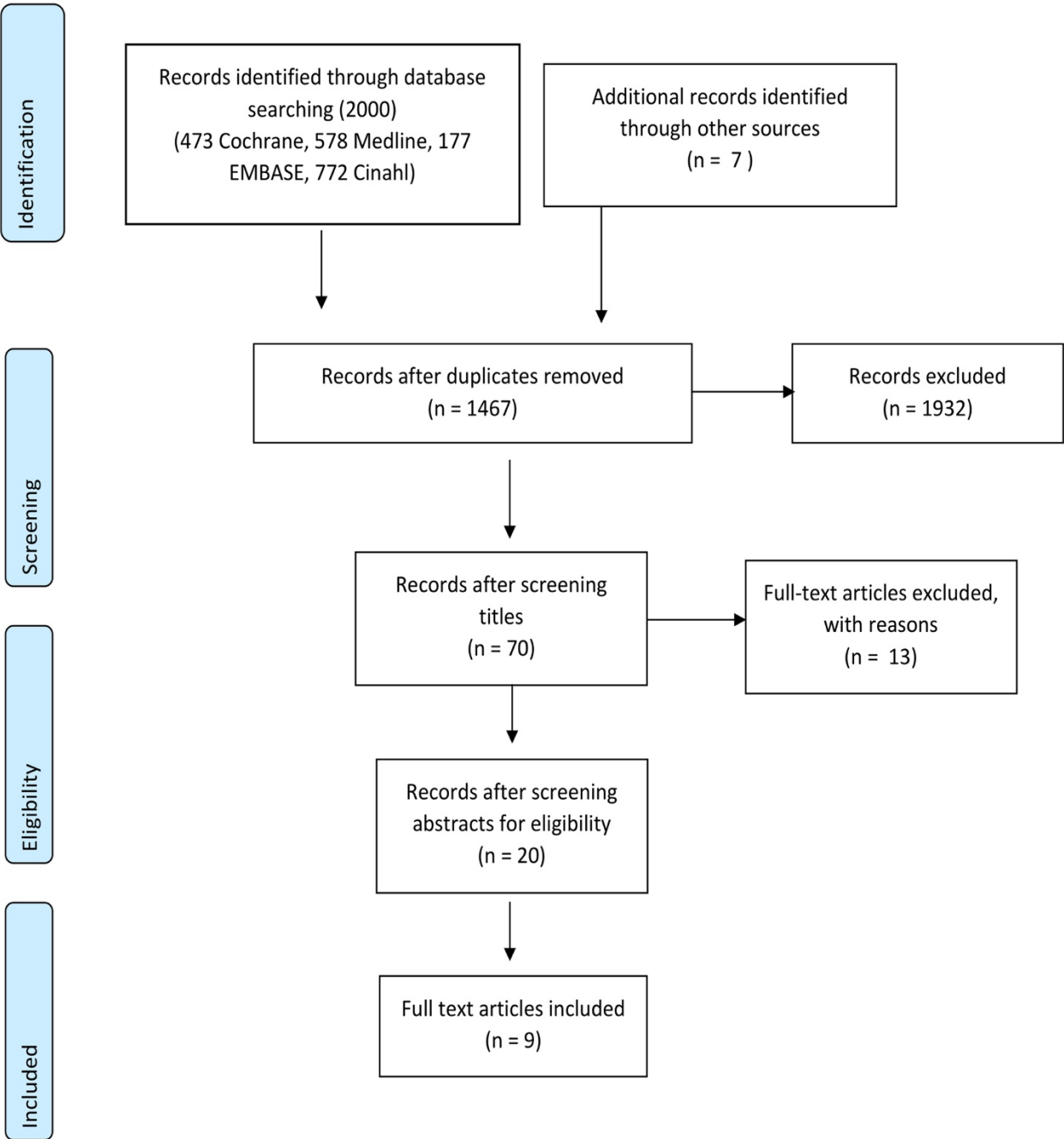
Literature search was conducted by two independent researchers; according to the predefined strategy and criteria. Each reviewer extracted the data. All data was recorded independently by both literature reviewers in separate databases and were compared at the end of the reviewing process to limit selection bias.

Search Strategy

The review was conducted through the electronic databases; Medline, Embase, Cochrane and Cinahl. The search terms used were; “End of life care/Palliation/Palliative care/Palliative treatment and Clinical decision making/clinical reasoning/clinical judgement and surgery/surgical/surgeons, yielding a total of 2000 articles. (578 Medline articles, 177 EMBASE articles, 473 Cochrane articles, 772 Cinahl articles). Duplicate results were removed. References and bibliography lists and journal contents pages were hand searched, including JAMA, Journal of Surgical Education, BMJ, but no further relevant articles were identified. Where the information was not available publicly, contact was made directly with the author to request availability. Articles which were included in the review can be seen in the modified

PRISMA flow diagram. The final full text articles included comprised of studies focused on exploring perceptions, training and assessment for EOL decision making in surgery.

Figure 4. Modified Prisma Flow diagram – Complexity of EOL decision making in surgery



Inclusion Criteria

English language articles

Articles referencing surgical decision making and end of life care or palliative care

Papers using evidence from other healthcare professions were included if surgical practitioners were among the study sample

Observational studies (introducing pilot curriculum or assessment methods), Interventional studies, surveys, structured and semi-structured interviews related to surgical decision making and EOL care

Exclusion Criteria

Papers published in languages other than English (because of differences in proficiencies for translation)

Papers not related to clinical decision making or palliative care in surgery

All English language papers were that were considered relevant to surgical decision making in EOL scenarios were included. Papers that were excluded after title review focused on decision making in areas of nursing, pharmacy, pharmacology, neo-natology and pediatrics, neurology, nephrology, radiation and oncology and veterinary disciplines among others. Papers excluded after abstract review were focused on treatment decision making in particular, specific scenarios or clinical conditions, not related to EOL situations.

3.3 Results

A study by Daniel D. Klaristenfeld et al (46) introduced a pilot curriculum for palliative care in surgery. Forty-seven general surgery residents participated. Most residents (94%) had "discussed palliative care with a patient or patient's family". Initially, 57% of residents felt "comfortable speaking to patients and patients' families about EOL issues". This number rose to 84% after delivery of the curriculum in three 1-hour sessions ($P < .01$). Initially 9% thought that they had "received adequate training in palliation during residency," but at post-test and at 3-month follow-up, 86% and 84% of residents agreed with this statement ($P < .01$).

Alison L. Antes et al (48) tested a decision-making measure on graduate medical students. Scores on the new measure indicated on average, participants answered 75% of items correctly. Evidence for construct validity included the lack of correlation between scores on the measure and socially desirable responding, negative correlation with moral disengagement, and modest to low correlations with professionalism attitudes. A positive correlation was observed with a clerkship rating focused on professionalism in peer interactions.

There were 102 respondents to the survey created by Sarah Bateni et al (49). Surgeons reported fewer hours of palliative care training during residency, fellowship, and continuing medical education combined (median 10, IQR 2-15) compared with medical oncologists (median 30, IQR 20-80) and medical intensivists (median 50 IQR 30-100), $P < .05$. Additionally, 20% of surgeons reported no history of any palliative care training. Absence of palliative care training was associated with recommending major operative intervention more frequently compared with physicians with ≥ 40 hours of palliative care training (0.7 ± 0.7 vs 1.6 ± 0.8 , $P = .01$).

Christy E Cauley et al (50) interviewed 24 surgeons. Participants felt responsible for conducting EOL conversations with seriously ill older patients and families before surgery to prevent nonbeneficial

treatments. However, wide differences in prognostic estimates among surgeons, inadequate data about postoperative quality of life (QOL), patients and surrogates who were unprepared for EOL conversations, variation in perceptions about the role of palliative care, and time constraints are contributors to surgeons providing nonbeneficial operations.

In the training for the use of BC/WC decision making measure initiated by Tyler Chesney et al (51) , 18 of 36 invited residents participated, of which 83% felt that a new communication tool would be useful. Almost all (94%) used BC/WC in practice. Residents found the tool acceptable and useful to enhance preference sensitive communications. They found the training valuable. Summative attitudes and confidence scores were not different before and after the intervention; however, actions scores were higher after the intervention ($p = 0.04$). Residents performed a median of 15 (interquartile range 13–17) of the 19 elements on the formative performance evaluation. Commonly missed items were narrating outcomes of palliative approaches, prompting deliberation and providing treatment recommendations.

Jacqueline M. Kruser et al (52) conducted a similar training for the use of BC/WC tool. Surgeons completed a median of 10 of 11 BC/WC elements with both standardised and hospitalised patients (range 5-11). They found moderate variability in presentation of treatment options and description of outcomes. Three months after training, 79% of surgeons reported BC/WC is better than their usual approach and 71% endorsed active use of BC/WC in clinical practice. Patients and families found that BC/WC established expectations, provided clarity, and facilitated deliberation.

Michael J. Nabozny et al (53) (53) convened 4 focus groups at senior centers and 2 groups of surgeons in Madison and Milwaukee. Seniors (n=37) and surgeons (n=17) agreed that maximizing quality of life should guide treatment decisions for older patients. However, when faced with an acute choice between surgery and palliative care, seniors viewed this either as a choice between life and

death or a decision about how to die. Although surgeons agreed that very frail patients should not have surgery, they held conflicting views about presenting treatment options. Seniors and surgeons highly value quality of life, but this notion is difficult to incorporate in acute surgical decisions.

3.4 Discussion

'Damage is greatest if all you do is battle to the bitter end'. Atul Gawande (42)

The following themes emerged from our analysis

3.4.1 Delayed referral to palliative care / aggressive treatment near EOL

We looked into studies exploring causes of surgeons undertaking aggressive measures that fail to rescue patients from death or from life states that they would find unacceptable. One aspect we found is wide differences among surgeons regarding prognostic estimates and inadequate perceptions about postoperative quality of life (50, 54). Unrealistic expectations and mistaken assumptions about patients' goals of care often drive burdensome and unwanted treatment of those with serious illness or at the end of life. Compassionately delivering accurate and honest prognostic information inclusive of functional, cognitive, and psychosocial outcomes is crucial for helping patients and families understand what to expect. Structured, shared decision making will improve end of life experience for patients and family (55, 56, 57)

We also found that previous research has shown operative intervention in patients with advanced disease is associated with greater risks of serious complications, prolonged hospitalizations, hospital readmissions, and death compared with patients without this diagnosis (58). Surgeons, therefore, must weigh the surgical risks with the potential palliative benefits, knowing that operative complications may impact quality of life profoundly. (58, 59, 60)

3.4.2 Surgery in last year of life may be contradictory to patient's goals of care

An article published in BJS (54) stated that 20 per cent of the National Health Service budget in the UK is spent on care in the last year of life. Although interventions at the end of life (EOL) may be valuable, they may cause unnecessary suffering and waste resource. Surgery for cancer in the last year of life is now recognized as a potential indicator of poor EOL care (61). Better care involves improved communication with patients and loved ones, and includes optimal timing of shared decision-making, better evidence about outcomes for surgical patients approaching the EOL, timely referral to palliative care and, most importantly, culture change to recognise that providing good palliative care is sometimes the best thing to do (54).

A majority of older, chronically ill patients would decline a low-risk procedure if the outcome was severe functional impairment. However, 25% of Medicare beneficiaries have surgery in their last 3 months of life, which may be inconsistent with their preferences. Surgeons highly value quality of life, but this notion is difficult to incorporate in acute surgical decisions (53).

3.4.3 Surgeon's and Patients' perspectives

A survey published in 2018, surgeons reported fewer hours of palliative care training during residency, fellowship, and continuing medical education combined compared with medical oncologists. Absence of palliative care training was associated with recommending major operative intervention more frequently compared with physicians (49).

A qualitative study (Christy E. Cauley et al) performed detailed interviews to explore how surgeons approach such discussions, and to identify modifiable factors to reduce nonbeneficial surgery near the EOL. Surgeons reported performing operations they knew would not benefit the patient to give the family time to come to terms with the patient's demise. Wide differences in prognostic estimates among surgeons, inadequate data about postoperative quality of life (QOL), patients and surrogates

who were unprepared for EOL conversations, variation in perceptions about the role of palliative care, and time constraints are contributors to aggressive approach (50).

3.4.4 Introducing decision-making measures and Assessments

Previous studies show attempts of introducing decision making measures for surgeons or surgical residents when encountered with complex decisions; for instance, when a patient with an underlying terminal disease/malignancy is facing an acute surgical condition. These are pilot attempts at training sessions or formative evaluation. Such studies included in our systematic review are discussed below; “Best Case/Worst Case” (BC/WC) is a communication tool designed to promote goal concordant care during discussions about high-risk surgery. However, due to lack of evidence, extensive research and time constraints it has not been widely incorporated into surgical training or assessment.

Jacqueline M. Kruser et al evaluated a structured training program designed to teach surgeons how to use BC/WC, which included a two-hour training session followed by analysis of their performance with both hospitalized and standardised patients. They concluded that surgeons can learn to use BC/WC with older patients considering acute high-risk surgical interventions. Surgeons, patients, and family members endorse BC/WC as a strategy to support complex decision making (52).

Tyler Chesney et al (51) evaluated senior general surgical residents’ acceptance of the BC/WC tool and their attitudes, confidence and actions before and after training which included a 2-hour training intervention included a didactic session, a live demonstration, small-group practice and debriefing. This was followed by a formative performance evaluation. They felt that the training was valuable and that role play was its greatest strength but that these situations were challenging to simulate. Barriers to BC/WC use included time constraints and difficulty defining the best and the worst cases precisely (51).

In non-surgical specialties, successful attempts have been made for development and implementation of construct valid training and assessment tools of decision making. One recent study (by Alison L. Antes et al, Feb 2020) developed a decision-making measure which was tested on fourth year medical students. This comprised of clinical scenario-based items. Respondents were tasked with selecting two responses (out of six plausible options). Concluding that routinely applying a set of strategies (taught as a part of the decision-making measure), should assist professionals at any career stage with handling complicated professional decisions (48).

There have been studies for formative assessment of decision-making skills. Daniel D. Klaristenfeld et al in their study designed a pilot curriculum in palliative surgical care for surgical residents. This was presented in three 1-hour sessions. Sessions included group discussion, role-playing exercises, and instruction in advanced clinical decision making. Their inference was that with a reasonable time commitment, surgical residents are capable of learning about palliative and end-of-life care (46).

Further research is required in this field to develop summative means of assessment for Clinical decision making in End-Of-Life situations and communication about palliative care. Furthermore, this task should be identified as an EPA in surgery. Empathic communication is a core competency identified by the Accreditation Council for Graduate Medical Education (ACGME). Many specialties identify effectively delivering serious news and facilitating family conferences as key entrustable professional activities (EPAs). However, few programs have systematically incorporated these skills into residency training (62).

