

Bridging Technology and Support: The Influence of Triage Nurse Monitoring on Digital Health Engagement in Older Adults with Multiple Chronic Conditions

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In the European Union, around 50 million people live with multimorbidity, the coexistence of two or more chronic conditions, which is especially prevalent among older adults. This poses challenges for individuals and healthcare systems, underscoring the need for innovative self-management solutions. Digital health technologies offer promising tools, but the complexity of multimorbidity often requires additional human support. A nurse-led telephone triage and monitoring service could enhance digital health interventions. This study explores engagement patterns with a digital health platform among older adults with multimorbidity, comparing those with and without clinical triage support. Results indicate that triage support improved engagement, especially for consistent tasks like vitals monitoring and self-reporting. Tailoring interventions to individual health needs and motivations, while integrating professional support to enhance self-efficacy, can optimise digital health tools for older adults with multimorbidity.

CCS CONCEPTS • Human-centered computing • Human computer interaction (HCI) • Empirical studies in HCI

Additional Keywords and Phrases: Engagement, Digital health, Older adults, Self-management, Clinical support

1 INTRODUCTION

Over the past 50 years, global life expectancy has been increasing exponentially, showing little sign of slowing down [11]. However, while people are living longer, they are not necessarily living well for longer (ibid.) which is confirmed by the fact that global healthy life expectancy in 2016 was estimated to be just 63.3 years [24]. The prevalence of chronic health conditions is also increasing because of an ageing population [9]. In developed countries, it is estimated that more than 25% of the adult population live with two or more chronic health conditions (multimorbidity) which rises to 50% in the population aged over 65 years [9]. Multimorbidity places a significant burden on people who live with it, physically, mentally, socially and financially. Individuals with

multimorbidity are at risk of functional decline and disability, in addition to having to take multiple medications (polypharmacy) and requiring frequent health care utilisation which leads to poor quality of life [12, 25].

Self-management, defined as the actions individuals take to manage symptoms, emotions, and lifestyle changes associated with living with a chronic condition [2], is a crucial aspect of multimorbidity care to support and maintain health. Managing multiple chronic conditions is inherently complex, requiring individuals to navigate overlapping symptoms, adhere to intricate medication regimens, coordinate care across multiple providers, and balance the physical and emotional demands of their illnesses within the constraints of daily life [13]. Technology has the potential to transform self-management practices and improve health outcomes for those with chronic conditions. However, engagement levels with technology-based health interventions are concerning, with limited participation and high attrition rates being common [14, 26]. For example, digital health applications are abandoned by more than 25% of people after only one use which implies that users are not gaining real health benefits from achieving their health goals [10]. Moreover, Yardley et al. [27] warn that dropout rates and non-usage attrition are higher when there is no human support system in place for users. Similarly, older adults lack the supports, both technical and clinical, to sustain engagement [23]. Further, comparatively little research has explored how technology might support multimorbidity management with few examples of longitudinal trials of such technology [7].

This paper reports preliminary findings in relation to digital self-management engagement from an ongoing Effectiveness-Implementation Hybrid (EIH) trial [5], which aims to assess the effectiveness of a digital health platform through a pragmatic randomised controlled trial and evaluate its implementation via process evaluation. Participants were randomised into three trial arms: Arm 1 participants use the digital health platform with self-management support provided by telephone triage nurses (TTNs), who monitor alerts and conduct monthly check-in calls; Arm 2 participants self-manage their conditions using the platform without TTN support; Arm 3 participants receive standard care. The trial duration for each participant is six months. This paper focuses on a sub-sample of Arm 1 and Arm 2 participants who have completed the trial, examining their logged engagement with the platform over the six-month period and reporting on thematic analysis of interviews conducted following three months of participation. This paper offers three contributions. Firstly, this paper presents objective engagement data with a digital health platform over a six-month period alongside interview data, providing a comprehensive insight into engagement. Other research to date has focused on the use of questionnaires to assess engagement [17] or has focused solely on examining usage logs [3], both of which fail to capture why and how users engage. Secondly, the presents findings in relation to engagement of older adults with multimorbidity, an understudied cohort in digital health research. Finally, this paper compares engagement of those with and without clinical support.

