

Systematic Review: Effectiveness of Telemedicine in Outpatient Parenteral Antimicrobial Therapy (Tele-OPAT)

Oyewole Chris Durojaiye (Corresponding Author)^{1,2}, Ihsan Jibril¹, Evangelos I Kritsotakis^{3,4}

1. Department of Infection and Tropical Medicine, Royal Hallamshire Hospital, Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield S10 2JF, UK
2. Department of Microbiology, Royal Derby Hospital, University Hospitals of Derby and Burton NHS Foundation Trust, Derby DE22 3NE, UK
3. Laboratory of Biostatistics, School of Medicine, University of Crete, Heraklion, Greece
4. School of Health and Related Research (SchARR), University of Sheffield S1 4DA, UK

Introduction

With advances in technology, telemedicine has been more widely used to deliver healthcare in many clinical specialities, including infectious diseases and across different healthcare settings. The COVID-19 pandemic has further accelerated the growth of telemedicine, and it is likely to be used increasingly in the future. However, the adoption of telemedicine in the delivery of outpatient parenteral antimicrobial therapy (OPAT) has been relatively slow and limited. This study aims to collate current evidence for telemedicine in OPAT regarding clinical efficacy, safety, acceptability and cost-effectiveness.

Methods

We systematically searched the Cochrane Library, CINAHL, EMCARE, EMBASE and MEDLINE databases through 24 July 2022, for relevant studies published in English. Research articles and conference abstracts were included if they involved any form of telephone or video consultation in delivering parenteral antibiotics in the home or outpatient setting. Given the sparse research in tele-OPAT, conference abstracts were considered to account for as much existing literature as possible and provide a comprehensive overview of the topic. Study findings were synthesised into three main themes: patient outcomes and safety, patient and provider satisfaction and cost-effectiveness. The mixed methods appraisal tool was used to review the methodological quality of the studies. PROSPERO CRD42022342874

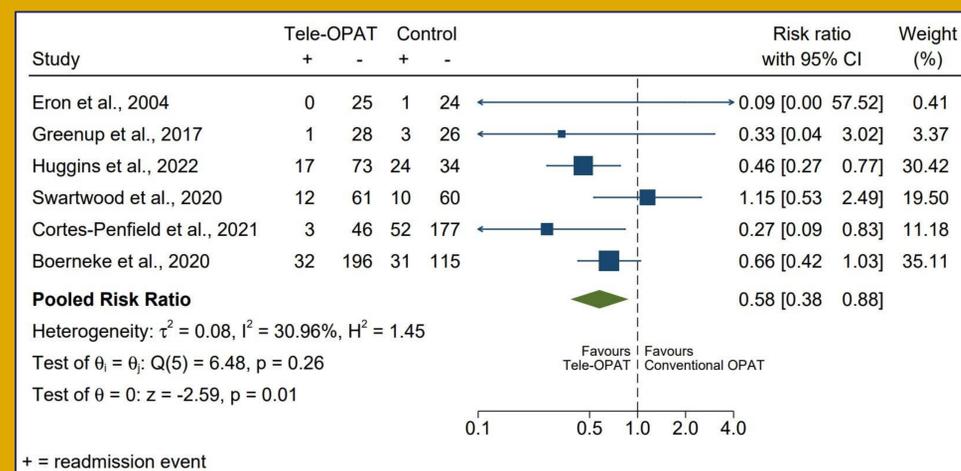
Results

The literature search yielded 311 articles, of which 12 (five full-length articles and seven conference abstracts) reporting over 1245 telemedicine interventions were reviewed. The studies were published between 2004 and 2022. Most (10/12; 83%) appeared in the last 5 years and were conducted in the United States ($n = 9$) and Australia ($n = 3$). Two studies were conducted in paediatric patients. Altogether, the studies included 2572 participants of whom over 1245 had some form of telemedicine, with sample sizes ranging from 2 to 636.

Videoconferencing was most commonly used (8/12; 67%) followed by telephone calls only ($n = 3$). The types of services provided via telemedicine included consultation between healthcare professionals, remote patient monitoring, home support/care, patient/caregivers consultation and tele-visit.

The reported outcomes were heterogeneous. Hospital readmission was the most assessed outcome. Pooling data from six comparative studies (1051 patients), the risk of rehospitalisation was significantly lower for the telemedicine group compared with the conventional OPAT group (risk ratio, 0.58; 95% confidence interval, 0.38 - 0.88; $p = 0.01$) with moderate heterogeneity of effects across the studies ($I^2 = 31\%$) (Figure 1).

Figure 1. Results of random-effects meta-analysis for the risk of hospital readmission in telemedicine versus conventional outpatient parenteral antimicrobial therapy (OPAT)



The studies reviewed demonstrated comparable clinical cure or improvement rates using telemedicine compared with conventional OPAT. Telemedicine was also associated with lower cost, high patient satisfaction and comparable complication rates compared to conventional OPAT.

Conclusions

This systematic review suggests that tele-OPAT can be safe, clinically and cost-effective with high patient satisfaction.

However, high-quality studies and publication of existing data and experiences are needed to further validate this model of care delivery and address gaps in knowledge, especially regarding clinical acceptance and perspectives on tele-OPAT.

As telemedicine continues to grow, new and existing services should consider adopting tele-OPAT to support OPAT delivery, especially for patients residing in remote and geographically isolated locations – including nursing home residents and socio-economically disadvantaged patients.

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Contact details

Dr Oyewole Chris Durojaiye (Corresponding Author): c.durojaiye@nhs.net