

Short Communication

Hybrid training in rural, remote and island health care: insights from Scotland and the US

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Abstract

Introduction: Healthcare professionals in remote, rural, and island areas face challenges including professional isolation, limited access to continuing professional development, and the difficulty of staying connected with peers. Hybrid training, combining online and in-person learning, has been suggested as a potential solution to address these issues, but its impact on healthcare professionals' practices in such settings remains under-researched. This study explores the perceived benefits, changes in practice, and challenges of hybrid training in Scotland and the US, focusing on two programs: the Pre-Hospital Emergency Care Program in Scotland and the Tele-Ed Program in Georgia, US.

Methods: A qualitative case study design was used to explore the impact of hybrid training on healthcare professionals in rural, remote, and island settings. Participants included both learners and trainers from two hybrid training programs conducted between August 2023 and February 2024. Semi-structured interviews were conducted from February to May 2024, and the data were analysed using reflexive thematic analysis. Ethics approval was obtained from the University of Aberdeen and Augusta University institutional review boards.

Results: Eight participants were interviewed (four from Scotland and four from the US). Data analysis revealed two main themes: specific rural healthcare challenges and training adaptations, and hybrid training modality. Subthemes for the hybrid training

modality included training experiences, challenges, and participant evaluations of the training format. Both the Scottish and US participants highlighted challenges unique to rural health care, such as professional isolation and limited resources. Regarding hybrid training, some participants valued its structured framework, while others experienced difficulties with online engagement and technical issues.

Discussion: The study reinforces the importance of accessible and flexible education for rural healthcare professionals, demonstrating the potential of hybrid training to reduce professional isolation and build confidence, especially in high-pressure scenarios. The findings also highlight challenges, particularly with online engagement and course availability. The training's practical application in real-world settings was evident, with participants reporting improvements in clinical practice and interdisciplinary teamwork.

Conclusion: Hybrid training holds promise in addressing key challenges faced by healthcare professionals in rural, remote, and island settings. While it can reduce isolation and enhance professional development, improvements are needed in online engagement and contextualisation of content. Future research should explore the long-term effects of hybrid training on healthcare providers' retention, professional isolation, and patient outcomes.

Keywords

continuing education, health workforce, professionalism, rural health services.

Introduction

Healthcare professionals practising in remote, rural, and island practices encounter significantly more clinical, professional, and social challenges than their urban counterparts. Some of these challenges include limited access to continuing professional development (CPD) and specialised training as well as increased professional isolation, or the feeling of being disconnected from peers, lacking mentoring or opportunities for professional interaction¹⁻⁴. These challenges could have lasting impacts on both patient care and the retention of healthcare providers in these regions^{2,5}.

There has been an increasing need for solutions to these challenges globally. Hybrid training, using both synchronous (face-to-face) and asynchronous (web-based) modalities for learning, has been identified as a potential solution. The hybrid training method has lower time and cost expenses than traditional training programs and provides the opportunity to reduce professional isolation^{2,3}, something that has been noted as a challenge with purely online learning in healthcare professionals⁶. While promising, the impact of hybrid training on healthcare professionals' practice in rural, remote, and island settings remains under-researched^{5,7}.

The main objective of this study was to explore how hybrid training can promote changes in healthcare practices in remote, rural, and island settings by answering the following research questions:

- What are the perceived benefits of attending hybrid training on remote, rural, and island practice for healthcare professionals who attend such training?
- What changes, if any, to individual perceptions or practice come about as a consequence of attending such training, and why?

The study explored hybrid training in two programs in different geographic areas: the Pre-Hospital Emergency Care (PHEC) Program in Scotland and the Tele-Ed Program in Georgia, US.

Methods

Approach and recruitment

A qualitative case study design explored the impact of hybrid training on healthcare professionals in remote rural and island settings in both the UK and the USA to allow for a detailed comparison of both shared and distinct aspects related to organisational, geographical, and cultural contexts.

Two hybrid training programs were purposefully selected: the Pre-Hospital Emergency Care Programme in Scotland, UK and the Tele-Ed Program in Georgia, US. These programs were selected because they contained hybrid training with an online element and an in-person element, focusing on healthcare challenges or relevance to remote and rural health. All those who participated in either training program between August 2023 and February 2024 were emailed to invite them to participate. In addition, individuals involved in either developing or delivering the programs were also invited to participate by email.

