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Michalsen, Andrej; Long, Ann C; DeKeyser Ganz, Freda; White, Douglas B; Jensen, Hanne I; Metaxa, Victoria; Hartog, Christiane S; Latour, Jos M; Truog, Robert D; Kesecioglu, Jozef; Mahn, Anna R; Curtis, J Randall

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Inter-professional shared decision-making in intensive care units: a systematic review and recommendations from an expert panel

Running title: Interprofessional shared decision-making

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ABSTRACT

OBJECTIVE: There is growing recognition that high-quality care for patients and families in the intensive care unit (ICU) requires exemplary inter-professional collaboration and communication. One important aspect is how the ICU team makes complex decisions. However, no recommendations have been published on inter-professional shared decision-making (IP-SDM). The aim of this project is to use systematic review and normative analysis by experts to examine existing evidence regarding IP-SDM, describe its principles and provide ICU clinicians with recommendations regarding its implementation.

DATA SOURCES: We conducted a systematic review using MEDLINE, Cumulative Index to Nursing and Allied Health Literature, and Cochrane databases and used normative analyses to formulate recommendations regarding IP-SDM.

STUDY SELECTION: Three authors screened titles and abstracts in duplicate.

DATA SYNTHESIS: Four papers assessing the effect of IP-SDM on quality of care were identified, suggesting that IP-SDM is associated with improved processes and outcomes. Five recommendations, largely based on expert opinion, were developed: 1) IP-SDM is a collaborative process amongst clinicians that allows for shared decisions regarding important treatment questions; 2) clinicians should consider engaging in IP-SDM to promote the most appropriate and balanced decisions; 3) clinicians and hospitals should implement strategies to foster an ICU climate oriented towards IP-SDM; 4) clinicians implementing IP-SDM should consider incorporating a structured approach; and 5) further studies are needed to evaluate and improve the quality of IP-SDM in ICUs.

CONCLUSIONS: Clinicians should consider an IP-SDM model that allows for the exchange of information, deliberation and joint attainment of important treatment decisions.

INTRODUCTION

In many parts of the world, physicians, nurses, and other healthcare professionals working in intensive care units (ICU), hereafter referred to as the ICU team, often treat patients autonomously and coordinate the input of other disciplines involved. With increasing independence, ICU teams have also become a prime source of information, guidance, and care for patients and their families. However, there are several important challenges to high-quality patient- and family-centered care in the ICU. First, despite significant advances in ICU care, approximately 15-30% of patients in ICUs die, often after complex decisions that further life-sustaining treatments are not indicated or not appropriate.(1-4) Second, improved ICU treatments result in more patients surviving with reduced quality of life. This entails tradeoffs for patients, families, and ICU teams that need to be addressed.(5,6) Third, healthcare expenditures for ICU care have risen dramatically, largely due to technological advancements and ageing populations(7,8) Finally, the humane and interpersonal aspects of care have not kept pace with technological advances.(9,10)

In the context of these challenges, a well-functioning ICU team that incorporates communication, collaboration, and shared decision-making is important for high-quality care. Unfortunately, successful teamwork in ICUs is often hampered by discord concerning prognostication, disagreement about indication for treatments, insufficient knowledge of patients' goals of care, and a lack of adequate communication, collaboration, and decision-making among team members. These deficiencies result in team conflicts, moral distress, burnout, poor patient care, and poor family support.(11-27) These deficiencies can be addressed through inter-professional communication and collaboration. Therefore, we developed this systematic review of existing empirical research, coupled with normative analyses by experts, to develop recommendations for inter-professional shared decision-making (IP-SDM) regarding important clinical decisions within the inter-professional ICU team.

METHODS

This is a project of the Section on Ethics of the European Society of Intensive Care Medicine (ESICM) which relies on a systematic review and normative analyses by experts to identify features of high quality inter-professional communication and collaboration. The panel included ICU physicians and nurses as well as bioethicists. The panel conducted a systematic review of medical, nursing, critical care and bioethical journals.

