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To cite this article: Anette Krane, Gunn Pettersen, Knut Tore Lappegård & Tove Aminda Hanssen (2023) In need of percutaneous coronary intervention in an arctic setting– patients' experience of safety and quality of care: a qualitative study, *International Journal of Circumpolar Health*, 82:1, 2273016, DOI: [10.1080/22423982.2023.2273016](https://doi.org/10.1080/22423982.2023.2273016)

To link to this article: <https://doi.org/10.1080/22423982.2023.2273016>



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Published online: 29 Oct 2023.



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In need of percutaneous coronary intervention in an arctic setting– patients' experience of safety and quality of care: a qualitative study

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ABSTRACT

Patients with coronary heart disease need timely treatment for survival and optimum prognosis. There is limited research exploring patients' experience regarding distance to percutaneous coronary intervention. The aim was to explore patients' experiences of aspects contributing to safety and quality of care regarding health services following percutaneous coronary intervention in Northern Norway. A qualitative explorative design was used, and 15 patients participated in individual semi-structured interviews 9–16 months after treatment. The reflexive thematic analysis revealed two main themes: (1) being part of a safe system and (2) adapting to new everyday life. Feeling safe and experiencing quality care depended on whether the participants were heard within the system upon first contact, whether help was available when needed, the travel time for treatment, sufficient information, the competency of care provided by healthcare professionals, and how follow-up services were organised when adapting to everyday life. To conclude, patients undergoing percutaneous coronary intervention in an arctic context perceived healthcare services as safe when the system delivered continuous care throughout all levels. Consistent optimisation of transport time and distance to treatment, especially for rural patients, and extensively focusing on follow-up services, can contribute to improving safety and quality of care.

ARTICLE HISTORY

Received 16 May 2023
Revised 9 October 2023
Accepted 16 October 2023

KEYWORDS

Coronary heart disease; patient experience; rural; arctic; feeling safe; quality of care; healthcare service

Introduction

Coronary heart disease (CHD) is the most common cause of death in Europe, accounting for approximately one in five deaths [1]. CHD includes stable angina pectoris and acute coronary syndrome (ACS), the latter consisting of unstable angina pectoris (UAP) and acute myocardial infarction (AMI). Subtypes of AMI include ST-elevation myocardial infarction (STEMI) and non-ST-elevation myocardial infarction (NSTEMI). Percutaneous coronary intervention (PCI) has been the preferred treatment modality for stable CHD and ACS for several years to restore blood flow through coronary arteries. Over the past decades, death rates from CHD have decreased in most European countries [2]; however, considerable disparity exists between European countries regarding current death rates and the rates at which these decreases have occurred. Similarly, treatment rates widely differ among countries for which data are available, indicating a range of disparity between them [3]. In Norway, in 2018, approximately 26,000 patients were hospitalised for CHD 12,400 patients were diagnosed with myocardial infarction, and approximately 12,000 were treated with

PCI [4]. Notably, for many patients with CHD, timely treatment is needed for survival and optimum prognosis; immediate initiation of PCI, fibrinolytic therapy, or an early routine invasive strategy is indicated depending on the diagnosis [5,6].

Access to equal, safe, and quality healthcare services for all inhabitants is a primary goal of health policies and strategies at the International, European, and national levels [7–9]. The health region of Northern Norway offers PCI at two hospitals to patients living at distances up to 468 km by air or 860 km by road; many patients must travel long distances to receive PCI in Northern Norway. The region has a scattered settlement of 481,926 inhabitants and an area of 112,986 km², accounting for 8.9% of its population and 34.9% of the country's area [10].

Published research and data from the Norwegian Registry for Myocardial Infarction reveal differences within and between Norwegian health regions regarding morbidity and mortality from myocardial infarction and geographical differences in treatment [4,11]. The extent to which

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these differences reflect patient perceptions of services has not yet been researched.

Several definitions of rurality exist, and travel time to the hospital has been emphasised in several studies. A scoping review described geographical areas with travel times to hospitals of 45–240 min as rural [12]. Furthermore, receiving treatments in a rural area subjects one to the healthcare service provided, and long travel times can be a burden. Limited healthcare services in rural areas can complicate individuals managing their conditions [12].

Feeling safe can be defined as being free from threats and dangers that call for an emotional reaction and being protected from external threats, risks, or dangers [13]. Perceptions of insecurity are reported when individuals experience the fear of losing control of their lives in healthcare settings. In a prehospital setting, feelings of safety arise from perceptions of calmness, trust, and protection [14]. During hospitalisation, patients' feelings of safety can be characterised by trust, care, presence, and knowledge [15].

