Development of Patient-Centric Digital Engagement Methods to Address Low Adoption & Adherence to Digital Health Tools: A Novel Conceptual Framework

AUTHORS

Jessica Doherty
Analyst, Alira Health
jessica.doherty@alirahealth.com

Renee Willmon
Senior Director, Alira Health
renee.willmon@alirahealth.com

Jean-Francois Ricci
Chief Access Officer, Alira Health
jf.ricci@alirahealth.com

Eduardo Perez-Guagnelli
Engagement Manager, Alira Health
eduardo.perez@alirahealth.com

INTRODUCTION & OBJECTIVE

> Patient digital health tools (P-DHTs) are increasingly common and can generate real-world data and track patient outcomes in real-time[1]. This evidence can enhance health research and care delivery, improving patient outcomes[2]. However, misalignment among stakeholders due to conflicting priorities and a lack of awareness of diverse patient needs has resulted in low adoption and adherence to P-DHTs[3]. Studies on P-DHT usage often lack generalizability, focusing on single tools or disease areas. We present a conceptual framework to develop evidence-based engagement methods that have the potential to improve adoption and adherence to P-DHTs.

METHODOLOGY

> A targeted review was conducted to explore current methods associated with measurement of adoption and adherence to P-DHTs, and to assess currently available P-DHTs, including public patient reviews. Digital patient engagement (PE) strategies and methods were assessed in a thematic analysis and classified according to the following variable types: (1) *Moderating variables* explaining why and how patients use P-DHTs, (2) *Mediating variables* influencing the strength of patient adoption and adherence to P-DHTs, (3) *Control variables* influencing why and how patients use P-DHTs, and (4) *Confounding variables* affecting patient interactions with P-DHTs.

Figure 1. PRISMA flow diagram
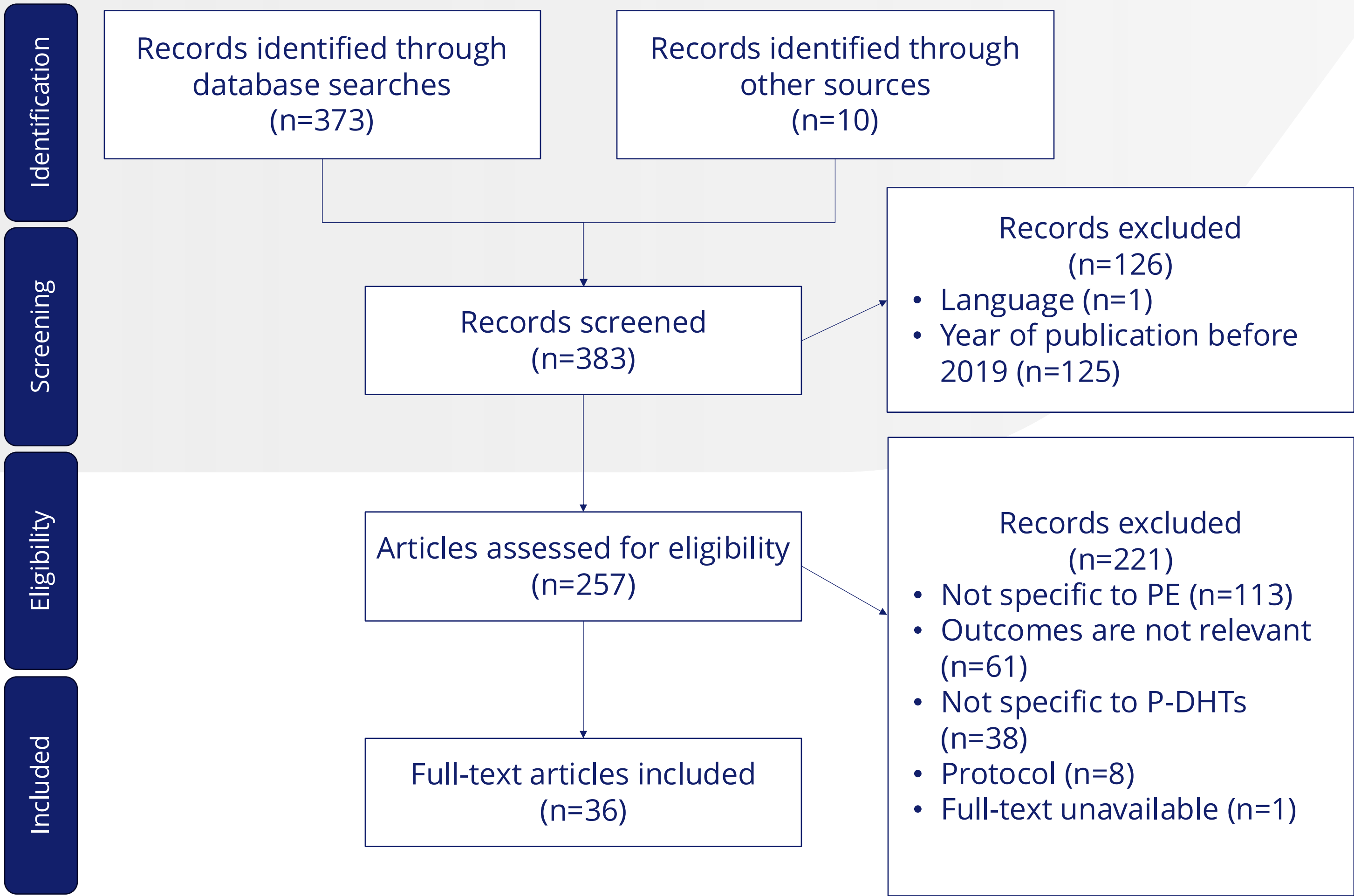
> 15 P-DHTs with publicly available information about their features and functionalities were compared against the following inclusion criteria:

