Navigating Economics of Telehealth in Oncology

EE510

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BACKGROUND

Background: About 1 in 5 people develop cancer in their lifetime, and approximately 1 in 9 men and 1 in 12 women die from the disease.[1] Fighting cancer is a costly battle. Each year in the United States, individuals diagnosed with cancer spend nearly $4 billion in direct, out-of-pocket costs for treatments. According to a study, first-year cancer care costs for Medicare patients accounted for 20% of income for many patients.[2] In addition, there are a number of other related indirect costs, such as the expense of driving to and from appointments and missed productivity.[3]

Telehealth, defined broadly as the use of digital technologies like telemedicine, e-health, and remote consultations to deliver healthcare, has rapidly emerged as a transformative solution in the context of cancer care. The COVID-19 pandemic forced the increased adoption of telehealth, highlighting its crucial role in maintaining continuous healthcare during restrictions. By enabling patients to receive care remotely, telehealth has the potential to significantly decrease the costs associated with traditional cancer care.[3] Given these promising benefits, there is a critical need to comprehensively assess the economic impacts or cost savings of telehealth interventions in oncology.

Aim: The objective of the study is to provide a detailed assessment of the economic evaluation studies on telehealth interventions in cancer care, emphasizing the analysis of diverse telehealth and their economic impacts.

METHODS

A targeted literature review was conducted in PubMed to include studies from last five years (Dec 2018 - Dec 2023). Only full-text papers published in English language that focused on virtual healthcare interventions, and reported outcomes related to cost-effectiveness and cost-benefit analysis were included.

Search terms: Searches were conducted using the following keywords:

Economic terms – Cost-effectiveness, cost-utility, cost-analysis, economic evaluation, economic assessment, cost-benefit, and cost efficacy

Disease terms – Oncology and cancer

Telehealth terms- digital health, telehealth, telemedicine, electronic health (e-health), mobile health (m-health), remote consultation, telemetry, digital care, telecare, home care services, digital transformation and telenursing

Data extraction: Data on publication details, country, intervention(s), comparator(s), economic analysis type, model structure, perspective, time horizon, costs, health outcomes, cost-effectiveness information, and details on scenario and sensitivity analysis were extracted.

Through significant reductions in time and travel costs, telehealth is making cancer care more accessible and less stressful for patients. Expanding these services promises to further enhance the accessibility and comprehensiveness of care, particularly as patient needs and healthcare systems continue to develop.

Telehealth is becoming indispensable in delivering cost-effective and cost-saving cancer treatment solutions

Figure 1: Types of evaluations (N=12)

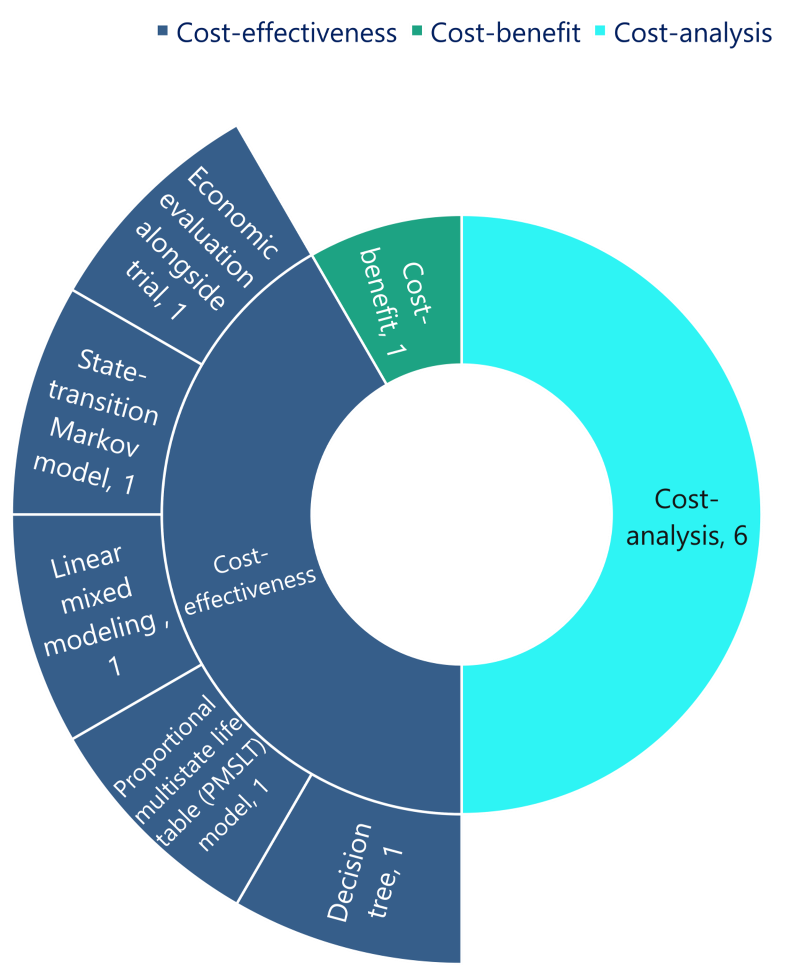


Table 1: Details on included studies (N=12)