Few studies have reported the views and experiences of PCI patients after discharge from hospital care to primary care. However, one study concluded that there are deficiencies in the continuity of care between secondary and primary care settings, demanding more attention regarding the service-system organisation to meet PCI patients' needs [16]. Patients assessing service quality has been questioned; however, it has been reported that patients could identify safety-related factors, which can help professionals better understand and identify potential safety concerns and make appropriate service improvements [17]. Patients are satisfied with their care during acute treatment; however, there are unmet needs regarding transportation and lifestyle changes (ibid). Furthermore, previous research revealed that tailored secondary prevention services, to a smaller extent, were more accessible and relevant to people living in rural areas than for those in more central regions [18].

There has been a demand for more research on transitions between rural communities and urban centres and the adaptation of services to improve rural needs [17]. Additionally, there is limited research exploring patients' experience regarding distance to PCI treatment and how it affects the feelings of safety and quality of care before and after PCI.

We aimed to explore patients' experiences of aspects contributing to safety and quality in the context of health services following percutaneous coronary intervention in Northern Norway. The research question was how do patients undergoing PCI in a predominantly rural context experience healthcare services regarding safety and quality?

Materials and methods

Design

We chose a qualitative design with an explorative inductive approach to address the aim and research question. Qualitative research enables understanding the experiences and perceptions of individuals within complex social environments [19]; we found it appropriate for this study. Two former patients with coronary heart disease participated in this research project as public collaborators and provided input on the interview guide, recruitment strategy, data analysis, and reporting of results.

Study setting and recruitment

This qualitative study was part of a more extensive multimethod, multicenter study aimed at investigating patients' experiences and outcomes after undergoing PCI in Northern Norway.

The first author identified patients treated with PCI through patient records from two Norwegian hospitals. Purposeful sampling was performed to ensure variation among the participants regarding sex, age, and distance to the PCI-performing hospital, to include the experiences of patients with acute and chronic CHD. Information letters were distributed to 35 participants who met the inclusion criteria, and 15 patients consented to participate. The sample size confirmed with the information power concept [20], achieving sufficient information relevant to this study.

Inclusion and exclusion criteria

Patients aged ≥ 18 who underwent PCI within the last 16 months, lived in regions in proximity or distance to PCI-performing hospitals, and consented to participate in the study were included. Exclusion criteria were other serious diseases such as cancer, severe chronic obstructive pulmonary disease (COPD), or heart failure.

Data collection

A semi-structured interview guide consisting of open-ended questions was developed based on previous research, relevant theoretical perspectives, clinical experience, and public collaborators' preferences. The interviews started with a broad introductory question: "Please tell me what happened that led up to the PCI treatment and about your experiences having undergone treatment?". Then, more specific questions were asked to obtain detailed descriptions, for example, "How did

you experience the healthcare system regarding what you have been through? What was vital for you to consider the health service as safe? Can you tell me whether the distance to your local and regional hospital mattered to you when you underwent PCI treatment? How did you experience coming home after having undergone PCI?”. Probing questions like “Can you please tell me more about that” were also used to enhance the depth of discussion.

The first author conducted the interviews between May 2021 and January 2022. All patients were interviewed once at each location according to their choices. Nine interviews were conducted by video consultation using Whereby®, and two using a telephone. Lastly, four interviews were face-to-face at patients’ homes or the local hospital. The interviews ranged from 30 to 70 min, except for one that lasted 2.5 hours. The interviews were audio-recorded and transcribed verbatim. Transcribed data were imported into NVivo software version 12 (QSR International Pty Ltd.) to facilitate further analysis.

Data analysis

The data were inductively analysed and reported according to reflexive thematic analysis (TA) by Braun and Clarke [21]; this fits the research question, method, and study on a superior level, allowing reflexive engagement throughout the process. Considering the research question, we analysed the data through an iterative, recursive, and open approach. The process started with familiarisation with the data, where authors AK and TAH read through each interview and noted their thoughts (Phase 1). They then discussed the interviews and notes and collaboratively coded 10 of the 15 interviews to enhance understanding, interpretation, and reflexivity. AK coded the final interview using the same approach. The interviews were read a second time and coded more thoroughly to ensure a rich basis for further analysis (Phase 2). A total of 480 manifest and latent codes were separated into four candidate themes with subthemes representing meaning patterns across the datasets (Phase 3). To ensure trustworthiness and the themes representing the data appropriately, relevant participant statements were linked to subthemes and themes, and the themes were further refined (Phase 4). With the involvement of the public collaborators in sharing thoughts on the themes, discussing the candidate themes with the co-authors, and actively interpreting the data by going back and forth through the phases, the process ended with two main themes (Phase 5). The final analytic

process was completed by writing the report, where findings (including participant statements) were presented, and relevant literature, theory, and existing research were discussed within the study context (Phase 6).