1) A PE solution made up of primarily digital components.
2) The solution can be used outside the point of care.
3) Allows bi-directional communication with patients.
4) The solution supports patients through either routine care or facilitates remote data collection for a digital patient registry or clinical study.

RESULTS

> The included papers addressed a variety of patient-directed health technologies (P-DHTs). Some focused on no specific therapeutic area (22.2%), while others covered multiple areas (13.8%).

> The most common area was mental health (16.7%). Cardiovascular diseases, oncology, diabetes, surgical recovery, and chronic pain each comprised 5.5% of the papers. Less common areas, such as sickle cell disease, HIV, Alzheimer's disease, chronic kidney disease, ophthalmology, and chronic myeloid leukemia, were each represented in 2.8% of the reviews.

Table 1. Patient ratings of P-DHTs

P-DHT	# of ratings	Average rating (1-5)
1	5	5
2	11	4.1
3	32	4.2
4	91	2.8
5	254	3.4

> Of the 15 patient-directed health technologies (P-DHTs) we examined, 53.3% met all inclusion criteria. Of these, only 62.5% had publicly available patient reviews on the App Store™ or Google Play Store™, and 50% provided qualitative feedback.

> The average user satisfaction rating for these 5 P-DHTs was 3.9 out of 5, but those above 4 had only 11 to 32 reviews, indicating especially small sample sizes. Qualitative feedback highlighted frustrations with bugs, inadequate onboarding, login issues, loss of stored data, and poor support.

> These findings, though based on small sample sizes, are consistent with challenges reported in the literature, which underscore poor engagement and misalignment with patient expectations[4].

