



Research Article

Barriers and Solutions for Deploying, Expanding and Sustaining Remote Patient Monitoring for Managing Patients with Heart Failure: Qualitative questionnaire-based study in France

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Abstract

Background: Despite therapeutic advances in the management of Heart Failure (HF), the clinical and economic burdens of the disease remain significant. Remote Patient Monitoring (RPM) has shown to reduce mortality and hospitalization rates and improve patient Quality of Life (QoL). Its use has also been recommended by the European Society of Cardiology (ESC). However, RPM deployment into routine clinical activities is still limited, particularly in France. **Aims:** The objective of this study was to identify and describe the perceived barriers and solutions of deploying, expanding, and sustaining RPM for managing patients with HF. **Methods:** A qualitative online questionnaire-based study was conducted throughout cardiology centers in France between June 15 to September 15, 2022. Cardiologists both in private practice and public hospitals were included to participate. **Results:** In total, participants from 71 French cardiology centers were included (70.5% practicing in public hospitals and 29.5% in private practice). Our study identified organizational, technical and regulatory barriers. Lack of dedicated staff to manage alerts, lack of training and the additional workload were barriers reported by participants. Integrating nurses in the management of alerts and designating a telemedicine referent were stated as two solutions/recommendations. **Conclusion:** RPM to manage HF patients in France is still not used to its potential. In this study, cardiologists stated that RPM should be easy to use for both patients and HCPs while being effective (generating a low number of false alerts) to improve the deployment and expansion of its use.

Keywords: Remote patient monitoring; Chronic heart failure; Barriers; Questionnaire; RPM

Abbreviations: CHF: Chronic Heart Failure; GDPR: General Data Protection Regulation; HCP: Healthcare Professional; HAS: *Haute Autorité de Santé*; HF: Heart Failure; QoL: Quality of Life; RPM: Remote Patient Monitoring

Highlights

- Remote patient monitoring (RPM) is useful in managing patients with heart failure
- In France, many barriers that do not allow the deployment, expansion and sustainability of RPM still exist
- Lack of dedicated staff to manage alerts, lack of training and the additional workload were reported as main barriers
- RPM should be easy to use for both patients and healthcare professionals while being effective (generating a low number of false alerts)

Introduction

Heart failure (HF) is a common condition affecting 1 to 2% of the adult population in developed countries [1-3]. Despite considerable therapeutic advances in its management, HF remains a frequent pathology with significant societal burdens [4]. Ways to optimize therapeutic strategies including telemedicine activities have been increasing in order to improve HF clinical outcomes and minimize its economic impact [5].

Remote Patient Monitoring (RPM) is a tool that can be used in the management of patients with HF [6]. Monitoring is performed by collecting clinical information, either actively via the collection of data directly by Healthcare Professionals (HCPs), or in an automated way [6]. As a result, this has allowed the detection of clinical situations at risk and the prevention of acute HF episodes that could lead to re-hospitalisations or death if untreated [7,8].

Many studies and meta-analyses conducted in recent years have demonstrated the effectiveness of RPM in HF management

with a reduction in all-cause mortality, hospitalizations rates and the improvement in Quality of Life (QoL) of patients [9,21-24]. In 2017, a Cochrane meta-analysis [5] identifying 39 trials revealed that RPM was associated with a 20% reduction in all-cause mortality and a 37% reduction in hospitalizations. Such studies have led to the inclusion of RPM in the latest recommendations of the European Society of Cardiology [25].

In France, the national health authority named Haute Autorité de Santé (HAS) published a document as an RPM reference [26] drawn up as part of the *Expérimentations de Télémedecine pour l'Amélioration des Parcours En Santé* (ETAPES program) intended to provide funded and sustainable digital health solutions to HCPs. However, implementing RPM into routine clinical practice has been limited. The objective of this study was to identify and describe the perceived barriers and solutions/ recommendations of deploying, expanding and sustaining RPM for managing patients with HF.

Material and Methods

A qualitative study was conducted using an online questionnaire that was sent between June 1, 2022, and September 15, 2022. The questionnaire was sent to cardiologists managing HF patients both in public and private practice cardiology centers in France. The use of RPM was not required for the participant to be included in of the study.

The questionnaire is presented in the Appendices. The analysis of the collected data aimed to describe participant characteristics as well as to identify the self-reported barriers and recommendations/solutions faced by cardiologists.

Results

In total, cardiologists from 71 cardiology centers were included in this study. Among participants, 70.5% were practicing in public hospitals and 29.5% were in private practice. More than a third of these centres (38%) were located in a metropolitan setting (>1 million inhabitants). Most participants were aged between 45- to 55 years (29.2%) followed by 35- to 45-year-olds (27.8%). The least number of respondents by age group were under 35-year-olds (18.3%) (Table 1).