2 METHODS

The EIH trial recruited 240 participants aged 65+ with at least two chronic conditions (e.g., respiratory, diabetes, chronic heart failure, or heart disease) via convenience sampling through advertisements, clinical services, and a home care organisation. Participants provided informed consent and received a blood pressure monitor, weight scale, smartwatch, and an iPad with bespoke CareApp for managing multiple chronic conditions. Those with diabetes were given a blood glucose monitor, and participants with respiratory conditions received a pulse oximeter. The CareApp (Figure 1, left) featured: (1) A dashboard summarising self-management data, linking to details such as historic blood pressure trends and relevant educational content. Users could also answer

self-report questions about mood or symptoms (e.g., breathlessness). (2) Medication management, including prescription tracking. (3) An educational library with resources on conditions, self-management, and device use. (4) Personalisation settings and help options. Participants in Arm 1 received clinical triage support from four TTNs, available 9 a.m. to 5 p.m., Monday to Friday. TTNs monitored real-time alerts (e.g., abnormal blood glucose levels) via a custom-built interface, responding with phone calls to advise on next steps (e.g., retaking readings, visiting a doctor). Call outcomes were documented in the interface. The platform was designed following an extensive requirements gathering and co-design process with older adults with multimorbidity, their informal carers and HCPs [redacted].

2.1 Platform engagement data

Participants' usage of devices and the CareApp was logged via a custom-built admin platform, providing a longitudinal view of individual engagement patterns for analysis. Participant usage over six months was normalised into weekly summaries for analysis (weeks 1 to n). Engagement metrics included: (1) overall platform usage, (2) CareApp engagement, and (3) vitals monitoring (e.g., blood pressure, glucose, SpO2, weight). Specific CareApp features analysed included reviewing vitals, activity (goal setting), self-reporting (mood, symptoms), education (condition-related materials, device training), and medication management (digital prescriptions, adherence tracking). Data were downloaded from the admin platform for a subset of participants in Arm 1 (n=32) and Arm 2 (n=32) for weeks 2 to 27 (Figure 1, right). The first week and last weeks of participation were excluded as not all participants started on the same day of the week. Individual data were exported as CSVs, then organised in Excel spreadsheets to facilitate analysis.

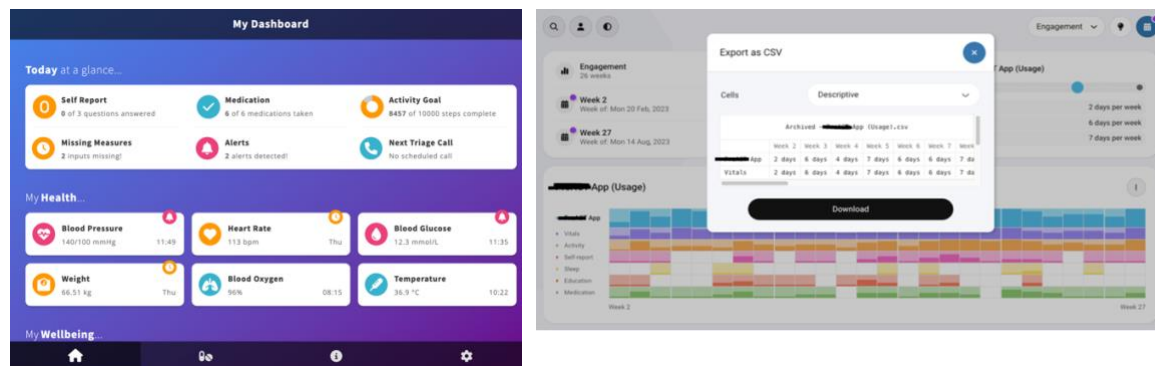


Figure 1 – Dashboard interface of the CareApp (left); A participant's CareApp (usage) box - clicking on the three dots on the top provides the option to export data as a CSV. Other sections allow viewing engagement data with devices (right)

2.2 Interview data

Semi-structured interviews were conducted following three months of participation with a subset of the participants whose engagement data was examined (n=12 Arm 1, n=12 Arm 2). Interviews were conducted predominantly by telephone due to geographic spread, with one face-to-face interview due to hearing difficulties. Participants were asked about their engagement with the technology, perceived benefits, and motivations for use. Arm 1 participants were further questioned on TTN support and relationships. Interviews, lasting 20–90 minutes, were audio-recorded, transcribed verbatim, and thematically analysed using NVivo 12 software following Braun and Clarke's reflexive thematic analysis protocol [4].

