Abstract

Patient-Generated Health Data Quality for Clinical Use: Human and Technology Factors

Robab Abdolkhani; Kathleen Gray, PhD; Ann Borda, PhD; Ruth De Souza, PhD

University of Melbourne, Melbourne, Australia

Corresponding Author:
Robab Abdolkhani
University of Melbourne
202 Berkeley Street
Melbourne,
Australia
Phone: 61 12231952
Email: rabdolkhani@student.unimelb.edu.au

Abstract

Background: The proliferation of advanced wearable medical technologies is increasing the production of Patient-Generated Health Data (PGHD). However, there is lack of evidence on whether the quality of the data generated from wearables can be effectively used for patient care. In order for PGHD to be utilized for decision making by health providers, it needs to be of high quality, that is, it must comply with standards defined by health care organizations and be accurate, consistent, complete and unbiased. Although medical wearables record highly accurate data, there are other technology issues as well as human factors that affect PGHD quality when it is collected and shared under patients' control to ultimately used by health care providers.

Objective: This paper explores human factors and technology factors that impact on the quality of PGHD from medical wearables for effective use in clinical care.

Methods: We conducted semi-structured interviews with 17 PGHD stakeholders in Australia, the US, and the UK. Participants include ten health care providers working with PGHD from medical wearables in diabetes, sleep disorders, and heart arrhythmia, five health IT managers, and two executives. The participants were interviewed about seven data quality dimensions including accuracy, accessibility, coherence, institutional environment, interpretability, relevancy, and timeliness. Open coding of the interview data identified several technology and human issues related to the data quality dimensions regarding the clinical use of PGHD.

Results: The overarching technology issues mentioned by participants include lack of advanced functionalities such as real-time alerts for patients as well as complicated settings which can result in errors. In terms of PGHD coherence, different wearables have different data capture mechanisms for the same health condition that create different formats which result in difficult PGHD interpretation and comparison. Another technology issue that is relevant to the current ICT infrastructure of the health care settings is lack of possibility in real-time PGHD access by health care providers which reduce the value of PGHD use. Besides, health care providers addressed a challenge on where PGHD is stored and who truthfully owns the data that affect the feasibility of PGHD access. The human factors included a lack of digital health literacy among patients which shape both the patients' motivation and their behaviors toward PGHD collection. For example, the gaps in data recording shown in the results indicate the wearable was not used for a time duration. Participants also identified the cost of devices as a barrier to the long-term engagement and use of wearables.

Conclusions: Using PGHD garnered from medical wearables is problematic in clinical contexts due to low-quality data influenced by technology and human factors. At present, no guidelines have been defined to assess PGHD quality. Hence, there is a need for new solutions to overcome the existing technology and human-related barriers to enhance PGHD quality.

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Multimedia Appendix 1

Full poster.

[PDF File (Adobe PDF File), 3MB-Multimedia Appendix 1]

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