Clinical question and outcomes

The population-intervention-comparison-outcome (PICO) question, developed prior to the systematic review, was: "Should inter-professional shared decision-making versus no inter-professional shared decision-making be used in the care of critically ill patients?" The population is critically ill patients, the intervention is use of IP-SDM and the comparison is the absence of IP-SDM. Patient and family-centered outcomes included: satisfaction with care, quality of communication, quality of dying and psychological symptoms. Clinician-centered outcomes included: inter-professional collaboration, inter-professional satisfaction with decision-making, moral distress, burnout, job satisfaction, and intent to leave.

Evidence review and evaluation

We developed search strategies using medical subject heading keywords and text words and used these to search MEDLINE, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Cochrane databases for relevant literature. The search strategies (developed by

ACL) included terms related to decision-making, interprofessional, collaboration, and intensive care (see supplement).

We used the following exclusion criteria: 1) no specific focus on IP-SDM in the ICU; 2) focus on patients <18 years of age; 3) non-English language; and 4) use of qualitative methods only. The decision to exclude qualitative literature was made *a priori*, based on our goal to identify quantitative data to address the PICO question; qualitative papers were included in the normative analyses. We included articles from 1975 to October 2017.

All abstracts were screened by two of three authors; when decisions to include were in question, the third adjudicated. We assessed the quality of the evidence following the GRADE approach,(28) based on the following criteria: risk of bias, precision, consistency, directness of the evidence, magnitude of effect, risk of publication bias, presence of dose–effect relationship and an assessment of the effect of residual confounding. Quality of the evidence was categorized into 4 levels: high, moderate, low and very low. Meta-analysis was not performed due to heterogeneity in patient populations and outcomes.

The work of the panel was done through phone calls, e-mails, and four in-person meetings. Consensus for all recommendations was reached through deliberation; due to the small size of the panel, no formal voting process was used. Discordant minority positions were incorporated through deliberation and consensus. All decisions about GRADE were made by the authors who conducted the systematic review.

Definitions

For this review, “inter-professional” is defined as an interaction between clinicians of different professions (e.g. nurses, physicians, and other healthcare professionals working in the ICU), while “interdisciplinary” is defined as an interaction between clinicians of different disciplines within the same profession (e.g. internists, anesthesiologists, surgeons). “Important clinical decisions” refers to complex treatment decisions, often affected by patients’, families’, and clinicians’ values, goals, and preferences, that have to be made by or for patients during their treatment in the ICU. Such decisions may concern complex medical or surgical treatments; such decisions may also concern the extent of treatment indicated or the limitation of life-sustaining treatments.

RESULTS

We screened 1162 abstracts with 1119 were excluded, leaving 43 for full review (Figure 1). Of these 43, 39 were excluded, mainly due to lack of specific focus on IP-SDM, leaving four articles for analysis (online supplement - Table e1).(29-32)

In a cross-sectional study of 90 ICU clinicians in one ICU in the USA, Baggs and Schmitt found a positive correlation between the degree of collaboration amongst staff and satisfaction with clinical decisions regarding the aggressiveness of treatment (for nurses, $r = 0.70$; for residents, $r = 0.50$).(32) These results were corroborated by subsequent studies, especially regarding the relationship between insufficient participation in decision-making and dissatisfaction amongst nurses.(16,22,24,25,27,33)

In an observational study of 152 clinicians from two Danish ICUs, Jensen and colleagues compared end-of-life care before and after implementation of hospital guidelines articulating the importance of interdisciplinary meetings to make decisions regarding extent of treatment.(31)

For patients who died after withdrawal of life-sustaining therapies, ICU length of stay did not differ significantly after the intervention (3.1 vs 1.7 days; $p=0.06$). However, median time from admission to first consideration of extent of therapy was lower following guideline implementation (1.1 vs 0.4 days; $p=0.03$), as was median time from admission to a withdrawal decision (3.1 vs 1.1 days; $p=0.02$). Furthermore, healthcare professionals' perception of quality of care was better post-implementation. These findings suggest that regular interdisciplinary meetings related to complex treatment decisions reduce patient suffering and dissatisfaction among clinicians.

