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An educational intervention to enhance critical care nurses' mentoring competence – a mixed-methods feasibility study

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Abstract

Background

Critical care nursing faces persistent staffing shortages, while nursing students' experiences during clinical placements influence educational completion and retention in the profession. Mentors are central to students' learning and professional development, yet few Norwegian critical care nurses have formal mentoring education. This study evaluated the acceptability and feasibility of an educational intervention tailored to Norwegian critical care nurses.

Methods

A convergent parallel mixed methods feasibility study was conducted in line with the UK Medical Research Council framework for complex interventions. Fourteen critical care nurses from four Norwegian intensive care units participated. The intervention comprised a self-paced online module and an in-person session, requiring approximately 10 hours in total. Acceptability was assessed through participant satisfaction, perceived workload, and willingness to recommend the course. Feasibility was assessed through recruitment, retention, adherence, and resource use. Data included pre- and post-course questionnaires, the Mentors' Competence Instrument, open-text responses, and field notes.

Results

The intervention was highly acceptable. Participants reported high satisfaction with the digital platform, course content, and especially the practical exercises. All rated the workload as appropriate and would recommend the course to colleagues. Qualitative findings showed that the course was perceived as relevant, engaging, pedagogically well structured, and well adapted to the critical care context. Feasibility was mixed. Retention was 100%, adherence was excellent, and resource use was modest. The main feasibility barrier was recruitment: only four of 20 contacted units participated, and recruitment lasted more than 12 months.

Conclusions

The intervention appears acceptable, relevant, and practical for participating Norwegian CCNs. However, recruitment procedures and organisational support must be improved before conducting a larger-scale evaluation.

Key messages regarding feasibility

1) What uncertainties existed regarding the feasibility?

Key uncertainties were whether participants would find the intervention relevant and engaging, and whether the recruitment strategy would yield enough participants to make a subsequent full-scale study feasible.

2) What are the key feasibility findings?

The intervention had good acceptability, retention and adherence, and moderate resource use, but recruitment of units was difficult and time-consuming.

3) What are the implications of the feasibility findings for the design of the main study?

A future main study should keep the intervention largely unchanged but revise the recruitment strategy and strengthen organisational support for participation.

Introduction

The global nursing workforce is facing a staffing shortage (1), and critical care nursing (CCN) is also affected. The COVID-19 pandemic has intensified these challenges, leading to higher levels of burnout and depression and a greater intention to leave the profession among critical care nurses than among other healthcare workers (2). Similarly, nursing students are at risk of discontinuing their studies, often because of negative experiences during clinical placements such as inadequate support or strained relationships with mentors (3, 4).

In this study, a “mentor” refers to an experienced nurse who, alongside their clinical responsibilities, guides, supports, and teaches nursing students during clinical placements. Mentors play an important role in nursing students’ professional development, as they facilitate learning and provide essential support during clinical placements. The effectiveness of mentoring is closely tied to the mentor's pedagogical skills (5), which affect students’ satisfaction and learning outcomes (6). Research highlights the importance of high-quality mentoring in clinical practice, which not only helps nursing students complete their education but also supports newly graduated nurses to remain in the profession (7, 8).

Some studies have explored mentoring competences in postgraduate nursing education (9, 10). There is, however, limited research focusing on mentoring in critical care settings, even though ICU placements are often perceived as more challenging than other clinical environments due to the complexity of patient care and the heightened reliance on mentors (11).

The structure and content of CCN education vary widely worldwide. In Norway, CCN education is a two-year master’s program consisting of 120 European Credit Transfer System (ECTS) credits, including at least 30 weeks of clinical practice (12). Only one-third of Norwegian CCNs who mentor students have formal mentoring education, and most CCNs, whether or not they have formal mentoring competence, report a need for further training in mentoring (13).

Globally, various educational programs have been developed to enhance mentoring competences among healthcare professionals (14–16). These programs range from short workshops to extended courses and use diverse teaching methods such as online learning, blended formats, and in-person sessions. Common topics include communication skills, feedback techniques, student-centered evaluation, and learning theories. Most interventions report positive outcomes, including improved confidence and self-perceived competence (14, 15). However, research on mentoring education in critical care nursing remains limited.

This study aims to evaluate the feasibility of an educational intervention tailored to the needs of Norwegian critical care nurses.

