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Sustainability in critical care practice: a grounded theory study

ABSTRACT

Background: Sustaining high-quality, critical care practice is challenging because of current limits to financial, environmental and social resources. The National Health Service in England intends to be more sustainable, although there is minimal research into what sustainability means to people working in critical care and a theoretical framework is lacking which explains the social processes influencing sustainability in critical care.

Aim: This study aimed to explain the concept of sustainability from the perspective of practitioners caring for critically ill patients.

Design: The qualitative research followed a Charmazian constructivist grounded theory approach, including concurrent data collection and interpretation through constant comparison analysis.

Methods: In-depth, interviews were conducted online or by telephone with 11 healthcare professionals working in critical care in the South of England (8 nurses, 2 physiotherapists and 1 technician). Schatzman's dimensional analysis and Straussian grounded theory techniques supplemented the data analysis.

Findings: Sustainability was defined as maintaining financial, environmental and social resources throughout the micro, meso and macro systems of critical care practice. The most pertinent social process enabling sustainability of critical care was satisficing (satisfaction of achieving a goal of quality care while sufficing within the limits of available resources). Increased satisficing enabled practitioners to fulfil their sense of normative, responsible, sustainable and flourishing practice. Satisficing was bounded by the cognitive and environmental influences on decisions, and an ethical imperative to ensure resources were used wisely through stewarding.

Conclusion: An explanation of the concept of sustainability and significant social processes, in relation to critical care, are presented in a theoretical framework, with implications for how financial, environmental and social resources for critical care practice can be maintained.

Relevance to clinical practice: This theory offers clinicians, managers, educators and researchers a definition of sustainability in critical care practice and provides a structured approach to addressing critical care sustainability issues.

Keywords: sustainability, critical care, satisficing, stewarding, bounded rationality

1 INTRODUCTION AND BACKGROUND

Critical care is a necessary but resource-intensive service with ongoing debate about how long current models of practice can last. Questions about the sustainability of critical care comes from the increased demand for more resources to care for critically ill patients due to new technologies and an ageing population with complex co-morbidities [1]. Additionally, all types of healthcare services at present are experiencing strain on resource supply from staffing shortages, economic austerity and imminent ecological crises [2]. The National Health Service (NHS) in England, through its Sustainable Development Unit (SDU), has a sustainability strategy to address these concerns about how to effectively maintain financially, environmentally and socially sustainable healthcare practice [3]. The SDU's strategy is based upon their vision to decrease healthcare's carbon emissions, safeguard natural resources and endorse healthy lifestyles and environments. There are also several other organisations in England, and internationally, promoting healthcare to become more ethically sound, environmentally responsible and financially feasible to last into the future. Examples of such organisations promoting the sustainable use of resources include the Centre for Sustainable Healthcare [4], Health Care Without Harm [5], BMA Medical Fair and Ethical Trade Group [6], Practice Greenhealth [7], and the Canadian Coalition of Green Healthcare [8].

Sustainability issues in critical care are mainly recognised in the literature as related to workforce supply and demand imbalances with financial implications [9-11]. There are some research-based [12, 13] and general publications [14-16] about the environmental impact of resource use in critical care, such as issues related to energy consumption, waste disposal and the overall carbon footprint of clinical practice. However, there is a shortage of research that explains what the concept of sustainability means to people working in critical care and how that impacts on their practice. There is also a lack of an established theoretical framework about the social processes which facilitate and hinder sustainability within the context of caring for critically ill patients.

2 AIM

This research intended to build a substantive theory which could address how sustainability was constructed by practitioners working in critical care and to explain the social processes involved in making sustainability a component of critical care practice.

3 DESIGN AND METHODS

This qualitative study used an exploratory, constructivist grounded theory research design [17].

3.1 Data collection

Semi-structured, in-depth interviews took place with 11 people (8 nurses, 2 physiotherapists and 1 technician) who have worked in adult critical care practice in National Health Service hospitals in the South of England. The following list provides further contextual background information to identify each participant's current role, as well as the type of practice and amount of experience working in critical care:

- Participant 1 (P01) – Outreach nurse, 11 years general critical care.