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Participant Characteristics	Rate of participants (%)
Age, years	
Under 35 years	18.3
Between 35 and 45 years	27.8
Between 45 and 55 years	29.2
Over 55 years	25
Cardiology Practice Type	
Public Hospital	28
Private Practice	72
Practice Setting	
Metropolitan based	38.9
*Urban based	55.6
Rural based	5.5
Use of Remote Patient Monitoring (RPM) to manage patients with heart failure	
Using one RPM	47.2
Using several RPM	12.5
Not using RPM	40.3

*Over 1 million inhabitants, RPM; remote patient monitoring

Table 1: Participant characteristics.

Over two-fifths of the participants stated that they did not use RPM in managing their patients with HF at the time of the questionnaire (40.3%), whereas 46.5% reported to using one RPM system and 12.5% reported to have used several in their medical practice. The total number of patients with HF to have a follow-up by RPM was 3,799.

Almost all cardiologists (96.6%) that had stated they did not use RPM in their practice were aware that it was recommended by the HAS and other scientific associations in France. The proportions of perceived importance regarding the barriers for not implementing RPM to manage patients is shown in Table 2.

Barrier type	Perceived importance (%)
Lack of staff to manage RPM alerts	90
Managing RPM alerts	86
Complex and additional workload to manage the RPM alerts	79
General practitioner not integrated into the course of care offered by RPM	79
Lack of training in technical tools and equipment	72
Administrative management of connected objects (troubleshooting)	72
Engagement of medical responsibility	72
Violation of medical secrecy and data confidentiality	69
Urban-based cardiologist not included in the proposed treatment course using RPM	69
Patient rights	69

Table 2: Percentage of perceived importance regarding the barriers for not implementing RPM in the management of patients with HF by French cardiologists.

On the other hand, pricing (such as the profitability of the investment and remuneration model) and the physician to patient relationship (such as dehumanization of medical practice and difficulty in informing or involving patients) were perceived as the least important barrier for not implementing RPM.

The main solutions/recommendations that could encourage the participants to implement RPM in their daily practice were stated as: training in technical tools and RPM equipment (55.2%), having a dedicated RPM nurse role in their practice (51.7%), the cooperation with a city-based nurse (41.4%), having RPM included in the standard routine care (55.2%), integrating therapeutic education (58.6%), including a rehabilitation software (48.3%) in the RPM system, as well as training on regulatory matters (48.3%). It was also reported that 79.3% of the cardiologists not using RPM were favorable to the presence of a medical contact from the RPM solution provider.

Among the cardiology centers that facilitated one or more RPM systems, the proportion of patients using RPM versus all patients with HF was 42.9% for less than 10%, 45.2% for between 10 and 30%, and 11.9% for more than 30%. It was stated that patients were mostly included in RPM during the follow-up (31%), followed by during hospitalization (26.2%) and after a hospitalization (23.8%). The main barriers of including patients with HF to RPM was reported to be because there was a need for a rigorous choice of the patient clinical profile (64.3%), patient's refusal to use RPM (42.9%), misunderstanding by the patient (28.6%) as well as a language barrier (26.2%).

The simplicity and speed of use by both patients and HCPs (50%) were the primary criterion for participants when choosing an RPM solution. The presence of an intermediary platform managing the equipment and ensuring an initial sorting of the alerts was not perceived as necessary (22%) (Figure 1).



Figure 1: Perceived barriers and solutions of Remote Patient Monitoring (RPM) to manage patients with heart failure as reported by cardiologists.

Over half of the centers (56.4%) that used RPM for managing their patients had to modify their organization in order to set up the telemedicine solutions. These organizational changes primarily included: the creation of a dedicated nurse job (66.7%), implementation of an internal clinical protocol (41.7%) as well as designating a referent in their clinical department (37.5%). Other changes were joint management with the attending physician or the city-based cardiologist (20.8%), cooperation with a city-based nurse (20.8%) and outsourcing the management of alerts by

another platform (20.8%). The perceived benefits of using RPM both in terms of patient management and daily clinical practice are shown in Table 3. It was reported that 42.9% of cardiologists stated that they were disturbed more frequently by using RPM in daily clinical practice and 26.2% of them experienced a work overload generated by using RPM solutions to manage their patients.

Benefit for cardiologists to use remote patient monitoring	Percentage (%)
For patient management	
Better management and/or faster management of decompensations	90.5
Decreased hospital readmissions	71.4
Patient reassurance	71.4
Better patient empowerment	69
Optimization of medical treatment	45.2
Better cooperation with the attending physician or city-based cardiologist	26.2
For daily clinical practice	
Better patient management	45.2
Faster decision-making	42.9
More fluid organization of work	28.6

Table 3: Perceived benefits for cardiologists using RPM for patient management and for daily clinical practice.