Data collection and analysis

Data were collected and recorded via online semi-structured interviews conducted between February and May 2024 to ensure participants had time to reflect on training participation. Interviews invited participants to describe their experiences with hybrid training, perceptions of any impact on professional practice, and any challenges they faced in applying what they learned during training. The concept of professional isolation was embedded within the interview schedule³.

Interview transcripts were analysed using reflexive thematic analysis^{8,9}. Initially MFOM, AL, and AR read transcripts to familiarise themselves with the data and agreed on initial codes. These codes were then applied systematically across all transcripts. Once coded, themes were generated by MFOM, AL and AR. These themes were then discussed and refined with the wider researcher team (PN, DK, FN, and SAM) before being finalised. This approach, and the varied perspectives of the research team (healthcare practitioner, educator, education developer, educational researcher, remote and rural health researcher, and healthcare student), enabled a deep exploration of participant experience without a preconceived framework.

Our study had focused aims, embedded the theory of professional isolation within its design, and generated rich data. We also recruited a diverse sample and conducted cross-case analysis. During analysis sufficient information power was deemed to have been met due to lack of further substantive codes in the final transcripts coded¹⁰.

Ethics approval

Ethics approval was granted for this study by the University of Aberdeen, School of Medicine, Medical Sciences and Nutrition Ethical Review Board (724155) and Augusta University Institutional

Review Board (2066784-2).

Results

The sample comprised eight participants: four from Scotland and four from the US. Information regarding whether participants were learners or trainers, along with their participant codes, is presented in Table 1

Participants represented a diverse mix of clinical and academic perspectives, including hospital-based and primary care physicians, emergency medicine physicians (past and present), and nurse practitioners.

Two main themes were derived from the data analysis: rural healthcare challenges and adaptations, and hybrid training modality. The theme of rural healthcare challenges and adaptations had one subtheme, and the hybrid training modality theme had three subthemes. Definitions and representative quotes for each subtheme are shown in Table 2.

Table 1: Study sample characteristics

Region	Role	Participant identification	Gender
Scotland	Learner	Learner 1	Male
	Learner	Learner 2	Male
	Learner	Learner 3	Female
	Trainer	Trainer 1	Female
US	Learner	Leaner 4	Male
	Learner	Learner 5	Male
	Trainer	Trainer 2	Male
	Trainer	Trainer 3	Female

Table 2: Key study themes and subthemes with definitions and supporting participant quotes

Theme	Subtheme	Definition	Participant quotes
Specific rural healthcare challenges and training adaptations	Specific rural healthcare challenges and training adaptations	Challenges faced by healthcare professionals in rural settings, including professional isolation and limited access to resources and training	'Working in rural areas means we often need to stabilize patients for longer, especially when the nearest cardiac center is far away.' (learner 4) 'That is, and I think there's one coming up soon on hypothermia and I thought that would be a good one to do, but it's in [name of town], so it's quite far away.' (learner 3)
	Hybrid training experience and adaptation	Participants' experiences with the hybrid training model and how they adapted to the format, both benefits and challenges	'I found the course really beneficial because it really consolidated a lot of my knowledge and 'made me feel more confident.' (learner 1) 'It's really helpful having that structured framework to work through when you're in a high-pressure situation.' (learner 1)
	Challenges and improvements	Specific challenges participants encountered with the hybrid format and suggested improvements	'Technical issues with the online sessions sometimes made it hard to stay engaged.' (learner 4)
Hybrid training modality	Training modality	Participants' evaluations of the hybrid model, including preferences for online or in-person sessions	'The online videos were clear, but the in-person sessions were where I really developed my practical skills.' (learner 4)

Theme 1: Specific rural healthcare challenges and training adaptations

Subtheme 1: Specific rural healthcare challenges and training adaptations

Both Scottish and US participants highlighted significant challenges unique to rural health care. These include working with healthcare providers of varying experience levels (learner 2), and stabilising patients far from advanced care facilities (learner 4). Additionally, rural healthcare professionals face professional isolation and limited access to continuing education compared to

their urban counterparts (learner 3, learner 5). In these responses, participants noted where they perceived potential benefits from attendance at appropriately adapted training for rural healthcare professionals.

