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Evaluating the role of simple assistive devices in promoting motivation and self-care in chronic disease management

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ABSTRACT

Objective: This study evaluates the development and distribution of simple assistive devices designed to support individuals in managing their health conditions at home. The focus is on older adults from lower socio-economic groups in Stoke-on-Trent and Newcastle-under-Lyme, UK.

Methods: Assistive kits were distributed to participants between December 2021 and April 2022, addressing weight management, diabetic foot care, mental wellbeing, and daily living independence. Each kit contained affordable and accessible assistive devices, including portion plates, exercise bands, and remote-operated plugs, alongside educational materials to promote self-care. Feedback was collected between March and June 2022 to assess user satisfaction and engagement. A qualitative analysis, informed by self-determination theory, explored how these kits supported autonomy, competence, and relatedness in self-management.

Results: Over 90 % of recipients reported using the kits more than once weekly and an increased confidence in managing their health conditions independently. Qualitative analysis indicated that the kits facilitated motivation towards self-management by enhancing users' autonomy, competence, and social connectedness. However, barriers such as cost, availability, and lack of support were identified as limiting factors for broader adoption.

Conclusions: This study highlights the potential of affordable, simple assistive devices to empower individuals in managing their health and wellbeing. The initiative demonstrates a promising approach to addressing health management challenges in lower socio-economic groups. Further research is needed to expand access and refine interventions to maximise impact and improve quality of life.

1. Introduction

The growing burden of the ageing population poses significant challenges to health and social care services and the overall well-being of older adults (Nachiappan et al., 2023). To address the varied needs of an increasingly co-morbid elderly population and ensure sustainability of health systems, greater focus must be placed on promoting self-care in chronic disease management (Alqahtani and Alqahtani, 2022; Jordan et al., 2008; Dineen-Griffin et al., 2019). Simple assistive devices enhance physical activity, support daily living, and promote self-management of long-term health by improving independence and reducing the burden on caregivers and healthcare services. These low-tech, affordable tools improve quality of life, particularly for individuals with physical, cognitive, or sensory challenges, making them especially valuable for the elderly. However, access remains unequal, often limited by socioeconomic status.

The complex interplay of biological, psychological, and social factors in the ageing process underscores the need for a holistic approach to health promotion among older adults (Dziechciaz and Filip, 2014). For instance, physical limitations associated with ageing can contribute to

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feelings of isolation and depression (Alexopoulos, 2005). Moreover, social factors, including retirement and reduced interpersonal relationships, can exacerbate feelings of loneliness and social isolation (Saleev et al., 2023). Provision of services for chronic disease management must therefore promote positive psychological experiences, health behaviours and social connections (Kemp and Fisher, 2022). The International Classification of Functioning Disability and Health (ICF) framework is also grounded within this biopsychosocial model. The framework highlights the relationship between personal or environmental factors, such as technology and product availability, and activity limitation (i.e. disability) in chronic disease (World Health Organization, 2007).

The challenge of addressing these factors is further compounded by persistent health inequalities, which disproportionately affect older adults in socioeconomically deprived areas (Brandt et al., 2022). Older adults in lower socioeconomic groups are more likely to experience poor health outcomes, reduced access to care, and limitations in engaging in self-care practices (Rahman et al., 2016; Shankar et al., 2010). Given the higher prevalence of chronic conditions among older adults in deprived areas (Callander et al., 2013), the exploration of targeted community-based management strategies becomes paramount, as such approaches hold the potential to significantly alleviate the financial burden on healthcare systems like the National Health Services in the United Kingdom.

Simple assistive devices support daily living and self-management of long-term health (De-Rosende-Celeiro et al., 2019), and such assistive technology addresses the environmental factors within the ICF, enhances independence, supports functioning, and eases the burden on caregivers and healthcare services (Khasnabis et al., 2015). These low-tech, affordable tools simplify daily tasks and enhance quality of life, especially for those with physical, cognitive, or sensory challenges, making them ideal for the elderly (Abrilahij and Boll, 2019). A pivotal report from the World Health Organisation (WHO) indicates that one in three people worldwide—more than 2.5 billion individuals—currently require at least one assistive product, a figure projected to rise to 3.5 billion by 2050 as the population ages and the prevalence of non-communicable diseases increases (*World Health Organization and the United Nations Children's Fund (UNICEF)*, 2022). However, variability in access to such devices remains an important global challenge, often dictated by socioeconomic status (*World Health Organization and the United Nations Children's Fund (UNICEF)*, 2022).

