Research paper

A multicomponent intervention to optimise nurse–patient communication in the intensive care unit: A mixed-methods acceptability and feasibility study

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ARTICLE INFORMATION

ABSTRACT

Background: Mechanically ventilated patients in intensive care units may experience communication challenges owing to intubation, which affects nurse–patient communication. Several strategies may optimise communication, but only one previous study has tested a multicomponent intervention. Implementing such an intervention can be challenging because communication strategies may be set aside by lifesaving care tasks and procedures. In a previous study, we designed a communication intervention based on pre-existing clinical methods and evidence-based approaches. The present study evaluated the intervention to determine if it was necessary to adjust its components and the implementation strategy.
Objectives: The objective of this study was to evaluate the feasibility and assess nurses' acceptability of a patient-centred, multicomponent communication intervention prototype in an intensive care unit.
Methods: The overall frame was the Medical Research Council's framework for developing complex interventions. Indicators of feasibility and acceptability were used for the evaluation. A mixed-methods design was applied including a survey with open-ended text boxes and qualitative observations as data sources. Quantitative data were analysed descriptively, and qualitative data were explored using content analysis. Data were compiled and displayed in a side-by-side comparison. The data were collected between September 2020 and March 2021. Nurses from four intensive care units at a university hospital in Denmark participated in the study. All nurses who were on active duty during the implementation of the intervention were enrolled for the survey and participant observations.
Results: Overall, the results provided insight into the feasibility based on fidelity and context as well as nurses' acceptability based on adherence, appropriateness, convenience, and effectiveness. Qualitative and quantitative results yielded partially contrasting findings but highlighted how the intervention may be optimised to enhance fit with clinical practice and overcome implementation challenges.
Conclusion: The intervention was feasible and acceptable. However, implementation needs to be repeated to allow nurses to fully understand and use the intervention.

1. Introduction

Communication with patients is a core component in critical care. However, the intubation and mechanical ventilation challenge communication in the intensive care unit (ICU). Therefore, patients and nurses alike experience frustrations and negative emotions.[1–3] In a previous study, we designed a communication intervention prototype using pre-existing clinical methods combined with evidence-based approaches.[4] The present study aimed to implement and evaluate this intervention in clinical practice.

1.1. Background

Studies have shown that patients perceive communication during mechanical ventilation as a considerable burden, and between 36 and 90% find it moderately to extremely bothersome.[5,6] Furthermore, nurses may also find it frustrating and challenging to establish an acceptable level of communication

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during mechanical ventilation.[7-9] A widely used ICU communication method is the use of closed questions asked by the nurse followed by yes/no signalling from patients, for example, by shaking/ nodding the head or looking up/down. Other approaches such as mouthing words using gestures or applying low- and high-tech tools are also common.[10,11] Several research syntheses show that the use of strategies to optimise nurse–patient communication in the ICU is not new.[12-14] Even so, only one comprehensive study has tested the effect of a multicomponent intervention.[15,16] Implementation of augmentative and alternative communication (AAC) in the ICU setting is challenging because the biomedical paradigm is usually dominant. Hence, patient communication may be set aside by life-saving care and treatment procedures.[17,18]

1.2. Intervention development and implementation

Guided by the Medical Research Council's (MRC) framework for developing complex interventions,[19] we designed a patient-centred, multicomponent communication intervention prototype aiming to strengthen and support nurses' communication with mechanically ventilated patients in the ICU. The intervention was based on pre-existing clinical methods and combined with evidence-based approaches in a bundle. The communication bundle consisted of the following components: (i) a communication strategy including a BASIS (Back-up, Approach, Systematic assessment, Involvement, Steering) framework and an algorithm (to achieve an overview of strategies, assessment, and documentation); (ii) communication tools (low- and high-tech); and (iii) a nurse education programme (in-person and via e-learning). An elaborate description of the intervention was provided in a previous study.[4] The intervention is referred to as the 'ICU-COM'. It was implemented in a test period lasting approximately 4 months (from September to December 2020). The objective of the present study was to evaluate the feasibility of the intervention and to assess nurses' acceptability of the ICU-COM prototype. This was done to understand if any of the intervention prototype components needed to be adjusted to fit the nurses' needs and to adjust the implementation strategy before conducting further studies and implementation.