After pooled analysis of the full text articles included in the study; the Table 4 highlights the important aspects of the complexity of EOL decision making.

| No. | Study Title | Year | First Author | Discussions/Findings |
|------------|---|-------------|-------------------------|--|
| 1 | Teaching palliative care and end-of-life issues: a core curriculum for surgical residents | 2007 | Daniel D. Klaristenfeld | Most surgical training programs have no curriculum to teach palliative care A pilot curriculum in palliative surgical care designed for residents was presented in three 1-hour sessions With a reasonable time commitment, surgical residents are capable of learning about palliative and EOL care |
| 2 | Surgeons' Perspectives on Avoiding nonbeneficial Treatments in Seriously Ill Older Patients with Surgical Emergencies | 2016 | Christy E. Cauley | Emergency general surgeons feel responsible for having preoperative discussions about EOL care with seriously ill older patients Multiple factors undermine adequate communication and lead to nonbeneficial surgery |
| 3 | Constructing High-stakes Surgical Decisions | 2016 | Michael J. Nabozny | In acute surgical decisions, some seniors consider a choice between surgery and palliative care Others view this as a simple choice between life and death |
| 4 | Goals of Care and End of Life in the ICU | 2017 | Ana Berlin | Exploring drivers of goal discordant treatment. Importance of open communication and shared decision making Ease suffering near end of life |
| 5 | "Best Case/Worst Case": Training Surgeons to Use a Novel Communication Tool for High-Risk Acute Surgical Problems | 2017 | Jacqueline M. Kruser | Evaluated structured training program designed to teach surgeons to use BC/WC Surgeons can learn to use BC/WC with older patients considering acute high-risk surgical interventions |
| 6 | Training surgical residents to use a framework to promote shared decision-making for patients with poor prognosis | 2017 | Tyler Chesney | Evaluated senior general surgical residents' acceptance of the BC/WC tool, their attitudes, confidence and actions before and after training. |

| | | | | |
|---|---|------|-----------------|---|
| | experiencing surgical emergencies | | | After training, self-reported actions scores increased, and observed performance was accurate |
| 7 | Palliative Care Training and Decision-Making for Patients with Advanced Cancer: A Comparison of Surgeons and Medical Physicians | 2018 | Sarah B. Bateni | Substantial deficiencies in palliative care training persist among surgeons and are associated with more aggressive treatment recommendations |
| 8 | A good surgical death | 2019 | C. Chamberlain | Surgical patients receive less hospice/palliative care than their medical counterparts. It is unclear how best to educate surgeons to talk about death and improve shared decision-making. |
| 9 | Professional decision-making in medicine: Development of a new measure and preliminary evidence of validity | 2020 | Alison L. Antes | Designed and tested a decision making measure on 4 th year medical students Further research in this field required to use such measures for assessment |

Table 4. Important aspects of the complexity of EOL decision making

| |
|---|
| <i>Causes of delayed referral to palliative care or aggressive treatment near EOL include differences in prognostic estimates and inadequate perceptions of post-operative quality of life.</i> |
| <i>There is high likelihood of surgery in the last year of life which may be contradictory to patient's goals of care</i> |
| <i>Surgeon's perspective; they report little to none palliative care training associated with recommending major operative intervention</i> |
| <i>Patient's perspective; unreal and mistaken assumptions from surgical interventions, unpreparedness for EOL conversations</i> |
| <i>Surgeons can learn the decision-making measure BC/WC and find it useful for shared decision making in complex situations</i> |

Table 5. Themes emerging from a detailed qualitative analysis of the full text articles

These themes laid the ground work for creating a cross-sectional survey and the following validation study conducted as a part of this research project.

3.5 Conclusion

Surgeons learn the essential skill of EOL decision making and communication around palliative care over time through experience, observation and role modeling. There is little or no formal training with substantial deficiencies in palliative care training associated with more aggressive treatment recommendations. Training surgeons in EOL decision making can avoid inappropriate invasive treatment of those with serious illness or at the EOL. It will improve communication among surgeons, patients and patients' families to identify desirable goals of care.

Following our findings from this detailed systematic review we created a cross-sectional survey to explore EOL decision making and palliative care competence in surgeons, detailed in the next chapter. This survey was designed to get an insight and understanding into the professional practices of surgical trainees regarding clinical decision making in EOL scenarios.

CHAPTER 4

STUDYING PROFESSIONAL ATTITUDES OF SURGEONS TOWARDS END-OF-LIFE DECISION MAKING, & THEIR RESPONSES TO END-OF-LIFE CLINICAL SCENARIOS

4.1 Introduction and Background

Clinical decision making is a highly nuanced skill, learned mostly through observation, role modeling and personal experiences. EOL decision making is an imperative skill in acute surgery. However, the factors influencing the surgeons' decision are not well understood with little prospective work around identifying this task as an EPA in surgical training and assessment, and therefore no formal training.

A small number of studies in previous literature have explored the factors influencing treatment and management decisions in specific contexts of malignancy or metastatic disease. Treatment planning for patients with metastatic disease needs to be individualised and several factors must be taken into consideration, including disease status; overall health status, outcome of prior surgery (63). Main factors identified by Axel Grothey in a study that were deemed to be influencing the CDM were disease characteristics (disease factors), general health status (patient factors) and non-medical factors (economical/technical/psychosocial factors) (63).

Riccardo Campi et al about difficult decision-making strategies stated that decisions must balance several, often competing priorities (64). While a clinicians' aim should be to "balance all factors against the goals of treatment to generate a patient-focused treatment plan", unfortunately this concept is often overlooked in current clinical practice (65). In an ideal decision-making model, individual's

specific health needs and desired health outcomes would be the driving force behind all health care decisions and quality measurements (66).

Previous studies have shown that there is little to no palliative care training including communication regarding EOL decisions and shared decision making in surgery. Surgeons have reported performing operations that they know will not benefit the patient and have also reported being inclined towards a curative approach. Earlier decisions about referral to palliative care or ceilings of treatment will help improve patient and family experience of the dying process through the recognition and allowance of natural death, whilst avoiding the excessive allocation of scarce resources to provide futile life sustaining treatments (67, 68, 69). Important factors for CDM identified by Nathan Walzi et al (67) included.

- *Acute clinical factors; severity of disease process*
- *Patient specific factors; Age, comorbidities, cognitive status, quality of life*
- *Family input*

Aims

We aimed to explore End of Life decision making as a potential Entrustable Professional Activity; part of non-technical skill training and non-technical skill assessment for prospective examinations.

We performed a survey to understand the practices, experiences and professional attitudes of surgeons in various stages of their career about EOL decision making and palliative care. What factors do they consider when making a decision and how competent they feel about situations associated with palliative care?

Secondly, to understand the factors influencing their decisions in stressful high-stake decisions.

We studied responses of surgeons to acute clinical scenarios and with the main aim of designing a summative assessment tool.

Objectives

To assess clinical decision making towards acute clinical scenarios in surgeons using a questionnaire

To explore attitudes towards EOL clinical decision-making amongst surgeons

To compare context-specific differences amongst participants

To make recommendations regarding formal training and assessment of high-stake clinical decision making

4.2 Methodology

The potential participants were surgical practitioners and Consultants in General Surgery. Participants were provided information with regards to the research project via hard/soft copy of Participant Information Leaflet (see Appendix 1) prior to commencing the research project and had the opportunity to contact the research team with any queries. Consent (see Appendix 2) was sought for this process, assuring that the data will be anonymised, and provided with the rationale that it will prospectively improve surgical training and examinations. A link to complete the survey (see survey questionnaire; Appendix 4) was distributed via email by the Qualtrics XM software. Qualtrics XM was selected for this purpose because of its GDPR compliance and safety.

This survey consists of three main sections:

Section A: Basic demographic information; age, sex, years since graduation, years of training. This was pseudonymised.

Section B: Clinical vignettes; participants were given certain relatable clinical scenarios and provided with options to note how they would proceed and what their decisions would be when faced with a dilemma.

These carefully structured clinical vignettes were inspired from acute surgical pathologies encountered by surgeons frequently. The scenarios constituted subtle differences, that would lead to variability in professional opinions regarding treatment and management plans. They ranged from benign acute pathology, locally advanced malignancy to acute pathology with underlying metastatic malignancy. The respondents were provided with six plausible options comprising of common practices in such situations and asked to choose the best possible response. The rationale behind these scenarios was to identify and attempt to analyse in a quantitative manner the ability to recognise conditions where palliative care would be in the best interest of the patient thereby avoiding futile interventions. A surgeon at a nodal point of transition to autonomous practice would take into account all patient factors, disease factors, technical factors and consider the potential effect on quality of life of the patient following major surgical intervention.

Keeping in mind the complexity of end-of-life decisions, and also the difference of opinion that may arise in these situations owing to different variables and confounding factors, an arbitrary scoring was awarded to the responses in these reflective questions. This scoring was decided by independent surgical consultants. The scoring was then compared among junior and senior surgeons.

Section C: Reflective questions about EOL decision making and communication about palliation.

Inclusion criteria

Practitioners in General Surgery

Practicing in Ireland

Exclusion criteria

Any other medical/surgical speciality

Undergraduate students

Not practicing in Ireland

Data Collection and Participants

Ethical approval for this project was sought from the St. James' Hospital (SJH) / Tallaght University Hospital (TUH) Joint Research Ethics Committee (REC); reference number 2020-07.

Data Processing

Principal Investigator (PI) and Supervisor; the data controllers, ensured that the data collected met the required aims and objectives of the research. PI had the access to non-coded data. All participants were coded at the onset of the research project. This was managed by the PI. The data was scribed onto IBM SPSS Version 24 using an encrypted computer. Data analysis was conducted by the principal investigator and co-investigator. After completion of the project, computerised data will be retained on an encrypted database for 5 years.

Data Analysis

Descriptive statistics, including means and standard deviations, were calculated for continuous data and frequencies and percentages for categorical data. The Mann-Whitney U test and Kruskal–Wallis test were used for ordinal and continuous data where appropriate. To compare means, t-tests were used and to compare proportions in groups of categorical data, Pearson's Chi-squared test was used. All analysis was performed using IBM SPSS version 24.

Funding

No funding was sought for the research project.

4.3 Results

A total of 18 respondents completed the survey; 67% male and 33% female. The survey comprised of three sections.

Section A - Demographics

The first section comprised of the demographics of the study population. Majority of the participants (n=11, 61.1%) were registered to an Irish Surgical Training Scheme or were a Consultant Surgeon in practice. More than half of the participants (n=11, 61.1%) were between the age of 31 to 50 years (31 – 40 years (n=6, 33.3%) and 41 – 50 years (n=5, 27.8%)). Male to Female ratio of respondents was 2:1. The consultant to registrar to senior house officer (SHO) ratio for the study participants was 1.6:1:1. Majority of the study participants had more than 5 years of clinical experience in Surgery (n=12, 66.7%). Among the group 13 participants (72.2%) held a clinical post of a Registrar and above; Registrar/Senior Registrar, Specialist Registrar or Consultant.

| DEMOGRAPHIC GROUPS | VARIABLES | N | PERCENTAGE (%) |
|-------------------------------|---------------|----|----------------|
| GENDER | Male | 12 | 67 |
| | Female | 6 | 33 |
| AGE DISTRIBUTION | 20 - 30 years | 4 | 22 |
| | 31 - 40 years | 6 | 33 |
| | 41 - 50 years | 5 | 28 |
| | >50 years | 3 | 17 |
| JOB DESCRIPTION | SHO | 5 | 28 |
| | Registrar | 5 | 28 |
| | Consultant | 8 | 44 |
| YEARS SINCE GRADUATION | <5 years | 6 | 33 |
| | 6 - 10 years | 3 | 16 |
| | 11 - 15 years | 3 | 16 |
| | 16 - 20 years | 3 | 16 |
| | >20 years | 3 | 16 |

Table 6. Demographic profile of the study participants

Section B – Clinical Vignettes

This section of the survey comprised of reflective questions related to decision making in acute surgical scenarios (see figure 5).

Vignette 1

The first acute surgical scenario presented to the respondents comprised of a benign pathology. The presence of multiple co-morbidities and high-risk factors posed a decisional dilemma. The respondents were scored on their decision making based on the arbitrary scoring awarded by independent consultants.

Kruskal-Wallis test showed a statistically significant difference ($p= 0.03$) in decision making among the three job titles (SHOs, Registrars, Consultants). Further sub-group analysis with pair-wise comparisons applying Mann-Whitney U test showed the statistically significant difference ($p= 0.03$) between registrars and consultants. Implying that the consultants therefore being able to identify a benign pathology as a palliative care situation earlier than the registrars.

Vignette 2

The next scenario in the survey comprised of a frail gentleman presenting with an acute abdominal pathology with underlying locally advanced malignancy and co-morbidities, along with high predicted morbidity and mortality scores. The older age of the patient, and mention of malignancy were designed to suggest palliative versus curative or operative approach as most consultants would agree in this case. Kruskal-Wallis test showed a statistically significant difference among job titles ($p= 0.03$). Pair wise comparisons showed that registrars scored significantly higher than SHOs ($p=0.03$). In this case; however, there was no significant difference in decision making between consultants and registrars.

Vignette 3

The respondents were then presented with a younger patient, 64 years old, with acute signs of shock and investigations confirming advanced metastatic disease burden. However, in this scenario unlike the previous two scenarios, morbidity and mortality scores were not provided.

Statistical analysis of the scores showed no significant differences in decision making among SHOs, registrars and consultants in this specific context ($p= 0.45$). Implying that in the absence of overt prognostic indicators all categories performed similarly. Even on a background of advanced metastatic malignancy, most of the participants (72%) either proceeded as per patient's wishes or proceeded to surgical intervention after discussing the risks involved. It may also imply that the scenario failed to

effectively simulate an actual work-based environment situation and is therefore not suitable for assessment of high-end decision making.

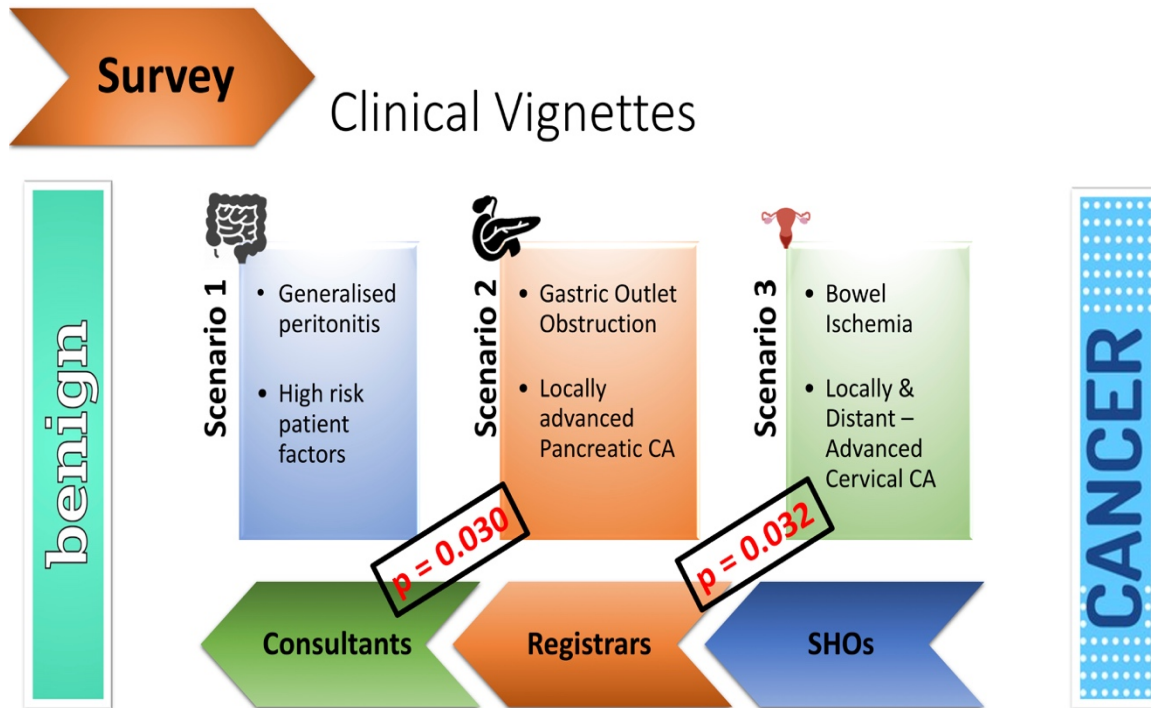


Figure 5. Summary of Clinical Vignettes. Carefully constructed clinical vignettes were divided into three scenarios. Scenario 1, focused on high-risk patient factors with an underlying benign pathology. Scenario 2, highlighted malignant Gastric outlet obstruction with locally advanced Pancreatic malignancy in a high risk patient. Scenario 3, mentions a patient with locally advanced and distant metastatic cervical carcinoma presenting with acute bowel ischemia on a background of significant comorbidities.

