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Original Article

Digital Self-Monitoring Burdens Among Patients Living with Chronic Heart Disease: A Qualitative Descriptive Study

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ABSTRACT

Background: Digital self-monitoring is increasingly used in chronic heart disease care to support symptom tracking, risk recognition, and continuity between clinic visits, but its everyday burden for patients remains insufficiently understood. Objective: This study explored how patients living with chronic heart disease experienced digital self-monitoring and identified practical, emotional, technical, financial, relational, and service-related factors that shaped their acceptability and sustainability. Methods: This qualitative descriptive study analyzed 12 anonymised interview accounts from adults with chronic heart disease or related cardiac risk factors who had experience using digital self-monitoring tools. Data were examined using reflexive thematic analysis, with attention to participant engagement, support sources, dominant burdens, and theme–quote linkage. Results: Six themes were developed: measurement work and daily discipline; data anxiety and alert fatigue; digital literacy and device usability; cost and connectivity burden; clinician responsiveness and data accountability; and family involvement between support and surveillance. Participants valued monitoring when it offered reassurance, earlier response, and shared care, but they struggled when readings produced fear without interpretation, devices were difficult to use, uploads created hidden costs, clinician feedback was unclear, or family support became intrusive. Conclusion: Digital self-monitoring in chronic heart disease should be designed as minimally disruptive and accountable care, with personalised schedules, plain-language training, clear thresholds, affordable connectivity, visible clinical response, and consent-based caregiver involvement. Keywords: chronic heart disease; digital self-monitoring; remote patient monitoring; treatment burden; digital health equity; qualitative research.

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INTRODUCTION

Family planning remains a central public health and development priority in Pakistan because contraceptive use, fertility preferences, gender norms, and access to reproductive health services intersect directly with maternal health, child wellbeing, poverty reduction, and progress toward universal access to sexual and reproductive health. Despite decades of national and provincial family planning programming, contraceptive uptake among married women of reproductive age has remained below policy aspirations, with national contraceptive prevalence commonly reported at approximately one-third of married women and the national commitment aiming to increase contraceptive prevalence to 50% by 2030 (1,2). Fertility has declined over time but remains above replacement level, with provincial and rural–urban differences reflecting persistent inequities in service access, women's autonomy, information, and continuity of contraceptive commodity availability (3). These patterns are directly relevant to Sustainable Development Goal targets on reproductive health, maternal health, gender equality, and informed decision-making, because unmet need for family planning is rarely explained by service availability alone and is strongly shaped by social acceptability, household negotiation, misinformation, provider trust, and the practical ability of women and couples to access methods safely and confidentially (4).

Pakistan's experience with community-based health workers, including the Lady Health Worker model, has shown the importance of locally embedded female workers for health education, household contact, referral, and continuity of care, particularly in settings where women's mobility, privacy, and decision-making power may be constrained (5). However, community health worker models for family planning cannot be evaluated only through service counts or commodity distribution. The acceptability and sustainability of such models depend on how women, men, frontline workers, and district-level implementers perceive the intervention, whether services are trusted, whether contraceptive myths and fear of side effects are addressed, whether male partners and influential family members support or resist use, and whether the supply chain reliably supports the demand generated through counselling. In Sindh and similar sociocultural contexts, family planning decisions are often mediated by religious interpretation, gendered power relations, mother-in-law influence, concerns about fertility, fear of infertility or weakness, restrictions on women's movement, privacy concerns, and the credibility of the person delivering the message (6). These factors justify a qualitative approach because the key implementation questions concern meanings, perceptions, negotiation processes, lived service experience, and contextual mechanisms rather than only measurable coverage indicators.