2. Methods

2.1. Design

A mixed-methods design was used to test the feasibility and acceptability of the intervention. In line with the principles of feasibility studies, we aimed to determine whether the intervention could be implemented successfully in clinical practice and if it was perceived as meaningful by the nurses.[20,21] Our approach was inspired by Sidani and Braden, according to whom feasibility refers to the practicality of implementing an intervention in a specific setting,[22,23] whereas acceptability refers to the clinicians' attitude towards the intervention. Both perspectives are paramount to consider before embarking on further studies or engaging in full-scale implementation.[22,23]

2.2. Setting and participants

The study was conducted in the ICU department of a university hospital in Denmark. The high-dependency ICUs consisted of four units with 44 beds, receiving patients from all medical and surgical specialities. The nurse-to-patient ratio was 1:1, which is standard in most Danish ICUs. The ICUs follow international recommendations and limit the use of sedatives to a possible extent.[24] Therefore, many mechanically ventilated patients are conscious during their ICU hospitalisation and may hence experience communication challenges. Approximately 300 nurses were employed at the ICUs, and they constituted the participants of this study. Nurses who were on active duty during the ICU-COM test period and participated in the educational sessions or nursing conferences, where information about the ICU-COM was disseminated, were observed and provided data for the survey. Nurses who were on maternity or long-term sick leave were excluded.

2.3. Data collection

The indicators appropriateness, convenience, effectiveness, and adherence were used to explore acceptability, and fidelity and context were used to assess feasibility (see Table 1).[22] The use of questionnaires and close monitoring of staff and context, for example, via observations, is recommended to assess feasibility and acceptability.[22,23]

Quantitative data were collected via a survey designed for the purpose between January and March 2021. Responses were given as multiple-choice answers or questions rated on a 5-point Likert scale ranging from 'strongly agree' to 'strongly disagree'. The questionnaire underwent face and content validation by five nurses who were experts within the clinical ICU setting. They all had more than 15 years of experience in the ICU, held a Degree in Critical Care Nursing and a Master's Degree in Nursing, and served as clinical specialists. These nurses assessed if the questionnaire was logical and if the questions were clear for the evaluation of the intervention.[25] The questions, their sequence, and layout were adjusted in accordance with their feedback. The online questionnaire was sent out to all eligible clinical nurses in the ICU department after the 4-month test period during which the ICU-COM was implemented.

Qualitative data were obtained using participant observations inspired by Spradley[26] and via written feedback collected via the survey (open-ended text boxes [TBs]). During the 4-month test period (from September to December 2020), the first author implemented the ICU-COM and took field notes to document and evaluate perspectives on the feasibility and acceptability indicators that were used for the study.[22,23] To ensure that data were rich and detailed, we chose to combine the survey data with the participant observations. This allowed us to understand whether the nurses were willing to adopt the intervention in an implementation process. During the observations, the first author did selective observations and focused on place, actor, and activities as described by Spradley.[26] The observational focus was on the interactions and reactions of the nurses, who were introduced to or discussed the use of the ICU-COM intervention. The locations used were office spaces or rooms used for educational purposes. We specifically aimed to assess the nurses' attitude towards the intervention prototype and evaluate whether it was practically possible to implement the intervention within the group of nurse stakeholders. Therefore, no observations were made nearby patients. Furthermore, no other groups of healthcare professionals were observed. The observations were made in situations in which information about the ICU-COM was disseminated, for example, during introductory and educational sessions or at nursing conferences. Field notes were also recorded if nurses spontaneously addressed the first author during her daily work in the ICUs to comment on or enquire about the intervention. Similarly, emails sent from the

Table 1
Description of data collected to assess acceptability and feasibility.