Themes emerging from qualitative analysis

The respondents who leaned towards early referral to palliative care and suggested to avoid surgical intervention provided the following reasonings

“I would offer surgery if patient is keen to proceed, but would introduce early concept of palliative care at this point”

“Patient is septic. Patient is unlikely to benefit from surgical management. I don’t think it is in his best interests”

“End stage disease, sepsis, high P-POSSUM, and co-morbidities”

“Critically ill, peritonitis, co-morbidities, and high P-Possum”

“Patient has non-curative disease. Will offer palliation for comfort”

“There is no curative option. Patient has co-morbidities. It is best to palliate”

“Poor prognosis and poor survival”

On the other hand, respondents inclined towards surgical approach, or their decision being subject to patient’s wishes, reported the following;

“Patient should be informed and allowed to drive the decisions”

“Data-driven shared decision making is the key”

“Patient can have surgery and get a de-functioning stoma if she wishes and understand the risks”

“Patient can still do ok”

“Unless the patient does not have capacity, they should decide what treatment they want”

“I would offer surgery if patient is keen to proceed”

“Patient needs to go to theatre to relief the obstruction along with management of cholangitis”

Section C – Professional Opinion

This section of the survey was designed to gain insight into the practical experiences and professional opinions of surgeons regarding EOL decisions and palliative care in surgery. They graded their views on a Likert Scale and the data was analysed quantitatively.

The data obtained from the survey shows that, in our surgical cohort, the level of comfort in EOL conversations rises towards the end of training, from junior to senior surgeons (see figure 9). Fifty-six percent of the entire sample reported being “fairly comfortable” in EOL conversations when graded on a Likert scale. Detailed sub-group analysis of the comfort level shows 40% SHOs, 60% registrars and 100% of the consultants are comfortable in EOL conversations with patients and family. Twenty-eight percent of the sample reported having discussed EOL decisions with a patient >50 times (see figure 6), whereas 33% reported having discussed the same with a patient’s family >50 times (see figure 7). 56% reported being fairly comfortable discussing EOL decisions with patients and family.

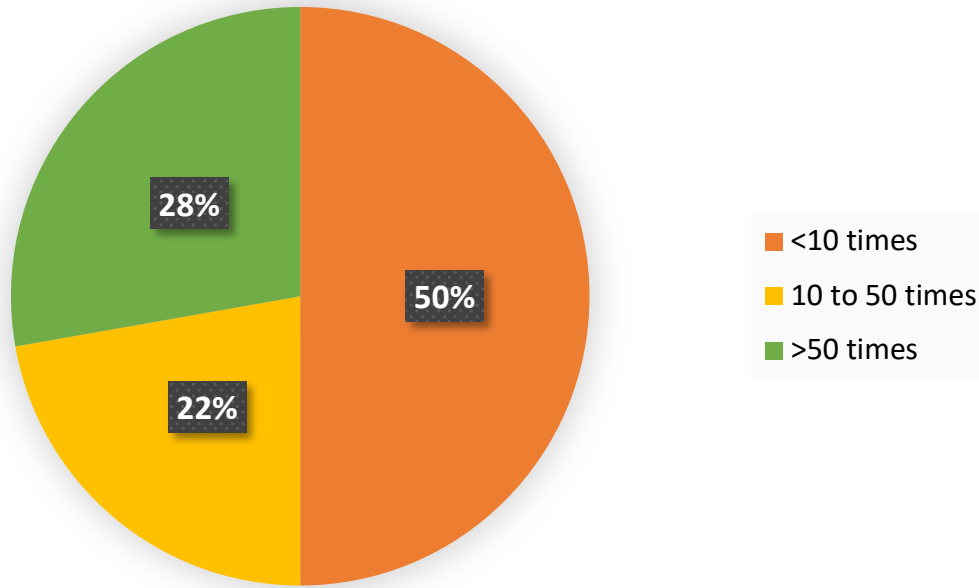


Figure 6. No of times EOL decision making discussed with patients

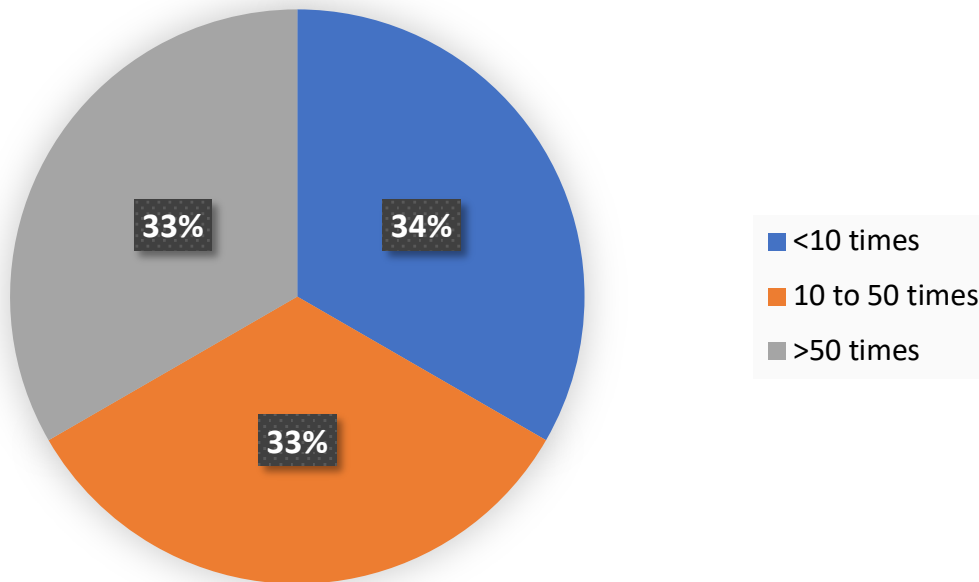


Figure 7. No of times EOL decision making discussed with patients' family

Respondents were also asked their opinion about the adequacy of training with regards to EOL conversations and decisions (see figure 8), ranging from extremely adequate to extremely inadequate. The opinion about training in this regard was split between moderately adequate (39%) and somewhat inadequate (39%), with 22% reporting it was neither adequate nor inadequate.

When subgroup analysis was performed among SHOs, Registrars and interns; 60% SHOs reported training in this regard to be inadequate, 60% Registrars reported it as inadequate/ neither adequate nor inadequate, and 50% of the consultants reported it inadequate/ neither adequate nor inadequate. The opinion about adequacy of training regarding End-Of-Life decisions and palliative care in surgery did not show any significant difference among the different job titles.

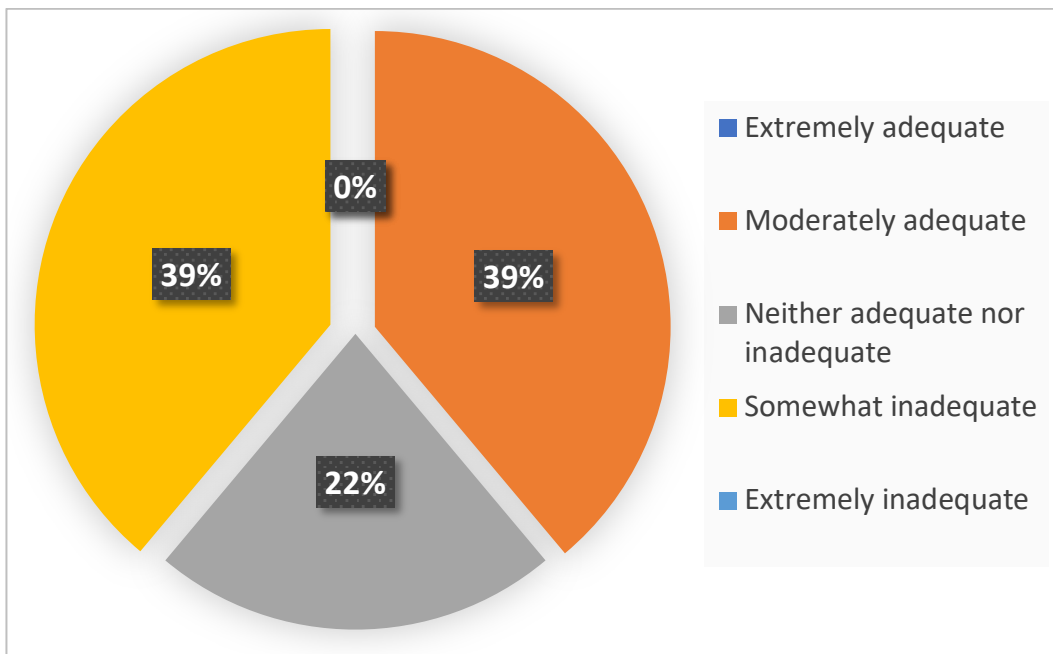


Figure 8. Adequacy of Training regarding EOL decision making

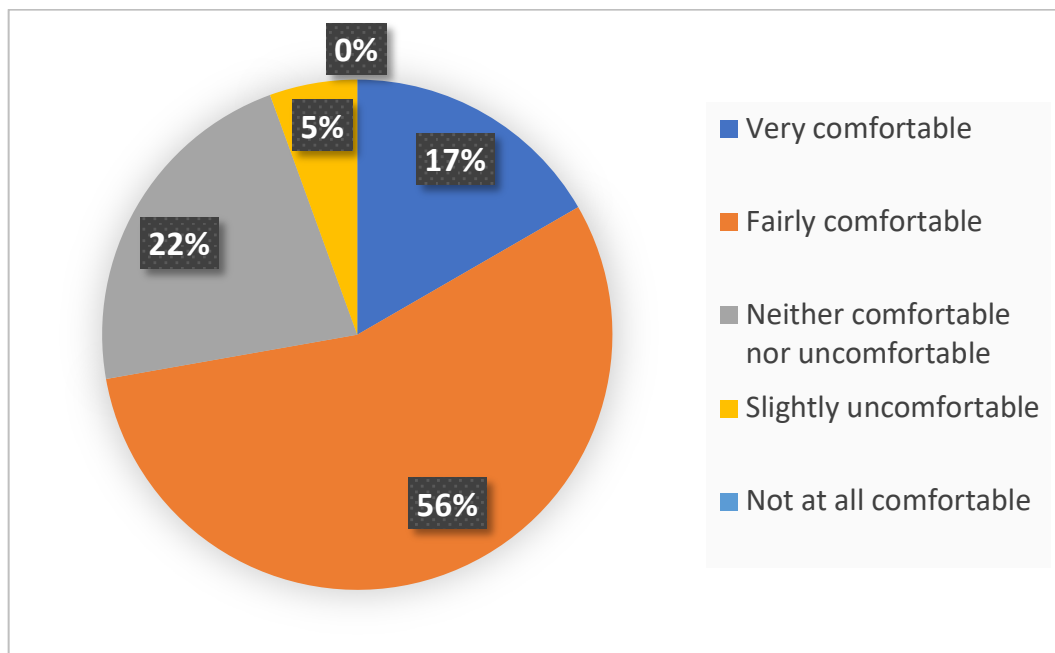


Figure 9. Level of Comfort to discuss EOL decision making with patient and family

As part of the survey the participants were also asked to provide a brief account of the factors that they consider to be important in EOL decision making during their clinical practice.

Factors (patient factors, disease factors, and non-clinical factors) considered by the respondents during the survey that influenced their decision making in high-risk clinical situations included:

Age and comorbidities

Patient factors and ability to withstand treatment options

“I try to think what is best for the patient – regardless of family wishes”

Disease factors

Patients’ factors

Previous Quality of life and baseline, smoking status and family supports

“I think there needs to be a holistic approach to all the issues. Sometimes the “easier” option is to do an operation that is likely to be futile rather than invest in exploring the alternatives and having the more difficult conversations”.

All of above factors should be considered. In cases where there is lack of agreement - always involve senior colleagues/ consultants for second opinions

Co-morbidities, mortality associated with surgery, and patient wishes

Patient beliefs, comorbidities, disease severity (e.g. stage of cancer), scoring systems such as P-POSSUM, and senior colleagues/consultants opinion/help.

4.4 Limitations

The limitation envisaged in this study is the relatively small sample size. In light of Covid-related restrictions, uncertainty and variable working hours it was not possible to manage the planned clinical connections for conducting the research on a bigger scale and achieve the desired sample size.

4.5 Discussion

A cross sectional study is useful for collecting data from many different individuals at a single point in time and observing variables without influencing them, finding correlations. Our study was designed to gain insight into surgeons’ current practices and their professional experiences and views related to critical decision making in EOL situations.

Analysis shows that opinion of surgeons regarding training in the aspect of EOL decision making is inadequate. Complex decision-making in high stake scenarios is an integral part of surgeons’ daily clinical practice nonetheless they feel a discrepancy in their training in this particular aspect. The delay in referral to palliative care and a curative approach with aggressive treatment interventions at EOL

might be grounded in this discrepancy. This backs up our findings of the previous chapter (Chapter 3- The Complexity of End-Of-Life decision making in surgery - A Systematic Review), as we found in our systematic review of available literature regarding EOL decisions and Palliative care, that surgeons reported little to none palliative care training, and were more likely than physicians to propose aggressive surgical interventions near EOL (49).

CDM may be highly nuanced, even more so in acute and critical scenarios, however analysis of the survey shows level of comfort in EOL conversations and palliative decisions rises with increasing number of years of clinical experience. This implies it is a skill learned over time through observation, personal experiences, role modeling (26).

Analysis from the first clinical vignette, which comprises of an acute benign pathology, validates the scenario as being able to differentiate high-end decision making since experienced consultants scored higher on this vignette by making a palliative care decision. Early referral to palliative care in cases where surgery will not be able to save the patient's life and adversely affect the quality of life would prove beneficial in many aspects in terms of patient and family experience of dying and unnecessary expenditure of precious resources. Similarly structured scenarios can be useful in formative and summative fashions for training and summative assessment purposes at nodal points of transition to autonomous practice.

The second clinical vignette, with advanced malignancy and comorbidities, found no significant difference in decision making among consultants and registrars. Registrars near the end of their training or in their senior years are able to make high end decisions in cases with malignancies, metastasis, or bad prognostic indicators about surgical outcome and post-operative quality of life. However, registrars scoring significantly higher than junior surgeons (SHOs) in said scenario advocates the use of similar vignettes for formative means in surgical training schemes.

4.6 Conclusion

Above findings of differential responses to clinical scenarios by junior and senior surgeons lays the groundwork for development of a formal assessment tool in a simulated environment, thereby bringing about potential improvement in prospective examinations.

The survey highlights a deficiency in an important aspect of surgical training, EOL decision making and palliative care. Our analysis shows that with meticulously structured bespoke clinical scenarios assessing high end decision-making skills is achievable. Findings from the detailed survey lay the foundation for development of a summative assessment tool for EOL decision making in surgeons; a task that has not been previously studied and assessed. These findings highlight the need for greater efforts systemwide in palliative care education among surgeons, including incorporation of a structured palliative care training curriculum in graduate and continuing surgical education.

The study provides the framework to design a high stakes scenario for summative assessment, detailed in the next chapter.

