Review

Paramedic-delivered teleconsultations: A scoping review

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Abstract

Introduction

Progression in the field of paramedicine has resulted in the development of novel roles within the profession, including the role of advanced paramedics providing teleconsultations for frontline paramedics. Little is known about the experience of paramedics providing or receiving teleconsultations. This scoping review aimed to investigate paramedic perceptions of physician and paramedic-delivered teleconsultations.

Methods

A scoping review of MEDLINE, CINAHL and EBM Reviews as well as paramedic-specific journals and the grey literature was conducted. Articles were included if they examined advanced paramedics, paramedics, emergency ambulance crew or emergency medical technicians receiving teleconsultations, or physicians and advanced paramedics providing teleconsultations.

Results

A total of 7461 unique citations were identified. Two citations were ultimately included in the review. One study examined the delivery of teleconsultations by advanced paramedics and one by physicians, both from the perspective of paramedics. Paramedics delivering teleconsultations generally considered the experience to be positive, while those receiving paramedic-delivered teleconsultations felt the level of advice was appropriate and assisted in expanding their own knowledge base. Paramedics receiving physician-delivered teleconsultations reported variable understanding of the unique challenges of out-of-hospital care and tension in the relationship between paramedics and physicians.

Conclusion

Little literature was identified examining the perceptions of paramedics delivering or receiving physician-delivered or paramedic-delivered teleconsultations. Given the continuing expansion of teleconsultation programs for out-of-hospital staff, this represents a significantly understudied area.

Keywords:

paramedic; prehospital; medical control; clinical support

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Introduction

The profession of paramedicine has undergone significant changes since its inception over 50 years ago (1). Moving from a model of care involving basic life support measures and rapid transport, paramedics now provide an increasingly advanced scope of medical care in the out-of-hospital setting (2,3). Paramedics may now be found providing clinical care in the community (4), in emergency departments (5) and in general practitioner clinics (6). Additionally, out-of-hospital paramedics now provide independent onward referral services (7,8) and an ever-expanding array of advanced life-support interventions (2,3,9,10). However, despite these developments within the profession paramedics working in the out-of-hospital setting continue to work in an exceptionally ambiguous environment with variable access to definitive diagnostic lab testing or medical imaging in the face of often competing priorities in patient management or resuscitation. The potential risks of this ambiguity are compounded by the fact paramedics often work alone or in tandem, with limited access to further resources and support in times of indecision or crisis.

In an attempt to mitigate the risk of these circumstances and provide sufficient clinical support to paramedics working in the out-of-hospital setting, many ambulance services provide access to teleconsultation services. Historically, these services have been provided by physicians located in the emergency department or by on-call physicians contracted by the ambulance service (11-14). Physicians in this role provide variable services dependent on the jurisdiction in which the paramedic practices, with some paramedics seeking teleconsultations for approval of advanced clinical interventions under a physician's license and others seeking enhanced clinical decision making to support their autonomous clinical practice (11-14). However, as the foundational education of paramedics has increased and specialist roles in paramedicine have grown, ambulance services have recognised the role paramedics may play in providing teleconsultations and subsequently developed such services (15-17).

It appears little literature examines the experiences of paramedics providing or receiving teleconsultations, either from a peer or physician, with no previous scoping or systematic reviews. In circumstances where information has not been previously reviewed or may be diverse in nature a scoping review may be preferable to a systematic review (18,19). Given the need for an explorative approach to this literature review, a scoping review was chosen to evaluate paramedic perceptions of teleconsultations delivered by physicians or paramedics. Specifically, this scoping review aimed to investigate the state of evidence relating to paramedic perceptions of physician and paramedic-delivered teleconsultations with the underpinning research question: "what is known about how paramedics perceive receiving or delivering teleconsultations in the literature?"

Methods

Moving beyond the original six stages proposed by Arksey and O'Malley (20), this scoping review was based on the framework proposed by the JBI Manual for Evidence Synthesis (21). There is no previously published scoping review protocol available for this review as it was completed as a component of one author's (RA) Master of Science dissertation.

Inclusion and exclusion criteria

This scoping review included articles involving advanced paramedics, paramedics, emergency medical technicians and emergency ambulance crew receiving teleconsultations, or physicians and advanced paramedics providing teleconsultations.