Most participants (45.2%) stated that the acceptable duration to include a patient in an RPM system was less than 5 minutes, whereas 28.6% stated that it is between 5 and 10 minutes and 26.2% stated more than 10 minutes is required. The management of false alerts was mostly stated to take less than 5 minutes (59.5%) followed by between 5 and 10 minutes (35.7%). Management of real alerts was estimated at more than 10 minutes for 42.9% of the participants and between 5 and 10 minutes for 47.6%. Lastly, 67% of cardiologists already using RPM were favorable to the presence of a medical contact from the RPM solution provider.

Discussion

Our study highlights the perceived barriers to deploying and expanding RPM among French cardiologists involved in managing patients with HF. Many studies have been published covering digital health, however, to our knowledge, no such study has focused on the use of RPM among HCPs specifically in France.

In 2020, one study carried out by a digital health agency [27] looked at the various obstacles faced in the global use of telemedicine for patients and HCPs. Another survey [28] in 2016 carried out among 1,037 member physicians focused on the main trends in physician's profiles using eHealth. In recent management sciences literature [29], HCPs perceptions regarding the use of digital health were questioned during preliminary open qualitative-based surveys. The analysis of the responses highlighted both positive and negative thematic categories regarding eHealth tools. Additionally, in 2016, as part of the ICARE4EU project, describing and analyzing innovative approaches to integrated care for people with multiple chronic diseases in 24 European countries, an assessment of the barriers to the implementation of eHealth was carried out [30]. This study showed that technical and organizational factors as well as human factors were involved in the outcomes.

In our study, three primary barriers were identified: organizational, technical, and legal/regulatory barriers (Figure 1). For the first, digital health provides possibilities for sharing information that HCPs never experienced before which affects both access to expertise and the practice of care. Therefore, the additional workload generated by the management of alerts is a major obstacle to the sustainable use of RPM. In addition, the management of alerts as well as the response to patients were perceived as heavily time-consuming. One of the reasons for this was that telemedicine tools are added on top of already existing care measures instead of being integrated into them, without reducing or adapting the time and frequency of physical consultations, thus increasing both costs and working time.

One of the proposed solutions/recommendations by the physicians was the integration of nurses in the management of alerts either by creating a dedicated job position within the cardiology center, by cooperating with a city-based nurse, or even outsourcing the management of alerts to a platform. Similarly, the designation of a telemedicine referent within the cardiology center with dedicated time spent clearly identified in the schedules seemed to be an effective solution to overcome the time-consuming and, at times, complex aspect linked to the management of computer equipment and administrative management.

Participants reported that the designation of a referent within the cardiology center, available at any time, could also be considered to face technical barriers. This referent may be amenable to manage the various technical problems such as hotlines calls, appointments with technicians and tests.

In our findings, the lack of training on RPM use appeared to be a main concern by the participants. Specific training should, therefore, be considered to all stakeholders within cardiology

centers using RPM, in order to integrate it as well as possible into their clinical practices. Frederix et al. [31] proposed certain measures aimed at facilitating the deployment of telemedicine in cardiology. One of the recommendations was the provision of training by national and international societies. Therefore, the French Society of Cardiology, the European Society of Cardiology and the HAS could offer training with dedicated certifications to all HCPs involved in the management of cardiovascular diseases in the future.

The perception that RPM devices are complex to use and not as ergonomic was also a key obstacle reported by the cardiologists to the long-term use of these tools. For this, it was stated that RPM should be easy to use for both patients and HCPs while being effective (generating a low number of false alerts). The design of the RPM solution should therefore be based on scientific data and could be encouraged by a streamlining and funding facilitation by authorities.

Even though the reliability and security of shared data were reported as reasons for the cardiologists not to use RPM, these are essential prerequisites for any digital health solution.

HCPs should be aware that RPM is regulated, and solution providers are required to comply with legal frameworks applicable to patient data (such as the General Data Protection Regulation (GDPR) and CE marking). RPM solution providers may also need to provide clear and reassuring information on this matter and specify that the various technical conditions, that must be respected by HCPs before setting up any RPM tool, is provided in the HAS reference document [26].

Regarding limitations, the lack of having open-ended questions may have limited our findings. Moreover, the data collected from the questionnaire was self-reported and partly dependent on the participants' self-perception, honesty and web abilities on the subject. The sample composition may have also constituted a bias since issue cardiologists that had interest on the subject responded to participate in the study.

Conclusions

RPM to manage HF patients is still not used to its potential in France. In this study, cardiologists stated that RPM should be easy to use for both patients and HCPs while generating a low number of false alerts to improve the deployment and expansion of its use.

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