Methods

Study design

This study was based on the UK Medical Research Council's (MRC) framework on developing and evaluating complex interventions (17). It employed a convergent parallel mixed methods design (18), combining quantitative and qualitative approaches to evaluate the intervention's acceptability and feasibility (19). Acceptability was defined as participant satisfaction, perceived burden, and willingness to recommend the intervention. Feasibility was defined as the extent to which the intervention and study procedures could be implemented successfully, measured by recruitment success, retention rates, and adherence to the intervention and questionnaires.

Participants, recruitment and setting

Participants were Norwegian CCNs who mentored CCN students during clinical practice. We purposively recruited CCNs with varying experience and mentoring backgrounds. We contacted 20 ICUs and unit managers organised recruitment within their units. Recruitment began in December 2024, and the first group completed the intervention in May 2025. Recruitment continued through 2025, with the last two groups completing the intervention in January 2026.

Participants received a 500 NOK gift card as an incentive because parts of the intervention were expected to be completed outside working hours.

Sample size

Because the aim was to evaluate acceptability and feasibility, no strict sample size was set a priori. A minimum of 12 participants was chosen, following Julious (20).

Intervention development

The intervention was based on the European guideline on clinical nurse mentors' mentoring competence development (21). The development process followed the MRC guidance on developing and evaluating

complex interventions (17) and the Guidance on Developing Complex Interventions in Healthcare (22) to refine and adapt the intervention. The development process is reported in a previous study (23).

Briefly, the intervention comprised a self-paced online module of approximately six hours' study and a four-hour in-person module that included discussion of course topics and simulated student–mentor conversations, for a total of ten hours. A more detailed course description is provided in Additional file 1.

Intervention delivery

The first author (MR) gave a short introduction to participants, either individually or in groups, before the intervention, and then gave them access to the online learning platform. Participants completed the online module independently. MR supervised recruitment and completion of the online module.

The online module was built on the open-source Open edX platform. It comprised short texts, videos, and six written assignments in which participants reflected on their own experiences related to the course topics. The first author provided feedback on the assignments via the course platform.

The in-person modules were scheduled approximately one month after participants gained access to the online module. They were held in a room at or near participants' units and consisted of five simulated conversations and discussions on the course topics. Authors MR and LD led the in-person modules for all groups.

Measures

Participants completed a pre-survey that collected background information and included a Norwegian version of the Mentors' Competence Instrument (MCI) (24) before starting the course. After the course they completed a course evaluation questionnaire and a post-course MCI.

Mentors' Competence Instrument

The MCI is a self-evaluation tool designed to assess mentoring competence in nurses who supervise students in clinical practice. The instrument comprises 43 items across seven competence dimensions: mentoring practices in the workplace, mentor characteristics, motivation of the mentor, goal-oriented mentoring, reflection during mentoring, student-centered evaluation, and constructive feedback. Items use a four-point Likert scale with the following response options: (1) fully disagree, (2) disagree to some extent, (3) agree to some extent, and (4) fully agree. Because measuring effects was beyond the scope of this study, we focused on the instrument's acceptability and responsiveness to inform future definitive effect studies through effect size calculations.

Evaluation questionnaire

The intervention evaluation questionnaire was based on recommendations by Feely and Cossette (25) and inspired by the Course Experience Questionnaire (26). Participants estimated the time they spent on

the online module, reported how many times they logged into the platform, and indicated whether they used work time to complete the course. They also rated the experienced workload and their satisfaction with the digital platform, course content, and critical care context, and whether they would recommend the course to others.

The evaluation included quantitative questions using five-point Likert scales and open-text feedback fields. Depending on the question, the scales were either: (1) very poor, (2) poor, (3) neither poor nor good, (4) good, (5) very good; or: (1) not at all, (2) to a small extent, (3) to some extent, (4) to a large extent, (5) to a very large extent. The workload question had options: (1) much too high, (2) slightly too high, (3) just right, (4) slightly too low, (5) much too low.

Qualitative evaluation

Participants could provide open feedback and comments on each topic in the evaluation questionnaire. During face-to-face meetings the facilitators discussed the course experience with participants and recorded field notes of participant opinions and experiences, along with facilitators' observations and reflections. Open written feedback and field notes were used as qualitative data in this study.