CHAPTER 5

EVALUATING CONSTRUCT VALIDITY OF A SUMMATIVE ASSESSMENT TOOL FOR END-OF-LIFE DECISION MAKING, AND ITS UTILITY IN A HIGH-STAKES EXAMINATION

5.1 Introduction and Background

In previous chapters we have established the importance of NTS in surgical competence. NTS accompany the manual technical skills of surgeons and are considered equally important for delivery of optimal and safe patient care (70) . NTS include communication, situational awareness, decision making, teamwork and leadership, amongst other skills. Poor NTS have been shown to contribute to medical error and negatively impact patient safety and clinical outcomes (71).

In the past decade various attempts have been made globally to incorporate NTS assessment into formal examinations, but no work has been done yet around formative or summative assessment of EOL decision making in surgery.

The Royal College of Surgeons in Ireland conducted a study recently where they performed a three-station OSCE assessment of NTS at the beginning of year one and again at end of year two of surgical training and investigated whether the NTS of surgical trainees improved after the first two years of this program (72). They found significant improvement in scores concluding the OSCE method is useful for formative measures in non-technical skills.

However, work needs to be done for improvement of these assessment methods to be used in a summative format.

A similar inference was drawn in a study conducted in the University of Minnesota Medical School, Minneapolis. They performed a pilot demonstration of assessment stations regarding leading family conferences in the surgical intensive care unit (SICU). This pilot provided residents with a positive learning experience and valid formative feedback. They concluded that more work in actor and rater training is needed before the examination scores can be reliably used in summative evaluation (73).

This chapter comprises two separate projects carried out with the same methodology;

1. Step One- Pilot Project;

Evaluating the construct validity of a summative assessment tool by testing on a cohort of surgeons at a university teaching hospital

2. Step Two- High-stakes Examination;

Evaluating utility of said assessment tool in a high stakes fellowship examination

Setting

Step One- Pilot Project

Step One was piloted at Tallaght University Hospital, inviting surgeons in different stages of their career to take part in this project. Tallaght University hospital is a 495-bed teaching hospital with a catchment population of over 450,000. It is one of the leading academic centres and is associated with Trinity College Dublin, providing an ideal setting for our research related to postgraduate surgical education.

Step Two- High-stakes Examination

Following the pilot, the assessment tool was then adopted in the UEMS (European Union of Medical Specialists) exam of F.E.B.S (Fellow of the European Board of Surgery). The UEMS Section of Surgery and European Board has the main activities of overlooking the surgical training, Standard of the Certificate of Completion of Specialist Training (CCST), continuing medical education in Surgery (Continuing Professional Development) and Surgical Quality Control.

The general surgery section of UEMS overlooks the examination FEBS; it is an 'Exit Examination' which constitutes the final rite of passage for Specialist Trainees in General Surgery leading to the conferment of Fellow of the European Board of Surgery in General Surgery (FEBS General Surgery). This is an international exam, candidates appearing in this exam constitute a diverse background coming from different parts of the world thereby exhibiting a diverse set of cultural background and training. The UEMS exam being aimed at surgeons at nodal point of transition for autonomous practice, presented a perfect setting for our assessment tool for potential improvement in prospective examinations.

5.2 Methodology

For the purpose of the study two separate projects were carried out. First, the simulated assessment station as a pilot project at a university teaching hospital including surgeons at different stages of their career.

This led to the second part of the project, a simulated assessment station as a part of a formal fellowship examination.

Study Participants and Data Collection

Ethics approval were sought from the St. James' Hospital (SJH) / Tallaght University Hospital (TUH) Joint Research Ethics Committee (REC); reference number 2020-07, for the pilot project and the Royal College of Surgeons Ireland ethical committee; reference number 212549337, for the European Board of Surgery in the division of General Surgery (FEBS General Surgery). For the purpose of the pilot project participants were informed that their participation in the study is entirely voluntary and their scores on the assessment will be anonymous. Their performance on the assessment station will not affect their future prospects or their career in any regard. Written and signed consent was taken at the day of the exam. (See consent form in Appendix 2)

Following the development of construct validity of surgeon's responses to commonly encountered acute surgical EOL scenarios in the survey discussed in the previous chapter, a bespoke simulated assessment station was carefully structured and piloted as an assessment tool for EOL decision making at a university teaching hospital. This aimed at providing further understanding into clinical decision-making process in EOL scenarios; including initial decision making, factors that are taken into account in such scenarios, and communication skills for palliative care.

Step One- Pilot Project

In Step One; the simulated assessment station for the pilot project included surgeons at different stages of their career at a university teaching hospital. To simulate a realistic work place environment, external stressors were introduced; time constraint and a concerned family member. The framework for decision making to consider palliation early in an EOL situation as opposed to active surgical intervention reflects the level of experience of a practicing surgeon. The simulated station involved a participant, two designated actors and was scored on a standard scoring sheet by two separate examiners. The participants were provided with an information leaflet about the study and an

invitation letter two weeks prior to commencing the pilot project (see Appendix 1). The actors and examiners were pre-briefed and any queries were dealt with prior to commencement of the simulated station. The station was directly observed by the principal investigator to ensure that the data collected met the required aims and objectives of the research.

Step Two- High-stakes Examination

Following the pilot project and achievement of construct validity, the assessment tool was presented to the Board of Examinations for Fellowship Examination of the European Board of Surgery in the division of General Surgery (FEBS General Surgery). The simulated assessment station was approved by the Board of Examiners, and was made a part of the formal examination. This exam was conducted in Royal College of Surgeons Ireland, Dublin, awarding successful candidates with a title of Fellow of the European Board of Surgery in division of General Surgery. This station comprised of the non-technical skills aspect of the examination. The assessment tool was used as a means of summative assessment in the high-stake examination of candidates at a nodal point of transition to autonomous practice.

Apart from the examination candidate; the simulated station included two fully trained actors designated by the Royal College of Surgeons of Ireland and was scored on a standard examination scoring sheet by three separate examiners. The actors and examiners were pre-briefed and any queries were dealt with prior to commencement of the examination. The station was observed by the principal investigator to ensure that the data collected met the required aims and objectives of the research.

Simulated Assessment Station Design

The participating candidates were provided with an acute surgical scenario that they would have to manage from initial history taking and investigations to making a treatment decision and communicating the management plan with the patient and the family member (see Appendix 3). The scenario was broken down into three phases for the purpose of step-wise delivery of information to the participant and corresponding tasks to be achieved:

Initial management and decision making

Final clinical decision making and factors taken into consideration

Communication related to End-Of-Life situation and palliative care

General communication skills were also marked as a Global Rater.

Aim

To validate a summative assessment tool for EOL decision making in surgery

Objectives

To validate a simulated assessment tool for prospective examinations

To evaluate simulated clinical decision making towards an end-of-life clinical scenario in surgeons at a high-stake examination

Inclusion criteria

Practitioners in General Surgery at Tallaght University Hospital for pilot project

Candidates of Fellowship Examination for the European Board of Surgery in the division of General Surgery (FEBS General Surgery) for summative assessment project

Exclusion criteria

Any other medical/surgical speciality

Data Processing

Principal Investigator (PI) and Supervisor; the data controllers, ensured that the data collected met the required aims and objectives of the research. PI had the access to non-coded data. All participants were coded at the onset of the research project. This was managed by the PI. The data was scribed onto IBM SPSS Version 24 using an encrypted computer. Data analysis was conducted by the principal investigator and the co-investigator. After completion of the project, computerised data will be retained on an encrypted database for 5 years.

Data Analysis

Descriptive statistics, including means and standard deviations, were calculated for continuous data and frequencies and percentages for categorical data. The Mann-Whitney U test and Kruskal–Wallis test were used for ordinal and continuous data where appropriate. To compare means, t-tests were used and to compare proportions in groups of categorical data, Pearson’s Chi-squared test was used. All analysis was performed using IBM SPSS version 24.

Funding

No funding was sought for the research project.

5.3 Results

This simulated assessment was a two-step study. First step was piloting the designed assessment tool on a cohort of surgeons in various stages of their career, at a university hospital. The purpose of the pilot project was to validate said assessment tool by achieving construct validity.

In the next step, the same assessment tool was adopted as a part of the formal examination process in an international high-stake exam as detailed above. The simulated assessment station was broken down into three phases;

First phase comprised of *Initial management and decision making*.

In the second phase candidates were assessed for the *factors taken into consideration* for making a treatment plan and management decision as well as their *communication skills with the patient*.

Third phase comprised of assessment of *final decision making/EOL decision making* in light of all the provided information, and finally for their *Communication regarding palliative care*.

Initial Overall Analysis

Pilot Project

Twenty-one surgeons, in different stages of their career and training, participated in the pilot assessment project at Tallaght University Hospital (Consultant: Registrar: Senior House Officer: Intern ratio of 1:1.7:2:2.3). The cumulative final scores of both assessors for the entire sample size were analysed to evaluate the means and standard deviations (see table 7 and table 8).

| Variable | Mean ± Std. Deviation |
|---------------------------------|-----------------------|
| Initial Decision Making | 85.00 ± 31.70 |
| Final Decision Making | 75.71 ± 39.54 |
| Global Rater for Communications | 3.69 ± 0.87 |

Table 7. Cumulative scoring of the entire sample size (N=21)

The initial management, factors considered for decision making, communication with the patient, palliative communication and final decision-making framework were all assessed on a Likert scale (1 – 3; right, partially right and not right) as represented below for the entire sample size.

| Variable | Mean ± Std. Deviation |
|---------------------------|-----------------------|
| Initial Management | 2.64 ± 0.42 |
| Factors Considered | 2.31 ± 0.70 |
| Communication | 2.36 ± 0.55 |
| Palliative Communication | 2.26 ± 0.77 |
| Decision Making Framework | 2.36 ± 0.79 |

Table 8. Cumulative scoring for the entire sample size (N=21)

Three junior colleagues had to receive a prompt during the initial phase of the simulation to help them through the rest of the case scenario. Statistical analysis performed according to the job showed linear increase in the scoring from intern, senior house officers to registrar and consultants. The test for linearity showed a significant difference between the job and factors taken into consideration ($p=0.00$), communication skills ($p=0.00$), palliative communications ($p=0.00$), final decision making framework ($p=0.05$) and also global rater ($p=0.01$); see table 9 and figure 10. There was no significant difference between the scores of initial management framework for the patient among the job descriptions stated above ($p=0.11$); see table 9 and figure 10.

| Variables | Intern | Senior House Officer | Registrar | Consultant | p value - ANOVA between groups (linearity) |
|---------------------------|-------------|----------------------|-------------|-------------|--|
| Initial Management | 2.50 ± 0.41 | 2.58 ± 0.49 | 2.70 ± 0.45 | 3.00 | 0.11 |
| Factors Considered | 1.79 ± 0.57 | 2.08 ± 0.66 | 2.90 ± 0.22 | 3.00 | 0.00 |
| Communication Skills | 1.93 ± 0.45 | 2.33 ± 0.41 | 2.60 ± 0.55 | 3.00 | 0.00 |
| Palliative Communication | 1.57 ± 0.53 | 2.33 ± 0.82 | 2.70 ± 0.45 | 3.00 | 0.00 |
| Decision Making Framework | 2.00 ± 0.82 | 2.17 ± 0.98 | 2.80 ± 0.45 | 2.83 ± 0.29 | 0.05 |
| Global Rater | 3.29 ± 0.76 | 3.50 ± 0.77 | 3.80 ± 0.91 | 4.83 ± 0.29 | 0.01 |

Table 9. Scoring among different job descriptions and linearity among groups

Mean Scores in relation to Job Description

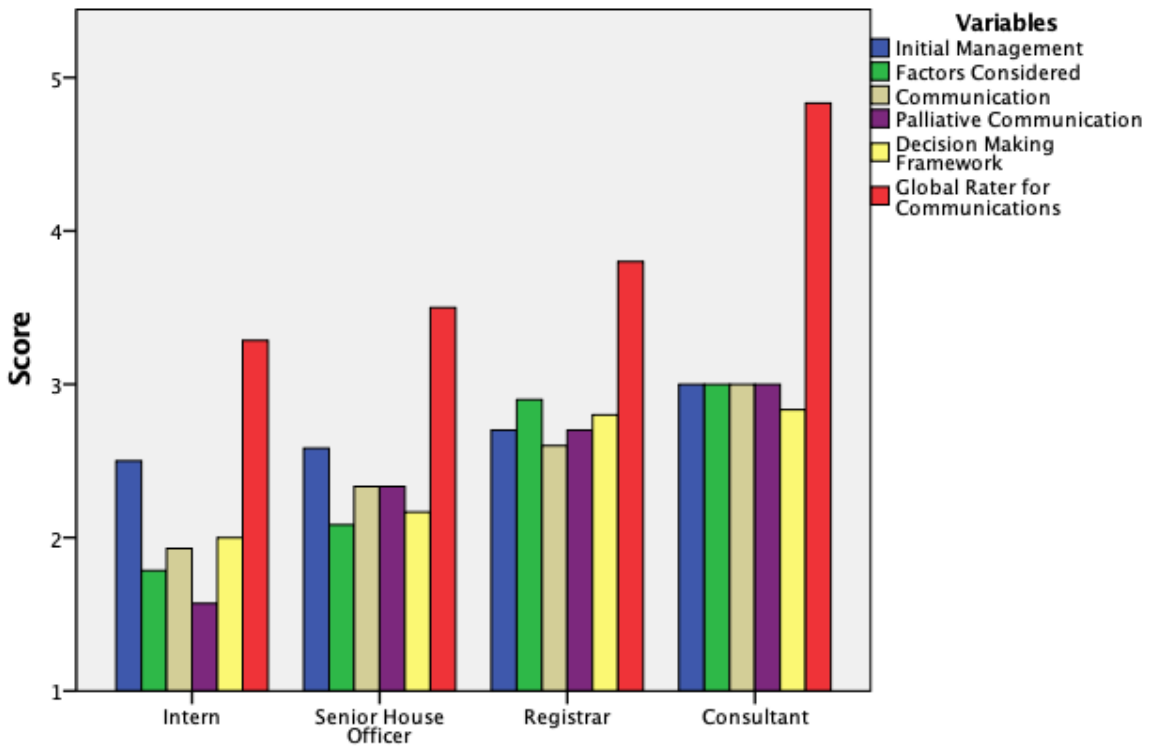


Figure 10. Scoring among different job descriptions and linearity among groups

Fellowship of the European Board of Surgery (UEMS) Examination

The bespoke validated assessment tool was adopted as a part of the formal examination and was included in the Fellowship of the European Board of Surgery (UEMS) Examination. After the formal selection process through the Board of Examination, eleven candidates were deemed suitable for the examination. All these candidates appearing in the examination were included in the research project. These exam candidates were all at the level of Senior Registrars or in their later stages of their training; at a nodal point of transition to autonomous practice. Their scores were compared with the scores of

Senior Consultants at the University hospital where this assessment tool was previously piloted and validated to give a meaningful comparison group.

