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Extended Research Article

Clinical and cost-effectiveness of paramedics working in general practice: a mixed-methods realist evaluation

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Disclaimer: This report contains transcripts of interviews conducted in the course of the research, or similar, and contains language which may offend some readers.

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Scientific summary

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Scientific summary

Background

General practitioner (GP) services in England are facing significant pressure due to increased healthcare demand. GP consultations have been rising by up to 15% annually, costing the NHS £9B, with a shortage of GPs to meet the rising demand. To address this, there has been a shift towards utilising allied healthcare professionals (AHPs), such as paramedics, to support front-line service delivery in general practice. The NHS England General Practice Forward View and the NHS Long Term Plan have both emphasised the importance of developing the multidisciplinary, integrated workforce and increasing the number of AHPs and support staff in primary care. Paramedics have been identified as a professional group that can contribute significantly to general practice, particularly in managing minor illnesses, conducting home visits, and providing urgent consultations. Health policy and related primary care initiatives in England – including the Additional Roles Reimbursement Scheme – recognise that the generalist skill set of paramedics may be well suited to a GP setting. Legislation for paramedic prescribing was recently enacted, furthering the role this professional group may play in primary care. Consequently, there has been a threefold rise in the number of paramedics working in GP services in the last 5 years.

However, there is a lack of research on the safety, clinical effectiveness, and cost-effectiveness of paramedics working in general practice. Previous studies have focused on the extended skills needed by paramedics and have made assumptions about their impact on reducing GP workload and costs without empirical evidence. General practice services are configured around a diverse array of local contexts, challenges and specific needs, meaning the paramedic skill set is utilised differently across the country. There is very limited evidence of how different models might suit different needs.

Aim

The aim of the study was to determine the clinical and cost-effectiveness of paramedics working in general practice settings ('paramedics in general practice'; PGP).

Research questions

We set out to answer the following seven research questions:

RQ1. What different models of PGP are in operation in England?
RQ2. What are the crucial mechanisms that underpin effective PGP?
RQ3. How does PGP care impact on patient clinical outcomes (e.g. unplanned hospital admissions, prescriptions, referrals, tests and investigations)?
RQ4. How does PGP care impact on patient-reported outcomes [e.g. concern, confidence in health plan, ability to manage symptoms, health-related quality of life (HRQoL)] compared to non-PGP care?
RQ5. Does PGP result in patient-reported safe management?
RQ6. What are the direct costs/savings associated with PGP care, and does it provide good value for money?
RQ7. Does PGP lead to improved experience, how and for which patients?

Methods

We drew upon the epistemology of realist evaluation to explore how the different mechanisms of a range of PGP models were related to outcomes (clinical and economic) and different practice contexts. A mixed-methods approach combined quantitative and qualitative data to gather comprehensive insights into the deployment of PGP models in different contexts, and to iteratively develop and test theories underpinning their successful operation (or otherwise).

The patient and public involvement and engagement group was integral to all stages of the study from writing the ethics applications, refining research instruments, designing patient material to interpretation and synthesis of quantitative and qualitative data, ensuring validity from a participant and carer perspective.

We began by conducting a rapid realist review, including searches of empirical and grey literature, interviews with system leaders (*n* = 8), and a stakeholder prioritisation event (*n* = 22 participants, 14 professionals and 8 patient representatives). Data were analysed using a realist technique called 'appraisal journaling', which involved summarising and reflecting on key causal insights. We developed initial candidate programme theories that we would go on to refine in the evaluation stage.

To conduct the evaluation, a case study approach was utilised, and a total of 34 general practice sites were recruited (*n* = 25 with paramedics and *n* = 9 without). These sites were located in England to maintain consistency in the policy environment. Sites were selected based on practice demographics, such as size, urbanity, and deprivation index, ensuring representation of different service models across England. Practices provided comprehensive detail on their PGP operating model, including details of practitioner competencies (including prescribing ability), patient eligibility for PGP care and practice workforce composition. Data were collected to explore various aspects of PGP care, including its impact on patient outcomes, patient-reported experiences, safety, costs, value for money, patient experience and the workload of GPs and other general practice staff. The quantitative element included both a prospective and a retrospective cohort component.

