

Developing a Mobile App to Self-Manage Postural Orthostatic Tachycardia Syndrome

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Abstract

Postural Orthostatic Tachycardia Syndrome (POTS) is a disabling chronic illness of the autonomic nervous system. Many patients use mobile applications intended to track and identify symptom trends to improve their quality of life. However, current applications are not tailored for POTS and consequently fail to meet patients' requirements. Current research into these technologies does not acknowledge the needs of the patient demographics (typically young and female). We conducted a survey of 89 patients, through which we identified the most strongly required features of illness-management software for this condition and highlighted why currently available applications are inadequate for many. The results of the research informed a prototype of an application for the management of this disorder. This proof-of-concept app demonstrates a user interface that minimises patient distress and energy commitment when compared to current solutions, as measured in the number of screens required to navigate to log symptoms.

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1 Introduction and motivation

POTS was first identified in 1997 as a form of dysautonomia affecting mainly young women [4], characterised by tachycardia without hypotension upon standing. It has three main subtypes (hyperadrenergic, neuropathic, and hypovolemic) each with different underlying mechanisms, but all significantly impact quality of life. Currently, there is no cure, and treatment focuses on symptom management through lifestyle changes, medication, and supportive garments. However, treatment effectiveness varies, and no standard approach exists due to limited research and patient variability. Emerging evidence suggests mobile health applications, successfully used in managing other chronic conditions, could help POTS patients maintain personalised treatment regimes and improve engagement and outcomes.

2 Background and Study Design

An online survey was carried out to identify the needs of POTS patients when using health tracking technology. Research in this area

remains limited, as evidenced by a systematic review of 82 articles (filtered from 960 hits) that did not include the POTS population [3]. Current literature on mobile health technologies may not apply to those with the disease due to the additional cognitive demands of the condition [1, 2]. Another goal was to understand the limitations of existing apps used in the POTS community (e.g., TachyMon and Visible). To lower the energy commitment for participants, an initial 3-part survey released. Following a positive response of 55 participants in three days, a second phase with additional questions was released. The long-form version of the survey was completed by 36 participants. The key requirements identified were: reduction of energy cost when using the app, incorporation of biometric data and reduction of emotional distress for the user.

3 Implementation and Evaluation

The number of 'clicks' was used to measure the speed with which the application could be used. To achieve 'single-click tracking', this app differs from current solutions by omitting a 'home screen' as it would require the user to navigate to the tracking page, thus increasing the time and energy burden. Instead, the first screen seen by the user is the symptom tracking page (Fig. 1, left).

Each tracking metrics button has a unique colour, which enables the user to access the app through colour recognition instead of reading words if they are experiencing brain fog. Fig. 1 demonstrates the two-phase mechanism for tracking symptoms in the app. This makes it adaptable to suit the user's energy level, e.g., a very fatigued user can track a symptom simply by clicking the relevant

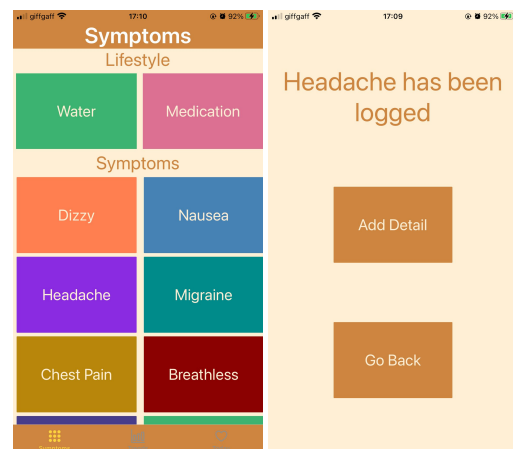


Figure 1: The symptoms tracking interface, with a 'Fast Track'

button ('fast track', as in Fig. 1, right). Conversely, a user who can add additional details can complete a 'detailed track', as in Fig. 2.

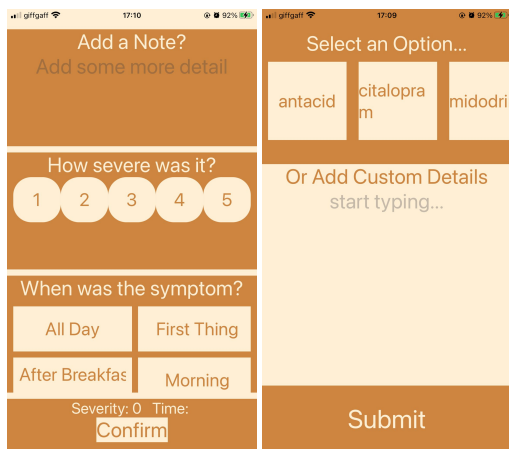


Figure 2: The 'Detailed Track' interface for symptoms

The prototype application effectively demonstrated the functional requirements of the system designed to assist POTS patients managing their condition. When compared to the current most popular solutions (e.g., Visible, as in Fig. 3) the prototype offers a fast user interface that is not energetically burdensome.