Analysis for the overall group showed statistically significant linear increase among the candidates for the UEMS examination and consultants from pilot study at the University hospital among initial management, factors considered/rational for EOL decision making and global rater (see table 10, and see figure 11).

| | UEMS Examination | Consultants at Tallaght University Hospital | p value - ANOVA between groups (linearity) |
|--|------------------|---|--|
| Initial Management | 2.09 ± 0.83 | 3.67 ± 0.58 | 0.04 |
| Initial Decision Making | 2.18 ± 0.75 | 3.33 ± 1.15 | |
| Factors Considered | 2.18 ± 0.60 | 4.00 | 0.01 |
| Communication with patient | 2.18 ± 1.08 | 3.33 ± 0.58 | 0.28 |
| Final Decision Making and Palliative Communication | 2.09 ± 0.83 | 3.67 ± 0.58 | 0.10 |
| Global Rater | 2.09 ± 0.83 | 3.67 ± 0.58 | 0.00 |

Table 10. Scoring among different job descriptions and linearity among groups for UEMS candidates in comparison to Consultants at Tallaght University Hospital

Comparison of mean score for Candidates at UEMS Examination

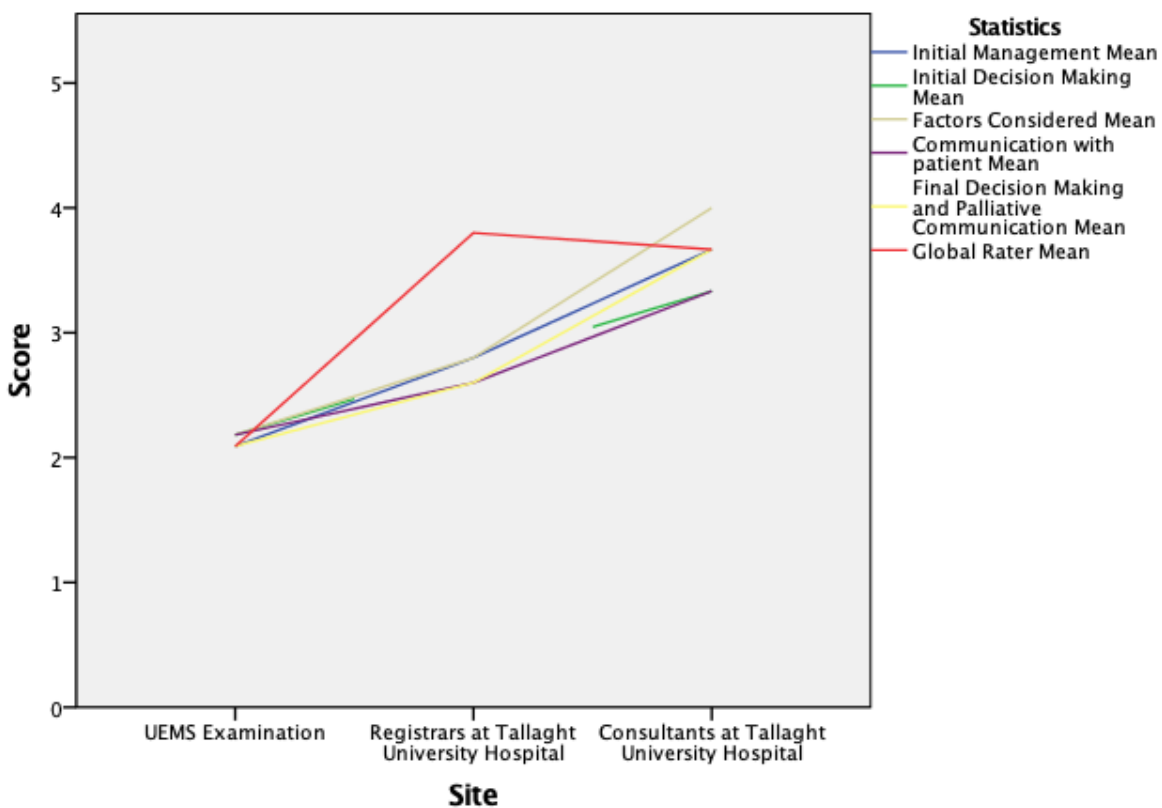


Figure 11. Scoring among different job descriptions and linearity among groups for UEMS candidates in comparison to Registrars and Consultants at Tallaght University Hospital

Subgroup Analysis

Comparison of Phase 1 Scores Among Fellowship Exam candidates and Experienced Consultants

On pairwise comparisons we found that the senior, experienced consultants (from pilot project) scored significantly higher than the exam candidates in aspects of “*Initial Management*” ($p=0.01$). There was no statistical difference in the initial decision making-process for these candidates ($p=0.10$). Further information (in terms of a CT-Scan) was requested by these candidates as a part of the scenario to reach to a final decision making (see Figure 12 and 13).

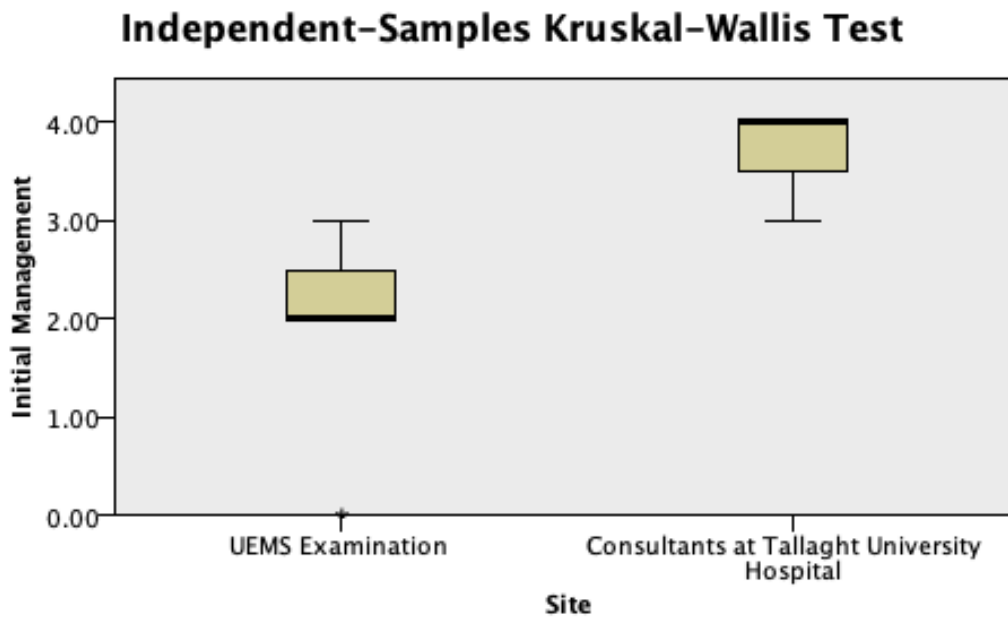


Figure 12. Pairwise comparison of Initial management among groups for UEMS candidates in comparison to Consultants at Tallaght University Hospital

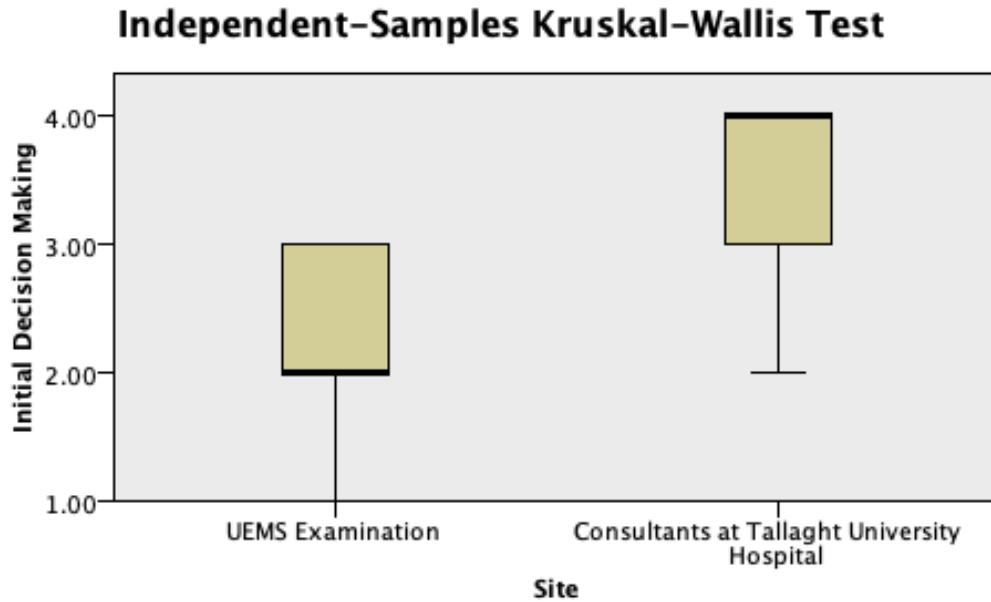


Figure 13. Pairwise comparison of Initial decision making among groups for UEMS candidates in comparison to Consultants at Tallaght University Hospital

Phase 2 Scores

In our pilot study at the University hospital we found that consultants and registrars in their senior years (3rd and 4th year) of training scored significantly higher than junior surgeons (interns/SHOs) in their factors considered for decision making ($p=0.004$, see figure 14).

Comparison of Phase 2 Scores Among Fellowship Exam candidates and Experienced Consultants

On subgroup analysis we found that the senior, experienced consultants from the pilot project scored significantly higher than the UEMS exam candidates in the aspect of “*Factors considered for decision making*” ($p=0.005$).

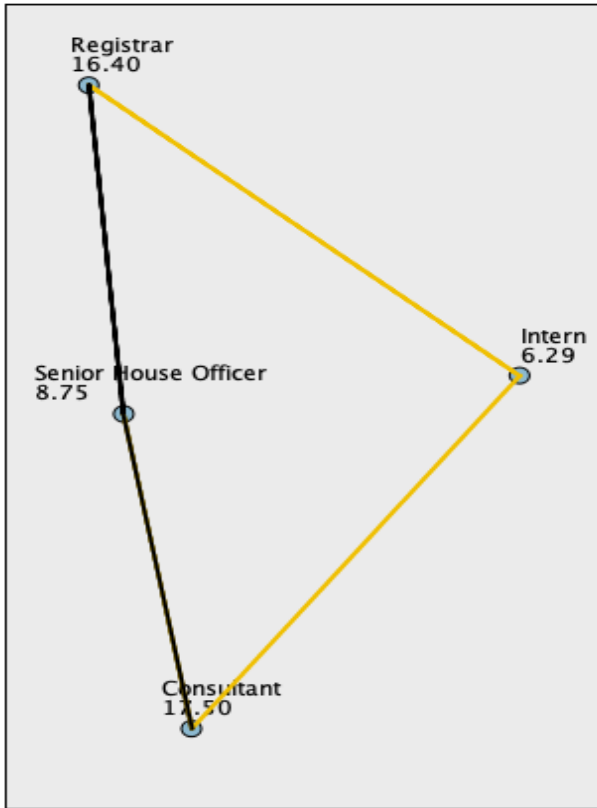


Figure 14. Pairwise comparisons for factors Considered in Decision Making at Tallaght University Hospital

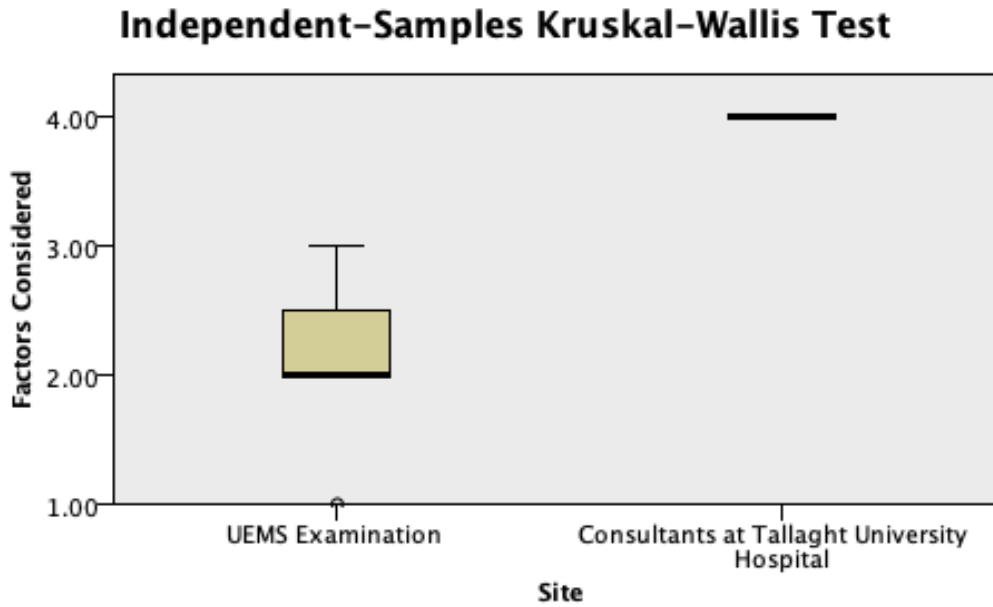


Figure 15. Pairwise comparison of factors considered among UEMS candidates in comparison to Tallaght University Hospital

Phase 3 Scores

Pilot Project

In our pilot study at the tertiary care hospital, we found that there was no significant difference among the job titles (interns, SHOs, Registrars and Consultants) for communication skills on a global rater ($p=0.06$). On pairwise comparison of the group, scores of Communication skills specific to palliative care and EOL decision making with patients and family members showed statistically significant differences among junior most doctors and the most experienced senior surgeons. The consultants scored significantly higher than interns ($p= 0.03$) in this aspect (see Figure 16 and 17).

Independent-Samples Kruskal-Wallis Test

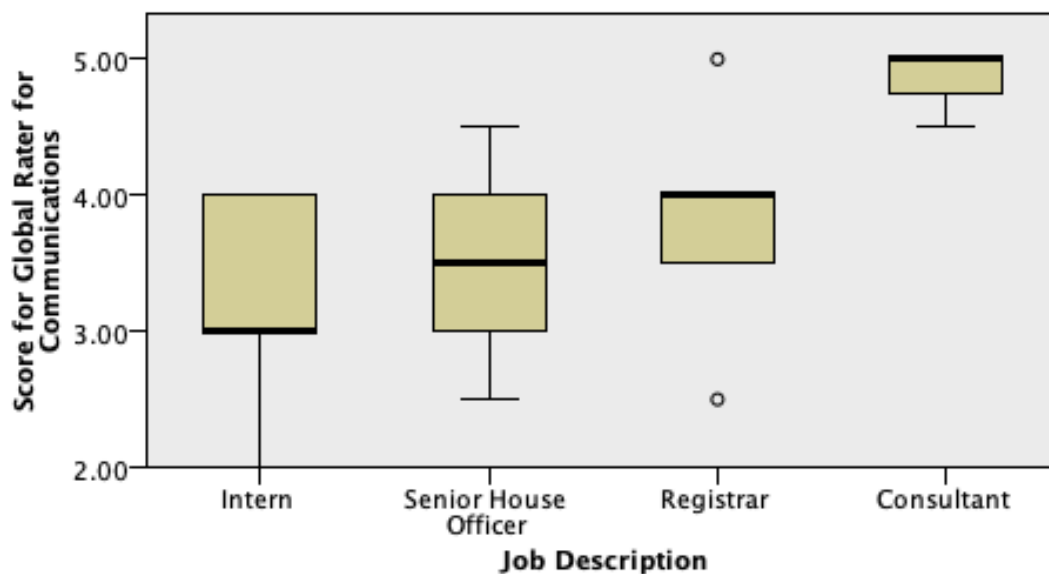


Figure 16. Pairwise comparison for Global rater of communications among surgeons at Tallaght University Hospital

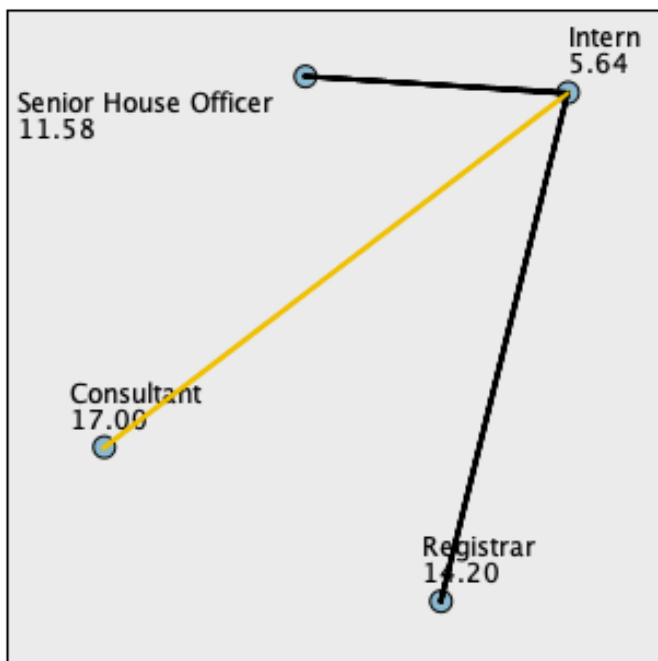


Figure 17. Pairwise comparison of Palliative Communication among surgeons at Tallaght University Hospital

Comparison of Phase 3 Scores Among Fellowship Exam candidates and Experienced Consultants

Upon additional analysis. We found no statistically significant difference among the experienced consultants and exam candidates in regards to their score on general communication skills with the patient ($p=0.07$, see figure 18). However, the comparison of “Communication about palliation and EOL decision” ($p=0.02$, see figure 19) and Global rater for Communication skills ($p=0.02$, see figure 20) showed a significant difference among the two categories; the experienced consultants scoring significantly higher than the exam candidates.

