A Literature Review of Email-based Telemedicine

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Introduction and methods

A structured analysis of peer-reviewed literature about the delivery of health services by email was undertaken for this review. A total of 185 articles were included in the analysis. For included articles, information such as medical specialty, country and participants in email exchange were recorded. Articles were also thematically categorized for sub-topic, study design and service-delivery application.

Results

It was shown that email-based telemedicine can be practiced in a large number of medical specialties (Table 1) and has application in primary consultation, second opinion consultation, telediagnosis and administrative roles (e.g. electronic referral).

Table 1. The medical specialty of email-based telemedicine services.

Speciality	Number of services (%)
Dermatology	47 (27.0)
General Practice	20 (11.5)
Pathology	15 (8.6)
Irrelevant [a]	14 (8.0)
Wound care - plastic/vascular surgery	13 (7.5)
Multiple - developing nations	8 (4.6)
Ophthalmology	7 (4.0)
Mental Health	7 (4.0)
Radiology	6 (3.4)
Multiple – remote community	4 (2.3)
Otolaryngology	4 (2.3)
Respiratory medicine	3 (1.7)
Neurology	3 (1.7)
Paediatrics	2 (1.1)
Multiple – military medical service	2 (1.1)
Dentistry	2 (1.1)
Cardiology	2 (1.1)
Anaesthetics	2 (1.1)
Neonatology	2 (1.1)
Multiple - metropolitan	1 (0.6)
Orthopaedics	1 (0.6)
Palliative care	1 (0.6)
Physiotherapy	1 (0.6)
Home care services	1 (0.6)
Rheumatology	1 (0.6)
Endocrinology	1 (0.6)
Speech pathology	1 (0.6)
Surgery	1 (0.6)
Urology	1 (0.6)
Oncology	1 (0.6)

[a] The speciality was irrelevant in some articles— for example, articles that studied communication style or articles that described legal aspects of telemedicine.

Email has niche applications in low-bandwidth visually oriented specialties (e.g. dermatology, pathology, wound care and ophthalmology) where attached digital camera images were used for telediagnosis. Diagnostic accuracy of these images was the predominant topic of research articles and results show email as a valid means of delivering these medical services.

Table 2. The sub-topic of reviewed article.

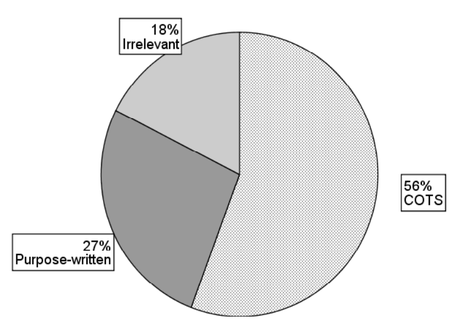
Topic	Number of Articles (%)
Diagnostic accuracy	54 (29.2)
General commentary or review of service	48 (25.9)
Feasibility study	25 (13.5)
Organisational impact	15 (8.1)
Client or clinician satisfaction	9 (4.9)
Attitude to use of email	6 (3.2)
Systemic review	6 (3.2)
Other	4 (2.2)
Cross platform comparison	4 (2.2)
Practice guidelines or recommendations	3 (1.6)
Legal	3 (1.6)
Communication style	3 (1.6)
Case study	3 (1.6)
Economic evaluation	2 (1.1)

Email is also often used in general practice where it is used an adjunct for face-to-face consultation.

Email-based telemedicine provides specialist medical opinion in the majority (76%) of reviewed cases and is most likely to be instigated by the patient's primary care giver (99%). However, email-consultations between patient and primary care or patient and secondary care are not uncommon (37%).

Most email services are implemented using ordinary email. However, a number of organizations develop an email-application purpose-written to support their telemedicine service due to impediments when using ordinary email.

These impediments include lack of: management tools for allocation and auditing of cases for a timely response and the co-ordination of effort in a multi-clinician, multi-disciplinary service. The ability to encrypt ordinary email thereby securing patient confidentiality during email consultation is also regarded as difficult when using ordinary email. Hence, alternative web-based email applications where the encryption can be implemented using more user-friendly HTTPS have become popular.



Conclusion

Much of the reviewed literature is descriptive or anecdotal. Hence, suffers from lack of conclusive results regarding positive patient outcomes. This may account for email-based telemedicine generally being regarded as underutilized. However, the potential is well recognized.