In a cross-sectional study of 566 Italian ICU nurses, Karanikola and colleagues explored the level of moral distress and its association with determinants of their work.(30) The investigators found a negative correlation between frequency and severity of moral distress and nurse-physician collaboration ($r=-0.169$, $p<0.0001$; $r=-0.215$ $p<0.0001$, respectively) as well as a positive correlation between nurse-physician collaboration and work satisfaction ($r=0.276$, $p<0.001$). This study supports the importance of interdisciplinary collaboration.(13,22,34)

In an observational study of 50 ICU clinicians in one Belgian ICU, Van den Bulcke and colleagues evaluated an intervention designed to improve ICU teamwork.(29) The intervention included structured weekly inter-professional meetings and in-depth case discussions. Study participants reported significant improvement in perceived “organizational factors” and “care processes” ($p<0.001$ for both items, using a validated instrument), suggesting regular interprofessional meetings facilitate timely decision-making about the extent of treatment.

Overall, the quality of the evidence was very low (online supplement - Tables e2 and e3).

RECOMMENDATIONS

Numerous studies document significant variation in the approach to ICU decision-making, especially concerning complex clinical and ethical issues.(4,35-41) Although there is considerable variability between countries, studies suggest there is similar variation within countries or even between clinicians within a single hospital. Indeed, the perspective of individual clinicians may be the most important factor in decision-making.(4,35-41) A key goal of IP-SDM is to move from individual to team decisions for important clinical issues and when IP-SDM is likely to improve decisions, as well as patient, family and clinician outcomes. As the systematic review yielded limited research, the following recommendations are based primarily on expert opinion and represent conditional recommendations. A conditional recommendation indicates uncertainty, but still means that the intervention would be the appropriate thing to do in most situations.(42,43)

Recommendation 1

We recommend IP-SDM be defined as a collaborative process amongst clinicians that allows for team involvement in important clinical decisions, such as those pertaining to the goals and extent of treatment or other complex medical issues and taking into account the available evidence and combined expertise of clinicians involved as well as the patient's values, goals, and preferences.

Shared decision-making is defined as a process in which clinicians and patients (and/or surrogates) share information with both parties, taking steps to build consensus about the preferred treatment, where generally an agreement is reached on which treatment to

implement.(44) Although addressing some of the same issues, IP-SDM is distinct and separate from shared decision-making with patients and their families. The latter describes *processes between the ICU teams and the patients and their families* and has been widely elaborated upon;(44-46) the former delineates the *processes within an ICU team* and has not been described in depth. There is often overlap in the process of shared-decision-making with patients and families and the process of IP-SDM, and there is also overlap in the composition of the groups involved in these two processes, yet it is helpful to separate them conceptually. Deliberations within teams rest on common medical understanding yet are often concerned with diverse assessments of the patients' status and treatment options; they benefit from diverse perspectives of the team members. During family meetings, though, the team should speak with "one voice" (within reason) and elicit how to best proceed in the patient's best interest. Discussions within the team will often influence discussions with patients and/or families and vice versa. However, in general the ICU team should arrive at a decision about medically-reasonable treatment options first and these options should then be discussed with patients and/or family members, in principle using shared decision-making.(44,47)

Recommendation 2

Regarding important clinical decisions, we recommend ICU clinicians consider engaging in an IP-SDM process in order to promote the most appropriate decisions.

Conceptually, decision-making can be executed on four different levels, going from individual decisions by one clinician to fully shared decision-making amongst a group of clinicians (Table 1).(48) These levels are intended to provide a conceptual guide to the process of decision-making, rather than serve as rigid or mutually exclusive approaches.