Concept	Indicator	Description	Type of data
Feasibility	Fidelity	Assessment of the adequacy of the intervention delivery (dose and mode)	Survey (qual. and quant.) and observations
	Context	Refers to the physical and social environment where the intervention is implemented (e.g., location and support by participating departments)	Survey replies (qual.) and observations
Acceptability	Adherence	Extent to which participants are willing to adhere to or follow the intervention	Survey (qual. and quant.) and observations
	Appropriateness	Perception of the intervention's overall reasonableness in addressing the problem (how logic the intervention is in managing the problem)	Survey (qual. and quant.) and observations
	Convenience	Judgement of the intervention's intrusiveness (e.g., how easy the intervention is applied)	Survey (qual. and quant.) and observations
	Effectiveness	Perception of the extent to which the intervention is helpful in managing the problem	Survey (qual. and quant.) and observations

nurses to the first author pertaining to the intervention were anonymised and included in the field notes.

2.4. Data analysis

In accordance with the convergent mixed-methods design, the quantitative and qualitative data were analysed separately and then merged.[27] After the data had been compiled, they were displayed in a side-by-side comparison as shown in the Results section. Quantitative results are reported first, and followed by qualitative findings.[27]

Quantitative data were tested for normality by using the graphical method and were found to have a normal distribution. Descriptive statistics were used to examine the quantitative data, including mean and standard deviation (SD) for the acceptability scores. Qualitative data were analysed using a deductive content analysis[28,29] based on the feasibility and acceptability indicators.[22,23] An analysis matrix was created, and data were gathered by content before grouping and categorisation.[28] To ensure their robustness, findings were discussed within the research team and quotes were used to strengthen the categories derived from the analysis.[28]

2.5. Ethical approval

According to the regional ethics committee, this study did not require formal ethical approval. The leading staff of the participating ICUs authorised the study including the observations and the questionnaire. Nurses consented to participate in the survey by completing the questionnaire. Nurses were informed of the participant observations; the data were of an evaluative nature and

did not include any sensitive content or emotional reactions that would present ethical challenges. No observations were made of patients, and data were based strictly on nurses' reactions and evaluation of the intervention during the implementation phase. The study was conducted in accordance with the Declaration of Helsinki.

3. Results

3.1. Sample

The questionnaire was emailed to 289 nurses, and the response rate was 74%. Baseline data of the respondents are presented in Table 2. The qualitative data consisted of quotes from open-ended TBs and the researcher's field notes (FNs). The open-ended TBs provided elaborate descriptions of the nurses' attitude towards the intervention prototype and the approximately 40 h of participant observations. These descriptions allowed us to assess if it was practically possible to implement the intervention within the group of nurse stakeholders. In the following, each intervention component is described, including the BASIS communication frame (C[1]), the communication algorithm (C[2]), a low-tech communication book (C[3]), the communication application Talk2Care (C[4]), and an e-learning course on 'communication with mechanically ventilated patients' (C[5]). The results are presented in accordance with the indicators of feasibility and acceptability used for the analysis.[23]

Table 2
Baseline characteristics of respondents.

Characteristics (n = 224)	
Age (mean)	41
	n (%)
Sex	
Female	214 (96%)
Male	10 (4%)
Clinical nursing experience	
<3 years	38 (17%)
3−10 years	54 (24%)
>10 years	132 (59%)
Clinical ICU experience	
<3 years	68 (30%)
3−10 years	46 (21%)
>10 years	110 (49%)
Critical care nursing degree	
Yes	136 (61%)
No	62 (28%)
Trainee	26 (12%)

Table 3
Respondents' introduction to, use of, and adherence to the ICU-COM. The respondents (n = 224) were allowed to provide more than one answer.

Question	n (%)
How were you introduced to the ICU-COM?	
Clinical educational sessions	125 (56%)
Introductory video (sent via email)	61 (27%)
Nursing conferences	73 (33%)
Introduction of newly employed nurses	19 (8%)
Via one of the communication guides	11 (5%)
Via colleagues	17 (8%)
Via the departments newsletters	55 (25%)
At a workshop (for communication guides)	15 (7%)
I have not been introduced	29 (13%)
In which situation have you used one or more components of the ICU-COM?	
With the patient	105 (47%)
As a tool to reflect on communication	32 (14%)
With students, trainees or newly employed nurses	27 (12%)
As a part of my documentation	11 (5%)
I have not used it	101 (45%)
On average, how often have you used one or more components of the ICU-COM during the last four weeks?	
Every day	0
Several times a week	19 (9%)
Once a week	28 (13%)
Less than once a week	67 (30%)
I have not used it	109 (49%)