Ethical considerations

This study conformed to the principles outlined in the Declaration of Helsinki [22]. The regional ethics committee (REC) assessed the study protocol; however, approving the study was not within their mandate. The study and data collection were approved by the local Data Protection Authorities at the hospitals where the participants underwent PCI (2020/1759, 2020/4161). All participants provided written informed consent to participate, and consent to publish, and were informed about the possibility of withdrawing from the study at any time without providing any reason.

Rigor and reflexivity

To ensure high-quality reporting, we followed the Standards for Reporting Qualitative Research [23]. Furthermore, to enhance rigor and trustworthiness, we considered credibility, dependability, confirmability, transferability, and authenticity in this study [19]. To strengthen credibility, we conducted the study to enhance the believability of the findings; the results and interpretations were truthful to the participants, the data, their interpretations, and the study context. To ensure dependability, we reported the study process in a manner that enabled replication of the findings with the same participants in the same context. Confirmability was guaranteed by acknowledging and discussing predispositions within the research team, allowing the results to reflect the participants’ voices and enabling public collaborators to reflect on the findings. Transferability was addressed by describing this study’s context and process for readers to evaluate whether the findings are transferable to their settings. To ensure authenticity, the text was written to illustrate the range of realities and experiences of the participants so that readers could understand them. Finally, the first author wrote a reflexive journal throughout the analysis to address researcher subjectivity, personal values, clinical experience, and knowledge within the patient group, to not affect data collection, analysis, and interpretation.

Findings

Characteristics of participants

The participant characteristics are presented in Table 1. The study participants were seven men and eight women aged 41–77. Two participants were admitted between January and February, and 13 were admitted between May and August. Half of the participants lived within a 1-hour travel distance to their local hospital, and two lived within a 1-hour travel distance to a PCI-performing hospital.

Themes

The main themes were (1) *being part of a safe system* and (2) *adapting to a new everyday life* characterising the participants' experiences with the healthcare service regarding safety and quality of care.

Being part of a safe system

This theme refers to the experience of being part of a safe and well-functioning system at all levels of the treatment chain. The main aspects of their experiences

Table 1. Participant characteristics.

Characteristics	Classification	N = 15
Sex	Female	8
	Male	7
Age	41–50	2
	51–60	5
	61–70	6
	71–80	2
Employment	Working	7
	Disability pension	4
	Retired	4
Level of education	Primary school	2
	Upper secondary school	6
	University	7
Cohabiting status	Living alone	2
	Cohabiting	13
Type of admission	Acute	13
	Planned	2
Travel time to local hospital*	<1 h (Range: 5–55 min)	7
	1–4 h (Range: 105–210 min)	8
	>4 h	0
Travel time to PCI-performing hospital*	<1 h (Range: 5–55 min)	2
	1–4 h (Range: 60–210 min)	5
	>4 h (Range: 300–750 min)	8
Former PCI	Yes	2
	No	13
Participated in learning and mastery course	Yes	4
	No	11
Participated in cardiac rehabilitation	Yes	2
	No	13
Other health problems/illness	Yes	6
	No	9

*Travel time by road/car to the local hospital.

were first contact with healthcare services, trust in receiving help when needed, proximity and distance to PCI-performing hospitals, the role of healthcare professionals, and the discharge process to home.

The first contact matters

For participants experiencing vague or ambiguous AMI symptoms, it was a process to call for help. The threshold for making the first medical contact was high due to the fear of burdening the healthcare system. One participant who experienced embarrassment due to insecurity in interpreting symptoms recalled feeling safe when the nurse supported the call.