Early research has demonstrated the potential of readily available assistive products in supporting self-care among those suffering from chronic conditions. These results, from 100 device users, highlighted that assistive products can empower users in managing a variety of chronic conditions, often in a manner unique to their health condition and circumstance (Nachiappan et al., 2023). More widely, a study of over 8000 participants in India estimated that over 24 % have a need for assistive devices but were limited by financial barriers and availability (Senjam et al., 2023). Moreover, the potential of assistive technology remains unfulfilled with high abandonment rates (Phillips and Zhao, 1993; Martin et al., 2011; Sugawara et al., 2018). Key barriers to their use identified in a meta-analysis included: the perceived benefit of the tool, confidence in its use, lack of trustworthy information, lack of awareness among healthcare professionals and personal psychological and social barriers (Howard et al., 2022).

Consequently, there remains a critical need for structured evaluations of such interventions, particularly in deprived areas where the potential impact could be most significant. Moreover, given our previous findings (Nachiappan et al., 2023), a more detailed exploration of users' experiences through qualitative-driven research may better elucidate *how* these devices support self-management in such unique ways. By exploring the role of assistive devices in promoting self-care and motivation in deprived elderly populations, our research can guide their future development and integration within any healthcare system.

1.1. Local context

The city of Stoke-on-Trent and the surrounding area of North Staffordshire provide an ideal context for exploring these issues. As one of the most deprived areas in England, Stoke-on-Trent faces significant socioeconomic challenges that profoundly impact the health and well-being of its residents. More than half live in areas classed as being among the most deprived nationally, with the average person aged 65 years and above spending half of their remaining years with a life-limiting health condition (Office for National Statistics, 2023). In addition, the region has lower than average educational attainment with 63 % of adults with a higher qualification, compared to the national average of 67 % (Office for National Statistics, 2023). This in turn may impact the population's health literacy and acceptance of educational materials. The challenges faced by older adults in this area exemplify broader issues faced across the country, such as health inequalities and the need for accessible and effective self-care interventions.

1.2. MyHealthKits

The *MyHealthKits* initiative, piloted in Stoke-on-Trent, offers bespoke themed kits containing simple, readily available products to support patients with chronic conditions. Four themed *MyHealthKits* are designed to support different aspects of health. The *Weight Management* Kit includes portion plates, a digital analytic weighing scale, and nutritional education to aid dietary control. The *Stay Lively* kit promotes physical activity with resistance bands, pedometers, and exercise guides for older adults. The *Stay Balanced* kit supports sleep and mental well-being with a pillow spray and educational materials on self-help strategies and cognitive behavioural therapy. The *Diabetes Wellness* Kit helps prevent and manage foot complications with foot inspection mirrors, moisturising creams, diabetic socks, and guidance on foot care. Each kit includes user-friendly instructions and educational resources to encourage effective use and long-term self-care.

The bespoke provision of these assistive products is a novel approach and, while initial feedback has been promising (Nachiappan et al., 2023), there is a need for a more comprehensive evaluation of the acceptance, usage, and overall user experience. This study aims to address this gap by conducting a structured evaluation of the *MyHealthKits* initiative in Stoke-on-Trent and North Staffordshire. Specifically, the research objectives are to:

1. Assess the acceptance and usage patterns of supportive health kits, including each of the simple assistive devices included within, among older adults in deprived areas.
2. Explore whether, and how, such kits, and the included devices, can promote self-care and independence in this population.

2. Methods

2.1. Study design and participant recruitment

This is a post-market surveillance study which evaluates the usage and acceptance of *MyHealthKits*. Our study population included community residents in Stoke-on-Trent and Newcastle-under-Lyme. Distribution of kits and recruitment of participants occurred during a series of 22 local health education events held between December 2021 and April 2022 and directly through general practice clinics. These events were supported by the research team in collaboration with community leads. Events were open to all individuals within the community, with invitations extended through local community leads, healthcare professionals, and promotional materials to maximise outreach.