Economic considerations

We evaluated the economic aspect of the intervention by calculating resource use from the perspectives of participants and facilitators.

Analysis

Descriptive statistics, including minimum and maximum values, means, and standard deviations, were used for questionnaire data. Hedges' g was calculated from paired-samples t-tests to analyse pre- and post-intervention MCI data for preliminary effect size estimation. Statistical analyses were conducted using IBM SPSS Statistics version 29. Authors MR and TAH performed the analyses. There was one missing data point in the course feedback and two missing data points in the MCI. Means were calculated excluding missing data.

Field notes and open feedback were analysed together utilising a directed content analysis (27). Because each open-ended question followed one of the two main topics in the questionnaire (course delivery and course content), these topics served as initial coding categories. The data were coded and analysed within the categories resulting in several subcategories. The codes could move between the categories if they related to another topic. Ultimately, the name of course content category was changed to align better with the results, and one additional category, organisational recommendations, was added. Authors MR and LD conducted the preliminary analysis and discussed the findings with the other authors before agreeing on the final categories.

Following the convergent parallel mixed methods design (18), the quantitative and qualitative results were first analysed separately and then merged in the discussion.

Ethical considerations

The study was approved by the Norwegian Agency for Shared Services in Education and Research (SIKT) for handling personal data (Reference number: 210976). Participants received written information in advance stating that participation was voluntary and that confidentiality would be maintained. The first author (MR) assigned each participant a unique code to link pre- and post-intervention questionnaires. The code key was stored separately and securely.

Results

Participants

A total of fourteen CCNs from four ICUs (two general, one medical, and one post-operative) participated. They were divided into five groups of two to four participants. One participant was male, and the rest were female. Participants were relatively experienced, with a mean age of 43 years and an average of 12 years' CCN experience. Four had formal mentoring education and six held a master's degree. Over half mentored several students each year, and only one mentored less than once a year. Participant characteristics are summarised in Table 1.

[Table 1]

Table 1. Participant characteristics		
Characteristic		n = 14
Gender	Female, n	13
	Male, n	1
Age, mean (SD)		42.9 (9.7)
Work experience as nurse in years, mean (SD)		18.6 (9.9)
Work experience as CCN in years, mean (SD)		11.9 (9.4)
Mentoring experience in years, mean (SD)		13.4 (8.0)
Formal mentoring education	Yes, n	4
	No, n	10
Master's degree	Yes, n	6
	No, n	8
Frequency of mentoring students	More than one student per year, n	8
	One student per year, n	5
	One student every other year, n	1
SD = standard deviation		
CCN = critical care nurse		

Acceptability

Participant satisfaction and experienced workload

Participants were very satisfied with the learning platform and course contents, with mean scores to all questions above four on a scale from one to five. The practical exercises were rated the highest (4.93) and the clarity of expectations the lowest (4.14). Table 2 presents the participant satisfaction.

[Table 2]

Table 2. Course satisfaction (n = 14)		
Learning management system evaluation:	Mean (SD)	Median (min-max)
How well did the access and login to the course function?	4.71 (0.61)	5 (3–5)
How well did the course platform function technically?	4.57 (0.51)	5 (4–5)
How easy was it to navigate and find your way around the course platform?	4.5 (0.65)	5 (3–5)
How did the course look visually?	4.62 (0.51)	5 (4–5)
Course content evaluation:		
How do you assess the clarity of the learning objectives for the course?	4.36 (0.84)	5 (2–5)
How well did you understand what was expected of you during the course?	4.14 (0.36)	4 (4–5)
How do you assess the quality of the course material in the theoretical part?	4.5 (0.65)	5 (3–5)
How do you assess the quality of the feedback you received on the course?	4.57 (0.51)	5 (4–5)
How do you assess the quality of the practical exercises on the course?	4.93 (0.27)	5 (4–5)
How do you assess your ability to manage your own learning in the course?	4.57 (0.51)	5 (4–5)
Overall, how satisfied are you with the course?	4.93 (0.27)	5 (4–5)
All scales on 5-point Likert scale: 1: very poor, 2: poor, 3: neither poor nor good, 4: good, 5: very good		

All 14 participants rated the workload as 3 (just right) on a scale where 1 = much too high and 5 = much too low.