“When I called and said: ‘I have pain in my chest ...’ I’m pleased that the woman I spoke to took me so seriously. Because it could be the case that she said, ‘No, we will look at it later’. Then I would say, ‘Yes, we do, don’t we?’ I do not think I would have said, ‘You must take me seriously’. So, it is important that the threshold for being taken seriously is low.” (Inf 6)

Participants with vague symptoms who were promptly referred to a PCI-performing hospital recalled feelings of safety and satisfaction. Other informants with similar symptoms, who were told to wait and call back later if symptoms worsened, felt uncertain when to re-contact. One participant waited several days while exhibiting intermittent diffuse symptoms and did not make re-contact, despite feeling worse, until a friend understood that it was an ongoing AMI. Upon first contact, participants who felt they were taken seriously and understood by professionals experienced a high level of trust and safety within the healthcare system; however, those who felt not taken seriously felt disappointed and unsafe. One participant had to wait several months before his symptoms were taken seriously by different healthcare personnel in primary healthcare before finally receiving planned angiography and PCI treatment:

“If the time factor had been shorter from when it was discovered until I got help ...” (quiet and thoughtful) ... it was really that time that was challenging: it felt unsettling.” (Inf 3)

Another participant was admitted to the hospital on three occasions with AMI symptoms and was declared healthy at the third discharge. Some weeks later, the fourth admission caused by an AMI led to weakened trust and disappointment with the healthcare system.

“If they had discovered it earlier, I would have avoided the traumatic experience with the helicopter, flashing blue lights, and pain. I should not have gone through it; it came hard on me afterward ... not getting the help you need leaves its mark. I do not understand how it could not be detected when the heart attack was so close.” (Inf 9)

Those in acute and planned settings who experienced paramedics, nurses, and doctors as knowledgeable, competent, and calm expressed feelings of safety within the system.

Help is close when something happens

Participants living in rural settlements far from PCI-performing hospitals experienced that they felt safer when they were closer to help and healthcare services when illness occurred and after PCI; those living in the rural Arctic part of the country worried about access to PCI-treatment due to invariable and unpredictable climatic challenges. The unstable weather during autumn and winter made them feel unsafe because it could delay prehospital transport and time to the PCI-performing hospital. However, others felt safe and trusted that prehospital medical help would be available when needed. One participant said the following:

"I cannot go around thinking of not getting help. I feel safe that help would come, and if it does not, and I die, I cannot do anything about that. We all have our time on earth." (Inf 13)

Some urban and rural participants stated that the distance and travel time to the hospital affected their choice of residence. One had already moved, while others considered moving closer to the hospital if they needed access to specialised healthcare services. Another participant voiced a more pessimistic perspective about the acute need for medical help and access in rural areas.

"If it happened at the cabin with poor mobile coverage, I might have died out there."

(Inf 1)

Although participants reflected on these issues and heard stories of climate-related delayed medical help, none experienced this during admission. Acute participants were transported to the PCI-performing hospital by ambulance, air ambulance (fixed or rotor wing), or rescue helicopter. Even if the prehospital transport took several hours, they felt safe because they were well cared for by competent nurses and doctors. One participant was transported by the rotor wing to the airport near a non-PCI-performing hospital and then waited at the airport for the fixed wing for further transport to the PCI-performing hospital.

Another participant who was transported by air ambulance experienced unpredictable weather conditions from one day to the next. At discharge, heavy snow conditions led to closed airports, delayed flights, and increased travel times to return home. The return was uneasy because he had to travel using borrowed shoes and inappropriate clothing for travelling, as the

long distance to the hospital meant that the relatives could not bring any before discharge.

Patients with a history of AMI living where transport time was crucial experienced admission to local non-PCI-performing hospitals before transport to PCI-performing hospitals, as time-consuming with unnecessary delays.

"There must be 'a bridge' to treatment where direct transport to the PCI hospital is the standard procedure when they suspect a myocardial infarction." (Inf 8)

Participants with planned hospital admissions did not consider time or distance from home as critical. They generally felt it was convenient and safe when travelling by airplane or driving their car with their spouse, even when the travel time varied from 1 to 7 hours. However, the closer the PCI-performing hospital was to their home, the more satisfied they were because of the reduced travel time. One said:

"I was happy I could drive only seven instead of seventeen hours to the other PCI hospital." (Inf 2)

Participants living close to rehabilitation centres and hospitals offering learning and mastery courses (LMC) experienced easier access to these services after discharge.