The concepts of interest were paramedic perceptions of both physician and paramedic-delivered teleconsultations, as well as paramedic or physician perceptions of delivering these teleconsultations.

The review was limited to the context of emergency, unplanned care in the out-of-hospital setting and so did not include articles examining paramedics working in settings such as the emergency department or general practitioner clinics. The review was not limited by geography.

Types of evidence sources

Sources of evidence were restricted to qualitative research in which paramedics or physicians were able to express their perceptions of receiving or delivering teleconsultations. Quantitative research was not considered as it sought to inform the performance of a grounded theory inquiry into paramedic-delivered teleconsultations.

Search strategy

An initial search was conducted using MEDLINE and CINAHL to identify common keywords and themes in the titles and abstracts of retrieved and relevant articles. These keywords were subsequently used to develop full search strategies and adapted for each information source. Reference lists of included sources were reviewed for potential sources missed within the search strategy. English-language articles only were considered for inclusion (owing to time and feasibility constraints).

Sources of evidence, screening and selection

Databases were searched using OVID, including MEDLINE, CINAHL and EBM Reviews, from date of inception until September 30th 2020. A number of paramedic-oriented journals were manually searched using keywords identified during stage one and two of the literature search. The grey literature was examined using Google Scholar, the OpenGrey search engine and other search engines to attempt to identify any potentially unpublished research relevant to the research question. Identified citations were imported into EndNote X9. Articles

were initially screened for inclusion based on title and abstract examination against the inclusion criteria. If any doubt existed regarding suitability, the article full text was retrieved and reviewed for possible inclusion. If doubt still existed and agreement could not be reached between reviewers, an independent colleague was consulted for deliberation.

Data extraction and analysis

Information from retrieved articles which met the inclusion criteria were analysed and data relevant to informing the research question was extracted (Table 1). Given scoping reviews by design provide an overview of the current available evidence to summarise the current understanding of a concept and assist in identifying gaps in the literature rather than providing statistically significant results (19,20), the quality of evidence retrieved was not examined (21).

Results

Study inclusion

The search of databases revealed a total of 8220 citations, with 7460 remaining after removal of duplicates. An additional record

potentially meeting inclusion criteria was found during manual searching of paramedic-oriented journals. 7420 citations were identified as not relevant based on initial screening of titles, with 41 article abstracts reviewed for possible inclusion. An additional 35 articles did not meet the criteria for inclusion based on review of the abstracts, with six full-text records retrieved. Three citations were excluded as they did not explore paramedic or physician perceptions of receiving or delivering teleconsultations, while one was excluded as a quantitative examination. This left two unique citations for inclusion in the review (22,23).

Characteristics of included studies

This scoping review of the literature identified just two unique citations, which are summarised in Table 1. Studies were published in 2013 (22) and 2018 (23) respectively, with one set in the United Kingdom (22) and one in Canada (23). Both studies used qualitative methods, one using mixed methods combining focus groups and qualitative surveys (22), while the other used a qualitative survey (23).

A total of 309 paramedics were included between the two studies (22,23). Eleven of these were advanced paramedics

Figure 1. Study inclusion

in specialist paramedic roles delivering teleconsultations, while 42 were frontline paramedics and 14 were emergency medical technicians (EMTs) receiving paramedic-delivered teleconsultations (22). 184 primary care paramedics (PCPs) and 58 advanced care paramedics (ACPs) working in non-specialist roles receiving physician-delivered teleconsultations were also included (23). Both studies were conducted with paramedic staff working in the out-of-hospital environment (22,23).

Review findings

Paramedics delivering teleconsultations

The primary focus of the research by Jackson and Jones (22) was the experience of advanced paramedics in north-west England delivering teleconsultations. Two focus groups of 11 advanced paramedics resulted in the generation of five themes: function, responsibility, barriers, education and support (22).

Advanced paramedics felt the introduction of paramedic-delivered teleconsultations had significantly improved patient safety, while increasing access to clinical advice for frontline staff (22). Initially advanced paramedics reported frontline staff, including paramedics and EMTs, were often calling to discuss decisions after the fact, but would now request support during the decision-making process (22). Overall, advanced paramedics reported that the majority of support provided was around capacity to consent and medication administration (22).