S NO.	STUDY YEAR	COUNTRY	INTERVENTION	COMPARATOR	RESULT
1	Lizée Tet al. 2019	France	Surveillance based on web-based PRO	Conventional surveillance	ICER: €20,912 per QALY
2	Pascha VA et al. 2021	Argentina	Telemammography screening	Mammography screening	ICER: £26,051 per QALY
3	Compen F et al. 2019	Netherland	Individual internet-based MBCT (eMBCT)	Treatment as usual (TAU)	Net monetary benefit (NMB): €1,916
4	Grout L et al. 2021	New Zealand	Smart phone apps	Business as usual	QALYs gained = 430 Net cost saving = $2.2 million
5	Lebiedzik M et al. 2023	Czech Republic	Telemedicine using SMART technologies	Control group of in person healthcare	Shortening of hospitalization period: 40% Cost saving: USD 2,800.
6	Longacre CF et al. 2020	U.S.A	Telerehabilitation intervention	Control group of in person healthcare	ICER: $15,494/QALY
7	Zakaria et al. 2020	Denmark	Teledermoscopy	Standard care	Cost reduction by $140.12 per patient
8	Alexander et al. 2023	Australia	Teletrial	Standard trial	Cost reduction by AU$2155 per patient
9	Tinao et al. 2019	U.S.A	Telemedicine	Face to face consultation	Cost reduction by US $90
10	Gkaintatzi et al. 2022	England	Multimodal Digital intervention	Inpatient care	Total QALYS increase by 0.02 per week for each additional week
11	Liu et al. 2022	U.S.A	Telemedicine	In person standard visit	Time saving: 4.1 to 5.6 h per visit time Cost saving of up to $223.3 ± 171.4 per visit, per patient
12	Patel KB et al. 2023	U.S.A	Telehealth	Physician visit	Cost saving: $147.4 to $186.1 per visit, per patient

Figure 2: Types of perspectives

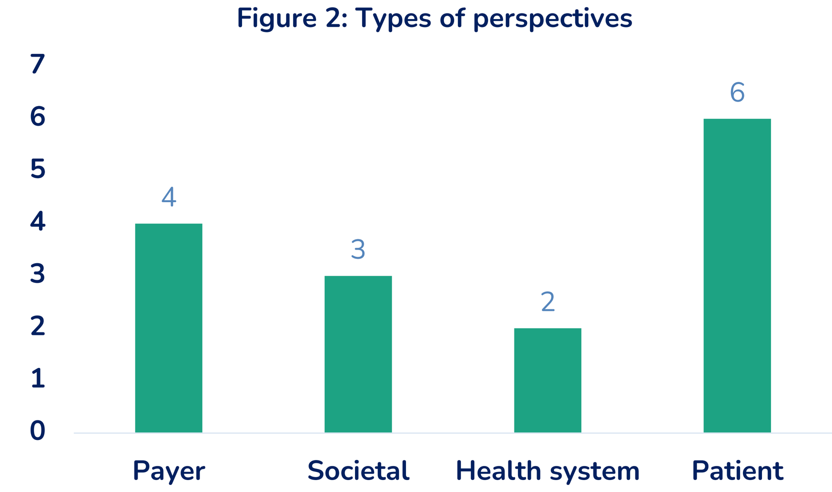


Figure 3: Details on scenario analysis (N=12)