- Participant 2 (P02) – Practice educator nurse, 13 years general critical care.
- Participant 3 (P03) – Technologist, 21 years general critical care.
- Participant 4 (P04) – Practice educator nurse, 25 years general critical care.
- Participant 5 (P05) – Physiotherapist, 15 years general critical care.
- Participant 6 (P06) – Physiotherapist, 11 years general critical care.
- Participant 7 (P07) – Lecturer nurse, 28 years general and cardiac critical care.
- Participant 8 (P08) – Specialist nurse, 7 years general and ECMO critical care.
- Participant 9 (P09) – Agency nurse, 20 years general critical care.
- Participant 10 (P10) – Practice educator nurse, 26 years general critical care.
- Participant 11 (P11) – Senior sister nurse Interview 1, Matron Interview 2, 24 years general critical care.

Purposive sampling began by recruiting participants through the social media sites of the British Association of Critical Care Nurses (BACCN) and snowball sampling. Theoretical sampling followed as directed by analytical findings within the data. The inclusion criteria included people working in or linked to critical care practice in some way. As a University employee teaching a post-registration intensive care course, the primary researcher (H.B.) so excluded recruiting clinicians who were her own students into the sample.

Each participant had an extensive, one-hour first interview through an online video call or telephone call. The agenda in Supporting information, acted as a flexible guide, rather than a rigid programme because the interviews were semi-structured (each participant did not get asked all of the questions necessarily, but the discussion directed the use of additional explanatory probes to clarify or expand on the individual responses). A shorter, follow-up interview with 7 out of the 11 participants used focused questioning to explore the recognisability, resonance and fit of the proposed theory to their own experience.

3.2 Data analysis

Constructivist grounded theory data collection and analysis procedures occurred concurrently and iteratively until the point of theoretical sufficiency [17]. Dimensional analysis [18] and the conditional/consequential matrix and storyline from Straussian grounded theory [19] complemented the analytical processes. H.B. interviewed the participants, transcribed the audio-recorded interviews and completed the data analysis, with supervisory support and contributions from J.R., J.S., and C.H. Trustworthiness and rigour came from keeping an audit trail, using reflexivity within a

research journal, memoing throughout the research process and member checking. Specifically for this study, member checking included: 1) exploratory probes and paraphrasing during the interviews to confirm what the participant meant and expand on examples; 2) sending the full interview transcripts back to the participants to provide the opportunity for clarification and further comments by email; and 3) follow-up interviews to 'audition' the draft theory. All of the 7 participants who replied for this second interview felt that both the definition of sustainability in critical care practice and the explanation about the influencing social processes proposed within the theory were recognisable, relevant and applicable to their previous experiences. Therefore, analysis of the data and memos from the follow-up interviews helped to establish theoretical sufficiency by providing additional support for how the theory related to the participants' clinical practice.

3.3 Ethical and research approval

The Research Ethics and Governance Committee of the host University provided ethical approval to conduct the study (Approved Manuscript Reference REGC-15-006.R1). The BACCN National Board authorised the recruitment information to be advertised on the BACCN social media sites. Participants provided written informed consent, which was refreshed verbally before beginning the interviews. The PhD thesis by H.B. [20] contains further details about the research methodology and methods, including a comprehensive explanation of the rationales, strengths and limitations for primarily following a constructivist grounded theory approach while blending in elements of dimensional analysis [18] and Straussian grounded theory [19]. The PhD thesis [20] also includes the participant information sheet, consent form, additional raw interview data and examples of memos.

4 FINDINGS

4.1 Meaning of sustainability in critical care practice

The participants defined sustainability in critical care as the ability to maintain the required resources for critical care practice into the future. All participants discussed financial resources as an integral aspect of sustainability because of current

pressures on fiscal budgets and concerns about the affordability of the current healthcare model. A Trust is a hospital organisation within the National Health Service in England, which meant the participants of this study were referring to their hospital employer when they indicated a Trust.

> *The Trust wants to balance the books financially, and critical care seems like a bottomless pit of spending...yet they don't address the reasons why we overspend, and that's often because it's a knock-on effect of the rest of the Trust. (P10)*

Many of the participants related sustainability to their concerns about the carbon footprint and ecological damage caused by critical care practice, particularly with their perception of the misuse of infection prevention actions and because of their inability to reduce or recycle physical waste products.