3 RESULTS

3.1 Demographics

The engagement dataset analysed consisted of data from 64 participants, of whom 35 (54.69%) were male and 29 (45.31%) were female. The participants were evenly split between Trial Arms 1 and 2, with 32 participants (50%) in each group. Overall, the age range was 66-90 years and the mean 74.51 years. Within Arm 1, the age range was 66-90 years and the mean age 74.91, and 19 participants were male. In Arm 2 the range was 66-88, the mean age was 74.10 years and 16 participants were male. A subset of the 64 participated in qualitative interviews (Arm 1: n=12, 3F, age range 67-89 years, mean age 75.33 years, n=11 had 2 study conditions, n=1 had 3 study conditions); (Arm 2: n=12, 4F, age range 68-87 years, mean age 73.67, n=11 had 2 study conditions, n=1 had 3 study conditions). In Sections 3.3 and 3.4 participant quotations are identified using participant id, gender, age, conditions (CHF for chronic heart failure, CHD for chronic heart disease, Resp for a chronic respiratory condition, T2D for type 2 diabetes) and trial arm.

3.2 Engagement Findings

The findings show for the 26-week period that participants across Arm 1 engaged on 75.22% of days, while those in Arm 2 engaged on 73.91% of days. The highest level of usage saw interaction on 99% of days in Arm 1 and 100% of days in Arm 2, while the lowest level of usage was 21% of days in Arm 1 and 38% in Arm 2. In terms of engagement with the health monitoring devices, a total of 14,106 measures were taken overall, with Arm 1 taking more measures than Arm 2 (7,545 vs 6,561). This was also the case with all devices except the blood glucometer, with Arm 2 taking the greater number compared to Arm 1 (1,069 vs 763 measures). Further, Arm 1 took a higher average number of measures per week from week 2 to week 27 than Arm 2 (290.19 vs 252.35). In considering this data, it is important to remember that all participants received a blood pressure monitor and weight scales (n=32 Arm 1, n=32 Arm 2), while those with diabetes received a blood glucometer (n=12 Arm 1, n=21 Arm 2) and those with a respiratory condition received a pulse oximeter (n=19 Arm 1, n=16 Arm 2).

Overall CareApp engagement (opening the CareApp to view the dashboard) was slightly higher in Arm 1 (engagement on 54.16% of days) than in Arm 2 (engagement on 46.10% of days). In examining the engagement with the vitals section of the CareApp (i.e., visiting any of those sections displaying detailed trend data of the various vitals parameters), this occurred on 47.84% of days for Arm 1, while the level of engagement for Arm 2 was slightly lower at 43.63% of days. Arm 1 engaged with the activity, self-report, education and medication sections of the CareApp on a higher percentage of days than Arm 2. Outside of the vitals section, the highest engagement level for both arms was with the medication feature (26.41% of days for Arm 1 and 19.09% of days for Arm 2). The lowest level of engagement also for both arms was with the education feature (3.5% of days for Arm 1 and 2.19% of days for Arm 2).

When examining the number of self-report surveys completed, Arm 1 completed 2,636 while Arm 2 completed 1,403. The average number of self-report surveys completed by Arm 1 was 82.38, almost double the number completed by Arm 2 participants which was 43.84. On average, Arm 1 participants completed 3.06 surveys per week, while Arm 2 completed 1.72 per week. Further, eight people in Arm 1 and 15 in Arm 2 never answered a self-report survey. In Arm 1, 13 participants set an activity goal, while 11 set one in Arm 2. The number of goals set by Arm 1 participants was 22 and by Arm 2 participants was 13. Further, the average

number of weeks a goal was set by Arm 1 participants was 21.69 and by Arm 2 participants the number of weeks was 21, with the average number of weeks that a goal was met being 6.38 for Arm 1 and 9 for Arm 2.