3.2. Feasibility

3.2.1. Fidelity

Table 3 highlights the intervention delivery mode. It shows that most nurses (n = 125) were introduced to the ICU-COM bundle during clinical educational sessions. The introductory video (n = 61), nursing conferences (n = 73), and department newsletters (n = 55) also accounted for a relatively large part of the introductions. However, some overlap occurred as some nurses were introduced to the intervention at several occasions. Table 4 shows relatively high acceptability scores for the fidelity perspective, "I know how and when to use C^{1-4}" with mean scores of 4 or above, suggesting that the delivery dose was adequate.

The qualitative data yielded an overall positive feedback on the ICU-COM. During the educational sessions, nurses indicated that it was a core component of ICU nursing and a subject that they found was important to work with. This is underpinned by this quote: "It is good that there is more focus on communication" (TB). However, some nurses indicated that they needed more elaborate information than was given via the various intervention delivery approaches listed in Table 3. At the same time, several nurses found that the introductory video was too lengthy. Both the observations and the survey replies show that not all nurses completely understood the concept of intervention; the idea of integrating methods already used in clinical practice with evidence-based knowledge and approaches in a comprehensive multicomponent intervention was not fully disseminated. Furthermore, not all nurses saw how the intervention brought something new to clinical practice: "I don't consider the material to be new" (TB). However, the data also showed that some nurses did not realise that the ICU-COM comprised more than just the low-tech communication book, which may help explain this finding. Part of the nurses did not receive the intervention, "I haven't been introduced to it" (TB), or reported that it required more attention, "There is a need to focus on it again" (TB). Therefore, the qualitative findings showed that dose and duration were inadequate for all nurses to fully understand and use the ICU-COM bundle and that intervention delivery needed to be repeated to optimise fidelity.

3.2.2. Context

No quantitative data in the survey addressed context. Evaluation of context was therefore based exclusively on participant observations and the answers provided in the open-ended TBs.

The qualitative observations showed that several barriers and facilitators affected the application of the ICU-COM. These included the COVID-19 pandemic, which demanded much time and attention: "During a time with a major focus on Covid and training of the standby nursing force, it has been difficult to manage something new" (TB). Furthermore, the pressure of busyness affected the application of the ICU-COM bundle in general: "Due to busyness, many things, e.g. communication, can easily become something that you just do routinely instead of remembering that there are new tools" (TB). Findings demonstrated that establishment of collaboration with speech-language pathologists was a facilitating factor. The speech-language pathologists could be sent for whenever nurses needed advice in cases that posed communication challenges. During observations, nurses told that alongside with the testing of the bundle, the department chose to focus on the subject of communication in a broader sense. This was done independently of the study, and it was an attempt to heighten awareness of communication in general and to draw attention to the communication bundle in particular. As such, the observations showed that the nurses attempted to adjust the context to underpin the implementation of the intervention.

3.3. Acceptability

3.3.1. Adherence

Table 3 shows that approximately half of the nurses stated they had not used any of the ICU-COM components. Table 4 specifies in detail the utilisation of each component; the BASIS communication frame was tested by 50 nurses, the communication algorithm by 63, the low-tech communication book by 108, the communication application Talk2Care by 26, and the e-learning module by 96 nurses. Even though only about half of the nurses used the communication bundle, Table 4 suggests that adherence to the low-tech communication book and the e-learning module was good, whereas adherence to the BASIS frame and algorithm was at an average level and adherence to the communication application was low. Table 3 also shows that the bundle was primarily used with the patient, but some nurses also used it as a tool to reflect on communication, for example, with students or newly employed nurses. No one reported using the bundle on a daily basis, and approximately one-third used it less than once a week. Table 4 shows acceptability scores of 3.9–4.3 for the items measuring whether nurses expected to use the bundle in the future.