> *Sustainability is having an environmental and social responsibility to reduce our footprint environmentally, whether it's from emissions or waste management, and looking at how we can take greater care of the resources we've got in the world. (P04)*

Social resources were discussed by some participants, including using volunteers as a 'people' resource in addition to staff members providing care. Another aspect of 'people' as a resource was the social well-being of the entire critical care team, which requires fulfilled, motivated, resilient practitioners who can adapt to change, cope in practice and recover from the stress of working in a highly pressured work setting.

> *You can become easily disillusioned* [depending on] *how much you feel you're valued. If your perception is that the Unit might close or change, it undermines the value of the work you're doing now and all the effort and hard work you put in. If the Trust* [as the employer] *don't recognise it, it's difficult to keep yourself motivated and proactive. (P06)*

A further component of social sustainability was sufficient resourcing to foster the psychosocial well-being of patients and their families for a well-rounded, holistic approach to critical care practice.

Generally, the participants viewed sustainability as a desirable, positive goal achieved by sustaining into the future the different types of financial, environmental and social resources needed for critical care practice including:

- **Physical resources** – energy (light, heat, electrical power), water, hospital building, transport.
- **Clinical supplies** – equipment, critical care therapy items, storage space.
- **Finances** – money to support commissioned critical care services.
- **People** – patients and families, critical care team (physical well-being and emotional labour of staff), volunteers.
- **Time** – time of critical care team to plan and deliver care for patients and families, time for proactive sustainability initiatives.
- **Knowledge** – technical and non-technical knowledge of critical care and sustainability, education, informed practice drawing from different kinds of knowledge (research-based, intuitive, experiential and learned through peers).

How these different types of resources for critical care got used had a knock-on effect within and between the micro, meso and macro systems of critical care practice:

- **Micro systems** – patient, bed-space and critical care unit.
- **Meso systems** – hospital, Trust (collection of hospitals within one organisation), critical care network.
- **Macro systems** – National Health Service, society, ecosphere.

An example of the knock-on effect of resource use was how bed shortages on the hospital wards delayed discharges out of critical care, which then reduced the capacity to admit new Level 2 and 3 patients to critical care. In England, Level 0 and 1 adult patients are cared for on a ward, Level 2 is high-dependency care, Level 3 is intensive care and critical care is an umbrella term for both Level 2 and 3.

> *The health service will not be able to sustain the financial cost of having level 0 and level 1 patients in ICU* [intensive care unit]*. It is a daily battle to transfer these patients to suitable wards so that the precious ICU resources – financial, staffing, clinical supplies – are not spent on patients who no longer need that level of care, and the beds are available for the level 2 and 3 pts who need admitting* [to critical care]*. (P10)*

Furthermore, the interconnectivity of systems and the ripple effect from how resources are used demonstrated the potential for co-benefits from improving the financial, environmental and social aspects of care.

> *Maintaining sustainability will improve the environment and will also be part of the efforts for saving money. (P08)*

In summary, sustainability in critical care practice was defined by the participants as maintaining financial, environmental and social resources across the micro, meso and macro systems of critical care practice where a balance between resource supply and demand does not impede on pending resource availability.

4.2 Using resources sustainably in critical care practice

The participants' main concern was that the present model for resource use in their critical care units is not economically, ecologically or socially sustainable for the future. Therefore, sustainability was intrinsically linked to decision-making processes about if and how to use resources while caring for critically ill patients.

> *The guidelines coming in with recommendations for certain levels of quality of care, along with reduced amounts of staff and cash available, don't match. It will be interesting to see where it goes in terms of sustainability, where that critical line is of not being sustainable at certain points and certain levels of service. (P06)*

Decision-making in critical care for this study included goal-setting where quality care represented the minimum threshold for the aims of clinical investigations and interventions. The participants indicated that the threshold for what defines and constitutes quality care needs to be mutually agreed by the multi-disciplinary healthcare team, patient and family through effective communication and teamwork. For instance, this participant discussed how sustainability was impeded from the lack of a collective, shared understanding of how to achieve quality critical care:

> *The* [critical care] *service is under incredible strain, society is under a lot of angry tension. There's so much background noise, people can't concentrate and ask what is it we want and how are we going to achieve it. How are we all going to come together with a common vision to all see the same thing? (P02)*

External financial constraints and barriers to patient centred care were described as also affecting the participants' decision-making related to resource use. Hospital

targets, clinical guidelines, protocols and checklists influenced the objectives within their clinical goals. Positive aspects of this type of protocolised, standardised approach to care included consistency for all patients and the promotion of evidence-based practice. However, infection prevention policy and routine investigations that were not necessarily appropriate were examples of externally set standardised approaches to care, which the participants felt led to large amounts of avoidable physical waste and inefficient use of financial and environmental resources.

> *During a busy shift or when working in an isolation room, we stock up on materials not necessarily required for the patient, but just-in-case we need it. Also, we are wasting time, resources and money by ordering unnecessary tests by junior staff due to lack of experience or poor communication among colleagues. (P08)*

Another process which both hindered and enhanced sustainability was coded by the researcher as buffering during data analysis whereby the 'good enough' level for a goal's aspiration criteria needed to be more than 'just safe'. For the participants, buffering represented having sufficient resources to address the entirety of a patient's physiological, mental and social wellbeing, as well as for unexpected patient deterioration and new admissions. Sustaining a more meaningful level of quality also came from having adequate resources for a buffering 'shock absorber' to holistically fulfil the goals of patients, family and staff.

> *It's not just staff being satisfied but also the satisfaction of the patient.* [Patients] *know if you are 'just' doing your job or if you're doing extra, which is not quantifiable, but they will know. That for me is like a shock absorber that helps* [critical care practice] *feel sustainable. If all you're doing is what is safe, it chips away at people's resilience because it's constantly uncomfortable. (P02)*

The negative side to buffering was the excessive use of resources from 'just-in-case' decision-making if and when inappropriate risk aversion led to unnecessary interventions with economic and ecological costly resource implications.

> *It's the intervening that you don't always need. If you've got more senior people on duty, they're more confident at not having to open a CPAP circuit or things like putting somebody on dialysis. I'm not saying people don't need haemofiltration. But* [we need] *time and headspace to do it without making a mistake and thinking it's the middle of the night and I'm really tired, stressed and I'm going to have to get rid of that whole circuit and start again. (P01)*

Participants indicated that sustainability comes from adequately reaching a goal's aspiration threshold for decisions about resource use in critical care which 'satisfies' the people involved, but also 'suffices' within the minimum amount of financial, environmental and social resources needed to achieve the goal. Consequently, satisficing emerged as a central concept and was regarded as a social process because of the human interaction between staff, patients and families throughout decision-making about resource use in the micro, meso and macro systems of critical care practice. Theoretical sampling of relevant literature enabled the researcher to draw from extant definitions and theories about Simonian satisficing [21-23], neo-satisficing [24] and costly deliberation [25] to clarify and explain the data generated from this study. Hoveskog et al.'s [26] satisficing and sustainability continuum was also used to articulate how full sustainability comes from achieving normative, responsible, sustainable and flourishing stages, as depicted in Table 1. The theoretical sampling of all this pre-existing literature occurred during the final stages of constant comparison analysis to ensure the theory was grounded in the data and authentically emerged from the participants.

4.3 Influencing factors on resource decisions in critical care practice

The concept of bounded rationality emerged as another important process related to sustainability in critical care practice, which explained 'how' satisficing occurred. Bounded rationality was defined by Simon [27] as the way in which a decision maker's cognition and environment impacts on the aspiration threshold goal for the decision and the actions selected to achieve this aim. The key influences on decision-making in critical care, as identified within the interview data of this research, included:

- Social norms, culture, values and beliefs.
- Technical and non-technical knowledge and skills.
- Previous experience of the practitioner and colleagues.
- Resource availability.
- Uncertainty and high risk while caring for critically ill patients.
- Standardised approaches to practice (e.g. protocols, guidelines, care bundles and policies).