Advanced paramedics delivering teleconsultations described perceived barriers to accessing support. Primarily, advanced paramedics reported finding that senior paramedics in non-specialist roles and without backgrounds in higher education were often concerned about calling for fear of appearing incompetent or lacking knowledge (22). This was reportedly contrasted by the comparatively junior staff, particularly those from a background in higher education, who advanced paramedics believed had been encouraged to seek support throughout their education and so experienced a different culture around paramedic-delivered teleconsultations (22). It was also noted that previous poor engagements with paramedic-delivered teleconsultations appeared to influence the likelihood of frontline staff requesting support again, although what constituted a negative experience was not explored (22).

Advanced paramedics recognised how delivering teleconsultations required them to maintain a very high level of education and knowledge as this was expected of advanced paramedics by frontline staff (22). This contributed to advanced paramedics having very few requirements to consult additional, higher level clinicians during consultations (22).

Paramedics receiving paramedic-delivered teleconsultations

Since the introduction of paramedic-delivered teleconsultations, paramedics reported a significant decrease in seeking advice from sources not officially recognised by their ambulance service (22). On the few occasions this did continue to occur, this was

generally related to the unavailability of advanced paramedics to provide timely consultations (22).

A clear disconnect was reported in how advanced paramedics and frontline staff perceived responsibilities for care between the two clinicians (22). Although advanced paramedics stated that they believed responsibility for the patient remained with the frontline clinician on scene, with the advanced paramedic role to facilitate decision-making, a majority of frontline staff reported that they perceived the responsibility was now shared (22). Additionally, staff were unclear around their requirement to follow the advice of the advanced paramedic or whether advice provided could be considered optional (22).

Almost half of frontline staff reported they were not aware of a structured model or tool for use when communicating to advanced paramedics, with the same half reporting they would like to see one introduced (22). Almost all frontline paramedics stated they felt that consultations with advanced paramedics increased their knowledge base, while few felt the need to the support of physician level support in decision making (22).

Paramedics receiving physician-delivered teleconsultations

Using a combination of descriptive statistics and inductive thematic analysis, Foerster et al (23) examined the relationship between paramedics and physician-delivered teleconsultations from the perspective of paramedics. Almost half of respondents felt physicians providing teleconsultations understood the unique challenges of the out-of-hospital environment, compared with 23% who felt physicians did not understand these challenges (23).

However, during open-ended questioning paramedics described that although critical thinking by paramedics during physician-delivered teleconsultations was supported in theory, in practice it was more commonly felt that paramedics were not supported by physicians in applying critical thinking to patient presentations (23). Particularly, paramedics felt that when they did attempt to apply critical thinking to the management of complicated patient presentations this ultimately resulted in significant scrutiny and perceived interrogation from the physicians responsible for providing teleconsultations (23). This was reported to be further complicated by vague medical directives which required interpretation, but in which paramedics did not feel support to perform this interpretation (23).

Although paramedics noted efforts were ongoing to improve relationships between paramedics and physicians providing teleconsultations, the relationship was generally reported to be poor by paramedics (23). Primarily this was related to an apparent lack of trust or respect for paramedics as healthcare professionals, which was punctuated by a belief that the relationship between physicians providing teleconsultations and paramedics was often disciplinary in nature rather than supportive or educational (23).

Table 1. Characteristics of included studies

Authors	Year	Design	Objectives	Participants	Concepts	Findings
Jackson M, Jones C (22)	2013	Mixed methods	Aimed to explore issues and challenges in providing remote clinical advice	11 advanced paramedics and 56 EMTs and paramedics	Paramedics delivering teleconsultations and EMTs and paramedics receiving teleconsultations	Advanced paramedics believe paramedic-delivered teleconsultations has improved patient safety, with paramedics consulting during the decision-making process. Advanced paramedics perceived senior staff less likely to call for fear of appearing incompetent. Few requirements for consultation of higher-level support. Paramedics unclear on requirement to follow advice from advanced paramedics and not aware of framework for handover. Paramedics feel they receive real-time education and engagement with paramedic-delivered teleconsultations increases knowledge
Foerster C, Tavares W, Virkkunen I, Kamarainen A (23)	2018	Survey with descriptive statistics and inductive thematic analysis	Aimed to explore and understand the professional relationship between paramedics and physician medical oversight by frontline paramedics	184 PCPs and 58 ACPs	Paramedics receiving physician-delivered teleconsultations	Paramedics were split on whether physicians understood unique pre-hospital care requirements. Perceived mixed messages where paramedics are encouraged to apply critical thinking to patient management but felt over-scrutinised when they did. Relationship improving, but was generally not felt to be good between paramedics and physicians because of a lack of trust and respect.