The present study is positioned as a qualitative endline evaluation of a community-based family planning model involving Marvi workers, Marvi Markaz service points, and Basket of Choice/Behavioral Intervention Bundle components intended to improve awareness, acceptability, referral, counselling, and contraceptive commodity access among underserved communities. Within this intervention logic, Marvi workers function as locally accessible intermediaries between households, community norms, and formal service structures, while Marvi Markaz points and commodity access mechanisms aim to reduce practical barriers to contraceptive information and method availability. An endline qualitative evaluation is therefore necessary to understand not merely whether the model was implemented, but how it was experienced by married women of reproductive age, men, community-based workers, and district programme personnel; which mechanisms appeared to support or limit acceptability; and which operational conditions are likely to influence sustainability after implementation support is reduced.

Using a SPIDER-informed qualitative framing, the sample of interest comprised married women of reproductive age, men, Marvi workers, and district programme stakeholders; the phenomenon of interest was the perceived experience of community-based family planning counselling, referral, safe space access, and contraceptive commodity availability; the design used qualitative interviews and focus group discussions; the evaluation focused on perceived acceptability, barriers, facilitators, service experience, and sustainability; and the research type was qualitative endline evaluation. In PICo terms, the population included community members and implementers involved in or exposed to the intervention, the interest was the perceived functioning and acceptability of the family planning model, and the context was underserved intervention communities in Sindh where family planning decisions are shaped by gender, household, cultural, religious, and service-delivery factors. The objectives of this qualitative endline evaluation were to explore perceptions of the Marvi worker and Marvi Markaz/BiB model among women, men, frontline workers, and district stakeholders; identify perceived barriers and facilitators to family planning awareness, acceptability, access, and continuation; examine how gender norms, myths, household decision-making, privacy, safety, and commodity availability influenced service experience; and generate implementation-relevant recommendations for improving the sustainability, supervision, male engagement, and community responsiveness of the model.

MATERIALS AND METHODS

This study was conducted as an interpretative qualitative endline evaluation using in-depth interviews and focus group discussions analyzed through thematic analysis. The qualitative design was selected because the evaluation sought to understand perceptions, meanings, acceptability, barriers, facilitators, and implementation experiences related to a community-based family planning model rather than to estimate intervention effects statistically. The study was guided by qualitative reporting principles consistent with COREQ and SRQR, with attention to the study context, participant selection, recruitment, data collection procedures, reflexivity, analytic transparency, trustworthiness, and ethical protection of participants discussing sensitive reproductive health issues (7,8).

The evaluation was conducted in selected intervention districts and villages in Sindh where the Marvi worker, Marvi Markaz, and Basket of Choice/Behavioral Intervention Bundle model had been implemented. Data collection took place from 18 to 22 November 2024. The study setting included community locations linked to Marvi Markaz services and district-level programme structures. Participants were selected to capture perspectives across both service users and implementers, including married women of reproductive age aged 16–49 years who had direct or indirect exposure to family planning counselling or services, men from intervention communities, Marvi workers involved in community outreach and counselling, and district-level programme or implementation personnel, including DPM/DPWDO stakeholders. Inclusion was based on relevance to the intervention experience, ability to provide informed views about family planning awareness or service delivery, and willingness to participate voluntarily. The sampling strategy was purposive, with attention to variation in participant type, gender, community role, district context, and experience with family planning counselling, referral, safe space access, or commodity availability.

Recruitment was conducted through locally appropriate community and programme channels while maintaining voluntary participation and avoiding coercion. Potential participants were approached through intervention-linked field structures and were informed about the purpose of the evaluation, the voluntary nature of participation, the expected format of discussion, confidentiality protections, and their right to decline or withdraw without any effect on access to services. Particular care was taken because family planning is a sensitive topic in many household and community settings. Recruitment therefore aimed to ensure that women and men could participate in a setting that protected privacy and minimized social pressure. Where individuals declined participation or were unavailable, no attempt was made to compel involvement, and participation was limited to those who gave informed consent.