Clinical decisions are daily practice for ICU teams. Decisions are often appropriately made by individual clinicians (level 1) or after an exchange of information with other team members (level 2), including decisions to turn a patient, choosing antibiotics or whether to administer another fluid bolus. For slightly more nuanced issues, such as when to administer vasopressors, transfuse blood products or transfer a patient to acute care, involvement of other clinicians is common and depending on the circumstances, deliberation might be required (level 3) (49-52). Important care decisions with potentially far-reaching consequences for patients, families, and clinicians, such as the intensification or limitation of life-sustaining treatments, may warrant consideration of IP-SDM (level 4).(48,53) Whether a decision is "important" or "complex" may be a matter of debate among clinicians; this may be particularly true for decisions made at the higher levels of deliberation (level 3) versus shared decision-making (level 4), and we provide some examples in Table 2. The level of decision-making will largely depend on the complexity of the decision, patient circumstances, expertise of the team, and working relationships among team members.

When making important decisions, each clinician's level of involvement in IP-SDM may be influenced by many determinants, such as their individual judgment regarding the patient's prognosis, their experience and expertise, their hierarchical status in the ICU, and their personal and cultural values.(19,38,40,41,54,55) Importantly, a lack of recognition of value differences within the team in the context of complex clinical decisions can lead to unbalanced decisions and distress among clinicians.(12,14,16,22,33,56) If a decision is contrary to an individual team member's reasoned assessment or contrary to his/her professional values, then open deliberation and IP-SDM may be essential to ensure high-quality team functioning as well as individual clinician well-being.

Perhaps the most practical rationale for IP-SDM is that making use of the combined expertise and knowledge of all team members involved can lead to better-reasoned and more robust decisions. This in turn should improve outcomes for patients and their families. For example, studies demonstrate that when physicians and nurses agree about the prognosis for critically ill patients, their prognostication is significantly more accurate than sole prognostication of either a nurse or physician.(11,57,58) In addition, regular interprofessional team meetings, valuing the engagement of team members and promoting mutual respect, may help reduce moral distress and enhance resilience within the team.(29,31,34) The underlying principle is to transform individual clinicians into empowered and involved team members.

In many countries, the final authority and ensuing accountability for important clinical decisions ultimately lie with the attending physician or the department chair. However, the fact that ultimate responsibility belongs to one individual need not lessen the potential for IP-SDM, provided the clinician responsible believes the best decision was made and he or she can take responsibility for that decision.

Recommendation 3

We recommend clinicians and hospitals implement strategies to accept and foster an ICU climate oriented towards inter-professional and interdisciplinary collaboration and IP-SDM.

Successful IP-SDM depends on interpersonal skills as well as a good ICU climate.(11,13,59-62) Organizational research has shown that work-units' climate and culture exert important influences on outcomes, such as unit performance.(63,64) Many diverse factors impact the climate-performance relationship in an ICU, especially adequacy of management, staffing, resources, effective leadership, and the safety and ethical climate.(11,61,65-70) Specifically, improving and to some degree formalizing the exchange of clinician assessments regarding the extent and goals of treatment might increase clinician satisfaction with care processes, decrease moral distress, and improve the ICU climate.(29-31) There is limited evidence that specific interventions to improve ICU work environment lead to improved organisational performance or patient outcomes.(71) Overall, however, skilled communication, true collaboration and effective decision-making are recognised as imperative in establishing and sustaining healthy work environments – which in turn increase the likelihood that clinicians engage in IP-SDM.(11-14,21,25,29,31,60,66)

Consequently, we propose that ICU clinicians, and ICU physicians in particular, reflect on the types of situations in which they genuinely seek and incorporate the perspectives of the whole ICU team in decision-making. We acknowledge that IP-SDM may take significant time, and there may be circumstances where additional time spent by the ICU team could result in potential harms, both related to patient care and clinician stress. Assessment of potential harms related to IP-SDM should be incorporated into future research.

Recommendation 4

We recommend clinicians consider incorporating basic principles of the VALUE TEAM-template as an explicit approach to respectful communication during IP-SDM.