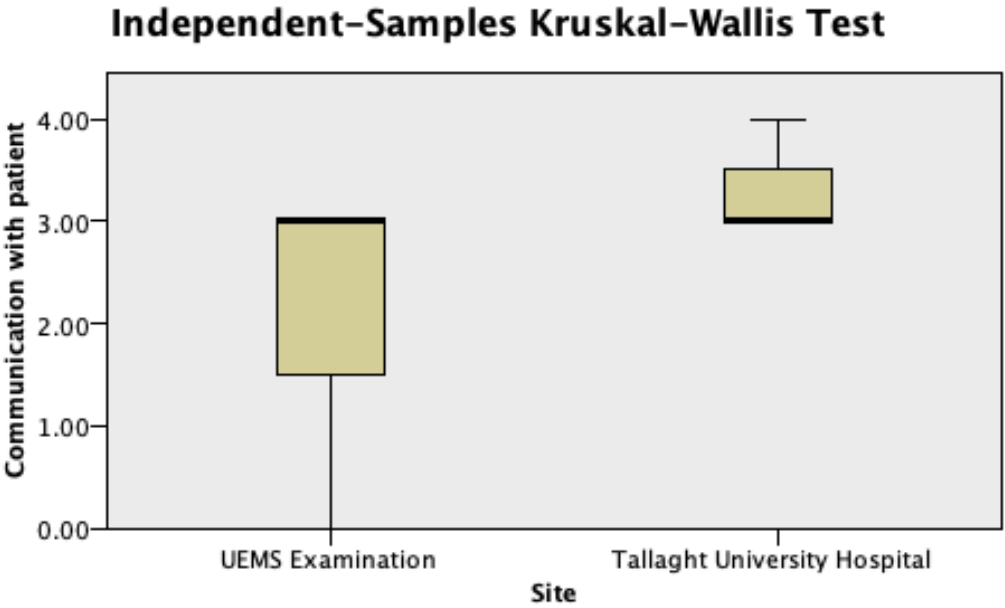


Figure 18. Comparison of communication skills with patients among UEMS candidates and consultants at Tallaght University Hospital

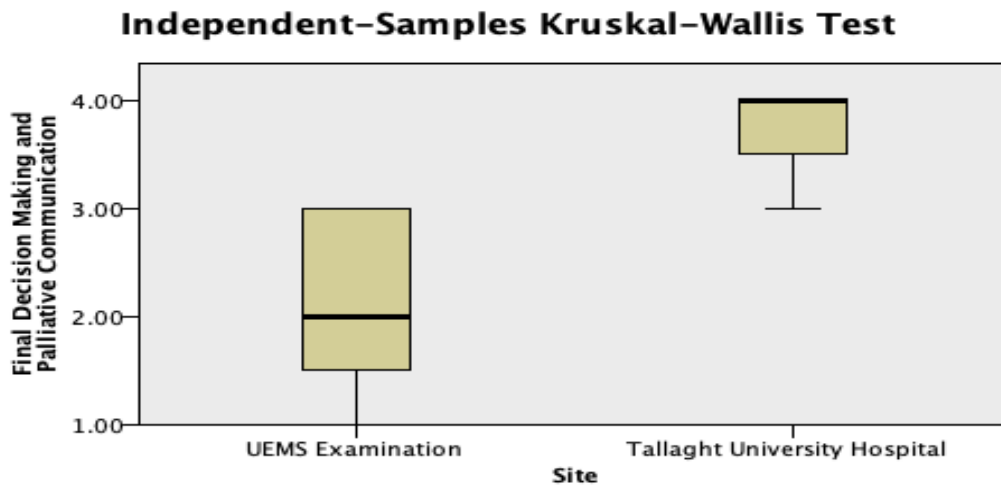


Figure 19. Comparison of final decision making and palliative communication among UEMS candidates and consultants at Tallaght University Hospital

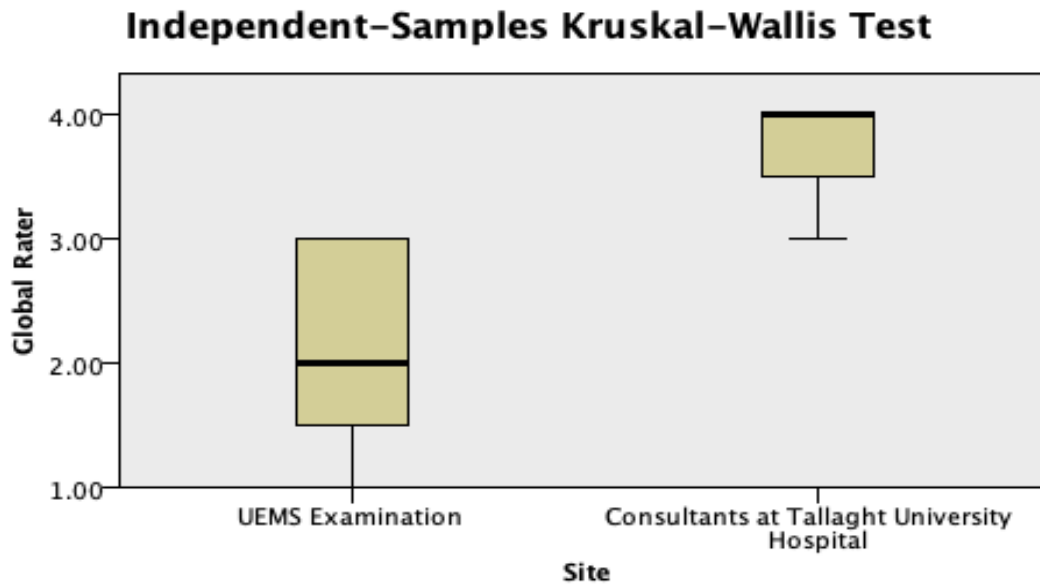


Figure 20. Comparison of global rater of communication skills among UEMS candidates and consultants at Tallaght University Hospital

5.4 Limitations

Varying cultural backgrounds may lead to different practices and experiences related to End-Of-Life decisions. For some of the UEMS exam candidates the exposure in home health-care environment would have been potentially different than exposure in Ireland. Standardisation of actors and examiners needs more extensive work done. One main limitation of our study is the relatively small sample size. Due to Covid related restrictions, distancing requirements and difficulties in travelling it was not possible to achieve a more desirable, bigger sample.

5.5 Discussion

Our aim was to develop a content valid assessment tool for EOL decision making in surgery and provide preliminary evidence for its construct validity.

The differential performances observed among junior and senior surgeons in the pilot assessment station suggests the development of construct validity; this assessment technique can differentiate between interns and consultants. Further development of the tool and/or increased sample size is needed to discriminate between Registrar/SHO and international trainees. Senior surgeons and consultants scoring significantly higher in aspects of EOL decision making and palliative communication implies this is a skill that can be assessed using bespoke clinical vignettes simulated following a standard structure.

The participants at nodal point of transition to pre-autonomous practice scoring lower than experienced consultants in the aspects of EOL decision making and palliative care reinforces the findings from our systematic review and survey that these skills are learned over time with experience.

Secondly, it reinforces a discrepancy in the formal surgical training schemes as there is no dedicated training in this aspect.

Finally, our findings from the data analysis show that the developed assessment tool can successfully differentiate high end decision making in a simulated context for summative assessment of EOL decision making.

5.6 Conclusion

Differential performances observed among junior and senior surgeons demonstrates the construct validity of the bespoke clinical scenario as an assessment tool for End-Of-Life decision making and communication about palliative care in surgery.

We believe the developed assessment tool for high stakes decision making is feasible and pragmatic. It is valid and can be useful for summative or formative assessment of EOL decision making in surgeons.

CHAPTER 6

DISCUSSION

End-Of-Life decision making and discussing palliative care is an imperative and inevitable aspect of a surgeon's clinical practice. However, these areas are more stressed upon and studied in the disciplines of Medicine and Intensive care than in general surgery.

Graduate and Post-graduate medical education has evolved substantially over the past decade in terms of training and assessment, with the introduction of new concepts of CBME, EPAs, WBAs and achievable milestones (74-76).

Various definitions of Professionalism and Good Professional Practice have been proposed, and there is a general consensus it encompasses both technical and non-technical skills. Many disciplines have incorporated NTS into their training programs and assessment methods, though the same cannot be said about surgical divisions as yet (7, 13, 72). Looking into domains of good professional practice, ideally, fellowship examinations should be assessing all aspects including both technical and non-technical skills

Our systematic review explored what is known about incorporation of NTS in surgery, and what previous literature tells us about training/assessment in regards to surgical NTS; with a special focus on clinical decision making in EOL scenarios. Non-operative skills, including clinical decision making, are broadly accepted as essential aspects of surgical professionalism. However, literature review shows there is an unequal representation of technical and non-technical domains in assessment, training and feedback, with more emphasis being placed on operative skill (15, 16). After a very thorough systematic review we found that EOL decision making in surgeons has not been studied or identified as a task or

professional activity to be assessed and trained. Surgeons feel that training in this regard would be valuable and beneficial keeping in mind the quality of care provided to patients, as it is a very nuanced skill but part of a surgeon's daily practice(51, 52).

In current surgical practices there are no formative or summative means of assessment for this skill. In some isolated studies decision-making measures have been introduced and tested successfully, for instance the BC/WC scenario for shared decision making. The BC/WC decision making model was found useful by practicing surgeons and endorsed by patients and families. However, incorporation of such measures into formal training schemes and high stakes examinations has not been considered yet.

Surgical training in palliative care and EOL decision making will improve patient's and family experience around dying, by avoiding aggressive surgical intervention near EOL which adversely effects the quality of life. Establishing goals of care is essential since aggressive treatment with a curative approach may result in life states unacceptable to the patient (56, 57). 25% of Medicare beneficiaries have surgery in their last 3 months of life, which may be inconsistent with their preferences. Surgeons highly value quality of life, but this notion is difficult to incorporate in acute surgical decisions (53).

Hence, we believe EOL decision making needs to be recognised as an EPA in surgical training schemes and assessments at nodal point of transition to autonomous practice.

Surgeons in various stages of their career responded to our survey which was informed by the systematic reviews. The survey was aimed at differentiating high end decision making and exploring professional attitudes about palliative care in surgery. We found significant differences in surgeon's responses to the management of frequently encountered acute surgical scenarios. Senior, experienced surgeons scored higher than junior surgeons in the early years of their career in the aspect of critical decision making in EOL situations. By achieving construct-validity we believe that similarly structured multiple-choice questions can be beneficial to assess CDM in EOL scenarios.

Senior surgeons also reported being more comfortable holding conversations about EOL decisions and palliative care than juniors. However, there appeared to be consensus among all surgeons, junior and senior, regarding their opinion of training they have received over their careers in the aspect of palliative care and EOL decision making. The survey results show this critical skill is learned over time through personal experience, role modeling and observation, which is consistent with the findings from the systematic review.

These findings laid the groundwork for development of a simulated assessment station as an assessment tool for EOL decision making in surgery.

Conventional examinations provide assessment of the global performance rather than individual competencies thus making the final feedback less meaningful (77). Objectively structured clinical examinations (OSCE) or simulated assessment stations are multidimensional tools for evaluating training and competencies (77). We aimed at developing a simulated assessment station as a pragmatic assessment tool for EOL decision making in surgeons. Critical decision making in stressful situations is an inevitable aspect of a surgeon's everyday duties but unfortunately previous studies show that surgeons report little to no palliative care training or decision-making aids (49). An inference seconded by our survey findings.

When this assessment tool was piloted at a university teaching hospital, differential performances were observed among junior and senior surgeons. Senior, experienced surgeons were able to identify, in earlier phases of the simulation, an acute situation where palliative care was in the best interest of the patient and scored significantly higher than junior surgeons in the aspects of final decision making. Whereas initial management among them did not differ significantly. General communication skills when marked as a global rater did not show any significant differences among the various job titles (interns/SHOs/registrar/consultants). However, there was a significant difference with regards to

specific communication related to the EOL decision and palliative care, with senior consultants scoring the highest. We studied and tested communication with regards to palliative care and EOL decisions as a separate task for the following reasons. Effective communication with patients and family, providing honest and understandable prognostic information to clearly set expectations and goals of care is extremely important for improving patients and family experience of dying. It is also important for avoiding non-beneficial surgeries and waste of precious resource. (55, 56, 57). Construct validity achieved in this simulated station successfully validated our novel assessment tool for summative assessment of EOL decision making in surgery.

Following validation, a similarly designed assessment station was adopted into the general surgery fellowship exam of UEMS. This constituted the NTS aspect of the formal exam. Candidates appearing in this exam were in the senior years of their training, at a nodal point of transition to autonomous practice. Although all the candidates appearing in this assessment station achieved a passing score, their cumulative score was significantly lower than senior consultant surgeons' scores from the pilot project. These findings draw on our inference from the systematic reviews and survey that surgical training schemes lack emphasis on palliative care and EOL decision-making, with most feedback and assessment being focussed on operative skill.

By achieving construct-validity we believe the complex skill of CDM in EOL scenarios can be assessed in a summative format using simulation techniques. Following successful validation, we also believe the bespoke clinical scenario constructed in our study is a practical and feasible means of summative assessment of EOL decision making and palliative care communication in surgery. Based on the differential performances observed, this assessment technique can differentiate between interns and consultants. Further development of the tool and/or increased sample size is needed to discriminate between Registrar/SHO and international trainees.

CHAPTER 7

CONCLUSION

EOL decision making is a nuanced skill. With no formal training, surgeons are learning this skill through personal experiences, role modelling and observation over a number of years of experience in surgical practice.

For the purpose of comprehensive assessment of surgeons' competency at nodal points of transition to pre-autonomous and autonomous practice, we need to move beyond technical and operative skills, and develop assessment tools for non-technical skills. Incorporation of non-technical skill assessment in not only prospective examinations but also formatively in surgical training schemes will improve the quality of care provided to patients.

Our bespoke clinical scenario has been successfully validated as a summative assessment tool for EOL decision making in surgery. The assessment tool needs further development to finesse its use as a formative assessment of EOL decision making in surgery. Its summative use has been proven, differentiating between consultants and interns. but there is not enough data or studies to conform formative use among the different grades of training.

APPENDIX

8.1 Appendix 1 – Participant Information Leaflet

Study title: Do fellowship examinations really examine clinical decision making? A validation study.

