Evaluation Approaches of Digital Health Technologies: A Systematic Analysis

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Abstract

Background: Profound scientific evaluation of novel Digital Health Technologies (DHT) is key to enhance successful development and implementation. In such, we developed the eHealth evaluation cycle in previous research. The eHealth evaluation cycle contains five consecutive study phases: conceptual, development, feasibility, effectiveness, and implementation.

Objective: The objective of this study was to create a visual overview of DHTs' evaluation approaches used in original research and to determine to what extent the study phases of the eHealth evaluation cycle have been utilised.

Methods: We conducted a systematic literature search in PubMed including the MeSH term 'telemedicine' in combination with a wide variety of evaluation approaches. Original studies from 2019 (pre-COVID-19 cohort) were included. Data on the following variables were extracted and systematically analysed: journal, country, publication date, medical specialty, primary user, functional classification, evaluation study phases, and evaluation approach.

Results: 824 studies were included after 1583 titles and abstracts were screened. The majority of the evaluation studies focused on the effectiveness (impact) (36.9%) study phase, whereas uptake (implementation) (8.5%) was the least. The RCT (19.0%) was the most commonly used DHT evaluation method. Within the effectiveness (impact) study phase, the RCT was used in half of the studies. In the conceptual and planning phases, survey research (34.6%) and interview studies (34.6%) were most frequently used. The United States published the largest amount of DHT evaluation studies (36.9%). Psychiatry / mental health (10.6%) and cardiology (8.9%) published the majority of the studies within the field.

Conclusions: We found that the study phases of the eHealth evaluation cycle are in equally studied. Also, the majority of the studies in the effectiveness study phase still uses a RCT design. However, in order to successful develop and implement novel DHTs, stimulating equal evaluation of the sequential study phases of DHTs and selecting the right evaluation approach that fits to the iterative nature of technology, might be of utmost importance.

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Amsterdam, 24 June 2023

Dear Editor, dear dr. Eysenbach,
We believe that, in order to ensure the successful development and implementation of Digital Health Tools, a more in-depth understanding of eHealth evaluation study phases in relation to existing and novel evaluation approaches is of paramount importance.

In 2021 we developed and published in your journal the ‘eHealth methodology guide’, describing Digital Health Technologies’ evaluation approaches structured in an *eHealth evaluation cycle* https://tinyurl.com/ehealthmethodologies. In this present manuscript we describe the follow-up study which aims to develop a better understanding of the actual practise of the evaluation study phases of the *eHealth evaluation cycle* in relation to DHT evaluation approaches.
Through a systematic literature search we included more than 800 original studies (JMIR represented the biggest share among others!) and extracted and analysed the data of 8 variables each study. Herewith we were able to create a visual overview of the evaluation of DHTs in general.

We believe that our work will provoke the interest of the *JMIR* readers and may have a significant impact on the successful development and implementation of DHTs.
With kind regards,
On behalf of the co-authors,
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Supplementary Files

Multimedia Appendixes

Manuscript.
URL: http://asset.jmir.pub/assets/a1623db7964b36f8eca7246b2ffa19de.docx

Example data extraction sheet.
URL: http://asset.jmir.pub/assets/03778fc7e253ac285c31289117fd44f7.xlsx

Results variables country, medical specialty and journals.
URL: http://asset.jmir.pub/assets/fedcfe1f15731b05eb2970f02465287c.docx

Complete list of evaluation approaches.
URL: http://asset.jmir.pub/assets/a8b562dadd8f77b80ecc812ac15e7a19.docx

All performed cross tabulations.
URL: http://asset.jmir.pub/assets/2beff8ff6e68656c20f623bc9dfdf61d.docx

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