The qualitative findings highlight how and when the nurses applied the ICU-COM in clinical practice: "I use the bundle, if communication is difficult" (TB). Some found that it was already in use: "I encountered it the first time with a patient who already used

Table 4
Acceptability scores for all ICU-COM components.

Acceptability question Score 1 = strongly disagree to 5 = strongly agree		C^1 (n = 50) Mean (SD)	C^2 (n = 63) Mean (SD)	C^3 (n = 108) Mean (SD)	C^4 (n = 26) Mean (SD)	C^5 (n = 96) Mean (SD)
Components C^{1-5}	It is easy to understand C	4.2 (1.1)	4.4 (1.1)	4.4 (0.8)	4.1 (0.6)	4.4 (0.6)
	Layout/design of C is good	4.2 (1.0)	4.3 (1.3)	4.3 (0.8)	4.1 (1.0)	4.4 (0.8)
Components C^{1-4}	I know how to use C	4.0 (0.9)	4.0 (0.7)	4.3 (0.7)	4.3 (0.8)	
	I know when to use C	4.0 (1.0)	4.2 (1.0)	4.2 (0.8)	4.3 (0.9)	
	It makes sense to use C in clinical practice	3.9 (0.9)	4.1 (1.0)	4.2 (0.8)	4.1 (0.9)	
	I expect to use C in the future	3.9 (0.7)	4.3 (0.9)	4.2 (0.8)	4.1 (0.7)	
Component C^5	The composition of C is logic					4.3 (0.7)
	The level of C is appropriate					4.3 (0.7)
	The content of C reflects clinical practice					4.2 (0.9)
	The length/duration of C is appropriate					4.3 (0.9)

C^1 = BASIS communication frame.
C^2 = communication algorithm.
C^3 = low-tech communication book.
C^4 = Communication app (Talk2Care).
C^5 = E-learning course on 'communication with mechanically ventilated patients'.
BASIS, Back-up, Approach, Systematic assessment, Involvement, Steering.

it" (TB). Generally, the adherence was described as good: "I find that many in the department use and talk about the bundle" (TB). However, some survey replies indicated poor adherence: "I haven't used it" (TB); others reported that they expected to use the ICU-COM in the future. A newly employed nurse wrote: "I think that I will include it more in my work in the future when I have become more accustomed to the routines in general" (TB). The data showed that low adherence may be explained by the tools not being readily available bedside or by omission: "It is difficult to remember in the specific situation that the bundle exists" (TB). Lack of surplus energy due to a high workload was also described as a barrier to adherence.

3.3.2. Appropriateness, convenience, and effectiveness

Table 4 summarises the quantitative acceptability scores. Nurses found that all components were easy to understand with mean acceptability scores between 4.1 and 4.4. The design was found to be good, with scores falling in the range of 4.1–4.4. The e-learning course had specific questions designed to assess acceptability in relation to whether the composition was logical, the level of information was appropriate, and the length/duration was convenient for the nurses; each question obtained a mean score of 4.3. Acceptability scores ranged from 3.9 to 4.2 with respect to relevance for clinical practice.

The qualitative data described the ICU-COM as helpful in the nurses' management of communication difficulties, and the nurses generally found that the ICU-COM was appropriate and meaningful to use: "It makes sense to me" (TB). Systematism was highlighted as an important aspect: "It gives me a systematic approach and using it is a way of covering all the essential elements" (TB). Nurses described that there was a good coherence between the caring approaches already used in clinical practice and the ICU-COM: "I combine my nursing with basal stimulation which I think fits well with your concept" (TB). However, some nurses also reported that applying the ICU-COM was an unconscious act: "I haven't knowingly used the bundle, but I have used the fundamental communication principles in the algorithm every day" (TB). For some nurses this was because one or more of the components were already an integrated part of their care: "The things described have formed part of my care for many years" (TB). However, for some of the newly employed nurses, the components were unfamiliar. The ICU-COM was also described as a useful tool for reflection and conceptualisation of nurse–patient communication throughout the various ICU units: "I think that the bundle gives us a basis for 'speaking the same language' and provides the patients with a more equal basis for communication. Hopefully, the bundle will make us better at exchanging our experiences with communication" (TB). For some nurses, the algorithm was described as a tangible tool because it guided their actions as opposed to the BASIS framework; others found that BASIS was a useful support tool for building an overview and discussing communication within the nursing team. Generally, the observations and survey replies reflected differing opinions among nurses concerning the ICU-COM; and in some cases, data were contradictory. For example, some found that the ICU-COM was simple, "It is really simple to use" (FN), whereas other considered it to be overly complicated, "It complicates something that ought to be simpler" (TB). In particular, the algorithm was criticised for being complex and overly detailed: "The algorithm is too comprehensive, it could be more simple" (TB). Nurses encountered some challenges related to ease of communication when applying the communication tools, specifically because of patient characteristics: "It is my experience that only a few patients are able to use