Functionality and context-specificity

Participants recommended the intervention for CCNs with varying experience and mentoring competence. On average they indicated the intervention would work well as the sole mentoring course for CCNs, as an introduction before formal mentoring education, and as a refresher after formal training, but the responses were more dispersed for these items. Opinions varied on how important it was that the course be CCN-specific, but all agreed it had successfully addressed CCN needs. Functionality outcomes are shown in Table 3.

[Table 3]

Table 3
Course functionality (n = 14)

To what extent would you recommend this course to:	**Mean (SD)**	**Median (min-max)**
Inexperienced CCNs without formal mentoring competence?	4.5 (0.65)	5 (3–5)
Inexperienced CCNs with formal mentoring competence?	4.36 (0.75)	5 (3–5)
Experienced CCNs without formal mentoring competence?	4.79 (0.43)	5 (4–5)
Experienced CCNs with formal mentoring competence?	4.36 (0.84)	5 (3–5)
To what extent do you think this course could function as:		
The only course on mentoring competence for critical care nurses?	4.29 (0.61)	4 (3–5)
An introductory course before taking a formal mentoring course at a university?	4 (1.24)	4 (1–5)
A refresher course after completing a formal mentoring course at a university?	4.29 (1.20)	5 (1–5)
To what extent do you agree with the following:		
It was important to me that the course was specific to critical care nursing.	4.21 (1.12)	5 (2–5)
The course succeeded in being specific to critical care nursing.	4.64 (0.50)	5 (4–5)
All scales on 5-point Likert scale: 1: not at all, 2: to a small extent, 3: to some extent, 4: to a large extent, 5: to very large extent CCN = Critical care nurse		

Feasibility

Recruitment, retention and adherence

Unit managers were first contacted by email, which was the only contact method for most units. If email contact failed, we attempted telephone contact. We contacted 20 units in total, of which four participated in data collection. Figure 1 shows the flow chart with reasons for non-participation.

[Figure 1]

Unit managers did not provide data on how many CCNs were invited to participate, so recruitment within units could not be evaluated. All participants completed the intervention, yielding a retention rate of 100%. One participant did not complete one reflection assignment in the online module. Otherwise, all participants completed the intervention as intended.

All participants completed the Mentors' Competence Instrument before and after the intervention (100% retention). The analysis indicates a positive change in all measured dimensions and effect sizes varied from medium to large in this sample (Additional file 2).

Time used to complete intervention

On average, participants used 7.8 hours (SD 3.3, min 3, max 15) to complete the online module using on average 6.4 (median 4) separate times to log on to the platform. One participant completed the whole module in one sitting while the participant with most separate times logged on 20 times. We had estimated that we would use four hours on the in-person module but ended up using three hours for this part with all groups.

Nine participants had the opportunity to complete the course during worktime while four reported having completed the course only partly in worktime. One participant completed the course completely outside of working hours.

Qualitative course evaluation

The qualitative course evaluation touched both acceptability and feasibility aspects but were analysed and presented separately. Three categories were identified in the analysis of qualitative data: course delivery, relevance to context, and organisational recommendations.

Course delivery

The participants gave feedback on the learning platform in written evaluations and face-to-face discussions. Overall, it was viewed positively, though some found navigation awkward and noted it worked better on a computer than on a mobile device. Clearer instructions were suggested to improve usability.

All participants praised the course structure and balance of text, videos, assignments, and practical exercises, noting a clear pedagogical progression. The only critique was that some learning outcomes were unclearly formulated. Many were surprised by the time required for written assignments but found them engaging and conducive to reflection, helped by the lack of strict technical requirements, as illustrated by a comment from one participant: *"I was somewhat surprised by the amount of writing involved, but in hindsight, it was probably necessary to benefit fully from the course."*

Nearly all were very satisfied with the practical module. Simulated conversations were new for everyone, but facilitators had managed to create a safe environment, and group size was considered optimal.

Relevance to context

Feedback on the course content was mostly positive. Participants were pleasantly surprised, especially by the practical material, which they found highly relevant. Several appreciated the concise format as brief but sufficiently challenging.