3.3 Theme 1 – Motivation to engage

3.3.1 Perceived benefits from engaging with the technology

Across both trial arms, the 24 participants identified several benefits of using the technology, which served as motivation to continue engaging. SEP11 (M, 73, Resp.+T2D, Arm 2) described the technology as “a *driving force*” that provided motivation due to its perceived effectiveness. The key benefits reported included increased health knowledge, the availability of personal health readings, improved health behaviours, and overall health improvements.

The acquisition of health knowledge was significant for participants (Arm 1 = 9; Arm 2 = 8). They reported learning about their conditions, such as understanding appropriate ranges for blood pressure, and blood sugar levels. Access to graphical trends on the CareApp, educational videos, and medication management tools enabled this learning process. For six participants (Arm 1 = 3; Arm 2 = 3), the ability to identify spikes in readings allowed them to recognise patterns, determine causal factors, and decide on appropriate actions. These actions included contacting HCPs, retaking readings, increasing hydration, or exercising. One participant, SEP01 (M, 71, CVD+T2D, Arm 2), described feeling more knowledgeable about his condition and better equipped to engage with HCPs: *“It enhances your ability to talk to the medical consultants... I know exactly what I want to ask and exactly what they’re saying to me.”*

Participants highlighted the importance of having immediate access to their readings. This was particularly valued by SEP07 (M, 89, CHF+CHD, Arm 1), who expressed reassurance when his blood pressure readings were within range, describing the impact as *“colossal”*. Similarly, SEP42 (M, 71, Resp.+T2D, Arm 2) noted that the readings removed uncertainty from self-management, reducing guesswork. The medication management feature was also beneficial. SEP19 (M, 87, CHD+T2D, Arm 2) used the system to evaluate trends and assess the effects of his medications: *“It’s easy enough for me to look at a trend and say ‘oh, you know that’s something that I need to change.’”*

Improvements in health behaviours, including proactive healthcare engagement, increased physical activity, condition management, and weight loss, were reported as motivating factors for participants (Arm 1 = 5; Arm 2 = 3). Some participants described becoming more proactive in consulting their HCPs. For instance, SEP05 (M, 73, CHD+T2D, Arm 1) sought guidance from his General Practitioner (GP) regarding hypertension symptoms, while SEP23 (M, 70, CHD+T2D, Arm 2) scheduled blood tests with his GP and Practice Nurse. Increased physical activity was similarly motivating, as participants observed progress through their recorded data. SEP20 (M, 72, CHD+T2D, Arm 1) noted how step tracking encouraged daily exercise: *“The steps keep you wanting to do the exercises every day...it does encourage you.”* Similarly, SEP65 (M, 71, CHD+Resp., Arm 1) emphasised improved health through daily walking, and SEP43 (M, 78, CHD+Resp., Arm 1) described cycling five miles daily, attributing his improved health to this activity. Weight loss emerged as a key motivator for three participants (Arm 1 = 1; Arm 2 = 2). For SEP13 (F, 68, CVD+T2D, Arm 2), regular weight monitoring led to a change in perspective and attitude toward her health: *“I knew I was overweight but now seeing it every day... I want to lose weight.”*

3.3.2 Contribution to research and helping others

For eleven participants (Arm 1=6; Arm 2=5), contributing to research emerged as a significant motivator for engaging with the technology that was being trialled. For some, participation was driven by a desire to support scientific advancement. For instance, SEP26 (F, 69, CHD+Resp., Arm 2) noted that contributing to research provided sufficient motivation to use the technology daily. Similarly, SEP12 (M, 85, CHF+CHD+Resp., Arm 1) expressed enthusiasm for participating in a Europe-wide research initiative. Others viewed their involvement as an opportunity to advance science for societal benefit. As SEP43 (M, 78, CHD+RESP, Arm 1) stated: *“I’m a firm believer in anything that will advance science...we stay in the dark ages if we don’t have these projects.”* Personal hopes for health breakthroughs also motivated some participants. For example, SEP48 (F, 71, COPD+CHD, Arm 2) expressed optimism that research could contribute to a cure for COPD. Commitment to the trial itself served as a motivator for three participants (Arm 1=1; Arm 2=2), even in the absence of perceived personal benefits.