Data were collected through semi-structured in-depth interviews and focus group discussions. Separate data collection formats were used to allow both individual accounts and group-level discussion of shared community experiences. Focus group discussions were used where interaction among participants could help elicit common perceptions, community norms, myths, and shared service experiences, while in-depth interviews were used for programme personnel and participants whose role or experience required more detailed individual exploration. Focus group discussions were organized in manageable groups, generally consistent with qualitative practice for community-based discussions, and were facilitated in private or relatively protected settings to support open conversation. Data collection explored awareness of family planning, perceptions of Marvi workers, experiences with Marvi Markaz or related service points, acceptability of contraceptive counselling, myths and fears, male and family influence, privacy and mobility concerns, commodity availability, referral experience, safety issues, supervision, programme sustainability, and recommendations for improvement.

Interview and focus group guides were developed around the evaluation objectives and adapted to participant type. Guides included open-ended questions and probes to encourage participants to describe their own experiences, perceptions, concerns, and suggestions rather than to provide predetermined responses. Discussions were conducted in locally appropriate languages by trained facilitators familiar with qualitative interviewing and sensitive reproductive health topics. Female facilitation was used where needed to support women's comfort and privacy. Verbal or written consent was obtained according to approved field procedures, including permission for note-taking and audio recording where applicable.

Data collectors also recorded field notes on non-identifying contextual details, group dynamics, and issues relevant to interpretation, while avoiding documentation of information that could reveal participant identity.

Confidentiality and anonymity were maintained throughout data collection and reporting. Participants were not identified by name in transcripts, notes, tables, or quotations. Quotations were labeled only by participant category and district or setting label where appropriate, such as MWRA, man, Marvi worker, or district programme stakeholder, while avoiding details that could make individuals recognizable. Given the sensitivity of family planning discussions, particular attention was paid to privacy during discussions, respectful facilitation, non-judgmental language, and safeguarding of participants who might disclose household opposition, fear, restrictions on mobility, or pressure related to reproductive decision-making.

Audio recordings and field notes were managed securely and transcribed verbatim where recordings were available. Data collected in local languages were translated into English for analysis and manuscript preparation while preserving the meaning of participants' accounts. Transcripts were de-identified before analysis. Data files were stored securely and were accessible only to authorized members of the evaluation team. Translation and transcription were reviewed for conceptual accuracy, especially for culturally specific terms related to family planning myths, religious interpretation, household authority, shame, trust, privacy, and method-related fears.

The analysis followed a thematic analysis approach. The research team first familiarized itself with the transcripts and field notes through repeated reading. Initial codes were generated inductively from participant accounts while also being sensitized by the evaluation objectives, including awareness, acceptability, barriers, facilitators, commodity access, household decision-making, male engagement, trust in Marvi workers, privacy, safety, and sustainability. Codes were then compared across participant groups and districts to identify recurring patterns, contrasts, and deviant or negative cases. Related codes were organized into candidate subthemes and themes, which were reviewed against the underlying data to ensure that interpretations were grounded in participant accounts. Coding disagreements or differences in interpretation were resolved through team discussion and consensus. An audit trail was maintained through coding notes, theme development records, and analytic memos documenting decisions during the movement from raw data to final themes.

Reflexivity was addressed by recognizing that the evaluation team's professional roles, association with programme assessment, and prior expectations about community-based family planning interventions could influence data collection and interpretation. To reduce this risk, facilitators used open-ended questions, avoided leading probes, encouraged participants to discuss both positive and negative experiences, and treated myths, fears, non-use, resistance, and dissatisfaction as important implementation data rather than as participant failure. Analytic discussions considered how power relations between evaluators, programme personnel, Marvi workers, and community participants might shape what was disclosed, particularly when participants were recruited through intervention-linked channels.

Trustworthiness was strengthened through triangulation across participant groups, including women, men, frontline workers, and district stakeholders; comparison across districts and community contexts; use of field notes alongside interview and discussion data; team-based review of codes and themes; and attention to disconfirming or divergent accounts. Credibility was supported by grounding each theme in representative quotations. Dependability was supported through documentation of data collection and analytic procedures. Confirmability was supported through analytic memos and consensus discussion. Transferability was supported by describing the intervention context, participant groups, and community setting sufficiently to allow readers to judge relevance to similar family planning and community health worker programmes. Saturation was considered during analysis by examining whether later interviews or discussions continued to add substantively new themes or mainly reinforced the developing thematic structure.