Assignments were regarded as the core of the online module. Participants agreed they were relevant and practice-based, though several suggested better balancing and noted that one particular assignment was unclear, as one participant commented: *"I found the written assignment on learning objectives complicated. I did not fully understand how it was intended to be written."*

Practical exercises were well received and seen as relevant and engaging. Cases were challenging enough to support learning without being overly difficult.

Organisational recommendations

All participants were highly satisfied with the course and would recommend it for colleagues. Most hoped colleagues could attend despite resource constraints, viewing it as excellent value for the invested time. Those who completed the course partly or entirely outside work were equally satisfied but stressed that future participants should be allowed to take it during work hours. Several suggested making the course mandatory for CCN mentors, and one proposed integrating it into CCN education. A comment from one participant: *"We should have been allowed to complete the course during working hours, since it benefits the unit, and it and should eventually become mandatory."*

Economic considerations

Participants reported that they used on average 7.8 (median 7) hours on the online module. Instead of estimated four hours, we used three hours on each in-person module, adding up to a total of 10 to 11 hours of work to complete the intervention. All in-person modules were conducted at participants' workplace requiring no additional travel expenses of the participants. The groups for in-person modules consisted of two to four participants.

The first author delivered the online module and provided written feedback, averaging about 1.5 hours per participant. Combined facilitator time averaged 3.5 hours per participant (primary facilitator 2.5 h, co-facilitator 1 h), including brief preparation and debrief but excluding time spent on intervention development and extended evaluation.

Discussion

The aim of this study was to evaluate the acceptability and feasibility of an educational intervention designed to enhance CCNs' mentoring competence. A total of fourteen CCNs from four different ICUs

participated in the study. The quantitative evaluation was predominantly very positive, while the qualitative data further elaborated on these findings. At the same time, the qualitative data provided constructive feedback for further refinement of the intervention. Table 4 summarises the feasibility outcomes which are discussed further below.

[Table 4]

Table 4
Feasibility outcomes

Feasibility area	Criterion/data source	Result	Interpretation
Acceptability	Satisfaction	Good	Feasible
	Perceived burden	Good	
	Willingness to recommend	Good	
Retention	Participants completing course	14/14	Feasible
Adherence	Completion of assignments	One missed assignment	Feasible
Workload	Participant time use	10–11 hours	Acceptable but needs management support
Resource use	Facilitator time	3.5 h/participant	Feasible but may need adaptation
Recruitment	Units contacted and enrolled	4/20 units	Not feasible without revision

Evaluation of acceptability

The intervention and how it was delivered were well received by the participants. Results in both course evaluation questionnaire and qualitative data show that they were especially satisfied with the practical content and how the course was pedagogically aligned. Even though the intervention was based on an evidence based model (21), the MRC framework for developing and evaluating complex interventions (17) requires evaluation of the context when implementing existing interventions in new settings. According to participants in our study, the intervention succeeded in framing the topic in critical care context with relevant examples and cases.

Participants gave valuable open feedback on specific parts of the intervention which will be used to further refine the intervention. For example, several instructions could be clearer and one written assignment was difficult to comprehend according to several participants.

Both the quantitative and qualitative evaluation suggest that the intervention succeeded in being interesting and engaging for the participants, and all participants would recommend it for colleagues.

Evaluation of feasibility

Retention and attrition are important aspects of a feasibility study (28). In our study, all participants who started the intervention also completed the intervention and answered all pre- and post-intervention questionnaires giving a retention rate of 100%. However, in a larger-scale evaluation study, more attrition can possibly be expected when implementing a follow-up measurement. For example, in a study utilizing the same original intervention guideline as our study, Oikarainen et al. (29) report retention rates of 43% and 15% in fulfilling the follow-up questionnaire after six months for intervention and control groups respectively.

Adherence to the intervention elements was also very good in our study. One participant did not complete one written assignment in the online module. All other participants completed the intervention as intended and found it engaging and relevant. Although the intervention was relatively short, this finding suggests that participants considered it worthwhile to invest time in, a view supported by open feedback and discussions during the in-person module.

This study used the MCI to assess changes in self-evaluated mentoring competence and to inform power calculations for a subsequent evaluation study. The sample was small, and change was assessed only from pre-intervention to immediate post-intervention; moreover, estimating intervention effects was not a primary aim at this stage. However, all participants completed both surveys, and the MCI indicated positive changes in self-reported mentoring competence, with effect sizes ranging from moderate to large. These findings suggest that the MCI is a suitable instrument for evaluating intervention effects in a future study.