Entering the unfamiliar role as a patient

Some participants found the transition from being healthy to sick, and then becoming a patient in an acute care setting, stressful and unpleasant. At the same time, others felt safe, adapted quickly to the hospital routine, and accepted being patients. Another participant experienced hospital stays as alienating and could not wait to return home. Having family members present at the hospital was experienced as safeguarding, and the participants expressed gratitude towards the hospitals for allowing their relatives to be with them. One participant said the following:

"For me, it was a shock, and I would not have been able to understand what was happening if he had not been there. He received all the information." (Inf 7)

Some acutely admitted patients felt unready for discharge the day after because they needed more time to recover and accept what had happened. They recalled feeling unsafe and afraid of what would happen. Those with longer hospital stays before discharge reported feeling safe, in control, sufficient, and ready to leave. Participants with planned admissions felt safe being discharged the day after PCI if they received adequate information from nurses, doctors, and physiotherapists. Conversely, they felt unsafe travelling home immediately after discharge because it was far from the hospital, and they chose to stay nearby for days if complications occurred.

Participants experienced the information at discharge as unadjusted for their knowledge, and that oral and written language was difficult to understand. Those who received too much information felt overwhelmed and did not manage to comprehend it. One participant with Sámi as the first language experienced challenges understanding information given in Norwegian, since the two languages are not mutual comprehensive, but received translational support from family members. Participants also lacked information regarding how the drugs worked, their interactions, side effects, and on-demand medications. One patient said the following:

“I think a lot all the time. Now I am going to retake one of those drugs. Why should I? I don’t know a thing, why everything is happening. I have not received any information at all. Why do I get this and that, and how do they work?” (Inf 15)

Participants called for a discharge conversation with information and a clear plan after discharge, including routines for follow-up and visits to the general practitioner (GP). At home, they tried to recall doctors’ words and searched for web-based information to compensate for the missing information. One participant who experienced post-discharge chest pain feared that it was AMI and felt disappointed not to be informed about the possibility of stent pain before being discharged from the hospital. Another participant experienced a lack of information about how and when to follow-up on coronary rest stenosis, providing feelings of insecurity and fear of sudden death.

“It would have taken longer to intervene on the rest stenosis, but there was nothing to worry about; the stenosis could be there for a while”, the doctor said. However, what is a while, and when will you check again? It is the fear of when it will ... ? When will something happen to me again?” (Inf 4)

Adapting to a new everyday life

This theme contains experiences related to coping with illness and the necessary adjustments after PCI, continuing everyday life with support from others such as healthcare professionals, GPs, peers, and family or friends.

Knowledge and acceptance

Participants experienced variations in their knowledge of the disease and uncertainty about how to live further when returning home. Missing information has affected and challenged their ability to adapt to new situations. Some participants struggled to adapt to everyday life, could not accept what they had experienced, and

distanced themselves from the incident. One participant experienced it as challenging and not being understood by family and friends.

“The disease is not visible on the outside. We look as if we are healthy. For me, life became much worse, while others said they became a new person.” (Inf 1)

Various psychological reactions appeared (up to several months) following PCI after the participants realised they had been through a severe and life-threatening situation. One participant experienced fear of death when reminded of what had happened, such as seeing an ambulance or feeling chest pains. Another participant’s expression may indicate post-AMI psychological challenges.

“The experience itself made me sad. I should be happy to survive a heart attack, but I felt sad. The worst was the depression that lasted for three months. I had to dig deep to find joy in everyday life.” (Inf 10)

Participants who reported they were uninformed that different mental reactions could occur felt alone with their thoughts and had difficulty sharing them with others. Those who experienced such reactions felt that it prolonged their return to daily life; they expressed that it would have been easier to accept it if they had been informed beforehand. Some participants voiced that their GP had not referred them to a psychologist despite reporting stress, depression, or other mental needs. They attributed this failure to feeling ignored as “not being sick enough”. Most of those with psychological reactions did not attend rehabilitation or LMC at the hospital, and those who had experienced it as positive learning normalised psychological reactions. One participant underwent a telephone interview regarding his mental health status; talking about his experiences was positive. He suggested having a phone number to call when feeling down could help.

Living on, with support from others

Participants experienced variable follow-ups within the healthcare system and felt placed in a generalised system that fits everyone, lacking an individual approach. They expressed different follow-up needs to feel safe and well-looked after, from once a month to every three or six months after PCI.

To a large extent, the experienced quality and safety were related to primary healthcare, notably the instability of the GPs in the region. Due to the high turnover rate, some participants reported feelings of unsafety talking to incessantly new GPs, each with their understanding of whether or how to organise follow-up. In certain rural areas, locums from foreign countries were

not fluent in Norwegian, which resulted in communication problems between the study participants and GPs.