4.4 Responsibility to use critical care resources appropriately

In this study, the concept of stewarding represented a practitioner's ethical sense of duty to use resources responsibly. Stewarding explained 'why' satisficing occurred across the spectrum of responsible resource use, including the production, procurement and consumption of critical care supplies, along with waste management and disposal. Stewardship within the resource cycle of critical care practice, with an ultimate aim to reduce waste and use resources responsibly, thereby enabled sustainability.

4.5 Theory of sustainability in critical care practice

The theoretical framework of Fig. 1 summarises this research study's data and presents satisficing as the central social process facilitating sustainability in critical care practice, with bounded rationality and stewarding influencing the context and conditions impacting upon decision-making about resource use in critical care.

5 DISCUSSION

The tri-dimensional (financial, environmental and social) aspects of this study's findings reflected core principles in the sustainable development definition from the United Nations *Brundtland Report,* also known as *Our Common Future* [28], and Elkington's triple-bottom-line of business [29]. Similarly, other definitions of sustainable healthcare as a whole included overlapping economic, ecological and social dimensions, which recognised the interplay and co-influence of these three domains on each other [30].

The findings from this study, therefore, resonated with established sustainable development and general sustainable healthcare literature, but also generated a new theory based on the contextual factors for sustainability which are specific to caring for critically ill patients. For instance, practitioners in critical care routinely make decisions about if, when and how to use resources for life-threatening clinical situations. Decision-making then involves additional, unique, time-limited pressures and ethical responsibilities because of the impact these resource decisions have on maintaining the life of the critically ill patient. Furthermore, clinical decision-making

in critical care encompasses extensive investigations and therapies to address severe multi-organ failure for an individual patient. If there were unlimited amounts of money and minimal environmental or social impact from treating complex conditions such as sepsis, acute respiratory distress syndrome, poly-trauma and shock, then sustainability would not be an issue. The interview data highlighted concerns practitioners have about sustaining quality critical care within the resource-intensive context of critical care practice though, alongside the current limits of reduced financial, environmental and social resources.

The emphasis on maintaining quality within this study's theory also related to the SusQI framework by Mortimer et al. [31, 32] which enhanced previous definitions of quality healthcare by adding sustainability to the traditional domains of efficiency, timeliness, safety, patient experience, equity and effectiveness and thus embedded sustainability into a quality improvement model. Sustainability and quality improvement initiatives have been linked together in further literature about sustaining NHS healthcare practice [33, 34]. That intrinsic connection between sustainability and improving quality healthcare from a broad perspective was then consistent with the theory generated from this research that specifically focused on critical care practice.

Other literature portrayed a negative view of satisficing as a clinical reasoning heuristic. For example, inappropriate satisficing can lead a practitioner to rush into a wrong decision choice by not considering a fuller range of options, which subsequently causes clinical mistakes and requires further resources to address the error [35]. Nevertheless, the literature [36] also recognised that cognitive de-biasing reduces the risk of diagnostic and therapeutic mistakes while satisficing by relying less on Type 1 thinking (subconscious, fast and emotive) in favour of Type 2 thinking (slower, logical, purposeful and analytical) [37]. Similarly, the participants from this research discussed how meta-cognitive strategies promoted sustainability, including mindfulness, reflection, reflexivity and 'seeing the bigger picture', as seen in the flourishing critical care practice row of Table 1. Furthermore, these types of concepts in the data about taking time for purposeful and responsible decision-making related to the *Getting It Right First Time* (GIRFT) national quality improvement programme [38] and other 'slow healthcare' literature, which promote taking extra time for

thoughtful, reflective practice [39]. Through focusing on satisficing to prevent both overusing and underusing resources in critical care, the theory from this study also added another example to the literature-base of the importance of the Goldilocks principle that advocates for clinical practice which is 'not too much, not too little, but just right' as a means of sustaining quality healthcare practice [40].

6 LIMITATIONS

The research study was limited by its relatively small sample localised to the South of England, but an initial level of theoretical sufficiency was reached to present the theory summarised in Fig. 1. Follow-up research is planned to assess the impact on resource use when the theory is applied to clinical critical care practice in a variety of settings within and outside England.