Ethical approval for the evaluation was obtained from the HANDS Ethics Review Board. Participation was voluntary, and informed consent was obtained before data collection. The study followed principles of respect for persons, confidentiality, minimization of harm, and protection of participant anonymity. Because family planning can involve sensitive disclosures about marital communication, household authority, method use, fertility intentions, and gendered restrictions, the evaluation emphasized privacy, voluntary participation, respectful questioning, and careful de-identification of all reported quotations and findings.

RESULTS

The analysis showed that digital self-monitoring was experienced as a conditional and uneven form of care work rather than as a uniformly empowering technology. Participants generally recognised the potential value of monitoring for reassurance, earlier recognition of deterioration, and shared management with clinicians or family members. However, this perceived value depended on whether the monitoring routine was understandable, affordable, technically manageable, emotionally tolerable, and linked to visible clinical response. Across the 12 participant accounts, engagement ranged from continued use with support to irregular use, delayed uploading, temporary discontinuation, dependent use, overchecking, and selective use. This variation suggested that reduced engagement was not simply refusal or poor adherence, but often reflected the interaction between monitoring workload, patient capacity, digital literacy, family involvement, cost, and confidence in service responsiveness.

Table 1. Participant And Monitoring Characteristics (n = 12)

Code	Participant Position	Digital Self-Monitoring Practice	Engagement Status	Primary Support Source	Main Burden
P01	Older adult with heart failure	Daily weight and blood pressure app	Continued with support	Spouse and nurse	Fear of wrong readings
P02	Middle-aged coronary patient	Wearable tracker and medication app	Irregular use	Daughter	App confusion and password problems
P03	Hypertensive cardiac risk patient	Connected blood pressure monitor	Continued reluctantly	Clinic educator	Repeated measurement anxiety
P04	Post-stent patient	Symptom diary and step counter	Stopped temporarily	Son	No clinician feedback
P05	Heart failure patient living alone	Weight scale and symptom portal	Delayed uploads	Neighbour	Internet cost and fatigue
P06	Patient with arrhythmia concern	Smartwatch rhythm alerts	Overchecked readings	Online forums	Alert anxiety
P07	Older woman with CHD	BP and medicine reminder app	Dependent use	Granddaughter	Low digital confidence
P08	Informal worker with heart disease	Mobile follow-up and photo uploads	Inconsistent use	Employer and clinic	Work schedule and data cost
P09	Patient with multimorbidity	Multiple apps and paper notes	Felt overloaded	Caregiver	Too many instructions
P10	Rural-to-urban migrant patient	Text reminders and BP uploads	Conditional use	Community health worker	Connectivity and language
P11	Retired patient	Wearable and patient portal	Engaged but anxious	Cardiologist	Unclear thresholds
P12	Younger patient after cardiac event	Fitness watch and diet app	Selective use	Peer support	Feeling surveilled

Table 1 demonstrates that participants were not positioned equally in relation to digital monitoring. Some participants continued monitoring when practical or relational support was available, such as support from a spouse, nurse, clinic educator, cardiologist, or community health worker. Others depended on family members, neighbours, employers, caregivers, or online forums to make monitoring workable. The table also shows that each form of engagement carried a distinct burden. Participants who continued monitoring could still experience fear, reluctance, or anxiety, while those with irregular, delayed, or selective use often faced barriers linked to app navigation, password problems, internet cost, work schedule, language, or lack of feedback. The pattern therefore indicates that engagement was shaped less by willingness alone and more by whether the monitoring system fitted into the participant's daily life and support environment.

Six interrelated themes were developed from the analysis: measurement work and daily discipline; data anxiety and alert fatigue; digital literacy and device usability; cost and connectivity burden; clinician responsiveness and data accountability; and family involvement between support and surveillance. These themes captured the practical, emotional, technical, financial, clinical, and relational dimensions of digital self-monitoring. Although the burdens are presented separately for clarity, participants' accounts suggested that they frequently overlapped. For example, unclear thresholds could increase repeated checking, repeated checking could increase anxiety, and dependence on family support could reduce technical burden while introducing privacy or surveillance concerns.

