Topic: Development of a Mobile Application for Assessing Quality of Life in Breast Cancer Patients: Study on Usability and User Preferences

Entwicklung einer mobilen Anwendung zur Erfassung der Lebensqualitaet bei Brustkrebspatientinnen: Eine Studie zur Nutzbarkeit und Benutzerpraeferenzen

Breast cancer is a common and severe chronic condition that significantly impairs the health and quality of life (QoL) of patients [1]. Measurement of health-related quality of life (HRQoL) aims to capture the perceived impact of the disease and its treatment on patients' physical, emotional, and social health [2]. A successful integration of systematic and timely assessment and evaluation of HRQoL in clinical care offers numerous benefits, ranging from improving communication between patients and healthcare professionals to enhancing the patients' QoL and survival rates [1, 3–5].
HRQoL assessments are typically conducted using standardised population-specific patient-reported outcome measures (PROM) in paper-based or electronic formats [2]. Computerised adaptive testing (CAT), based on item response theory, introduces the possibility of individualised and shorter questionnaires, by leveraging previous responses [6]. Additionally, patient-generated PROMs (PG-PROM) exist, allowing patients to determine the domains and weighting of their QoL [7]. Furthermore, objective patient-generated health data collected using sensors can complement these subjective measurements [8].
Despite the advantages, systematic assessment of HRQoL is not commonly incorporated into the standard care of patients with breast cancer [1]. In addition to barriers related to healthcare professionals, previous studies have identified patient-specific barriers associated with standardised questionnaires, including issues such as time burden and the relevance of questionnaire items [1, 7, 9, 10]. However, there are limited studies that have explored user preferences and the impact of HRQoL measures on patients long-term compliance and willingness to report QoL. Furthermore, the inclusion of standardised questionnaires, personalised questionnaires and objective PGHD within a single mobile application may overcome barriers and improve usability.
Therefore, the aim of this research work is to develop a user-friendly mobile application that allows for the assessment of HRQoL in breast cancer patients using a modular mixed-methods approach. Subsequently, usability and user preferences regarding the different measures will be evaluated.
In the light of that objective, this work consists of the following parts:

- Literature research on the methodology of assessing HRQoL, existing measures and electronic implementations, as well as evaluations of acceptability, usability, and barriers
- Requirements engineering based on relevant studies on existing requirements
- Development of a mobile app, providing access for patients with breast cancer with at least the following features: completion of standardised and individual questionnaires and generation of reports on patient HRQoL.
- Conducting a study with a minimum of six participants, including both doctors and patients, to assess the usability and user preferences of the developed application and the included measures.

The thesis must contain a detailed description of all developed and used algorithms as well as a profound result evaluation and discussion. The implemented code has to be documented and provided. An extended research on literature, existing patents and related work in the corresponding areas has to be performed.

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