Principal investigator's name: Maria Mahmood

Principal investigator's title: Dr/Research Masters Student, TCD

Telephone number of principal investigator: +353 87 3972350

Consultant/co-investigator's name: Paul Ridgway

Consultant/co-investigator's title: Associate Professor in Surgery, TCD

Data Controller's/joint Controller's Identity: Maria Mahmood and Paul Ridgway

Data Controller's/joint Controller's Details: mahmooma@tcd.ie, ridgwayp@tcd.ie

Data Processor: Royal College of Surgeons in Ireland, Dublin 2

You are being invited to take part in a research study to be carried out at the Royal College of Surgeons in Ireland as part of a research degree affiliated with Trinity College Dublin, The University of Dublin looking at work-place based activities in surgeons. This study has RCSI Research Ethics Committee approval and is covered by insurance policies by RCSI.

Before you decide whether or not you wish to take part, you should read the information provided below carefully. Take time to ask questions – don't feel rushed and don't feel under pressure to make a quick decision. Your participation in this study is completely voluntary.

You should clearly understand the risks and benefits of taking part in this study so that you can make a decision that is right for you. This process is known as 'Informed Consent'.

You can change your mind about taking part in the study any time you like. Even if the study has started, you can still opt out. You don't have to give us a reason. If you do opt out, rest assured it won't affect your prospective examination results or career opportunities.

This research study is taking place to validate the assessment of non-technical skill competency in surgical trainees at the point of transition to fellowship in a simulated environment. As a result of initiatives made in the previous decades, such as the ACGME and EU-working directives, which limit doctors in the amount of hours they can work and receive exposure to learning opportunities, the topic of assessment of competency has been discussed thoroughly.

Simulation has been successful in evaluating technical skill competency through the use of objective markers such as time of completion, error rate, and economy of motion. Similar validated measures for non-technical skill competency are not as established. Recognising that patient safety and quality of care is enhanced with improved communication, collaboration, leadership and management, it is important that the public can be assured that those practicing are rigorously assessed in all aspects of professional practice.

This is an evaluative piece of research with the aim to establish validity of a simulated station which evaluates non-technical domains of professional practice for future use as an enhanced examination.

This research is independent of the formal UEMS examination and will not affect the outcome of the examination process.

Who is organising and funding this study?

This principal investigator of this research is Dr. Maria Mahmood, a researcher in surgery affiliated with Trinity College Dublin, The University of Dublin under the supervision of Professor Paul Ridgway, Associate Professor in Surgery and Chair of Examinations (UEMS). This research has been funded as a quality improvement initiative for the UEMS examination.

Why am I being asked to take part?

You are being asked to take part in this study as participation is aimed at participants at the point of transition to fellowship. The aim of the research is to validate non-technical skill assessment of the examination while also achieving the following objectives:

To validate the assessment of the simulation station for prospective examinations

Why is this study being done?

To assess clinical decision making towards a clinical scenario in surgeons pre-examination using a validated questionnaire

To evaluate simulated clinical decision making towards a clinical scenario in surgeons in simulation examination

To compare self-reported clinical decision making processes and simulated clinical decision making processes amongst participants

To explore real-life application of clinical decision making assessment using a follow-up survey

To compare cultural and context-specific differences amongst participants

How will the study be carried out?

This study will commence in March 2021 in Royal College of Surgeons in Ireland. Participants will be expected to complete a pre-examination questionnaire on Day 2 after completing their formal examinations. Participants will also be expected to complete an in-simulation clinical scenario assessment on Day 2 after completing their pre-examination questionnaire as well as partake in a discussion on the research process and examination. Finally, participants will be asked on a 3-month follow up for their thoughts on the process once again.

What will happen to me if I agree to take part?

By agreeing to take part in this study you will be providing informed consent to three additional activities alongside the formal examination period – the pre-examination questionnaire, the post examination discussion, and the 3-month follow up survey all of which will take place on Day 2 after the fellowship examination is completed. You will also be invited to complete a 3-month follow up survey.

All data will be coded by the Principal Investigator, who works independently of the formal UEMS examination, to protect confidentiality throughout the examination process (i.e. ensuring this will not affect summative examination results) and data analysis (i.e. ensuring protection of your data for research purposes).

What are the benefits?

This research process provides an opportunity to contribute to the development of the UEMS examination process and improve the quality of current assessment methods. This is an area of assessment that has not yet been explored and will benefit future professional practice.

What are the risks?

It is not envisaged that this study will provide any major risks to participants. The research project is run independently from the formal UEMS examination and managed by an independent investigator. The principal investigator will have sole access to ID coding and your individual performance in the study will remain confidential from members of the UEMS examination team. Assessment of performance in the examination process will be conducted by an external independent examiner.

Is the study confidential?

All data relating to participants findings will be encrypted and coded. Personal information that could identify the participant will be removed to protect the confidentiality of the participant. Access to completed assessments will be limited to the Principal Investigator and independent from the examination team to ensure confidentiality of the participants. This information will be kept for 5 years and may be used in further studies within this timeframe. These future studies may involve potential examination development studies that are informed by the research outputs of this research project. Participants will be provided results of their own assessments. The collective research findings as agreed by the established research objectives aim to be presented as part of a research thesis, in a peer-reviewed academic journal and conferences.

Data Protection

Purpose We will be using your information in our research to help us examine assessment of non-technical skills with the aim of validating an assessment station.

Legal basis This is intended for scientific research use only as supported by Article 6 and 9 of the General Data Protection Regulation (2016).

Data recipients Participant's coded information will be limited to the research team, the data controller and data processor, involved in this study.

How long will data be stored The data will be stored for 5 years.

Risks/Implications There are no envisaged risks or implications as the data will be coded and all identifiable factors removed, only the principal investigator will carry the key.

Withdrawing consent This data may be used for future studies in developing the UEMS examination assessment. You have the right to withdraw consent to your data being used in this research project. You will be able to do this by contacting Maria Mahmood at mahmooma@tcd.ie who will have access to the coded participant information.

You have a **right to lodge a complaint** with the Data Protection Commissioner if you are unsatisfied with the management of your personal data within this study.

You have a right to request **access to your data**, as well as a copy of your data.

You have a right to **restrict or object to processing** of your personal data. You have a right to have any inaccurate personal information corrected or deleted.

You have a right to have your personal data deleted, unless the request is impossible or hinders conduct of the research. You have the right to data portability.

Automated processing/ Profiling This data will not be used in any form of profiling in your personal work.

Where can I get further information?

If you need any further information now or at any time in the future please see the 'UEMS Privacy and Data Security Policy' (<https://www.uems.eu/general/privacy-and-data-security-policy>), or contact:

Name: Maria Mahmood, Principal Investigator

Email: mahmooma@tcd.ie

Address: Department of Surgery, Trinity Centre for Health Sciences, Tallaght University Hospital,
Tallaght, Dublin 24.

Thank you for your consideration,

Maria Mahmood, Research Masters Student,

Department of Surgery,

School of Medicine,

Trinity College Dublin, The University of Dublin.

8.2 Appendix 2 – Consent Form

PARTICIPANT CONSENT FORM

Study title: Do fellowship examinations really examine clinical decision making? A validation study

| | | |
|--|-------------------------------------|------------------------------------|
| <i>I have read and understood the Information Leaflet about this research project. The information has been fully explained to me and I have been able to ask questions, all of which have been answered to my satisfaction.</i> | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| <i>I understand that I don't have to take part in this study and that I can opt out at any time. I understand that I don't have to give a reason for opting out and I understand that opting out won't affect my examination outcome or professional career.</i> | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| <i>I am aware of the potential risks, benefits and alternatives of this research study.</i> | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| <i>I have been given a copy of the Information Leaflet and this completed consent form for my records.</i> | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| <i>I consent to take part in this research study having been fully informed of the risks, benefits and alternatives.</i> | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| <i>I give informed explicit consent to have my data processed as part of this research study.</i> | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| <i>I consent to be contacted by researchers as part of this research study.</i> | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

| FUTURE CONTACT | | |
|---|------------------------------|-----------------------------|
| I consent to be re-contacted by researchers about possible future research related to the current study for which I may be eligible. | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

| STORAGE AND FUTURE USE OF INFORMATION | | |
|--|------------------------------|-----------------------------|
| RETENTION OF RESEARCH MATERIAL IN THE FUTURE | | |
| I give permission for material/data to be stored for <u>possible future research related to</u> the current study <u>without further consent being required</u> but only if the research is approved by a Research Ethics Committee within a 5 year period. | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

| |

Participant Name (Block Capitals) | Participant Signature | Date

To be completed by the Principal Investigator or nominee.

I, the undersigned, have taken the time to fully explain to the above participant the nature and purpose of this study in a way that they could understand. I have explained the risks involved as well as the possible benefits. I have invited them to ask questions on any aspect of the study that concerned them.

| | |

-----Name

(Block Capitals) | Qualifications | Signature | Date

Assessment Tool Tallaght University Hospital 10th December 2020

8.3 Appendix 3 – Clinical Scenario

Time allowed: 9 minutes

All communication is verbal with candidates, except when pictures are shown

Standard setting for all

Timing: 10.00-12.30

Examiners: 2

1 station

(Bowel Ischemia, Locally advanced Carcinoma)

You are on call when a 78-year-old woman, Mrs. Niamh Kennedy, arrives in the emergency dept. with severe abdominal pain that started 3 hours ago. She shows the clinical signs of peritonitis and sepsis on examination. Background medical history includes comorbidities of IHD and COPD (not on home oxygen). Bloods have been sent. The pain reported by the patient is disproportionate to clinical findings.

You find a recent echocardiograph on the hospital system with an ejection fraction of 40%.

Phase 1 2 minutes

1a Can you briefly, within a minute and a half, take an abridged history from the patient and talk through your initial management options? **(Participant talks through their management options with examiner)** 1min30sec

1b Following this discussion, with the available information, would you classify your management as...

30sec

Operative, Conservative, Palliative, or Unsure-Need more information?

Phase 2 2minutes

You have managed to locate old hospital notes with the help of your team;

The patient was previously diagnosed with locally advanced pancreatic cancer three months ago. She has received an initial round of chemotherapy. A recent CT Scan from a week ago shows progression of disease with distant mets post-chemo.

2a Briefly (1 minute) can you describe how does this new information influence your management plans and options? **1min**

2b Communicate your management plan with the patient briefly. **1min**

She is being sent for a CT Scan

Phase 3 5minutes

Patient is back from CT, her GCS is 9. CT shows an ischemic gut with patchy ischemia in the distribution of the superior mesenteric artery. A new POSSUM score shows a morbidity and mortality of 80% and 70%.

3a Would you say your management plan now is **operative, conservative or palliative or unsure?** 40sec

3b The patient's son, Patrick Kennedy, arrives in the hospital who has just come back from the United States after a long time. Collateral obtained reports a good baseline function with no issues regarding capacity or ADL assistance.

The patient no longer has capacity to communicate with you.

He urges you to do everything in your power and anything you can. Does this influence your decision?

Communicate with the son your decision. 3min

IF PARTICIPANT IS NOT INCLINED TOWARDS PALLIATION (Additional Prompt)

3b(ii). Consultant anaesthetist reviews the patient and is not agreeing to bring the patient into surgery based on patient's baseline and current condition. You are faced with the task of communicating with the patient's son regarding palliative care and their preferred end of life decisions.

3c What is the framework of your decision making or the thought process you follow to come to a management plan?

PROMPT: What *factors* do you take into consideration before reaching a final decision? 1min20

8.4 Appendix 4 – Survey Questionnaire

Survey Section A

Q. Are you registered to the Irish Surgical Training Scheme or a Consultant Surgeon practicing in Ireland?

Yes

No

Q. Age Group

20-30

31-40

41-50

>50 years

Q. Gender

Male

Female

Non-binary/Third gender

Prefer not to say

Q. How long is it since you first graduated from medical school?

<5 years

6-10 years

11-16 years

17-22 years

>23 years

Q. Which of these most appropriately corresponds to your current job title?

Senior House Officer

Registrar

Specialist Registrar

Consultant

Other (please specify)

Survey Section B – Clinical Vignettes

Q1. An acutely unwell 74-year-old female presented to the emergency department with generalized peritonitis and signs of obstruction. CT Abdomen Pelvis performed after initial management noted to show closed-loop small bowel obstruction. The patient has multiple co-morbidities including severe Chronic Obstructive Pulmonary Disease (COPD), Ischemic Heart Disease (IHD), and Atrial Fibrillation with an ejection fraction of 30%. A risk assessment by P-POSSUM score for the patient's predicted morbidity and mortality is 87% and 79% respectively.

How do you proceed?

IV Fluids and NG (drip and suck)

Exploratory Laparotomy with Small Bowel resection and stoma formation

Exploratory Laparotomy with Small Bowel resection and anastomosis

Discuss with patient and family and ask their wishes, proceed as per patient's wishes

Discuss with patient risks associated with surgical intervention before proceeding to theatre

Convey the life limiting nature of the condition and proceed with palliative / end of life care

Q2. An acutely unwell 89-year-old male patient presents to the emergency department with signs of acute confusion, sepsis, and obstructive jaundice. CT Abdomen and Pelvis performed after initial management noted to show evidence of gastric outlet obstruction, cholangitis, and locally advanced pancreatic neoplasm. The patient has multiple co-morbidities including severe Chronic Obstructive Pulmonary Disease (COPD), long-standing Diabetes, and stage 4 Chronic Kidney Disease. A risk

assessment by P-POSSUM score for the patient's predicted morbidity and mortality is 94% and 88% respectively.

How do you proceed?

Full medical management for Cholangitis and emergency Exploratory Laparotomy with Palliative Gastro-jejunostomy

Full medical management followed by Neo-Adjuvant with Gemcitabine and albumin-bound paclitaxel and subsequent Pancreaticoduodenectomy

Full medical management followed by Neo-Adjuvant with FOLFIRINOX/modified or FOLFIRINOX and subsequent Pancreaticoduodenectomy

Discuss with patient risks associated with surgical intervention and proceed with Palliative Gastro-Jejunostomy

Discuss with patient and family their wishes and proceed per patient's wishes

Q3. Convey the life limiting nature of the condition and proceed with palliative / end of life care

An acutely unwell 64-year-old female patient presented to the emergency department with signs of shock and cachexia. CT abdomen pelvis performed after initial management noted to show evidence of locally advanced cervical neoplasm, extensive peritoneal disease burden, and large bowel obstruction with Pneumatosis Coli. The patient reports having refused chemotherapy due to its side-effect profile and had opted for herbal treatment at the time of diagnosis of cervical neoplasm.

How do you proceed?

Conservative management for Large Bowel Obstruction

Convince the patient for Systemic Chemotherapy

Exploratory Laparotomy with Sub-total colectomy and End Ileostomy

Ask the patient and family their wishes and proceed per patient's wishes

Discuss with the patient risks associated with surgical intervention and proceed to surgery

Proceed with palliation / end of life care

Survey Section C

Q. How many times have you discussed palliative care with a patient's family?

<10 times

10-50 times

>50 times

Q. How many times have you discussed palliative care with a patient?

<10 times

10-50 times

>50 times

Q. Rate your level of comfort while speaking to patients or their families about end-of-life issues.

Very comfortable

Fairly comfortable

Neither comfortable nor uncomfortable

Slightly uncomfortable

Not at all comfortable

Q. Rate how adequate is the training you have received in palliation or communication around end-of-life care decision making during residency?

Extremely adequate

Moderately adequate

Neither adequate nor inadequate

Somewhat inadequate

Extremely inadequate

Q. In an acute, life-limiting clinical scenario, where the family still requests maximum available treatment after learning about poor prognosis, to what extent would you be influenced to modify your decisions regarding life-sustaining therapy?