Theme 2: Hybrid training modality

Subtheme 1: Hybrid training experience and adaptation

Learner 1 appreciated the structured framework, which proved helpful in high-pressure situations experienced in rural settings; Learner 2 found that attending the course twice reinforced key

concepts useful for rural practice. Learner 4 found the online component less engaging compared to traditional live lectures and preferred more interactive experiences.

Subtheme 2: Challenges and improvements

Participants highlighted challenges with the hybrid format. Trainer 1 mentioned that the course was often oversubscribed. Both Learner 2 and learner 4 struggled with the online components. Learner 4 suggested more practical, hands-on training, while learner 5 recommended region-specific resources to address local (rural) healthcare challenges.

Subtheme 3: Training modality

Responses to the hybrid training modality were mixed. Learner 1 found the practical component critical for building confidence in rural practice. Learner 4 noted that the online lectures lacked engagement and advocated for a greater balance between online and in-person sessions to enhance the overall learning experience, particularly for skills development.

Discussion

This study provides insights into the impact of hybrid healthcare training on rural, remote, and island practice, focusing on the experiences of healthcare professionals in Scotland and the US. The findings align with existing literature on the value of accessible, flexible education for rural practitioners while identifying specific benefits and challenges associated with the hybrid model.

Perceived benefits of hybrid training

Hybrid training was widely perceived as a valuable approach for rural healthcare professionals, supporting skills development, confidence-building, and improved patient care. Participants emphasised that structured training frameworks helped them feel more prepared for emergency scenarios, especially under pressure. These findings align with previous research indicating that hybrid models enable healthcare professionals in remote areas to access learning without the logistical constraints of travel, reducing professional isolation and fostering a sense of community among practitioners^{11,12}. The structured nature of hybrid training was particularly beneficial in reinforcing knowledge through repeated exposure, as noted by participants who attended courses more than once.

Challenges of hybrid training and areas for improvement

Despite its advantages, the hybrid training model presented several challenges, especially with online engagement and accessibility. Participants found that while online modules provided foundational knowledge, they lacked the interactive depth of in-person training, leading to lower engagement for some learners. This is consistent with existing critiques of digital learning, which emphasise the need for interactivity to maintain learner engagement¹³. Additionally, some participants highlighted technical issues as barriers to online participation.

Another key challenge was the availability of training opportunities. Some participants noted that hybrid training courses were frequently oversubscribed, limiting access for those who wished to attend. While the training covered essential clinical skills, participants suggested that additional content tailored to

region-specific challenges and patient demographics would further enhance applicability. These findings suggest that while hybrid training is effective, optimising its design, through increased course availability, enhanced online interactivity, and greater contextualisation for different rural settings, could improve impact.

Changes to individual perceptions and practice as a result of hybrid training

A key outcome of the training was its practical application in real-world settings. Participants from both Scotland and the US described specific instances where skills learned during the training were directly applied in clinical practice, particularly in emergency care and patient stabilisation. Several learners also noted that, beyond clinical skills, the training fostered improvements in interdisciplinary teamwork, leadership, and confidence in decision-making – skills that are critical for rural practitioners who often work with limited support. These novel findings indicate that hybrid training not only delivers essential technical knowledge but can also support professional development and enhance workforce resilience.

Limitations and future directions

As a small-scale study, these findings are based on a limited sample of participants from two training programs, which may not fully capture the broader diversity of rural, remote, and island healthcare training needs. Further research with a larger participant pool and across diverse healthcare settings would help to confirm these findings and refine hybrid training models. Additionally, while this study focused on immediate and short-term impacts, future work should explore the long-term effects of hybrid training on professional retention, ongoing CPD engagement, and patient outcomes.

Conclusion

This study extends previous research to demonstrate that hybrid training has the potential to help healthcare professionals overcome the barriers that limit their access to CPD and other resources, while also potentially reducing professional isolation; this is a delicate balance for training providers. While hybrid training may be effective in reducing the barriers, improvements in online engagement and region-specific content are necessary to enhance impact. Future work should explore the long-term effects of hybrid training on provider retention, professional isolation, and patient care.

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Conflicts of interest

The authors declare no conflicts of interest.

AI disclosure statement

The authors declare no AI or AI-assisted technology was used to formulate questions, hypothesis or to design or conduct experiments; draft or revise any parts of the paper; translate any

part of the paper; collect, analyse, interpret or visualise data or generate synthetic data or images used in this research.

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