

# Mixed-methods study of user needs and preferences in mobile apps for sleep disturbance

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## Introduction

Sleep disturbances are widespread, impacting 33-45 per cent of adults [1]. The most common sleep disorder is insomnia which is under-recognised and undertreated [2]. The most limiting treating factor is a shortage of treatment resources including trained clinicians [3]. In response there has been increasing interest in harnessing mobile technology for sleep health.

Although mobile health (mHealth) apps demonstrate promise for improving sleep at scale, end user engagement is a prerequisite for sustained use and effectiveness. Design processes developed by Human-Computer Interaction researchers [4] can contribute to understanding the target users' experiences, and support future engagement with the technology.

In this study we assessed the experiences, needs and preferences of those with poor sleep and insomnia to inform the development of an engaging sleep app.

## Methods

We triangulated results from qualitative (focus groups, app reviews) and quantitative (online survey) approaches. Two focus groups were conducted (N=10). An online survey tested themes identified from the focus groups against a larger population (N=167). In addition, we analysed 434 user reviews of 6 smartphone apps available on app stores.



## Results

Common focus group themes included the need to account for diverse sleep phenotypes with an adaptive and tailored program, key app features (alarms and sleep diaries), the complex yet condescending nature of existing resources, providing rationale for information requested, and cost as a motivator. Most survey participants (156/167, 93%) would try an evidence-based sleep app. The most important app features reported were sleep diaries (148/167, 88%), sharing sleep data with a doctor (116/167, 70%), and lifestyle tracking (107/167, 64%). App reviews highlighted the alarm as the most salient app feature (43/122, 35%) and data synchronisation with a wearable device (WD) as the most commonly mentioned functionality (40/135, 30%).

## Conclusions

This co-design process involving end-users through three methods consistently highlighted sleep tracking (through diary and/or WD), alarms, and personalisation as vital for engagement although their implementation were commonly criticised in review. Engagement is negatively affected by poorly designed features, bugs and didactic information which must be addressed. Other needs depend upon the type of user e.g. those with severe insomnia.

## References

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