Economic evaluation was done from a resource perspective. The intervention was estimated at about 10 hours per participant. Although the split between online and in-person time shifted, the total remained similar. Time use varied, with one participant reporting 18 hours. According to the participants, clearer instructions for written assignments might reduce this variation. From the facilitators' viewpoint the in-person module was most resource intensive, with two facilitators each spending about three hours per group of 2–4 participants. A group size of three participants and two facilitators for the in-person modules was seen as optimal by facilitators and participants in our study.

Only four of the 20 contacted intensive care units participated, and recruitment took more than 12 months. Some units never responded. Most units were initially interested but withdrew when asked to allocate work time for the participants to complete at least part of the intervention. Management support plays a pivotal role in engaging nurses in research (30), including in the Norwegian CCN context (31). Our results suggest that, although participants experienced the intervention positively at an individual level, it did not succeed in engaging unit managers. According to King et al. (32), self-motivation, relevance to practice, a focus on workplace learning, strong leadership, and a positive culture

are interrelated factors that contribute to successful continuing professional education. Mlambo et al. (33) report similar findings among nurses, emphasising the importance of access to opportunities and protected time for continuing professional development. Participants in our study likewise stated that it was important for mentoring education to be facilitated during work hours. We aimed to make the course as accessible as pedagogically reasonable by keeping it compact, delivering most of the content online, and travelling to the units to conduct the in-person modules. We did not explore the reasons for non-participation beyond the categories presented in Fig. 1, but we observed that only two unit managers were actively engaged in organising the course delivery within their unit.

The achieved recruitment rate is insufficient to support a subsequent evaluation study, so the recruitment process must be refined. Possible approaches include revising the recruitment strategy to emphasise closer collaboration with unit managements and embedding recruitment in unit workflows and broadening the target group to other nursing specialties such as operating room and anaesthetic nurses.

Strengths and limitations

This study followed established frameworks, guidelines, and checklists, contributing to methodological rigour. The intervention was based on an evidence-based framework and was thoroughly developed in a previous study before feasibility testing. The MCI self-evaluation tool is well established in this field.

The study was not pre-registered but was part of a larger project with predefined outcomes. It did not include a comparison group, which would have provided valuable information on recruiting a comparator for a future evaluation.

The first author had a dual role as investigator and facilitator and knew some participants beforehand. These factors could have introduced social desirability bias into the evaluation as anonymity could not be maintained in this study setting. These issues were discussed with all participants in advance, and it was emphasised that constructive feedback was crucial for the evaluation.

Recruitment was a major challenge. Number of participants and participating units were low, and all units were from university hospitals, introducing selection bias. The units were, however, located in different parts of Norway, and the participants were considered to have formed a representative sample of Norwegian CCNs. We recruited 14 participants before recruitment was discontinued due to project time constraints. We judged that the study's primary aim was met.

Conclusion

This feasibility study found the intervention to be acceptable and relevant for Norwegian critical care nurses. Participants were highly satisfied with the course content and practical exercises, rated the workload as appropriate, and showed excellent adherence and retention. Resource use was modest at about 10 hours per participant, with combined facilitator time averaging roughly 3.5 hours per participant.

The main feasibility barrier was recruitment. Only four of 20 units participated, and recruitment took over 12 months, limiting generalisability and the practicality of scaling up the study. Before a larger evaluation, the recruitment approach must be revised to secure unit participation and reduce barriers to participation.

Abbreviations

CCN
Critical care nurse/nursing
ICU
Intensive care unit
MCI
Mentors' Competence Instrument

Declarations

Ethics approval and consent to participate: Informed consent to participate was obtained from all participants. The study adhered to Helsinki Declaration and received approval from the Norwegian Agency for Shared Services in Education and Research (SIKT) for the handling of personal data from participants (Reference number: 210976). According to the Norwegian Health Research Act (https://lovdata.no/dokument/NL/lov/2008-06-20-44) a research project on humans requires an ethical approval if the purpose is to study health or sickness, and/or the project gathers health related data. This project gathered critical care nurses' opinions on a non-health-related intervention, and thus no ethical approval was required.