3.4 Theme 2 – The role of the TTNs in supporting participant engagement

3.4.1 Reassurance, reliability and confidence through monitoring and support

Being monitored by the TTNs was perceived as a significant source of support. Participants reported a sense of reassurance from knowing their health was being monitored and articulated the comfort derived from this service, appreciating that the TTNs were *“there at the end of the phone”* (SEP09, M, 82, CHF+CHD, Arm 1) and were *“keeping an eye on things”* (SEP15, M, 73, CHD+Resp., Arm 1). The service provided opportunities to seek advice on issues that might otherwise have necessitated GP contact or that were *‘bothering’* them. The reassurance of ongoing monitoring was highlighted as important by nine participants. For instance, one described it as a *‘big comfort’* and expressed appreciation for TTNs ensuring *“everything was ok”* (SEP10, M, 68, CHD+T2D, Arm 1). Being monitored incentivised several participants to consistently take their readings. For instance, one participant reported that knowing his readings were being checked motivated him to adhere to regular monitoring, likening the TTNs’ oversight to *“somebody adding on another medical person watching you”* (SEP20, M, 72, CHD+T2D, Arm 1). Similarly, another participant described how TTNs’ follow-up phone calls encouraged him to remain consistent, enabling him to *“keep going”* (SEP65, M, 72, CHD+Resp., Arm 1).

Reliability was identified as an important aspect of the TTN service, with participants appreciating the TTNs’ responsiveness to abnormal readings. Seven participants noted that they expected prompt communication in the event of abnormal readings. The TTNs’ responsiveness instilled confidence in participants, as reflected by one participant who described *“an awareness that they are there... and that they will respond promptly”* (SEP12, M, 85, CHF+CHD+Resp., Arm 1). Confidence was further associated with the TTNs’ advice. Three participants highlighted that receiving advice empowered their self-management efforts and bolstered trust in the TTNs. One participant shared his preference for contacting TTNs over his GP, viewing them as a *“first port of call”* (SEP43, M, 78, CHD+Resp., Arm 1). Additionally, he noted his willingness to seek GP care if advised to do so by the TTNs. For some participants, addressing health-related queries through the TTNs alleviated anxiety and reduced the need for GP visits. Six participants emphasised this benefit, while others indicated they felt capable of self-managing or preferred consulting HCPs directly.

3.4.2 Personalised care and connections

All twelve Arm 1 participants reported positive experiences interacting with the TTNs, with common descriptors including 'good' and 'friendly', and highlighted the comfortable nature of their communication. However, three participants noted limited interactions and, as a result, did not perceive that they had established a strong relationship with the TTNs during the initial three months of the trial. Despite this, they still found the TTNs to be helpful and knowledgeable: *"I've only had like three, three or four phone calls...I haven't built up a relationship as such...They've all been very good, been very knowledgeable...and very helpful."* (SEP20, M, 72, CHD+T2D, Arm 1).

Participants frequently cited personal characteristics of the TTNs, describing them as 'caring,' 'empathic,' 'understanding,' 'pleasant,' 'lovely,' and 'nice.' For example, one participant appreciated that the TTNs showed genuine personal interest in him (SEP05, M, 73, CHD+T2D, Arm 1). Similarly, another participant emphasised the TTNs' attentiveness and willingness to address broader concerns beyond clinical readings. She noted the TTNs' composed and unrushed approach, contrasting it with her experiences in primary care: *"if you were on the phone to the doctor...you just go in with whatever you have...if you have anything else well, shut up about it... So, you never feel when you're on the phone to them [the TTNs] that you have to be quick"* (SEP55, F, 67, CHF+CHD+Resp, Arm 1). This perception was reinforced by others, who felt the TTNs' approach demonstrated sincerity and a commitment to holistic care. As one participant observed, *"You didn't get the feeling that it's just a tick box exercise... They were actually calling to see genuinely how you were"* (SEP20, M, 72, CHD+T2D, Arm 1). These interactions fostered trust and highlighted the TTNs' ability to provide a sense of individualised care, distinguishing their service from participants' experiences with other HCPs.