Figure 2. Conceptual framework flow diagram
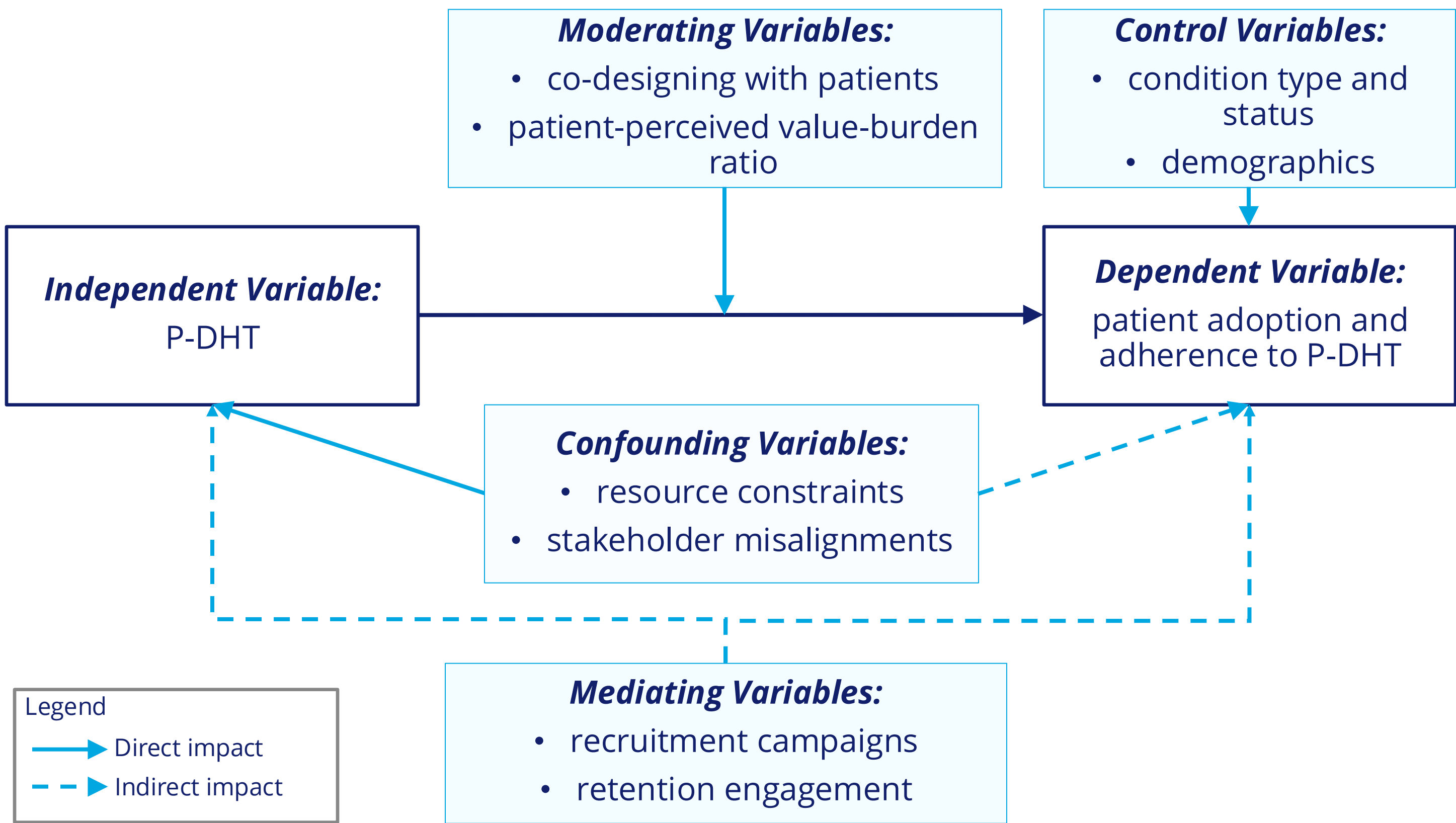
Thematic analysis of engagement strategies and methods explored in the literature and existing P-DHTs revealed:

> *Moderating variables*, including co-designing P-DHTs with patients and the patient-perceived value-to-burden ratio of P-DHT use. Examples were collaborative workshops and focus groups with patients throughout the development process to develop P-DHTs aligned with patient expectations, needs, and preferences.

> *Mediating variables* entail recruitment and retention efforts to promote patient-perceived benefits of P-DHTs and ongoing use. Examples of these were providing content to raise awareness of the features that patients found the most beneficial and customizable reminder notifications.

> *Control variables* encompass demographics and condition status, which influence patients' motivations for P-DHTs. Examples include features that cater to patient needs at different phases of disease progression.

> *Confounding variables* include resource constraints and stakeholder misalignments that influence the quality and functionality of P-DHTs.

CONCLUSION

Patient-centered digital health technologies (P-DHTs) must prioritize patient engagement to generate valuable real-world data, which can ultimately enhance health research and care delivery to improve patient outcomes. To create genuinely patient-centric tools, it's essential to consider the role of moderating, mediating, control, and confounding variables, as these will impact the successful implementation of P-DHTs. These factors should not only guide the development of P-DHTs but also inform ongoing engagement strategies, ensuring that patients continuously find value in using these tools over time.

REFERENCES

1. Iu AW, Brown Iii W, Madu NE, Maiorano AR, Bigazzi O, Medina E, Sorric C, Hays SR, Odisho AY. Patient Engagement With and Perspectives on a Mobile Health Home Spirometry Intervention: Mixed Methods Study. JMIR Mhealth Uhealth.2024; 12:e51236.
2. Horgan D, Borisch B, Cattaneo I, Caulfield M, Chiti A, Chomienne C, Cole A, Facey K, Hackshaw A, Hendolin M, et al. Factors Affecting Citizen Trust and Public Engagement Relating to the Generation and Use of Real-World Evidence in Healthcare. *International Journal of Environmental Research and Public Health*. 2022; 19(3):1674
3. Blanchard M, Koller CN, Azevedo PM, Prétat T, Hügle T. Development of a Management App for Postviral Fibromyalgia-Like Symptoms: Patient Preference-Guided Approach. *JMIR Form Res*. 2024; 8:e50832.
4. Haggag, O., Grundy, J., Abdelrazek, M. et al. A large-scale analysis of mHealth app user reviews. *Empir Software Eng*. 2022; 27(196).

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