Table 2. Thematic Matrix Of Digital Self-Monitoring Burdens

Theme	Core Codes	Representative Quotation
Measurement work and daily discipline	Remembering readings; charging devices; repeated entries; fitting tasks into routines	P03: "It sounds small, but checking, writing and uploading became another appointment every day."
Data anxiety and alert fatigue	Worry about abnormal values; repeated checking; unclear thresholds; alarm tiredness	P06: "The watch would warn me, then I would check again and again until I could not relax."
Digital literacy and device usability	Passwords; navigation; updates; small text; device errors	P07: "My granddaughter could use it, but alone I was scared to press the wrong button."
Cost and connectivity burden	Mobile data; device cost; transport; unstable signal	P05: "They said upload every day, but internet is not free and some days I had to choose."
Clinician responsiveness and data accountability	Slow feedback; uncertainty about review; lack of escalation guidance	P11: "I wanted to know which number means danger, but the app only showed colour."
Family involvement between support and surveillance	Caregiver help; pressure; privacy loss; family worry	P12: "The watch helped, but my family started asking about every low step day."

Table 2 shows that the main burden of digital monitoring was not limited to device use. The first theme, measurement work and daily discipline, reflected how monitoring became embedded in daily routines through remembering, charging, measuring, recording, uploading, and waiting for interpretation. The quotation from P03 illustrates how a task presented as brief or simple could accumulate into a daily obligation. This theme reframes monitoring as active work performed by patients rather than as passive data collection.

The second theme, data anxiety and alert fatigue, captured the emotional burden of receiving numbers, alerts, or colour-coded signals without sufficient interpretation. Participants could become uncertain about whether a reading represented clinical danger, device error, stress, poor technique, or normal fluctuation. The account from P06 shows how smartwatch alerts could trigger repeated checking and prevent relaxation. This theme indicates that monitoring data may reassure patients only when the system provides clear thresholds, practical guidance, and confidence that concerning results will be acted upon.

The third theme, digital literacy and device usability, reflected the technical demands created by passwords, navigation, updates, small text, unclear buttons, and device errors. P07's quotation demonstrates how digital monitoring could increase dependence on younger family members and reduce the participant's confidence in self-management. This theme suggests that digital literacy should not be treated as an individual deficit alone, because device design, training, language, and troubleshooting support all shaped whether participants could use monitoring tools independently.

The fourth theme, cost and connectivity burden, showed that monitoring could transfer hidden financial and infrastructure costs to patients. P05's account illustrates the practical tension between daily uploading expectations and the cost of internet access. This burden was particularly relevant for participants whose monitoring depended on mobile data, stable connectivity, electricity, device maintenance, or time away from work. In this context, digital access meant more than owning a device; it required affordable connectivity, reliable infrastructure, and the capacity to sustain repeated monitoring tasks.

The fifth theme, clinician responsiveness and data accountability, was central to whether monitoring felt worthwhile. Participants wanted to know who reviewed their data, when feedback would be given, which readings required action, and what steps they should take when values appeared abnormal. P11's quotation highlights the insufficiency of colour-coded feedback when danger thresholds and escalation instructions are unclear. This theme indicates that monitoring was acceptable when it was linked to visible clinical interpretation, reassurance, medication advice, or escalation, but frustrating when uploaded data disappeared into an apparently unresponsive system.

The sixth theme, family involvement between support and surveillance, captured the ambivalent role of relatives and caregivers. Family members helped participants operate devices, remember measurements, interpret apps, or respond to alerts. At the same time, family involvement could compromise privacy or create pressure when relatives monitored step counts, readings, or daily behaviours. P12's account illustrates this shift from helpful support to perceived surveillance. This theme shows that caregiver involvement should be negotiated carefully, with attention to patient consent, autonomy, privacy, and the emotional burden placed on both patients and family members.

