

Exploring how patients use a connected Internet-Of-Things system (C4A) with CE-marked devices to support asthma self-management?

A mixed method study

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1. Introduction

Traditionally, clinicians assess, manage and support patients during face-to-face consultations but remote care maybe more convenient, enable on-going monitoring, as well as enabling infection control in a pandemic. We aimed to explore how a connected system (A4A+) with smart devices (smart-inhaler, smart-watch, smart peak flow meter) could support asthma self-management.

2. Definition

A connected self-management system is an architecture that uses diverse sensors linked to a device-agnostic platform (app) to collect and collate data relevant to a long-term condition to support patients' self-management decisions, with an option to share monitoring data with a clinician.

3. Method

We recruited 10 asthma patients (range of age/gender/asthma experience/action plan ownership/Apple/Android user/technological competences) via social media, observed their usage of the system over a month (during winter 2020/2021), and undertook baseline and exit interviews.

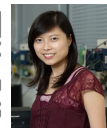
We interviewed one patient's analysis used the Unified Theory of Acceptance and Use of Technology (UTAUT) model[1]. Descriptive analysis of usage data enabled triangulation of findings.

[1]Venkatesh V, Morris MG, Davis FD et al. User acceptance of information technology: Toward a unified view. MIS quarterly. 2003 Sep 1:425-78.

Conflict of interest

CyH has received grant funding from the MRC CiC (ref: MRC/CiC/771) to plan and carry out the study works. BM and HP have received grant funding from Philips NV. MB is Managing Director of Tactum Ltd. Medical International Research and Smart Respiratory Products Ltd provided free smart peak flow devices for this research. Findair and Polar Electro(UK) have provided their apps and API connections to the A4A+ system.

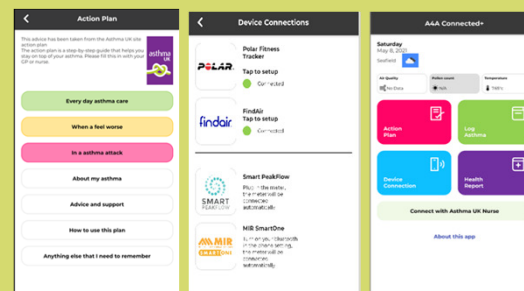
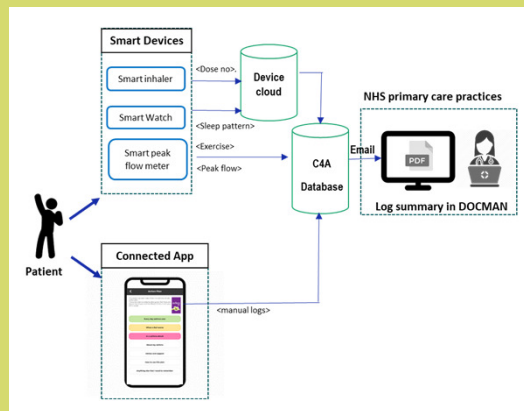
Questions?



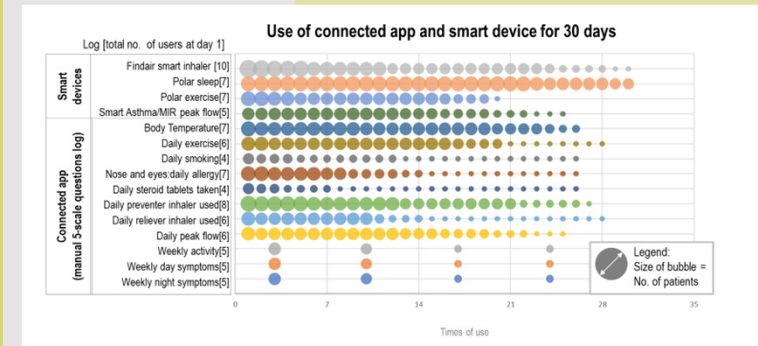
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C4A collected data from smart devices on an app that could be shared with practices in the form of a pdf that could be attached to patients' electronic health records.



4. Results



- 7517 self-monitoring data-points (asthma symptoms, PEFR, inhaler usage, exercise intensity, heart rate, sleeping pattern, body/air temperature) were collected from 10 patients.
- Most data logging reduced over the month of the study.
- Patients felt 'positive', found it 'easy' to use the system.
- Most patients chose to monitor how often they needed to use their reliever inhaler rather than their compliance with the preventer.
- Decisions about using devices were strongly influenced by whether the device was perceived as 'accurate'

5. Conclusion

Accelerated by COVID, a connected system could enable flexible digital approaches to care by providing self-management data to support remote consultations. However, providing users with confidence in the 'accuracy' of systems is needed to maintain motivation to use the system.

6. Strength and limitations

Most of the participants were well motivated participants (early technology adopter). Users with less confident in technology would probably need more support in setting up the technology. As well as the patients' usage data and in-depth interviews, we also discussed with the device manufacturers to triangulate data.

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