Discussion

This scoping review aimed to summarise the current qualitative literature surrounding paramedic and physician-delivered teleconsultations from the perspectives of paramedics. Although limited existing literature was found, cementing this as a profoundly understudied area in paramedicine, a series of important provisional findings relating to paramedic perceptions of both paramedic and physician-delivered teleconsultations were identified.

Paramedics delivering teleconsultations appeared to view the experience as an overall positive experience, with a number of key functions described (22). These included improving patient safety, assisting in ethically challenging decision-making and providing real-time education to frontline staff (22). Given the (at times) isolated nature of paramedic practice, the ability to consult peers regarding complex clinical and ethical decisions likely serves as an important mechanism in optimising patient outcomes and protecting paramedic mental health. Perceived barriers to accessing support from paramedic-delivered teleconsultations included previous negative experiences as well as the fear of appearing incompetent, although it was noted this

appeared less common in junior paramedics with backgrounds in higher education who have been encouraged during training to call for assistance (22). This finding appears to be suggestive of a possible culture shift in paramedicine towards incorporating real-time clinical advice into the Creative Adapting in a Fluid Environment model of paramedic decision-making, as proposed by Reay et al (24).

Frontline clinical staff receiving support from paramedic-delivered teleconsultations reported few requirements to seek advice external to the designated advanced paramedic teleconsultation system, reflecting the importance of advanced education in ensuring the success of these roles (22). The importance of advanced education in growing the paramedic profession and novel roles for paramedics is not a new concept, with the formalisation of paramedic training in the UK into undergraduate degrees reportedly enhancing practitioner legitimacy and the addition of post-graduate education considered 'empowering' for paramedics (25). Although there was some lack of clarity around the transfer of responsibility for patient care, frontline paramedics found that paramedic-delivered teleconsultations generally supported their original decision-making process (22). Paramedics conveyed a desire for a structured handover

structure to improve communication, but otherwise felt receiving paramedic-delivered teleconsultations were a positive, educational experience (22).

Paramedics receiving physician-delivered teleconsultations generally reported physicians delivering this service understood the unique demands of out-of-hospital care (23). But paramedics described a strained relationship between themselves and the physicians delivering teleconsultations which they perceived was caused by an underlying lack of trust in paramedics (23). Although this was noted to be improving, paramedics described an atmosphere in which critical thinking by paramedics was promoted in theory, but not in practicality, potentially cultivating an environment in which paramedics may not consult physicians for assistance unless mandated to do so (23).

Limitations

The study by Jackson and Jones (22) was limited by the sample of frontline clinicians being overwhelmingly composed of one clinical grade, possibly limiting transferability to all clinical grades of staff, and was also limited by the questionnaire method of data collection inherently limiting the depth of data obtained. Foerster et al's (23) work was limited by a low response rate (48%), possibly introducing respondent bias.

This review was inherently restricted by common limitations of scoping reviews, including the potential for missed literature and unpublished research. Additionally, because there was no formal evaluation of the quality of evidence it was not possible to provide recommendations or specific policy guidance. Finally, this review was limited to English-only articles, which may have resulted in missed citations.

Conclusion

Little literature was identified examining the perceptions of paramedic or physician-delivered teleconsultations. In the research available it was identified that paramedics delivering teleconsultations generally considered the experience to be positive while improving patient safety and practitioner knowledge. Frontline staff receiving paramedic-delivered teleconsultations felt the level of advice was appropriate and assisted in expanding their own knowledge base. Paramedics receiving physician-delivered teleconsultations, by contrast, reported that there was variable understanding of the unique challenges of out-of-hospital care and tension in the relationship between paramedics and physicians which impacted the delivery of timely and appropriate patient care. Given the continuing expansion of teleconsultation programs for paramedic staff, this represents an understudied area requiring a significant amount of additional investigation from a number of perspectives and in conjunction with various stakeholders in out-of-hospital care.

Competing interests

The authors declare no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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