The participants expected automatic summons after hospital discharge rather than it being up to them to decide. Similar to cancer patients enrolled in a system with a standardised follow-up, it would be safe for them. One patient said the following:

"I want fixed doctor's appointments because everyday life catches up with us rapidly, and then I forget." (Inf 6)

High satisfaction with follow-up made participants perceive the healthcare system as safe and of good quality. They attributed this experience to the regularity of appointments with their GP. Only one participant received a summons from a GP, while the others had to make the appointments themselves. Those receiving little follow-up experienced less satisfaction and felt left alone with responsibility and without professional support.

"It's like I have to follow up my GP, not the other way as it should be ... he doesn't take the tests that are needed." (Inf 11)

"The only control I get is if I follow up on things myself. I get nothing from the GP. I asked him how we should do this from now on. What is going to happen to my heart? He said I could come twice a year to check my blood cholesterol. But I did not think it was enough for me to feel safe." (Inf 9)

Another participant was told at the hospital to contact the GP after discharge but felt ashamed of misusing the GP's time. He remembered the following words from his GP:

"The GP said to me, 'Why are you here? You do not need an ECG; you are no longer sick'. I reacted with shame, but I just did what they said I had to do." (Inf 5)

Some participants reported asking for a referral to an LMC; in a few cases, the GPs referred participants to an LMC without informing the patient. Other participants reported not being informed about rehabilitation through the LMC or referral delays. Participants who waited one year to attend rehabilitation experienced the waiting time as inappropriate and felt that the rehabilitation was not significantly beneficial after attending. Some waited up to eight months for the LMC, expressing that they wanted it to be offered earlier:

"It is far too long to wait for several months; I needed the course three to four weeks after the heart attack." (Inf 1)

Participants meeting peers who had undergone PCI, either through an LMC or a patient organisation offering group meetings, reported that it helped cope with the situation. Moreover, participants recalled that the LMC service provided a forum for

sharing experiences with fellow patients and helped them understand what their relatives had gone through during their illnesses. Problems in attending an LMC and rehabilitation stay were related to the current family situation. Hence, one participant called for the adjustment of services to suit patients living with young children. Others did not attend because the local hospital did not offer LMC services, and the distance to the nearest LMC was long for their physical condition. Those not living near rehabilitation services or physiotherapists called for free transport to facilities or local group training. One participant was highly satisfied when the rehabilitation centre outnumbered the distance-related challenges by offering digital video rehabilitation.

Cohabiting participants experienced it as essential to have a stable home and to be supported by their family when coping with the incident. Participants who lived alone perceived their networks as an essential source of support and did not feel lonely. Some experienced relatives as concerned as the disease affected the whole family; it was grief for their relatives as well. Participants with young children and grandchildren felt it was challenging to explain what had happened after returning home. The children remained emotionally affected by the incident; therefore, they waited for the truth to be told. One participant experienced good-quality care when getting an appointment at the hospital, where the doctor explained everything to the children to help them accept what had happened.

Discussion

This study provides insights into the experiences of rural and urban dwellers undergoing PCI regarding the safety and quality of healthcare. The findings show that healthcare services are considered safe if the system delivers continuity of care at all levels. Aspects concerning safety and quality include short travel times, availability of help in proximity when needed, and being heard and taken care of by competent healthcare professionals. Helping one cope with illness through a safety net containing accessible health services, coping support, and having someone close was found to be central to the experience of safety.

Being part of a safe system

The findings indicate that a safe and well-functioning system, from prehospital service to local follow-up by GPs, was essential to experience continuity of care through the entire chain when undergoing PCI. In this study, the participants experienced safety and quality

when they met an attentive healthcare staff member, received help when needed, and experienced interaction and coordination between primary and specialist healthcare services and personnel. Previous research has indicated that it is challenging to move across the boundaries of information, management, and relational continuity, which impact a patient's experience of how care is connected [16]; and that patients within the healthcare setting feel unsafe when service quality is noticeably poor and that lack of quality is perceived as a potential threat, contributing to patients feeling unsafe [24].