7 IMPLICATIONS AND RECOMMENDATIONS FOR PRACTICE

The substantive theory from this research study about sustainability in critical care encourages practitioners to satisfice within their daily clinical practice by mutually agreeing with service users and the multi-disciplinary team what quality care is for an individual critically ill patient and being satisfied that the aspired goal is reached within the limits of financial, environmental and social resources. Routine, standardised or protocolised care that is of little value for a particular clinical situation should be avoided to prevent inappropriate use of resources. The principles of satisficing, bounded rationality and stewarding can be integrated into the content of critical care educational programmes to promote sustainability. Managers could also use the theory generated from this research to plan how their critical care unit can maintain the attributes across the 4 stages identified in Table 1.

Additional research about sustainability in critical care is recommended, including studies about strategic top-down approaches, grass-roots champions and maintaining sustainability through time. Stewardship throughout the entire life span of critical care clinical supplies warrants researching, including how production,

procurement and waste management can be more environmentally, ethically and financially responsible. Finally, sustainability metrics are needed for critical care units to measure against, including specific indicators, benchmarks and indexes for the financial, environmental and social aspects of normative, responsible, sustainable and flourishing clinical practice.

8 CONCLUSION

The theory developed from this research study proposes a definition of sustainability in critical care practice and offers a structured framework for the processes which can potentially enable critical care services to be maintained into the future, without putting economic, ecological and social resources at risk. Theoretical sufficiency could be strengthened even more with additional applications of the theory across national and international settings. Further development of the theory could then increase the wider critical care community's understanding of the concept of sustainability, satisficing, bounded rationality and stewarding. Therefore, expanded use of the theory holds promise to foster high-quality, responsible, sustainable and flourishing care for a wider range of critically ill patients and their families, delivered by practitioners with healthy staff wellbeing and full job satisfaction.

What is known about the topic:

- Critical care is a particularly resource-intensive service.
- Sustainability within the context of critical care had previously not been fully defined in the literature, nor was there a theoretical framework to explain the social processes enabling and hindering sustainability in critical care practice.

What this paper adds:

- Practitioners in critical care consider sustainability to be about maintaining financial, environmental and social resources for practice, which are inter-connected across critical care's micro, meso and macro systems.
- Critical care achieves full sustainability through normative, responsible, sustainable and flourishing practice from increased satisficing (when there

is the satisfaction that a goal of quality care is achieved while sufficing within the limits of available resources).

- Decision-making in critical care, including satisficing, is bounded by cognitive and environmental influences and the process of stewarding explains the ethical sense of responsibility to use critical care resources sustainably.

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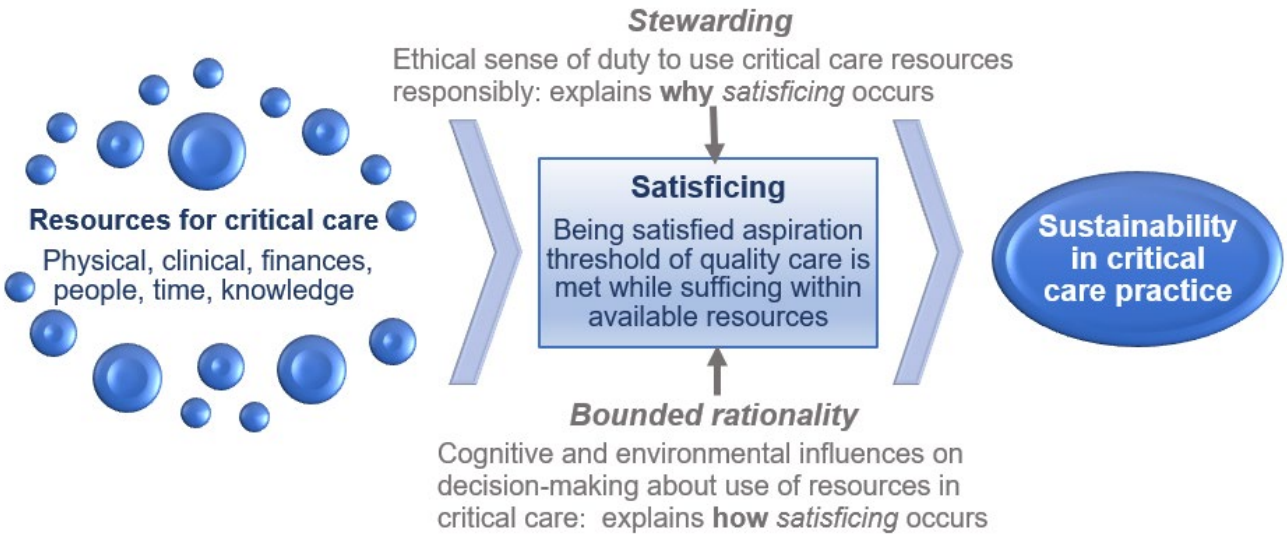
Table 1 Satisficing and sustainability continuum in critical care practice