Consent for publication: Only anonymised data is presented in the manuscript. All participants provided written, informed consent for the use of data from the focus group interviews.

Availability of data and materials: The anonymised dataset used and/or analysed during the current study is available from the corresponding author on reasonable request.

Competing interests: Authors of this article declare no competing interests.

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Authors' contributions: MR, MEK, BN, KM and TAH made substantial contributions to the concept and design of the study. MR and LD were responsible for the acquisition of data. MR, LD, MEK, BN, and TAH analysed and interpreted the data. MR drafted the original manuscript, and LD, MEK, BN, KM and TAH critically revised it for important intellectual content. All authors read and approved the final manuscript.

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Figures

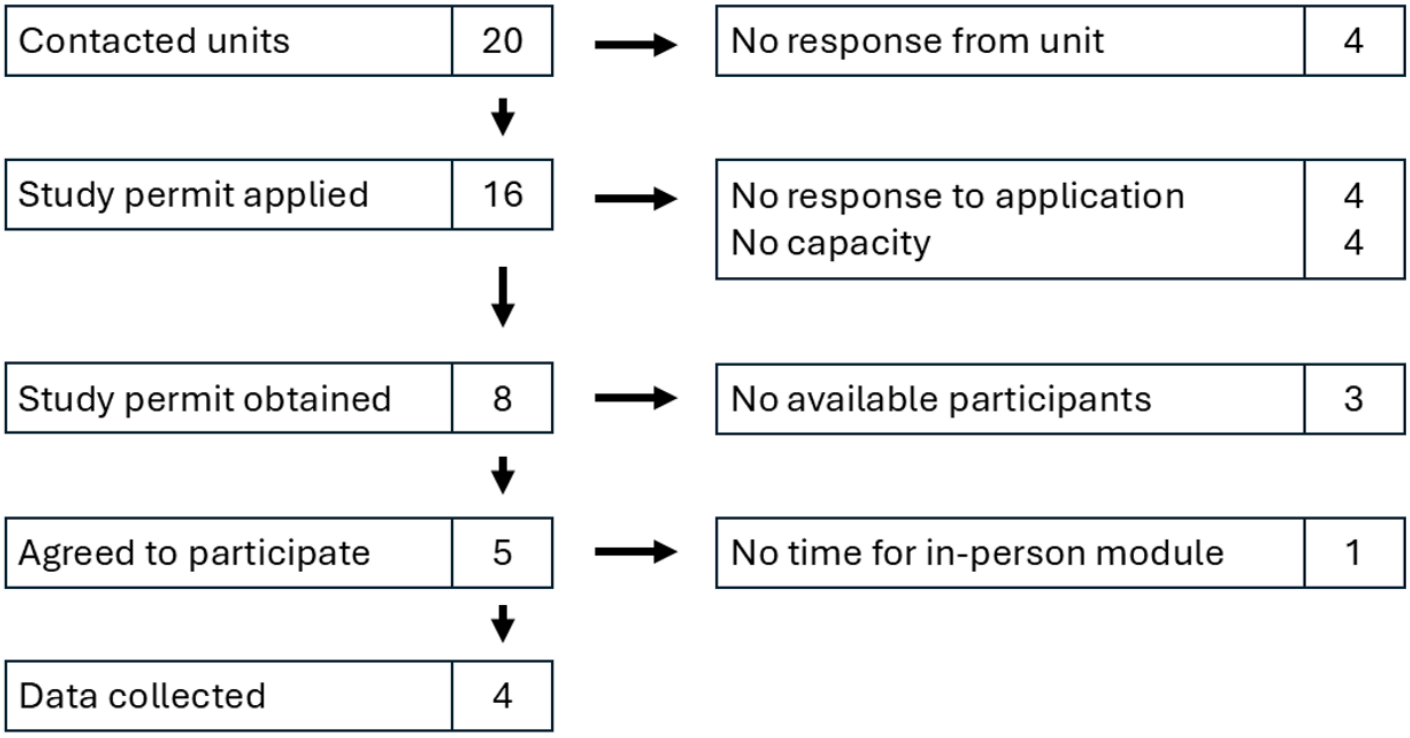


Figure 1

Recruitment flow chart with reasons for non-participation

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