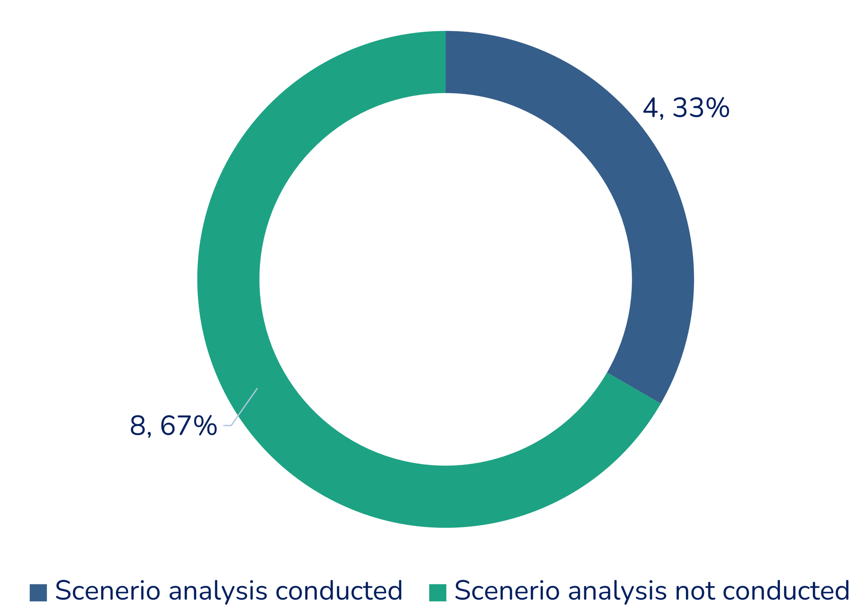
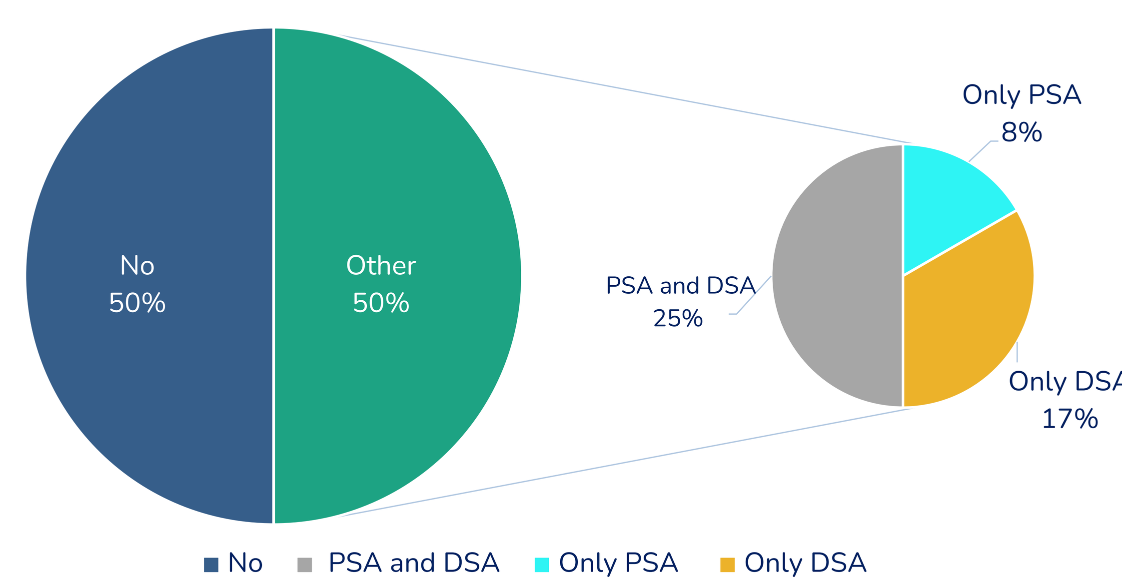


Figure 4: Details on sensitivity analysis



Abbreviations: DSA = Deterministic sensitivity analysis, ICER = Incremental cost-effectiveness ratio, PSA = Probabilistic sensitivity analysis, QALY = Quality adjusted life year

RESULTS

- Of the 117 studies retrieved from the searches, only 12 were eligible to be included in the analysis due to relevancy in outcome, disease area, or intervention. **(Table 1)**
- The types of evaluations observed in the studies were majorly cost-effectiveness (n=5; 42%), cost benefit (n=1; 8%) and cost-analysis (n=6; 50%). The following methodologies were deployed in cost-effectiveness studies - economic evaluation alongside trial, state-transition Markov model, linear mixed model, proportional multistate life table (PMSLT) model and decision tree. **(Figure 1)**
- The predominant perspective employed in the studies was that of a patient (n=6, 40%) followed by payer (health insurance or provider) (n=4, 26.7%), societal (n=3, 20%) and health system (or population-level) (n=2, 13.3%). **(Figure 2)**
- Time horizon ranged from six months to lifetime across studies.
- The major cost categories reported were direct costs (treatment costs, follow-up costs, screening costs, etc.), indirect costs (productivity loss, driving costs), and costs associated with terminal care.
- Scenario analysis was conducted in four studies (33.3%). **(Figure 3)**
- Sensitivity analysis was carried out in six studies – and was further divided into three categories: only deterministic sensitivity analysis (DSA) (n=2, 16.7%), only probabilistic sensitivity analysis (PSA) (n=1, 8.3%), and both PSA and DSA (n=3, 25%). Half of the studies (n=6, 50%) did not report either DSA or PSA. **(Figure 4)**
- All studies reported telehealth to be either cost-effective or cost-saving, suggesting significant economic benefits. **(Table 1)**

DISCUSSION

- This review indicates that telehealth is consistently cost-effective and often reduces costs, highlighting the need for its increased adoption to enhance patient-centered care.
- Despite its benefits, the literature on digital health in oncology reveals deficiencies in exploring varied intervention strategies and diverse populations.
- The findings highlight the need for continued research on telehealth's economic benefits globally, ensuring that all healthcare systems can effectively implement these advancements. Additionally, exploring the integration of artificial intelligence might further enhance the solutions.

References:

1. Ver Hoeve ES et al. Support Care Cancer. 2021 Jan;29(1):349-358.
2. WHO Global statistics - February 2024 (accessed: April 2024)
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