3.4.3 The role of TTN support in sustained participant engagement and self-management

Participants in Arm 1 were asked whether the support of the TTNs influenced the frequency of their engagement. For one participant (SEP55, F, 67, CHF+CHD+Resp., Arm 1), the reassurance provided by the TTNs' monitoring reduced her usage, as she felt less compelled to check her readings independently. Conversely, five participants indicated that they would use the technology less frequently without TTN support, as the nurses' oversight served as an incentive: *".. because they'll be watching"* (SEP09, M, 82, CHF+CHD, Arm 1). Among the remaining six who stated the TTNs did not impact their engagement, several expressed a strong determination to engage regardless of external influence.

Participants were also asked *how* TTNs motivated them to self-manage. Four individuals stated they would use the technology less frequently without TTN support, given the absence of personalised encouragement received. For example, SEP20 (M, 72, CHD+T2D, Arm 1) highlighted the importance of the *"personal touch"* provided by the TTNs, while SEP43 (M, 78, CHD+Resp., Arm 1) emphasised, *"The technology is no good to me unless I had the nurse at the end of it."* However, three participants stated they required no additional motivation to engage. For 11 participants, TTN support was viewed as important for effective self-management. SEP65 (M, 71, CHD+Resp., Arm 1) noted, *"Sometimes I mightn't know...if I'm getting worse...they know what exactly is happening much quicker than I would."* SEP05 (M, 73, CHD+T2D, Arm 1) shared a past experience of taking the wrong insulin and suggested that TTN advice would have been invaluable in preventing such an error. Finally, three participants stated that they would be less inclined to contact their HCPs without the TTNs prompting. SEP43 (M, 78, CHD+Resp., Arm 1) acknowledged that he would delay action, *"putting things on the long finger"* potentially worsening his condition.

4 DISCUSSION

Digital health technologies have the potential to empower individuals to actively engage in their care, fostering equitable partnerships with HCPs [16]. Sustained engagement with these technologies is vital for achieving meaningful health outcomes, which is critical to reduce burden on healthcare systems, particularly given ageing populations and increases in chronic disease prevalence [27]. Older adults with multimorbidity, in particular, encounter more significant barriers, making sustained use of these tools more complex [1, 13]. The role of clinical support in managing chronic conditions is well established, with evidence suggesting it enhances self-efficacy and adherence to self-management strategies [13, 19]. However, limited interactions between HCPs and patients—typically restricted to scheduled appointments or acute exacerbations—pose challenges. Time constraints often prevent HCPs from reviewing remote monitoring data [8, 18], leaving patients responsible for interpreting and responding to alerts from digital platforms [20]. This underscores the need for patient-centred care models that integrate professional support with effective tools to aid self-management. This study investigated how multimorbid older adults engaged with a digital health platform and examined the impact of TTN support on their engagement. The findings highlight a nuanced relationship between subjective experiences and objective engagement data, illustrating how TTN support enhanced engagement for some participants while reflecting variability in self-motivation and usage patterns.

Objective data revealed comparable overall platform engagement between Arm 1 and Arm 2 across the six months of the trial, with average usage recorded on 75.22% and 73.91% of days, respectively. However, Arm 1 participants exhibited higher engagement with key features, including health monitoring devices and CareApp features. Arm 1 recorded more total measures (7,545 vs. 6,561) and higher average weekly measures (290.19 vs. 252.35), suggesting that TTN support fosters consistent monitoring. Device-specific engagement varied, with Arm 2 participants recording more glucometer readings (1,069 vs. 763), likely reflecting the higher proportion of individuals with diabetes in Arm 2. This finding highlights the influence of individual health needs on device use, underscoring the importance of condition-specific self-management strategies.