During these events, healthcare professionals provided information on the significance of supportive devices in enhancing self-care, presented the kit contents, and highlighted their potential benefits. Attendees who engaged with the educational content and were able to read

and understand the provided information sheet were eligible to receive a kit. There were no specific inclusion or exclusion criteria (beyond being 18 years of age or older) for receiving a kit and therefore participating in the study. Kits were provided entirely free of charge, funded by the Community Renewal Fund programme, eliminating any financial barriers to access. Participants self-selected the most appropriate kit based on their health needs. Additional guidance was available from healthcare professionals for those managing multiple conditions regarding the kit contents and their suitability based on the patient's co-morbidities. Participants could only receive one kit. This self-selection process aligns with the programme's patient-centred approach, empowering individuals to take ownership of their health and make informed choices that best suit their personal needs. For vulnerable populations, where necessary such as those under the care of a Seriously Mental Illness team, distribution was conducted directly by clinical staff to maintain patient privacy and adhere to General Data Protection Regulation. These individuals were still able to self-select their health kit but the need to maintain confidentiality necessitated a separate distribution process. Kit recipients provided informed consent to be contacted directly via telephone to provide product feedback.

2.2. Sampling and data collection

All recipients were invited by phone to a telephone interview with a project support worker, approximately four weeks post-distribution. Those who initially did not respond were contacted again two to three weeks later. Demographic data were collected from an engagement form completed during kit distribution at the community events. This included self-reported data on age, ethnicity, disability and occupational status.

For each delivered kit, structured telephone interviews, using a topic guide (Table 1), were conducted to assess product acceptance and usage. Notes on the participants' answers were recorded during the interview by the project support worker.

2.3. Data analysis

Descriptive statistics of response rates and demographic characteristics were calculated using Microsoft Excel. Self-reported use of items and overall frequency of kit use were determined based on participant responses to questions one to three. Responses were quantitatively coded according to whether recipients reported using the kits daily and which items they described using most often.

Thematic analysis of qualitative data from participants' answers was conducted using Braun and Clark's method (Braun and Clarke, 2006), allowing deeper exploration of the participants' experiences (Braun and Clarke, 2014). The analytical process commenced with data familiarisation followed by systematic initial coding conducted by one researcher with consensus discussions with the wider research team. The third stage involved theme identification, where codes were collated into potential themes, and all relevant data was gathered for each prospective theme. Subsequently, the themes underwent a rigorous review process to ensure coherence with the coded extracts and the entire dataset. This systematic approach to thematic analysis enabled the uncovering of latent meanings and implications of participants' experiences with the *MyHealthKits*. The iterative nature of the process allowed for constant comparison and refinement of themes, ensuring a comprehensive and nuanced understanding of the data.

2.4. Theoretical framework

Qualitative data were thematically analysed through the lens of self-determination theory (SDT) (Deci and Ryan, 1985). SDT states that motivation may be extrinsic, driven by rewards or punishments, or intrinsic. For the latter to be maintained, three psychological needs must be satisfied: (1) the need for autonomy, (2) competence or self-efficacy and (3) relatedness or interconnectedness (Ryan and Deci, 2020). Previous evidence from qualitative studies exploring the experiences of patients with chronic disease have demonstrated the importance of nurturing these needs to feel 'free from disease'. (Eassey et al., 2020) Moreover, greater perceived autonomy and competence have been associated with better mental health, positive health behaviours and improved chronic disease outcomes including cholesterol levels and glycaemic control (Williams et al., 2004; Ng et al., 2012).

2.5. Reflexivity

Reflexivity has been maintained throughout the analytic process through rigorous coding diaries and consensus meetings with the research team. Interviews were conducted by a project support worker who was not known to any participants. Coding, initial thematic analysis and statistical analysis was conducted by SK who is not affiliated to the *MyHealthKits* company nor known to any participants.

2.6. Ethical approval

As this study was a post-market service evaluation of readily available off the shelf products, local health research ethics approval was not required.

3. Results

3.1. Participant characteristics

A total of 731 individuals attended the events and completed an engagement form, providing their demographic details. Among them, 438 were individual recipients of the kits, while the remaining 293 attendees included those accompanying recipients, community group members, or individuals interested in learning more about self-care.