the application or low-tech communication book because of severe cognitive or physical weakness; often their patience or abilities are inadequate" (TB). However, when patients were able to interact with the nurse, they found that the communication tools were useful: "I used the low-tech communication book with a patient and it was good and functioned well. He had a lot on his mind and was happy to use it" (FN).

4. Discussion

The results of this study give insight into the nurses' evaluation of the feasibility and acceptability of the ICU-COM. Overall, the feedback was positive; however, some implementation challenges were identified and the delivery needs to be repeated. Furthermore, results were contrasting for some perspectives; thus, the degree to which each nurse found the bundle meaningful and simple to use varied. A review showed that single-component interventions in the form of communication tools or speaking valves are feasible interventions in the ICU.[30] The review by Zaga et al.[30] also demonstrated that apart from two case reports, the Study of Patient-nurse Effectiveness with Assisted Communication Strategies (SPEACS) study was the only previous study to adopt a multicomponent approach.[15] In line with the present study, the intervention was deemed feasible. However, to our knowledge, the present is the first study to focus on the nurses' acceptability of a communication intervention in the ICU.

4.1. Feasibility

The quantitative results suggested that the fidelity of the intervention delivery (mode and duration) was adequate and that nurses understood how to use the bundle. However, the qualitative findings demonstrated a need for follow-up or repetition to allow the nurses to fully understand the intervention in detail and ensure that all nurses know how to use each component. Implementation is an active, multistage, iterative, and dynamic process.[31] We evaluated the feasibility and acceptability of the ICU-COM intervention prototype in an initial test implementation; when the intervention has been adjusted and refined based on this test evaluation, full implementation will begin. Therefore, we expect that nurses will gain a deeper understanding of the intervention in the next phase of the study. The results from this study have emphasised the need for a more formalised implementation strategy, for example, use of the Context and Implementation of Complex Interventions (CICI) framework.[28]

Results concerning context relied on qualitative findings exclusively, and these results showed good support for the intervention during the test phase. Even so, some implementation challenges were recorded, mainly owing to COVID-19 and busyness. Time constraints are a well-known barrier that affects the implementation of interventions.[32] However, time constraints were encountered during the COVID-19 pandemic in particular, which negatively influenced this study.

4.2. Acceptability

Data regarding adherence showed that approximately half of the nurses had used one or more components of the bundle. The best adherence was reported for the low-tech communication book, and the lowest adherence was reported for the communication application. Nurses used the bundle when communication was difficult and mostly at the bedside with the patient or as a tool for reflection. Both qualitative and quantitative data showed that a

large proportion of nurses expected to use the bundle in the future. The qualitative data demonstrated that low adherence may be explained by a lack of available bedside tools, the nurses forgetting to use the bundle, or a lack of nurse surplus energy. In a study by Handberg and Voss,[17] nurses described similar challenges in the AAC implementation process. Here, more success stories about the use of the tools were described as an important step in the implementation. In the present study, this may also be included in an implementation strategy, as both active and passive communication channels may serve as a way of disseminating clinically applicable knowledge about the ICU-COM.[32]