Overall, the findings indicate that digital self-monitoring was acceptable when it was simple, affordable, understandable, supported, and clinically responsive. Participants did not reject monitoring as a concept; rather, they struggled when monitoring increased daily workload, produced unexplained anxiety, required digital skills they did not have, created financial or connectivity burdens, lacked visible clinician response, or changed family support into surveillance. The results therefore suggest that digital cardiac monitoring should be evaluated not only by whether data are generated or uploaded, but by whether the monitoring process remains manageable, meaningful, and integrated into a responsive care system.

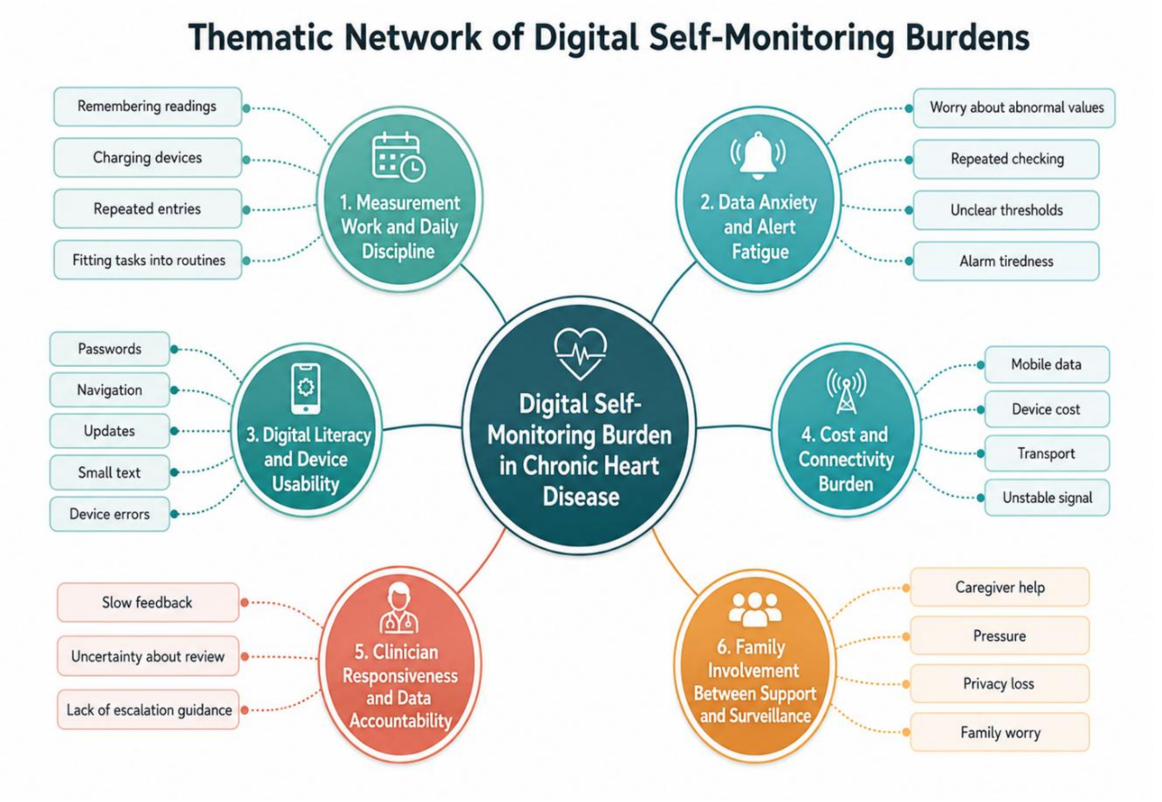

Figure 1. Thematic network of digital self-monitoring burdens among patients with chronic heart disease. The diagram presents six interrelated themes derived from qualitative thematic analysis of participant accounts: measurement work and daily discipline, data anxiety and alert fatigue, digital literacy and device usability, cost and connectivity burden, clinician responsiveness and data accountability, and family involvement between support and surveillance. Each theme is linked to its core subthemes, illustrating how digital self-monitoring burden emerged through practical routines, emotional responses, usability barriers, financial and connectivity constraints, clinical feedback gaps, and family-mediated support or surveillance.