Satisficing within decision-making about how financial, social and environmental resources are used in critical care practice	
Type of critical care practice	Each row is achieved before the next, with these 4 stages representing a continuum of increased satisficing leading to enhanced sustainability. The continuum's structure comes from Hoveskog et al. (25) which provided the conceptual language to explain this study's data.
1. Normative	**Do well** Safe, effective, patient centred and timely care which meets the physiological, psychological and social needs of critical care patients and their families.
2. Responsible	**Do well *while* doing less harm** Efficient critical care with minimal negative impact on future use of financial, environmental and social resources; equitable care which meets the service demand; goal-concordant care which respects the patient's wish for receiving, limiting or withdrawing investigations and therapeutic treatments.
3. Sustainable	**Do well *and* do (some) good** Audit, research and education are undertaken; holistic well-being of critical care patients and families are supported throughout entirety of acute, recovery and rehabilitation stages; resource reserves are available for uncertainties with current patients and the potential increase in future service demand.
4. Flourishing	**Do good *to* do well – full sustainability** Durability, resiliency and agility are used appropriately; meta-cognitive strategies are used during decision-making including mindfulness, reflection, reflexivity and seeing the big picture; holistically fulfilled practitioners with maximal job satisfaction.

Fig. 1 Sustainability in critical care practice



Supporting Information –Semi-structured agenda for initial interview

Deconstructing sustainability

What drew you to volunteer for this study?

Is sustainability an area of interest for you? If yes: In what way? What aspects of sustainability are of particular interest? How did you become interested? When did you become interested? What or who influenced you in becoming interested? If no: Is sustainability a term you've heard before – where, when, how?

When you hear the word sustainability, what comes to mind for you? How did you come to view the word sustainability in this way? How does _____ relate to critical care practice?

Is sustainability a topic that is discussed on your critical care unit? If yes: How? When? By who? What would typically prompt a discussion about sustainability? If no: Can you suggest a reason for sustainability not being discussed?

When, if at all, did you first notice sustainability issues with critical care practice? If so: How did you happen to_____? Who, if anyone, influenced_____? Tell me about how_____ influenced you.

Sustainability in practice

Please tell me about your last clinical shift in a critical care unit - were you aware of any sustainability issues during that shift?

If no: Can you identify any sustainability issues now that you did not notice while working that day? If so: How did these issues affect your clinical practice?

If yes: What were these issues? How did these issues affect your clinical practice? When did you first notice these issues? Are these issues being addressed by anyone in your critical care unit? If so: How? By who? If not: How do you think these issues could be addressed?

For you, what are the most important lessons you learned through experiencing _____.

As you look back on _____, are there any other events that stand out in your mind? Could you describe __*(each one)*___ it? How did this event affect what happened? How did you respond to ___*(the event; the resulting situations)*___?

What helps you to manage___*(noted issue)*___? What problems might you encounter while you manage this? Could you tell me the sources of these problems?

Who has been most helpful for you in relation to_____? How has he/she been helpful?

Has any organisation been helpful in relation to _____? What did _____ help you with? How has it been helpful? I've read in the literature the term sustainability has been linked to being able to stay within the limits of available resources. How do you think this relates to your critical care practice?

Embedding responses back to participants

What do you think are the most important ways for people working in critical care to practice sustainably? How did you discover this?

How has your experience as a _____ affected how you think about sustainability?

Could you tell me about how your views *(or actions)* on sustainability may have changed since you have _____?

What advice about sustainability would you give to other people working in critical care?

Is there anything that you might not have thought about before that occurred to you during this interview?

Is there something else you think I should know to understand sustainability better?