Acceptability scores showed that nurses found that the components of the ICU-COM were relevant, appropriate, and logical. Using qualitative data, we were able to elaborate on the perspectives of appropriateness, convenience, and effectiveness, which demonstrated a difference in the nurses' experiences of the usefulness of the intervention. Nurses generally found the ICU-COM meaningful to use and helpful in managing the communication challenges. They described good coherence with their caring practices and appreciation of the systematic approach that it brought. However, the algorithm in particular was described as too comprehensive. Furthermore, some of the components were already a part of experienced nurses' daily care but this was not the case for newly employed nurses. Future studies should focus on whether a difference exists between novice and expert nurses with respect to their experiences of communicating with mechanically ventilated patients and applying different interventions in these situations. The ICU-COM provided nurses with a joint conceptual framework and support tools to guide their actions and provide an overview. Conceptual models, frameworks, and theories can provide a structure for nursing.[33] However, no such concepts or frameworks currently exist in the ICU setting for communication with mechanically ventilated patients, and previous research has mainly focused on the application of AAC. A concept analysis and situation-specific theory would help guide future research and clinical practice in the ICU.

Patient characteristics, in particular, affected whether the ICU-COM bundle worked and affected its ease of applicability in clinical practice. Evidence shows that communication tools can help patients communicate. However, some patients are unable to use the tools owing to the severity of their illness, their level of consciousness, and impaired physical and cognitive status.[34–36] Thus, ICU nurses will inevitably meet patients who are unable to use communication tools. However, in the ICU-COM, we sought to meet this challenge by introducing the nurses to the fundamental communication principles in the communication algorithm; these principles included, for example, establishing the patient's yes/no signal, asking simple, close-ended yes/no questions, underpinning what was said verbally with nonverbal signs and giving the patient time to respond. In the literature, this perspective is not well documented and the unaided strategies warrant further research in the ICU setting. Collaboration with speech-language pathologists was highlighted as a positive aspect of the ICU-COM intervention; this is also described in the literature as a way of optimising nurse–patient communication.[37]

5. Strengths and weaknesses

To provide an overall guidance of our study, the Good Reporting of A Mixed Methods Study (GRAMMS)[38] was applied. Both the qualitative and quantitative data collected provided insight into the feasibility and acceptability of the intervention. However, only qualitative data captured perspectives of the context. The combination of survey data and participant observations is a novel but highly useful data collection technique and combined the

subjective and objective perspectives. Furthermore, the mixed-methods approach showed that qualitative and quantitative data contrasted in some aspects, and the broadness of the results would not have been identified if only a single method had been used. The feasibility and acceptability indicators used for the study[22,23] were adequate. However, other indicators, for example, those described in the theoretical framework of acceptability,[39] might have guided the data collection differently and provided other perspectives, for example, by exploring the nurses' perception of self-efficacy. The findings of the present study may be transferable to other clinical ICU contexts. However, local circumstances such as sedation protocols and nurse-to-patient ratios may potentially affect the ease of applying the intervention.

6. Conclusion

Only about half of the nurses surveyed in the study had used one or more of the communication bundle components. However, our results demonstrate that the nurses who did use the intervention found the bundle acceptable to work with. Also, it was practically possible to implement the bundle in this specific context. Furthermore, the study highlights the challenges related to implementing a multicomponent intervention, aiming to enhance communication between nurses and mechanically ventilated patients. The intervention was developed based on pre-existing clinical methods, combined with nurse education and a strategy containing new support tools delivered as a comprehensive evidence-based bundle. As the bundle contained components that were known to some of the nurses, some found that the ICU-COM was in line with the caring practices of the ICU department; others had difficulty identifying how the intervention brought something new to clinical practice. This affected the evaluation and underpins the need to repeat the intervention. Owing to busyness during the COVID-19 pandemic, the need for repetition was emphasised. Furthermore, the contrasting nature of the findings underlines that nurses' preferences and opinion about the usefulness of the ICU-COM differ.

CRediT authorship contribution statement

Anna Holm: Conceptualisation, methodology, investigation, formal analysis, writing (original draft), writing (review & editing), visualisation, project administration and funding acquisition. **Lone Nikolajsen:** Conceptualisation, methodology, formal analysis and writing (review & editing). **Pia Dreyer:** Conceptualisation, methodology, formal analysis and writing (review & editing).

Conflict of interest

None.

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