Arm 1 participants engaged more frequently with most CareApp features, including vitals, self-reporting, education, and medication management. Engagement with the vitals feature was highest for both arms (47.84% vs. 43.63%), followed by medication (26.41% vs. 19.09%). Conversely, the education feature demonstrated the lowest engagement (3.5% vs. 2.19%), suggesting participants prioritised actionable components of the platform. This is somewhat unexpected, as inadequate educational resources are often cited as barriers to effective self-management [7, 21]. While the TTNs may have provided supplementary education for Arm 1 participants, potentially reducing reliance on the CareApp's educational content, the low engagement for Arm 2 suggests this feature perhaps requires a re-design.

Arm 1 participants also completed more self-report surveys (2,636 vs. 1,403) and at a higher weekly average (3.06 vs. 1.72 surveys). TTN prompts likely encouraged compliance with self-reporting, emphasising the value of TTN follow-ups in maintaining engagement. Despite this, some participants in both arms (8 in Arm 1; 15 in Arm 2) never completed self-report surveys, reflecting challenges in sustaining engagement with this feature. Other studies have noted that older adults engage less with self-reporting than with symptom monitoring, citing a perceived lack of value and the cognitive effort required for reflective tasks [22]. TTNs can address these barriers by reinforcing the importance of self-reporting, particularly for symptoms not captured by devices, such as breathlessness. Interestingly, Arm 2 participants demonstrated a higher average number of weeks achieving goals (9 vs. 6.38 weeks), suggesting that self-motivated users may exhibit persistence in achieving activity-

related targets. This finding highlights the interplay between intrinsic motivation and external support, with TTN involvement potentially serving as a catalyst for individuals who require additional encouragement. Goal-setting behaviour was otherwise comparable, with Arm 1 participants setting more goals overall (22 vs. 13) and maintaining them for slightly longer durations (21.69 vs. 21 weeks).

Participants in both arms were motivated by contributing to research, perceived benefits of using the technology, and health improvements. However, Arm 1 participants reported a greater sense of accountability and encouragement due to TTN monitoring, which likely contributed to their higher levels of engagement, particularly in vitals monitoring and self-reporting. For example, the TTNs' role in fostering reassurance, confidence, and personalised care incentivised consistent monitoring, as expressed by participants who viewed the nurses as an extension of their healthcare team. Notably, participants emphasised the '*personal touch*' provided by TTNs, which they felt was lacking in interactions with other HCPs and which has been identified by others [15]. Participants also appreciated the reliability and responsiveness of TTNs, which reduced anxiety and encouraged consistent usage of the platform. Additionally, the enhanced health knowledge and ability to act on trends in their data motivated participants across both arms. Arm 1 participants engaged more frequently, likely because TTNs amplified these motivational factors by providing personalised advice and real-time support. These results indicate the importance of designing digital health interventions that balance professional support with tools that foster self-efficacy, as highlighted by others [6, 27]. Both arms reported improvements in health behaviours, such as increased physical activity and proactive healthcare engagement, as key motivators for continued use of the platform. However, TTN support in Arm 1 appeared to enhance these outcomes by providing timely advice and feedback. For instance, participants in Arm 1 highlighted how TTNs guided their self-management decisions, reducing the risk of errors and ensuring prompt action when abnormalities were detected. This likely contributed to the higher overall engagement in Arm 1, as participants felt empowered and reassured by the additional support.

This study demonstrates that TTN support positively influenced engagement with the digital health platform, particularly for features requiring consistent interaction, such as vitals monitoring and self-reporting. At the same time, individual health needs and intrinsic motivation shaped usage patterns, underscoring the importance of tailoring interventions to diverse user preferences. These findings suggest that integrating professional support with tools that foster self-efficacy can optimise digital health interventions for older adults with multimorbidity. As part of the larger EIH trial, future analyses will include data from the full cohort of participants and interviews with additional participants following six months of usage, including the triage nurses, to deepen understanding. These analyses will examine the impact of factors such as gender, age, health conditions, and user typologies on engagement. Furthermore, the trial will evaluate quality of life, healthcare utilisation, and symptom stabilisation to assess the broader implications of clinical support on health outcomes.

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