Of the attendees, 607 identified as White British, 24 as Asian British, 10 as Black/African British, and 90 preferred not to disclose their ethnicity. A significant proportion of attendees reported vulnerabilities, with 266 describing themselves as having a disability, 281 being aged 65 years or older, and approximately 500 being unemployed or retired.

Event promotion was conducted via flyers distributed to community groups and service users, supported by advertising on Primary Care Network and general practice social network pages and displays in general practice waiting rooms. Event capacity and space limitations determined the number of kits available at each event, ensuring that distribution was tailored to local needs and resources. A further 179 kits

Table 1
Topic guide for assessing kit usage, impact on health management, and recipient experience.

Questions included within the topic guide
1. How long have you been using the kit for?
2. How often have you used an item(s) of the kit?
3. Which items out of the kit have you used most often? Why?
4. Has the kit helped you to manage your health and well-being? If so, in what way?
5. Do you feel more confident about managing your health at home?
6. Which item did you feel was used the least in the kit?
7. Do you have any additional health conditions that have been improved from using the kit–for example, low mood, or poor mobility?

were distributed directly via general practices, for instance to vulnerable patients as described above. Therefore, a total of 617 *MyHealthKits* were distributed across the four categories, as shown in Table 2.

Across all 617 kit recipients, a total of 223 telephone interviews were conducted with an overall response rate of 36.14 %. The response rates stratified by *MyHealthKit* type are shown below in Table 2.

3.2. MyHealthKit usage

Table 3 presents key demographic and usage characteristics of respondents, including their age distribution, the duration of *MyHealthKits* usage at the time of feedback, and their self-reported frequency of use and confidence in self-management. As shown, most recipients (57 %) reported using the kits daily, with the *Stay Lively* kit showing most frequent use. Overall, 92 % of recipients reported using their more than once a week and 87.5 % people indicated that they are confident of managing their condition at home. Table 4 shows the most frequently used items by kit type and demonstrates the wide usage of all included products.

3.3. Thematic analysis

Four themes emerged from our thematic analysis of participant responses: (1) personalised use of health kits as a promoter of independence and behavioural change, (2) fostering motivation through a sense of achievement, (3) psychosocial barriers to the effectiveness of health kits and (4) health promotion through community engagement. These are presented with supporting quotes included within the supplementary materials.

3.3.1. Theme

1: Personalised use of health kits as a promoter of independence and behavioural change.

Participants often tailored the use of their kit contents towards their individual circumstances and health needs, maximising their health benefits. Consequently, the tools facilitated self-driven behavioural change and not always in a direct manner. This promotion of independence and control was sometimes driven by the kits' ability to positively adapt the user's environment, improving their quality of life. However, whilst the tools may promote autonomy, they did not always overcome all the limitations posed by health conditions.

3.3.2. Theme

2: Fostering motivation through a sense of achievement.

Both the kits themselves, and the guidance included within, encouraged the self-efficacy of users in enacting sustained behavioural change. The perception that the advice and steps were achievable appeared to motivate users. Participants were further motivated by observing tangible improvements in their physical health, both objectively through improvements in weight and subjectively through improvements in their symptoms. Similarly, the kits have led to improvements in participants' mental health. These improvements in mental health also had beneficial effects on participants' physical health and health behaviours.

Table 2
Summary of *MyHealthKits* distributed by kit type, number of responses received, and response rates across different kit types.

Kit type	Distributed (n)	Responses (n)	Response rate (%)
Weight management	297	100	33.7
Diabetic foot care	70	40	57.1
Stay balanced	60	22	36.7
Stay lively	190	61	32.1
Total	**617**	**223**	**36.1**

3.3.3. Theme

3: Barriers to the effectiveness of health kits.

Despite these benefits, participants commented on important barriers to effective use of the kits. In one case, this stemmed from underlying psychosocial factors. In addition, conflicting information with other programmes may contribute to confusion for patients and hence limit engagement.

3.3.4. Theme

4: Health promotion through community engagement.

The health promotion benefits towards the wider community were particularly evident across participant accounts. This occurred indirectly through social and community networks. Similarly, beyond their direct benefits, use of the kits appeared to stimulate discussion and engagement of other members of the community group. Finally, the benefits of the health kits spread more directly within households; both through physical use of the contents themselves but also through the educational content within.