Many clinical decisions depend on several clinicians, often from different disciplines and professions and with potentially conflicting approaches. Therefore, IP-SDM needs to rest on basic principles of respectful communication. Using a structured approach for such

communication may reduce communication failures, improve information transfer, and increase the acceptability of treatment decisions, as well as job satisfaction, for the ICU team.

For communication between clinicians and families, use of a family-centered structured approach has been recommended. The VALUE-template, for example, focuses on valuing family statements and emotions, listening to the family and understanding the patient as a person.(72,73) As a systematic approach to support IP-SDM within the ICU team, we recommend incorporating the “VALUE TEAM-template”. Based on the VALUE-template,(72,73) it provides a guide for respectful communication, such as valuing all team members’ statements and emotions, listening to each other and addressing diverse opinions, making use of each person’s expertise and elaborating on patients’ values and goals in order to arrive at decisions in the patient’s best interest (Table 3).

Recommendation 5

We recommend further studies be done to improve the quality of IP-SDM amongst ICU clinicians and evaluate the association between IP-SDM and outcomes for patients, family members, and clinicians.

As the recommendations above are based on limited evidence, further research is needed. Research is specifically needed to evaluate the current quality of IP-SDM amongst ICU clinicians regarding patient care in the ICU and to identify methods to improve and promote IP-SDM. In addition, there may be a role for IP-SDM in decisions about triage and admission to the ICU that warrant further exploration.

LIMITATIONS

These recommendations are based on limited empirical evidence and therefore are largely based on expert opinion. Second, we only reviewed English literature and may have missed sources in other languages. Third, evidence suggests there is significant variability in ethical decision-making climate in different ICUs, and it is not clear how this impacts the effectiveness of IP-SDM in different settings. Even if not all recommendations can be utilized, ICU teams should aspire to implement IP-SDM as best as possible under prevailing circumstances.

CONCLUSIONS

High-quality care for ICU patients and their families requires, amongst other qualities, exemplary inter-professional collaboration and communication. The accomplishment of these tasks can be facilitated through IP-SDM. Therefore, clinicians should consider using an IP-SDM model that allows for the exchange of information, deliberation and joint attainment of a treatment decision in a structured manner. IP-SDM is neither intended to be used for routine and straightforward decisions, nor is it intended to promote any specific decision, but rather provides a range of explicit approaches to decision-making within the inter-professional team. Further research is needed to determine the extent to which implementation of IP-SDM can improve outcomes for critically ill patients and their families. Ultimately, fostering the credibility of team decisions and the quality of ICU work environments will improve outcomes for patients, family members, and clinicians.

Author contributions

Conceptualization: Michalsen, Curtis, White, DeKeyser Ganz, Jensen, Metaxa, Latour, Truog

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Drafting and revision of the manuscript for important intellectual content as well as final approval for the version submitted: Michalsen, Curtis, Long, White, DeKeyser Ganz, Jensen, Hartog, Metaxa, Latour, Truog, Kesecioglu, Mahn

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Ethical standards

This research does not involve human participants or animals.

Conflicts of interest

RDT reports receiving consulting fees from Sanofi for service on data monitoring committees; JK reports receiving honorarium from Xenios A.G. All other authors declare that they have no conflict of interest.

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Table 1. Levels of interprofessional collaboration in decisions [adapted from DeKeyser (48)]