Another finding was a high threshold for acting and seeking medical help. This might be due to reluctance to add additional burdens to the healthcare system [25], or suboptimal knowledge and awareness of CHD and AMI symptoms [26], as reported in previous research. Additionally, correctly interpreting vague symptoms can be difficult for patients and healthcare personnel. An insecure interpretation of vague symptoms sometimes leads to contact with family members or friends for a second opinion before seeking help. A high threshold for help-seeking has also been found to be related to prehospital delay [27]; to minimise delay, it is recommended to increase public awareness of how to recognise common symptoms of AMI and call emergency services [6]. Conversely, in our study, contacting the EMS and not being understood by healthcare personnel can cause system delays in treatment and illustrate the significance of competency in recognising the situation. Patients should be admitted as quickly as possible, and personal "mistakes" by healthcare personnel can lead to an experience of not being taken care of and reduced trust in the healthcare system. In addition, the perception of safety is influenced by receiving a satisfying response from healthcare professionals when needed and personnel's professional competence [28]. Improving these factors might help eradicate the perception of poor health service quality. Furthermore, it facilitates increased access to health for all and reduces health inequalities [9]. Particularly in rural areas, without equal services and direct access to a PCI centre, the availability of fixed-wing air ambulance services varies throughout the day [11]. Such areas represent a risk of increased transport time due to unstable weather conditions. It is recommended that all components of system delay be measured as quality indicators as they represent the quality of care [6]. However, misjudgements in the healthcare system are inevitable and may affect patients' experiences of safety and quality of care.

This study reveals that travel time affects feelings of safety and satisfaction in patients distant from healthcare services in acute and planned settings. In acute settings, the perception of being unsafe increases for patients with AMI because they know that time is crucial; similar findings have been reported elsewhere [28]. Treatment guidelines recommend primary PCI within 120 min for STEMI patients or fibrinolytic therapy within 10 min [6]; for NSTEMI patients, PCI is recommended within 24 h as an early routine invasive strategy [5]. Our findings indicate that the prehospital transport time is perceived as short under a well-developed system and good weather conditions; however, the travel time to treatment is prolonged if healthcare personnel does not take patients seriously upon the first EMS contact. In planned settings, the shorter the distance and travel time, the more satisfied and safer they feel, as it reduces the burden of long-distance travel and enables being accompanied by a next of kin.

Another finding was that a longer hospital stay contributed to the readiness for discharge; this aligns with a previous study in which patients felt more cared for and had more knowledge, in contrast to a shorter stay [29]. Feeling safe is closely related to the quality of care, based on six core elements: care must be safe, effective, evidence-based, timely, equitable, efficient, and people-centred [30]. These aspects advocate offering a longer hospital stay with adequate care to increase the patients' feelings of safety and the possibility of coping. If this is not possible, post-discharge telephone or digital follow-up by hospital staff might be a solution.

The transition from discharge to home and returning to daily life revealed uncertainty about what happens after discharge, and it is possible to reduce uncertainty if adequate information and follow-up plans are provided at the hospital. In a previous study, patients experienced discontinuity of care regarding discharge planning, follow-up appointments with GPs, and access to cardiac rehabilitation [16]. These aspects should be addressed and enhanced within the health care system to reduce the informational gap after discharge and increase patients' knowledge of the disease, relevant drugs, and participation in rehabilitation programmes.

Adapting to a new everyday life

This study reveals that returning to everyday life with support from family, peers, and professionals increases safety because patients are coping with support. Patients reported a lack of follow-up in primary care and referrals to other healthcare services after PCI, and experienced unstable access to GP services. Meeting new locum personnel at every consultation instead of

a regular GP leads to differences in follow-up and affects the safety experience. Furthermore, a familiar GP is easy to communicate with, enabling a feeling of safety; follow-up by locums from different ethnic backgrounds and linguistic differences are barriers to communication and understanding of the disease. These results align with the existing evidence that communication challenges are connected to frequent changes in GPs, and that shortages or deficiencies in primary care may threaten patient safety [15,31]. Moreover, a safe GP knows the patient, the patient's journal, history, and work situation, and friendly GPs are described as "especially safe" [31]. Another study reported that patients in small settings had a better relationship with their GPs [32]; conversely, we discovered that patients in rural areas experienced GP services as unsafe and of low quality in care. These data contribute to a clearer understanding that improvements in the GP service could reduce the burden of the disease and provide opportunities for shared decision-making among patients with CHD.

Meeting peers at LMCs and receiving support from family and friends was crucial for the participants to cope. Those who lived alone or received limited follow-up and support from others experienced less satisfaction and felt alone navigating an unknown field. Having the GPs or specialist health services ask questions about the disease, lifestyle changes, and drug prescriptions increases participants' safety and satisfaction with care. Previous research has shown that patients who experience life-threatening events have a prolonged return to daily life, and that friends and family are important supports to patients, highlighting the importance of family-centred interventions [29]. Other research has highlighted a shift towards patient-centred care by reaching overarching care goals based on what matters to specific patients [33]. To optimise therapies and care plans, adherence to treatment, adverse drug events (ADEs), economic burdens, and stress experienced by caregivers should be considered.