Qualitative realist interviews (*n* = 69) were conducted with patient participants (*n* = 20), paramedics (*n* = 13), GPs (*n* = 12), practice managers (*n* = 13) and other members of the practice team (*n* = 11) using semistructured interview guides. Quantitative data were collected through prospective patient questionnaires completed by patients immediately after a consultation with a paramedic (at PGP practices) or GP (at non-PGP practices) and 30 days later (*n* = 489 completed questionnaire pairs). These assessed patient experiences and outcomes using validated measures, including: the Patient-Reported Experiences and Outcomes of Safety in Primary Care questionnaire (safety; Oxford University Innovation Ltd, Oxford, UK); EuroQol-5 Dimensions, five-level version (HRQoL; EuroQol Research Foundation, Rotterdam, The Netherlands); Primary Care Outcomes Questionnaire (PCOQ) (health outcomes; University of Bristol, Bristol, UK) and the Modular Resource Use Measure (ModRUM) (health and care resource utilisation). Additionally, a bespoke search was conducted on the electronic health records system (*n* = 10 practices) to undertake a retrospective analysis of the subsequent resource implications of consulting with a paramedic or GP at the start of a care episode. This analysis looked at coded data arising from 22,509 index consultations.

Data analysis involved coding and thematic analysis of qualitative interviews, while quantitative data were analysed using the relevant statistical methods. Multilevel models were used to analyse the primary outcome. Economic analyses were based on published unit costs, where available, or derived from base principles. Sensitivity analyses were also conducted. The research team met regularly to discuss emerging findings, refine theories and ensure alignment between qualitative and quantitative data.

Sites were classified based on the integration level of paramedics within the general practice team and the complexity of patients seen in the PGP service. These classifications aided in organising and comparing findings across sites. Overall, the study aimed to provide valuable insights into the effectiveness of PGP care by examining its impact on various outcomes and considering different contextual factors.

Findings

Realist review

There was significant variation in the ways paramedics worked and became embedded in general practice settings across England. Key issues identified included: the lack of clarity among paramedic staff and general practice about the meaning of the term 'advanced practice'; the challenge of transitioning from ambulance roles to general practice; the need for training and development opportunities for paramedics to acquire the necessary skills for primary care (e.g.

managing multimorbidity and chronic diseases). Access to training was not only important for paramedics' professional development but also played a role in attracting and retaining them in the role. The review also explored patient perceptions and acceptability of the paramedic role in general practice. Overall, patients appeared to be satisfied with the role, but there were instances of confusion regarding who was delivering care (particularly home visits). Patients often associated paramedics with emergency care and had limited understanding of the paramedic skill set and scope of practice in general practice. Clear communication and education were identified as important factors in improving patient perceptions and acceptability of the role. There were variations in paramedic employment models in general practice. Rotational models, where paramedics work in both primary care and emergency services, were seen as beneficial for skill development and staff retention. However, the logistics of implementing rotational models were noted as complex and time-consuming, and there were concerns about maintaining relationships and competencies across different settings.

Qualitative interviews

The analysis was conducted at three levels (patient, practice and wider system/NHS). Within these levels, six principal domains of theorising emerged from the data:

1. *Access to services* PGP provides a new model of care delivery that supports better access to (particularly same-day) general practice services. Being seen more quickly, especially for urgent problems, can improve acceptability for patients.
2. *Safety* Patient acceptance of better access is contingent upon assurances that care is safe, supervised and well supported. The professional background and emergency skills experience of paramedics were seen as a positive in terms of acute care safety. However, time is needed to develop trusting relationships, both between clinicians (paramedics, GPs and other healthcare professionals in the practice) and between paramedics and patients.
3. *Practice workforce* Reconfiguring the workforce to operationalise PGP disrupts service delivery, at least initially. There are specific considerations (and differing levels of training, experience and skills required) for the range of activities in primary care, ranging from simple acute single conditions through to complex frailty management and home visiting.
4. *Infrastructure* Additional resources are required to support PGP, including for comprehensive induction and ongoing supervision. Delivering appropriate training and clinical governance also require resource and may impact GP (and other practice team) workload.
5. *Experience* Patients expressed a desire to be taken seriously, to have their concerns respected, to be given adequate time, and to feel confident that they were in safe hands. While patients had traditionally expected to see a GP, most adjusted their previous expectations about paramedics being primarily emergency clinicians and accepted their broader role within general practice. Patients feel that seeing someone who is not their GP is an acceptable alternative to GP care if they feel they have been listened to, respected and understood.
6. *Outcomes* Patients value a good experience of care but need assurances that PGP care can result in good clinical outcomes that address their medical and psychosocial needs. Patients feel that seeing someone who is not their GP is an acceptable alternative to GP care when the outcome results in what they need (including, where applicable, prescriptions, referrals or tests).