Name of Level	Definition	Example	Appropriate Use
Individual Decision (level 1)	A clinical decision is made without involvement of another type of healthcare professional	The decision when to turn a patient during a shift; the choice of an antibiotic for a given patient with a known strain of bacterial infection	A clinical decision is made by one healthcare professional according to known practice guidelines or norms that are applied to a specific patient in an unambiguous clinical situation
		While being suctioned by a nurse, a patient suddenly reverts to a fatal cardiac rhythm with very low blood pressure. The nurse immediately starts resuscitation while calling for a physician	In an emergency, when other healthcare professionals are not available
Information Exchange (level 2)	Relay of information from one healthcare professional to another, to be used by one healthcare professional for decision-making purposes	Relaying information about the patient's most current vital signs in a way that informs a unilateral decision to obtain an angiogram to rule out pulmonary embolism	Sharing of information that is obtained in the course of patient care
		A description of the clinical factors and physiological underpinnings behind the decision not to give a patient a third fluid bolus	Explaining the reasoning behind clinical decisions that were made by other team members not involved in the decision-making process
Deliberation (level 3)	A two-way flow of information with some discussion, yet a decision is not made with shared decision-making	During medical rounds there is a discussion of nursing and medical considerations as to why a specific patient should be treated with vasopressors and/or be given blood products. The attending physician then decides regarding these issues.	The patient is assessed independently by different healthcare professionals who come to their own conclusions about patient care. These conclusions are then discussed. A final decision is made by one of the providers.
Shared Decision-Making (level 4)	Each healthcare provider presents their information, a deliberation takes place, followed by a joint decision by participating providers	A patient with several chronic diseases is admitted to the ICU, suffers from many complications and presently is in multi-organ failure. The prognosis is very poor. After joint discussions amongst the ICU team, the staff members recommend to the family to change the treatment goal to comfort measures only.	A complex patient care decision that involves many different patient care issues, where different healthcare providers can contribute their expertise to a decision. A discussion is held between the stakeholders, a joint decision is made and followed. The decision may involve ethical dilemmas, where no decision is totally correct or incorrect.

Table 2: Differentiating best use of deliberation (level 3) from shared decision-making (level 4).

Decision	Circumstances that may guide best level of decision-making	Potential best level of decision-making
Decision to withdraw life-sustaining treatment in a 62-year-old man with metastatic lung cancer deteriorating after admission with pneumonia and sepsis	The attending physician had extensive conversations with the patient about his values, goals, and preferences prior to the development of septic shock, and the patient was very clear on what treatments he would and would not accept.	Deliberation but decision made by attending physician (level 3)
	The ICU nurse had extensive conversations with the patient and family at the bedside and has important insights into the patient’s values and goals.	IP-SDM (level 4)
Decision to increase the inspiratory pressure of non-invasive ventilation (NIV) for a frail 82-year-old patient with a moderately effective breathing status and known chronic obstructive lung disease, three days after extubation following a 10-day course of mechanical ventilation	The ICU nurse has extensive experience with this patient, with NIV, while the physician has less experience with the patient or with the patient’s response to NIV.	Deliberation but decision made by the ICU nurse (level 3)
	The ICU team (physician and nurse) have different but complementary expertise and experience with this patient and NIV, such that a shared decision is the safest approach.	IP-SDM (level 4)
Decision to extubate a 72-year-old patient with multiple chronic illnesses after 8 days of mechanical ventilation who has “marginal” weaning parameters and a “marginal” spontaneous breathing trial	The ICU physician has been caring for the patient for all 8 days, knows the patient well, and believes this is the opportune time to extubate. This assessment is supported by the ICU team.	Deliberation but decision made by attending physician (level 3)
	The ICU physician has been caring for the patient for 1 day, doesn’t know the patient well yet, and needs the input of the ICU team to make a safe decision.	IP-SDM (level 4)

Table 3. The VALUE-TEAM-Template

- V** value the input from all of the members of the inter-professional team, including, amongst others, physicians, nurses, physiotherapists, clergy, psychologists, and ethicists;
- A** acknowledge emotions;
- L** listen to each other;
- U** understand the team-members as integral persons, including their commitments to patients and high-quality patient care;
- E** elicit the expert suggestions of team-members and make use of their specific expertise;

- T** tie the decision to the best evidence available;
- E** elaborate on the patient's values, goals and preferences;
- A** address diverse opinions and seek consensus amongst team members;
- M** make the best decision weighing reasonable medical options with the patient's goals and the quality of life he/she would want to achieve after their stay in the ICU.