4. Discussion

This evaluation of health kits with assistive devices, using quantitative and qualitative measures, shows frequent use and user acceptance, highlighting their role in supporting independence and encouraging positive health behaviours for patients and the wider community. Moreover, kits motivated users in their self-care by promoting a sense of capability coupled with tangible improvements in their symptoms and disease control. Nonetheless, our findings also highlighted important psychosocial barriers to their use, such as conflicting messaging from other health promotion channels.

Our findings align closely with the self-determination theory of motivation (SDT) which places emphasis on the psychological needs of autonomy, competence and relatedness for maintaining intrinsic motivation (Deci and Ryan, 1985; Deci et al., 1999). *MyHealthKits* supported users' independence in daily activities by helping them overcome health-related limitations. By promoting self-efficacy through achievable goals and fostering interconnectedness, the kits also nurtured psychological well-being and intrinsic motivation. Previous qualitative literature has highlighted the importance of feeling 'free from disease' for sufferers of chronic illness (Eassey et al., 2020); our study shows that simple assistive devices can be an important step towards achieving this. The perceived improvements in disease control and quality of life are also in keeping with previous studies using targeted SDT-based approaches (Williams et al., 2004; Ng et al., 2012).

Aligned with the ICF framework and biopsychosocial model (Dziechciaz and Filip, 2014; Alexopoulos, 2005; World Health Organization, 2007), our findings demonstrate how assistive devices modify environmental and social factors which govern everyday functioning. Nevertheless, assistive devices alone may be insufficient to overcome all the limitations posed by a highly co-morbid population. Our results further highlight the importance of addressing psychosocial factors in chronic disease management. Participants commented on the benefits of the kits on their mental health which in turn encouraged improvements in their physical health behaviours, an important and well-researched phenomenon (Ohrnberger et al., 2017). Assistive devices may offer a means of targeting this bidirectional relationship and improving overall wellbeing and quality of life.

This study has important implications for healthcare service delivery. Use of the kits carried clear perceived health benefits, often in a unique manner to each individual which may not be captured by simple survey studies. These personalised benefits were possibly maximised through self-selection of the kits, promoting autonomy and choice, based on the individual's health priorities. Within the design of the kits, our results have demonstrated the importance of not only the contents but also the educational content included within. Overall, we have highlighted the potential role of simple assistive devices in promoting

Table 3
Descriptive statistics of self-reported demographic characteristics, usage patterns and confidence in self-management of chronic disease at home among *MyHealthKits* recipients (and respondents). All values are the percentage of total responses for each kit.

	Age			Duration of usage at feedback			Frequency of usage at feedback			Confident to manage your health at home?		
	<50 years (%)	51–70 years (%)	<70 years (%)	4 weeks (%)	Between 4 and 6 (%)	>6 weeks (%)	Daily (%)	2–4 times a week (%)	Once weekly (%)	Yes (%)	No (%)	Undecided (%)
Weight management (n = 100)	32	47	21	37.8	44.9	17.3	50.5	42.1	7.4	92.8	2.1	5.1
Diabetic foot care (n = 40)	17.5	42.5	40	57.5	32.5	10	50	42.5	7.5	92.5	2.5	5
Stay balanced (n = 22)	59.1	31.8	9.1	27.3	63.6	9.1	54.5	31.8	13.7	72.7	9.1	18.2
Stay lively (n = 61)	8.2	31.1	60.7	26.2	57.4	16.4	73.8	24.6	1.6	91.8	1.6	6.6
Total (n = 223)	**29.2**	**38.1**	**32.7**	**37.2**	**49.6**	**13.2**	**57.2**	**35.3**	**7.6**	**87.5**	**3.8**	**8.7**

Table 4
Descriptive statistics of self-reported usage rate of each item by kit recipients within the four *MyHealthKit* types.

Kit type	Item	Usage rate (%)
Weight management	Digital analytic scales	87
	Portion plate	73
	Exercise bands	62
	Moisturising cream	95
Diabetic foot care	Magnifying glass	82
	Diabetic socks	78
	Sleep mask	86
Stay balanced	Cognitive behavioural therapy (CBT) book	68
	Relaxation aids	59
	Remote plugs	96
Stay lively	Torch	89
	Exercise bands	72

motivation and self-care for patients with chronic disease which in turn can alleviate the burden on stretched healthcare services. On an individual level, the tools can improve quality of life and overall wellbeing whilst simultaneously carrying broader societal benefits through reduced healthcare utilisation across acute and chronic care. For healthcare professionals, increasing use of such kits will lead to a paradigm shift towards educating and supporting device users as part of a strategy promoting holistic care and self-management.