Prospective cohort component

Overall, there were no important differences in the primary outcome between PGP and non-PGP practices. Practice activation scores (degree to which practice is perceived as focusing on safety) were slightly lower in PGP practices, in particular those with medium and low levels of PGP integration and complexity. There was a small statistically significant difference in the PCOQ 'Confidence in Health Plan' domain by PGP complexity, such that confidence had deteriorated slightly more in the high-complexity group compared to non-PGP [−0.10, 95% confidence interval (CI): −0.17 to −0.04]. 'More communication problems between you and healthcare staff' at index visit were reported at PGP sites, especially those with a medium level of integration, and more problems with diagnosis and harm to physical health at day 30 at sites with a low level of integration. PGP sites had lower quality of life (QoL) scores at initial visit and 30 days for the PCOQ 'Confidence in Health Provision' domain. The study found that participants at PGP sites had lower QoL scores at the post-index visit compared to non-PGP sites. However, both groups showed an overall improvement in QoL by the 30-day follow-up, with a higher improvement reported by participants at PGP sites. There was no significant

difference in post-index visit scores for the EuroQol visual analogue scale (EuroQol Research Foundation, Rotterdam, The Netherlands) between PGP and non-PGP participants. In terms of resource use and costs, primary care costs were similar between PGP and non-PGP sites, but secondary care costs were slightly higher at PGP sites. In total, NHS costs were just under £22 more for paramedic-led care (95% CI −£141.89 to £184.87). There was no important difference in quality-adjusted life-years (QALYs) between PGP and non-PGP sites. Differences between different models of PGP care (low/medium/high integration, and low-/medium-/high-complexity patients) were also marginal and unlikely to be clinically significant.

Retrospective cohort component

The retrospective cohort component showed that paramedic-led care had relatively little association with the patterns of subsequent patient care, with the possible exception of increased rates of prescribing. In analyses adjusting for differences in appointment, patient and practice characteristics, we found that paramedic-led care has the potential to reduce the cost of NHS care by approximately £20 per 30-day episode of care (mean −£23, 95% CI −£40 to −£5). After adjustment for appointment, patient and practice characteristics, there was no convincing evidence that the level of PGP integration within a GP practice was associated with substantial differences in the costs of care episodes. Costs of care episodes tended to be lowest in PGPs classified as working with high-complexity patients, although these differences were no longer evident after adjustment for appointment, patient and practice characteristics. The initial differences were largely driven by higher referral and testing rates in PGPs working with low-complexity patients, which may merit further exploration.

Limitations

The study was conducted during the response to and recovery from the COVID-19 pandemic, and during times of atypical pressure on general practice service (including the group A *Streptococcus* outbreak). Recruitment of both sites and individual participants was hampered, requiring amendments to our original plans and an uneven distribution of participants across sites and models. The case study design included sites that were by definition self-selecting, which may have decided to take part due to a desire to demonstrate the perceived effectiveness of PGP. These may not be representative of general practices in England. Additionally, despite attempts to recruit from practices with diverse characteristics, the final sample did not represent the full diversity of practice populations. Due to the range of PGP models, it was more complex to discretely categorise these for analysis than envisaged.

Conclusions

Paramedic working in general practice care can improve access to general practice (particularly same-day care). There is the potential for PGPs to take on a large volume of primary care workload without substantial spillover effects on other NHS colleagues and services. Acceptance of PGP models is based on an understanding of the primary care paramedic role, and confidence that mechanisms are in place to support it. PGP models exhibit substantial variation, and there is no single optimal model. Safety is achieved through a combination of comprehensive induction, ongoing supervision, appropriate postgraduate training and continuing primary care-focused education – all of which require substantial resource. The degree of PGP integration has less of an obvious impact on individual patient-level outcomes, and may be more associated with staff satisfaction, professional identity and role longevity. It may take time to adapt to the clinical context of primary care when transitioning from other areas of practice, and some evolution over time is likely when first operationalising PGP. Rotational working may mitigate some of the potential system-wide impacts on the emergency care workforce, but can require more investment from general practice to sustain. Nevertheless, PGP provides opportunities for the paramedic profession to develop and evolve.

Study registration

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