In this study, only a few patients participated in cardiac rehabilitation or prevention programmes due to non-referral or distance-related challenges. Furthermore, we discovered that travelling far to attend rehabilitation services or LMC was difficult for those living in rural areas; this has been highlighted as a burden in previous research on patients travelling long distances for cardiac follow-up [29]. Additionally, patients experience barriers to participation in cardiac rehabilitation due to misconceptions or a lack of knowledge to comprehend the possible benefits [34]. Participation in such programmes is highly recommended as soon as possible after PCI, as they are cost-effective and reduce hospitalisation, myocardial infarction, and cardiovascular mortality [33]. Additionally, they may reduce the burden of

psychological reactions with symptoms such as anxiety, sadness, or depression [35]. Telehealth can positively impact on health care delivery in rural communities, as it provides timely, cost-effective and accessible care closer to patient's home [36]. To increase access to care, especially for rural patients, delivering cardiac rehabilitation or prevention programmes through telehealth may lead to increased participation and long-term adherence to a physically active and preventive lifestyle.

Strengths and limitations

This study has several strengths. First, it is one of few studies providing nuanced and broad information on how patients experienced PCI. Participants in a vulnerable situation reflected openly in a trustful one-on-one interview providing rich data on important determinants of feeling safe and quality of health service experience. Patients were interviewed approximately one year after the event, in contrast to most of the previous studies that interviewed patients at earlier stages after PCI. Finally, including patient collaborators to formulate the invitation letter, relevant interview questions, and discussion of the results helped improve the study's quality and relevance.

This study has also some limitations that may help to inform future research. Regarding recruitment, most participants underwent PCI during summer and autumn, during which the weather conditions in rural Arctic regions are usually stable. We considered this in our study and expanded the inclusion criteria, resulting in two more patients undergoing PCI during winter. If we had included more participants treated in winter, it might have provided richer data to illustrate the challenges in evaluating the safety and quality of care. However, it was impossible to make further inclusions due to limited time resources. Another limitation was the risk of recall bias since participants were interviewed between 9 and 16 months after the PCI procedure. To reduce possible recall bias the interviews started with an introductory question, regarding what had happened prior and during the event, to help the participants recall and open up to tell their story in line with recommendations [37]. Finally, using videoconferencing and telephone in some interviews might have influenced what the participants disclosed, and the interviewer perceived; the COVID-19 pandemic caused restrictions on face-to-face interviews.

Conclusion

Undergoing PCI in arctic settings is experienced as individual and variable depending on different factors within the healthcare system. Initiatives to improve healthcare quality

and safety should focus on reducing the time to treatment, increasing public awareness of CHD and EMS healthcare personnel competency, and enhancing follow-up for patients undergoing PCI, especially for rural dwellers.

This study provides insights to practice and policy-makers on what constitutes equal and safe healthcare services from patients' perspectives. Developing a well-functioning system at all levels considering the strategic goals of equal and safe health services for all inhabitants, may enhance the quality of care and make patients feel safe. The findings provide important input that may help stakeholders and providers of healthcare develop a more coordinated clinical pathway and consistently improving services to a large population. Optimising transport time and distance to treatment and focusing on follow-up services is needed, especially for patients far from the hospitals.

Finally, this study can serve as a hypothesis-generating and lead to future research. Future research is needed to; investigate how to reduce the informational gap and increase the knowledge of patients with CHD to reduce the disease burden through early contact with EMS; develop, improve, and increase access to healthcare services for rural dwellers by offering digital follow-ups, heart schools, and cardiac rehabilitation; elucidate how to improve access to GP services in collaboration with specialist healthcare services, adjust individual follow-up, and facilitate shared decision-making.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Northern Norway Health Authority under grant number 2019/359-56.

Contributions of each author

AK, TAH, KTL, and GP were responsible for planning this study.

AK and TAK conducted the data collection and did the primary analysis and KTL and GP contributed to the validation of the analysis.

All authors contributed to the writing of the manuscript, gave final approval, and agreed to be accountable for all aspects of this work, ensuring integrity and accuracy.

Data availability statement

The datasets generated and analysed during the current study are not publicly available due to continued analysis and reporting of results. However, they are available from the corresponding author on reasonable requests.

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