4 Conclusion

This work identified critical gaps in existing mobile health applications for POTS patients and demonstrated the potential of a user-centered, low-energy interface to improve symptom tracking. Survey responses from 89 patients highlighted the need for simplified navigation, biometric data integration, and emotional sensitivity in app design. The resulting prototype offers a streamlined, single-click tracking system that reduces cognitive load and energy expenditure compared to current solutions. By prioritising ease of use and adaptability to fluctuating patient capacities, this proof-of-concept app illustrates a promising direction for future POTS-specific health technology. Further development and clinical evaluation are recommended to validate its effectiveness and refine features based on ongoing patient feedback.

References

- [1] Jessica S. Ancker, Holly O. Witteman, Baria Hafeez, Thierry Provencher, Mary Van de Graaf, and Esther Wei. 2015. "You Get Reminded You're a Sick Person": Personal Data Tracking and Patients With Multiple Chronic Conditions. *Journal of Medical Internet Research* 17, 8 (Aug. 2015), e4209. doi:10.2196/jmir.4209 Company: Journal of Medical Internet Research Distributor: Journal of Medical Internet Research Institution: Journal of Medical Internet Research Label: Journal of Medical Internet Research publisher: JMIR Publications Inc., Toronto, Canada.
- [2] Simon L. Jones, William Hue, Ryan M. Kelly, Rosemarie Barnett, Violet Henderson, and Raj Sengupta. 2021. Determinants of Longitudinal Adherence in Smartphone-Based Self-Tracking for Chronic Health Conditions: Evidence from Axial Spondyloarthritis. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 5, 1 (March 2021), 16:1–16:24. doi:10.1145/3448093
- [3] Lin Lu, Jiayao Zhang, Yi Xie, Fei Gao, Song Xu, Xinghuo Wu, and Zhewei Ye. 2020. Wearable Health Devices in Health Care: Narrative Systematic Review. *JMIR Mhealth Uhealth* 8, 11 (9 Nov 2020), e18907. doi:10.2196/18907
- [4] Sean Zhao and Vu H. Tran. 2025. *Postural Orthostatic Tachycardia Syndrome*. StatPearls Publishing, Treasure Island (FL). <http://www.ncbi.nlm.nih.gov/books/NBK541074/>

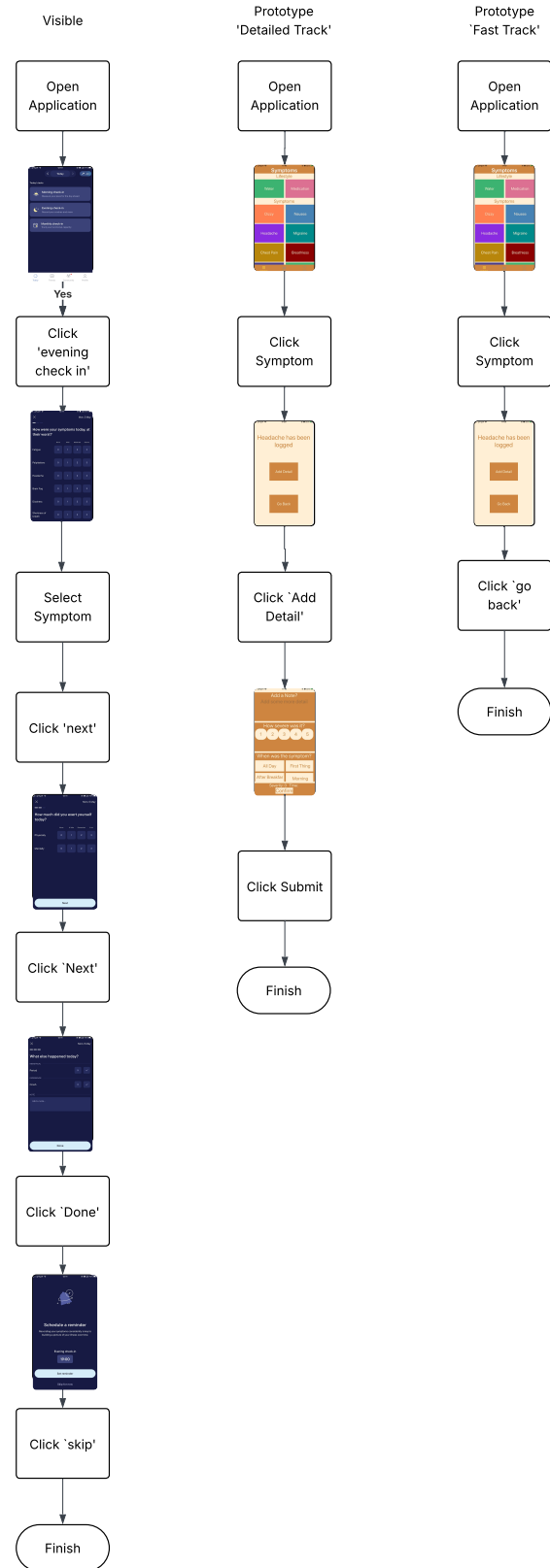


Figure 3: A comparison of steps required to log a symptom in Visible and the prototype