Usually

About half the time

Seldom

Never

Q. What factors (e.g. patient factors, disease factors, non-clinical factors) influence your decision making in a high-risk situation?

BIBLIOGRAPHY

1. Knowing when not to operate. *BMJ*. 1999;318(7180).
2. Emanuel L, Scandrett KG. Decisions at the end of life: have we come of age? *BMC Medicine*. 2010;8(1):57.
3. Tejwani V, Wu Y, Serrano S, Segura L, Bannon M, Qian Q. Issues surrounding end-of-life decision-making. *Patient Prefer Adherence*. 2013;7:771-5.
4. Raijmakers N. *End of Life Care and Decision Making* 2013.
5. MacRae HM, Cohen R, Regehr G, Reznick R, Burnstein M. A new assessment tool: The patient assessment and management examination. *Surgery*. 1997;122(2):335-44.
6. Epstein RM, Hundert EM. Defining and assessing professional competence. *Jama*. 2002;287(2):226-35.
7. Griffin C, Aydın A, Brunckhorst O, Raison N, Khan MS, Dasgupta P, et al. Non-technical skills: a review of training and evaluation in urology. *World Journal of Urology*. 2020;38(7):1653-61.
8. Djulbegovic B, Elqayam S, Reljic T, Hozo I, Miladinovic B, Tsalatsanis A, et al. How do physicians decide to treat: an empirical evaluation of the threshold model. *BMC Medical Informatics and Decision Making*. 2014;14(1):47.
9. Boyle FM, Allen J, Rey-Conde T, North JB. Learning from regret. *British Journal of Surgery*. 2020;107(4):422-31.
10. Donohoe C. Cutting Edge [Internet]. *BJS: BJS Society*. 2020. Available from: <https://cuttingedgeblog.com/2020/07/09/decision-making-regret-and-the-surgeon/>.
11. D'Costa AG. The Validity of Credentialing Examinations. *Evaluation & the Health Professions*. 1986;9(2):137-69.

12. Roberts N. Reviews : Abbot, A. The system of professions. An essay on the division of expert labor. Chicago and London, University of Chicago Press, 1988. xvi, 435 pp. ISBN 0 226 00068 0. Journal of librarianship. 1989;21(3):212-4.
13. Solymos OA-O, Snyman L, Condon E, Power C, Boland J. Moving beyond the technical skills and promoting professionalism-the experience of the College of Anaesthesiologists of Ireland with incorporating the Medical Council Eight Domains of Good Professional Practice into Entrustable Professional Activities. (1863-4362 (Electronic)).
14. Annual report 2016 The Medical Council of Ireland; 2017 Aug 31, 2017.
15. McIlhenny C, Kurashima Y, Chan C, Hirano S, Domínguez-Rosado I, Stefanidis D. General surgery education across three continents. (1879-1883 (Electronic)).
16. Wijnen-Meijer M, van der Schaaf M, Nillesen K, Harendza S, Ten Cate O. Essential facets of competence that enable trust in medical graduates: a ranking study among physician educators in two countries. Perspect Med Educ. 2013;2(5-6):290-7.
17. Smith BG. The Oxford Encyclopedia Women in World History: Oxford University Press; 2008 2008.
18. Evetts J, Mieg HA, Felt U. Professionalization, scientific expertise, and elitism: A sociological perspective. The Cambridge Handbook of Expertise and Expert Performance. 2006:105-23.
19. Taylor I. Maintaining surgical professionalism. Annals of the Royal College of Surgeons of England. 2011;93(6):423.
20. Cornett BS. A principal calling: professionalism and health care services. Journal of communication disorders. 2006;39(4):301-9.
21. Waddington I. The movement towards the professionalization of medicine. British Medical Journal. 1990;301(6754):688-90.

22. Ireland MC. Eight Domains of Good Professional Practice as devised by Medical Council: Medical Council Ireland; 2010 [Available from: <https://www.medicalcouncil.ie/existing-registrants-/good-professional-practice/>].
23. Jason R. Frank LS, Jonathan Sherbino. Can Meds 2015 Physician Competency Framework Ottawa: Royal College of Physicians and Surgeons of Canada 2015 [Available from: <https://www.royalcollege.ca/rcsite/canmeds/canmeds-framework-e>].
24. Andler C Fau - Daya S, Daya S Fau - Kowalek K, Kowalek K Fau - Boscardin C, Boscardin C Fau - van Schaik SM, van Schaik SM. E-ASSESS: Creating an EPA Assessment Tool for Structured Simulated Emergency Scenarios. (1949-8357 (Electronic)).
25. Kwan J, Crampton R, Mogensen LL, Weaver R, van der Vleuten CPM, Hu WCY. Bridging the gap: a five stage approach for developing specialty-specific entrustable professional activities. BMC Medical Education. 2016;16(1):117.
26. Cho CS, Delgado EM, Barg FK, Posner JC. Resident perspectives on professionalism lack common consensus. (1097-6760 (Electronic)).
27. Touchie C, ten Cate O. The promise, perils, problems and progress of competency-based medical education. (1365-2923 (Electronic)).
28. Valentine N, Wignes J, Benson J, Clota S, Schuwirth LWT. Entrustable professional activities for workplace assessment of general practice trainees. Medical Journal of Australia. 2019;210(8):354-9.
29. Steiman J, Sullivan SA, Scarborough J, Wilke L, Pugh C, Bell RH, et al. Measuring Competence in Surgical Training through Assessment of Surgical Entrustable Professional Activities. (1878-7452 (Electronic)).
30. Aljamal YN, Farley DR. Making EPAs a 59 minute objective measure for surgical trainees - A pilot study. (1879-1883 (Electronic)).

31. Carraccio C, Wolfsthal S, Englander R, Ferentz K, Martin C. Shifting paradigms: From flexner to competencies. *Academic medicine : journal of the Association of American Medical Colleges*. 2002;77:361-7.
32. Brydges R, Hatala R Fau - Zendejas B, Zendejas B Fau - Erwin PJ, Erwin Pj Fau - Cook DA, Cook DA. Linking simulation-based educational assessments and patient-related outcomes: a systematic review and meta-analysis. (1938-808X (Electronic)).
33. Tavares WA-O, Brydges R, Myre P, Prpic J, Turner L, Yelle R, et al. Applying Kane's validity framework to a simulation based assessment of clinical competence. (1573-1677 (Electronic)).
34. Crebbin W, Beasley Sw Fau - Watters DAK, Watters DA. Clinical decision making: how surgeons do it. (1445-2197 (Electronic)).
35. Clarke JR. Decision making in surgical practice. (0364-2313 (Print)).
36. Hughes TM, Dossett LA, Hawley ST, Telem DA. Recognizing Heuristics and Bias in Clinical Decision-making. (1528-1140 (Electronic)).
37. Epstein RM. How doctors think. (0021-9738 (Print)).
38. Geary U, Kennedy U. Clinical decision-making in Emergency Medicine. *Emergencias*. 2010;22:56-60.
39. Al-Azri NH. How to think like an emergency care provider: a conceptual mental model for decision making in emergency care. *International Journal of Emergency Medicine*. 2020;13(1):17.
40. Kozlowski DA-O, Hutchinson M, Hurley J, Rowley J, Sutherland J. The role of emotion in clinical decision making: an integrative literature review. (1472-6920 (Electronic)).
41. Rafati F, Nouhi E, Sabzevari S, Dehghan-Nayeri N. Coping strategies of nursing students for dealing with stress in clinical setting: A qualitative study. (2008-5842 (Print)).
42. Verdon DR. ASCO Keynote: Are your treatment goals what your patients really want? *Medical Economics*2019 [updated June 2, 2019. Available from:

<https://www.medicaleconomics.com/view/asco-keynote-are-your-treatment-goals-what-your-patients-really-want>.

43. Jox RJ, Schaider A Fau - Marckmann G, Marckmann G Fau - Borasio GD, Borasio GD. Medical futility at the end of life: the perspectives of intensive care and palliative care clinicians. (1473-4257 (Electronic)).
44. Kadooka Y, Asai A, Aizawa K, Bito S, editors. Japanese healthcare worker“ attitudes towards administering futile treatments: A preliminary interview-based study2011.
45. Rivera S, Kim D Fau - Garone S, Garone S Fau - Morgenstern L, Morgenstern L Fau - Mohsenifar Z, Mohsenifar Z. Motivating factors in futile clinical interventions. (0012-3692 (Print)).
46. Klaristenfeld DD, Harrington Dt Fau - Miner TJ, Miner TJ. Teaching palliative care and end-of-life issues: a core curriculum for surgical residents. (1068-9265 (Print)).
47. Ballou JH, Brasel KJ. Surgical Palliative Care Education. (1558-3171 (Electronic)).
48. Antes AL, Dineen KK, Bakanas E, Zahrli T, Keune JD, Schuelke MJ, et al. Professional decision-making in medicine: Development of a new measure and preliminary evidence of validity. PLOS ONE. 2020;15(2):e0228450.
49. Bateni SB, Canter RJ, Meyers FJ, Galante JM, Bold RJ. Palliative Care Training and Decision-Making for Patients with Advanced Cancer: A Comparison of Surgeons and Medical Physicians. LID - S0039-6060(18)30078-3 [pii] LID - 10.1016/j.surg.2018.01.021 [doi]. (1532-7361 (Electronic)).
50. Cauley CE, Block SD, Koritsanszky LA, Gass JD, Frydman JL, Nurudeen SM, et al. Surgeons' Perspectives on Avoiding Nonbeneficial Treatments in Seriously Ill Older Patients with Surgical Emergencies: A Qualitative Study. (1557-7740 (Electronic)).
51. Chesney T, Devon K. Training surgical residents to use a framework to promote shared decision-making for patients with poor prognosis experiencing surgical emergencies. Can J Surg. 2018;61(2):114-20.

52. Kruser JM, Taylor LJ, Campbell TC, Zelenski A, Johnson SK, Nabozny MJ, et al. "Best Case/Worst Case": Training Surgeons to Use a Novel Communication Tool for High-Risk Acute Surgical Problems. (1873-6513 (Electronic)).
53. Nabozny MJ, Kruser Jm Fau - Steffens NM, Steffens Nm Fau - Brasel KJ, Brasel Kj Fau - Campbell TC, Campbell Tc Fau - Gaines ME, Gaines Me Fau - Schwarze ML, et al. Constructing High-stakes Surgical Decisions: It's Better to Die Trying. (1528-1140 (Electronic)).
54. Chamberlain C, Blazeby J. A good surgical death. *British Journal of Surgery*. 2019;106.
55. Berlin A. Goals of Care and End of Life in the ICU. (1558-3171 (Electronic)).
56. Lilly CM, De Meo DI Fau - Sonna LA, Sonna La Fau - Haley KJ, Haley Kj Fau - Massaro AF, Massaro Af Fau - Wallace RF, Wallace Rf Fau - Cody S, et al. An intensive communication intervention for the critically ill. (0002-9343 (Print)).
57. Campbell ML, Guzman JA. Impact of a proactive approach to improve end-of-life care in a medical ICU. (0012-3692 (Print)).
58. Bateni SB, Meyers FJ, Bold RJ, Canter RJ. Increased Rates of Prolonged Length of Stay, Readmissions, and Discharge to Care Facilities among Postoperative Patients with Disseminated Malignancy: Implications for Clinical Practice. (1932-6203 (Electronic)).
59. Miner TJ, Brennan Mf Fau - Jaques DP, Jaques DP. A prospective, symptom related, outcomes analysis of 1022 palliative procedures for advanced cancer. (0003-4932 (Print)).
60. Miner TJ, Cohen J Fau - Charpentier K, Charpentier K Fau - McPhillips J, McPhillips J Fau - Marvell L, Marvell L Fau - Cioffi WG, Cioffi WG. The palliative triangle: improved patient selection and outcomes associated with palliative operations. (1538-3644 (Electronic)).
61. Jang TK, Kim DY, Lee SW, Park JY, Suh DS, Kim JH, et al. Trends in treatment during the last stages of life in end-stage gynecologic cancer patients who received active palliative chemotherapy: a comparative analysis of 10-year data in a single institution. (1472-684X (Electronic)).

62. Hurd C, Back A, Gibbon L, Trowbridge A. Deliberate Practice for Entrustable Professional Activities: A Point-of Care Procedural Curriculum for Delivering Serious News and Facilitating Family Conferences in Residency Training (FR482A). *Journal of Pain and Symptom Management*. 2018;55:634.
63. Grothey A. Rational treatment planning for metastatic disease. 2007.
64. Campi R, Mari A, Minervini A, Serni S. L'Essentiel est Invisible pour les Yeux: The Art of Decision-making and The Mission of Patient-centred Care for Patients with Localised Renal Masses. LID - S0302-2838(21)00147-0 [pii] LID - 10.1016/j.eururo.2021.02.027 [doi] FAU - Campi, Riccardo. (1873-7560 (Electronic)).
65. Welch HG, Kramer BS, Black WC. Epidemiologic Signatures in Cancer. *New England Journal of Medicine*. 2019;381(14):1378-86.
66. Catalyst N. What Is Patient-Centered Care? *NEJM Catalyst*. 2017.
67. Walzl N, Jameson J, Kinsella J, Lowe DJ. Ceilings of treatment: a qualitative study in the emergency department. *BMC Emergency Medicine*. 2019;19(1):9.
68. Kompanje EJ. The worst is yet to come. Many elderly patients with chronic terminal illnesses will eventually die in the emergency department. (1432-1238 (Electronic)).
69. Olsen JC, Bueneffe MI Fau - Falco WD, Falco WD. Death in the emergency department. (0196-0644 (Print)).
70. Doherty E, O'Keeffe D Fau - Traynor O, Traynor O. Developing a human factors and patient safety programme at the Royal College of Surgeons in Ireland. (1479-666X (Print)).
71. Young-Xu Y, Neily J, Mills PD, Carney BT, West P, Berger DH, et al. Association Between Implementation of a Medical Team Training Program and Surgical Morbidity. *Archives of Surgery*. 2011;146(12):1368-73.

72. O’Keeffe DA, Losty M, Traynor O, Doherty EM. Objective assessment of surgical trainees’ non-technical skills: Improved performance following a two-year program of instruction. *The American Journal of Surgery*. 2020;220(6):1566-71.
73. Chipman JG, Beilman GJ, Schmitz CC, Schmitz Cc, Seatter SC, Seatter SC. Development and pilot testing of an OSCE for difficult conversations in surgical intensive care. (1931-7204 (Print)).
74. Shah N, Desai C, Jorwekar G, Badyal D, Singh T. Competency-based medical education: An overview and application in pharmacology. (1998-3751 (Electronic)).
75. Weller JM, Naik VN, San Diego RJ. Systematic review and narrative synthesis of competency-based medical education in anaesthesia. *British Journal of Anaesthesia*. 2020;124(6):748-60.
76. Gofton W, Dudek, N., Barton, G., Bhanji, F. *Workplace-Based Assessment Implementation Guide: Formative tips for medical teaching practice*. Ottawa: The Royal College of Physicians and Surgeons of Canada: Royal College of Physicians and Surgeons; 2017 [1st ed:]; Available from: <http://www.royalcollege.ca/rcsite/documents/cbd/wba-implementation-guide-tips-medical-teaching-practice-e.pdf>.
77. Muthusami A, Mohsina S, Sureshkumar S, Anandhi A, Elamurugan TP, Srinivasan K, et al. Efficacy and Feasibility of Objective Structured Clinical Examination in the Internal Assessment for Surgery Postgraduates. (1878-7452 (Electronic)).