There is a global shortage of orthotic and prosthetic service provision, with only 5 % to 15 % of those in need having access to necessary devices. The findings from the UK cross-sectional survey highlight significant disparities in service provision, emphasising the need to prioritise prevention by supporting individuals early and empowering them to manage their health independently (Chockalingam et al., 2019). Although other reports from the UK indicate that assistive devices for self-care are underused (Healy et al., 2022), we argue that this is largely due to a lack of exposure, provision gaps and structured intervention. Based on WHO data, barriers to access are commonly identified as high costs, limited availability, and lack of support (*World Health Organization and the United Nations Children's Fund (UNICEF)*, 2022). Encouragingly, over half of our respondents reported satisfaction with their assistive products and services, finding them suitable for various environments and activities. The results of the current study confirm the effectiveness of assistive devices in self-care, enhancing autonomy and quality of life, and supporting the need for wider access and targeted interventions.

This study is not without its limitations, however. Firstly, we were unable to distinguish between the demographic characteristics of kit recipients and non-recipients at recruitment events, which may have highlighted potential selection bias. The self-selection and subsequent over-representation of respondents with stronger or more positive views may have led to a degree of responder bias. In addition, outcome data in this study is reliant on self-reporting of device usage and health impacts. Whilst the user-focused nature of this study means the focus is placed firmly on the participants' experiences, the structured nature of the interviews may have limited the depth to which these could be explored. Finally, whilst this study explored usage within the first four to six weeks, longer term data is vital, particularly with regards to abandonment (Phillips and Zhao, 1993; Martin et al., 2011; Sugawara et al., 2018; Howard et al., 2022).

Whilst this surveillance study begins to paint a picture of user experiences of assistive device packages in chronic disease self-management, further research into their clinical effectiveness is a vital and, as yet, unexplored aspect. Such studies can utilise linkage with healthcare data to determine associations between usage and more objective measures such as body mass index (BMI), glycaemic control through HbA1c levels, and healthcare utilisation through hospital attendances and clinic appointments. This data, coupled with quality-of-life impact data, can facilitate cost-effectiveness analyses thus providing justification for the widespread implementation of health kits. The use of longitudinal usage data should be an important consideration within these studies and can potentially be coupled with the use of validated SDT scales (such as the Treatment Self-Regulation Questionnaire) (Levesque et al., 2007) to assess healthcare-oriented motivation over time.

5. Conclusion

This study highlights the acceptability and health benefits of simple assistive devices in supporting the self-care of adults with chronic disease. In line with self-determination theory principles, *MyHealthKits* may encourage motivation towards self-management. Further research exploring their impact on healthcare outcomes and service utilisation is an important next step.

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CRediT authorship contribution statement

Sanat Kulkarni: Writing – review & editing, Writing – original draft, Formal analysis. **Nachiappan Chockalingam:** Writing – review & editing, Writing – original draft, Project administration, Funding acquisition, Formal analysis, Conceptualization. **Ruth Chambers:** Writing – review & editing, Project administration, Methodology, Funding acquisition, Conceptualization. **Pegin Poulose:** Writing – original draft, Formal analysis. **Shamita Suresh:** Writing – original

draft, Formal analysis. **Laxmi Thileepan:** Writing – original draft, Formal analysis. **Nitish Nachiappan:** Writing – review & editing, Writing – original draft, Data curation.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests.

While there were no competing interests during the development and delivery of this project, it should be noted that NC and NN are currently directors of Alegre limited, which owns and commercially offers *MyHealthKits*. None of the other authors have declared any competing interests.

NC and RC were the primary contacts for the funding agency and they were part of a bigger consortium for the CRF project. Although no competing interests were present during the development and delivery of this project, it is important to note that NC and NN are currently directors of Alegre Limited, which owns and commercially distributes *MyHealthKits*. No other authors have declared competing interests. The data was independently collected, analysed, and reported.

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Appendix A. Supplementary data

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Data availability

Data will be made available on request.

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