DISCUSSION

This qualitative descriptive study shows that digital self-monitoring among patients living with chronic heart disease was experienced as a negotiated form of care work rather than as a simple extension of clinical monitoring. Participants generally did not reject monitoring itself; instead, they valued its potential to provide reassurance, support earlier recognition of deterioration, and facilitate shared management. However, these perceived benefits were conditional on whether monitoring was understandable, affordable, technically usable, emotionally manageable, and connected to visible clinical response. The six themes developed from the interview accounts—measurement work and daily discipline, data anxiety and alert fatigue, digital literacy and device usability, cost and connectivity burden, clinician responsiveness and data accountability, and family involvement between support and surveillance—indicate that digital self-monitoring should be evaluated as a service-delivery process embedded in everyday life, not merely as a device-based intervention or data-transfer mechanism.

The theme of measurement work and daily discipline challenges the assumption that home monitoring is automatically convenient. From a health-system perspective, remote readings may appear to reduce clinic visits and increase surveillance between appointments. From the patient perspective, however, monitoring required remembering measurements, charging devices, entering data, checking portals, retaking uncertain readings, and fitting these tasks around fatigue, work, domestic responsibilities, and symptom fluctuation. This finding aligns with the treatment burden literature, which emphasizes that chronic illness care consists not only of disease symptoms but also of the workload imposed by treatment, monitoring, appointments, lifestyle modification, and administrative demands (12,13). Digital monitoring can therefore become burdensome when it adds repeated micro-tasks without reducing other forms of care work. A minimally disruptive approach would require tailoring monitoring frequency to clinical need and patient capacity rather than assuming that more frequent data collection is always preferable (14).

Data anxiety and alert fatigue demonstrate that patient-generated data can carry emotional consequences when readings are not accompanied by clear interpretation. Participants described worry about abnormal values, repeated checking, uncertainty about thresholds, and tiredness from alerts. In chronic heart disease, where symptoms may be ambiguous and deterioration may carry serious consequences, unexplained readings can shift interpretive responsibility to patients and families. This finding is consistent with concerns that patient-generated health data require clear accountability, review pathways, and action thresholds to be meaningful rather than anxiety-producing (9,11). Monitoring may reassure patients when it is linked to explanation, feedback, and escalation guidance, but it may increase fear when colour codes, alarms, or numbers are presented without a trusted clinical response.

Digital literacy and device usability emerged as a central determinant of whether monitoring supported or undermined self-care. Participants' difficulties with passwords, app navigation, updates, small text, and device errors should not be interpreted simply as individual deficits. These accounts show that digital confidence is shaped by interface design, training, language, troubleshooting access, visual accessibility, and support from family or services. This is particularly important for older adults, patients with multimorbidity, rural-to-urban migrants, and those with limited digital exposure. Digital health equity literature similarly cautions that access to a device does not ensure the ability to use digital health tools effectively or safely (19–21). Programs that rely on digital self-monitoring must therefore include plain-language training, repeated demonstrations, accessible interfaces, multilingual support, and non-digital alternatives for patients who cannot use digital systems independently.

The cost and connectivity burden broadens the interpretation from individual engagement to structural equity. Participants described mobile data costs, unstable signal, device-related expenses, electricity dependence, transport for troubleshooting, and time lost while maintaining monitoring routines. These hidden costs are often invisible when digital monitoring is framed as home-based convenience. However, for patients with limited income, unstable employment, or weak connectivity, daily uploading or app-based follow-up may compete with household priorities. This finding supports implementation scholarship arguing that remote monitoring should be treated as a service model requiring infrastructure, affordability, and workflow planning, rather than as technology distribution alone (10,20). Equity-oriented monitoring programs should therefore provide affordable devices, data support, technical assistance, and realistic expectations regarding upload frequency.

Clinician responsiveness and data accountability were among the most important determinants of whether monitoring felt worthwhile. Participants wanted to know who reviewed their data, when they should expect a response, which readings indicated danger, and what they should do if abnormal values appeared. When uploaded readings did not produce visible response, monitoring felt futile or unsafe. This finding reinforces the view that patient-generated health data become clinically meaningful only when embedded within accountable workflows (9–11). Clear escalation protocols, routine feedback, defined review responsibilities, and patient-facing threshold explanations are essential. Without these mechanisms, digital self-monitoring may create a false sense of surveillance, leading patients either to panic unnecessarily or to assume that someone is monitoring them when no timely review is occurring.

Family involvement was both enabling and potentially burdensome. Relatives helped participants operate devices, remember measurements, interpret apps, and respond to alerts. At the same time, family involvement could become intrusive when relatives monitored step counts, readings, diet, or activity patterns in ways that participants experienced as surveillance. This theme is important because chronic heart disease management often occurs within family systems, where support, anxiety, dependency, and control may overlap. Digital monitoring programs should therefore treat caregiver involvement as a negotiated component of care. Patients should be asked who may access their information, what type of support is acceptable, and how privacy and autonomy will be protected. Caregivers may also need basic training so that they can support monitoring without overinterpreting readings, increasing fear, or creating pressure.

The study has practical implications for digital cardiac care. Monitoring programs should be designed around patient workload, not only clinical data needs. This requires personalised monitoring schedules, plain-language instructions, clear danger thresholds, training and refresher support, low-cost connectivity options, simple device interfaces, visible clinician review, escalation pathways, and periodic reassessment of whether monitoring remains manageable. Family support should be encouraged where helpful, but caregiver access and involvement should be consent-based and bounded. The findings also suggest that engagement metrics such as upload frequency or device use may be insufficient indicators of success. A patient may upload data while feeling anxious, dependent, financially burdened, or unsupported; conversely, irregular use may reflect rational adaptation to workload, cost, or unclear feedback rather than non-compliance (22-26).

The study's trustworthiness is strengthened by its focus on detailed participant accounts, thematic analysis of varied monitoring experiences, and presentation of representative quotations linked to each theme. The findings provide transferable insights into how digital self-monitoring can become burdensome in chronic heart disease care, particularly when monitoring tasks exceed patient capacity or lack clinical responsiveness. However, several limitations should be considered. The sample was small and qualitative, so the findings are not statistically generalisable. The accounts were cross-sectional and did not capture how monitoring burden changes over time as patients gain confidence, disease severity changes, or service workflows improve. The study relied on participant accounts rather than direct observation of device use, clinician dashboards, or service response times. Social desirability may have influenced how participants described their use of monitoring systems or their views of clinicians and family members. Translation or summarisation of accounts may also have affected the nuance of some expressions, especially around anxiety, dependency, and privacy. Future research should examine longitudinal monitoring burden, compare different remote monitoring models, include clinician and caregiver perspectives, and test interventions designed explicitly to reduce patient workload while preserving clinical safety (27-30).

CONCLUSION

Digital self-monitoring in chronic heart disease was perceived as potentially useful but conditionally burdensome, depending on how well the monitoring system aligned with patients' everyday routines, digital capacity, financial resources, emotional tolerance, family relationships, and access to responsive clinical interpretation. The findings show that patients did not resist monitoring as a concept; rather, they struggled when monitoring became repeated unrecognised work, produced unexplained anxiety, required technical skills or connectivity they did not reliably have, shifted costs into the household, lacked visible clinician response, or changed supportive family involvement into surveillance. Digital cardiac monitoring should therefore be implemented as minimally disruptive, equity-oriented, and accountable care. Practical priorities include personalised monitoring schedules, plain-language training, clear thresholds and escalation pathways, affordable device and connectivity support, consent-based caregiver involvement, and routine review of patient workload. These conditions are necessary if digital self-monitoring is to support safer chronic heart disease care without becoming an additional burden of illness.

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